BUILDING GLOBAL INFRASTRUCTURE

PATTERNS OF POTENTIAL HUMAN PROGRESS

VOLUME 4

Dale S. Rothman
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BUILDING GLOBAL INFRASTRUCTURE:
FORECASTING THE NEXT 50 YEARS

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Cover Art
The cover art is a representation of an oil painting by Margaret Lawless, artist for the PPHP series. Ms. Lawless is a contemporary abstract artist whose works in various media portray aspects of the human condition, human progress, and the interaction of humans with nature. In this painting, she emphasizes the connections between people and the physical structures around them—connections that are vital to the fulfillment of human potential. The S-curve suggested by the landscape highlights the focus of this volume, which is how societies transition from low to high levels of physical infrastructure and access to infrastructure's benefits.

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Preface

Building Global Infrastructure is the fourth volume in Patterns of Potential Human Progress (PPHP), a series that explores prospects for human development and the improvement of the global human condition. Each volume focuses on one key aspect of how development appears to be unfolding globally and locally, how we might like it to evolve, and how better to ensure that we move it in desired directions.

The volumes emerge from the Frederick S. Pardee Center for International Futures at the University of Denver's Josef Korbel School of International Studies. The International Futures (IFs) modeling and analysis project has worked for more than three decades to develop and use the strongest possible global, long-term, multiple-issue capability for exploring the future of key global issues. Among the philosophical underpinnings of the IFs project are the beliefs that (1) prediction is impossible, but forecasting is necessary to help us understand change and to support policy development; (2) analysis should always be built around alternative possible futures; and (3) the tools for forecasting should be as fully open and transparent as possible.

The initial volume in the PPHP series was dedicated to the central issue of global poverty reduction. The volume first presented a long-range Base Case forecast from the IFs system, elaborating the path we appear to be on. It then explored an extensive set of variations in that path, each tied to alternative domestic and international interventions. The second volume applied a similar methodology—it provided a long-range Base Case forecast for global progress in education participation and attainment and then developed a normative scenario for global advance in education, looking for a pattern that was aggressive but reasonable. The third volume drilled down into arguably the most important of all issues for human development, that of health. Its Base Case showed the rapid changes occurring in mortality and morbidity patterns, including the growing burden of noncommunicable diseases and injuries, especially as populations age nearly everywhere. It also devoted considerable attention to exploring the complex relationships between health futures and broader demographic and economic ones, including the question of the extent to which investments in health contribute to economic well-being.

Following those three volumes, the series is turning from direct study of ends such as poverty reduction, education advance, and health improvement, to a consideration of some of the most important means by which these ends are achieved—specifically, the building of extensive infrastructure and the strengthening of governance. For example, in an upcoming volume on governance, we will explore possible futures (as well as look extensively at the past) of three interacting dimensions of governance—namely, the provision of security, the building of capacity, and the broadening and deepening of inclusion.

The current volume, *Building Global Infrastructure: Forecasting the Next 50 Years*, initiates our shift toward means, with an extensive consideration of the possible futures of infrastructure in countries across the world. We analyze the prospects for advance in access to rural all-season roads, electricity, improved water and sanitation, and information and communication technologies over the next half century for 183 countries and the regions and groupings into which they fall. We do so by placing infrastructure in the context of broader human development systems, including (1) the demographic and economic drivers of demand for infrastructure; (2) the constraints that financing availability places on infrastructure development and maintenance; and (3) the impacts that infrastructure has on economic growth and broader socioeconomic and environmental systems—which systems, in turn, affect the further demand for, and supply of, infrastructure over time. In summary, we take a broad systemic approach rather than simply extrapolating the demand for infrastructure or the potential investment needs of the sector

We first examine the dynamics of these interacting systems in a Base Case in order to understand the path we are on and where it might lead over the next 50 years. In addition, we explore the potential for, and impact of, various approaches to accelerating that developmental path. We look first at some of the infrastructure access targets that various organizations and initiatives have put forward, often in the spirit of the Millennium Development Goals. Most of these targets differentiate in relatively limited ways—or not at all—among countries at vastly different income and social development levels, making such goals rather unrealistic for many countries (particularly low-income ones). We, therefore, also build and explore scenarios that consider alternative targets and their dynamics across countries at different income levels and within different global regions. These alternative target scenarios, while still aggressive, are designed to take into account country differences by, among other things, adopting different time horizons for target achievement, pegging the access targets to the best performers within each income group or to a standard deviation above the average, or by favoring particular infrastructures over others. We move beyond just seeing whether such targets are attainable; because our attention to infrastructure is in the broader context of human development systems, we also explore the development outcomes of each target based on changes in GDP per capita and the Human Development Index. The dynamic and interconnected nature of the IFs system facilitates exploration of these interactions.

The time is ripe for the explorations of this volume. Across all types of infrastructure, the current high-income countries generally have made long, halting, and (in response to technological and broader economic changes) somewhat sequential historical transitions. In contrast, many developing countries today struggle with trying to build or extend all forms of basic infrastructure simultaneously, over a compressed time period, during a veritable rush toward modern development. The changing technologies within infrastructure systems also partly explain the differences one almost certainly will see in future development paths relative to historical ones. In no other case, of course, is this more obvious than with respect to information and communications technologies, where both developed and developing countries are coping with dramatic transformations, and where citizens in developing countries are progressing at a pace not so terribly different from that of their high-income neighbors.

Despite the quite rapid pace of recent advances in infrastructure development, a great many people still lack access to even such basic infrastructure as safe water or a modern form of energy. Improving access to such basic infrastructure is a key part of advancing human development. Our hope is that this volume's broad and deep exploration of multiple forms of infrastructure, their interactions, and their linkages to larger human development systems, can contribute to the collective efforts to create widespread and ultimately universal access to basic, critical infrastructures around the world.

Acknowledgments

The authors again owe special thanks to Frederick S. Pardee, who conceptualized the Patterns of Potential Human Progress (PPHP) series that this volume continues, and who provides generous core support to the Frederick S. Pardee Center for International Future and to all of our efforts to explore, understand, and shape global futures. We much appreciate Fred's ongoing support for the work of the International Futures project and his contribution of energy, enthusiasm, and ideas, including the special responsibility he has taken for the country-specific supporting data tables that accompany the PPHP volumes and appear online at the International Futures (IFs) website.

The IFs simulation modeling system, the core tool of this volume, has been developed over more than 30 years under the leadership of Barry B. Hughes at the Josef Korbel School of International Studies, University of Denver. Thanks to the support of the University and the Frederick S. Pardee Center for International Futures, the complete system, including both a downloadable version and an online version, is available for all users at www.ifs.du.edu.

Developed originally as an educational tool, IFs owes much to the large number of students, instructors, and analysts who have used or reacted to the system over many years and provided much appreciated advice for enhancement. The first three volumes of this series provided names of many of those, and without repeating the listing, we thank them still again (as we do earlier team members, listed also in those three volumes).

IFs team members who made special contributions to this volume include Eric Firnhaber (data and supporting research on water infrastructure); Sheila Flynn (background working paper); Keith Gehring (data and supporting research on ICT infrastructure); Britt Reiersgord (references); and Marc Sydnor (data and supporting research on energy infrastructure). Most especially, we express tremendous appreciation to Janet Dickson, who worked closely with the authors throughout the writing and production process. She brainstormed with us, kept us on task, served as in-house editor, and oversaw the production process.

We also thank an exceptional group of external reviewers who greatly enhanced the volume through their feedback. They are Gordon Hughes, Professor of Economics at the University of Edinburgh; Harpaul Kohli, Manager of Information Analytics at the Centennial Group International and the Emerging Markets Forum; Jan Mischke, Senior Fellow at the McKinsey Global Institute; and Rita Nangia, who was a Senior Advisor at the Asian Development Bank during the time she served as a reviewer for this volume. No one could save us from all of our errors of omission and commission, but they saved us from many. Cesár Calderón (World Bank), Gordon Hughes, Harpaul Kohli, and Shonali Pachauri (International Institute for Applied Systems Analysis) were also gracious enough to provide us with unpublished data from their various projects.

Beyond the core support of Frederick S. Pardee, additional recent funding for the IFs project has come from the United Nations Human Development Report Office; U.S. National Intelligence Council; and, thanks to our strategic partner in Africa, the Institute for Security Studies, from the British High Commission in South Africa and the Western Cape Provincial Government. Other developments within IFs have been funded in part by the European Commission, United Nations Environment Programme, United States Institute for Peace, Strategic Assessments Group of the U.S. Central Intelligence Agency, Frederick S. Pardee Center for Longer Range Global Policy and the Future of the Human Condition at RAND Corporation, and European Union Center at the University of Michigan. Thanks also to the National Science Foundation, Cleveland Foundation, Exxon Education Foundation, Kettering Family Foundation, Pacific Cultural Foundation, and General Motors for funding that contributed to earlier generations of IFs.

At Paradigm Publishers, Jennifer Knerr, long-term editor and friend of the IFs project, was wonderfully helpful and supportive. At Oxford University Press in New Delhi, we are grateful for the warm support and partnership of Jai Prasad, Commissioning Editor. We especially appreciate our relationship with Eleanora von Dehsen, who served as outside editor for this volume, and with Trevor Bounford and Denise Goodey of Bounford.com for their design and layout of the PPHP series.

Finally, the authors built on tremendous foundations of work directed toward understanding infrastructure—its forms, benefits, and costs. The hope that motivated our work was that we might contribute something to that ongoing effort by exploring the ability of countries around the world to meet the infrastructure needs of their people and by examining the broader human development consequences of meeting, or failing to meet, those needs over the next 50 years. Other than the authors, of course, none of the named individuals or institutions bears any responsibility for the current status of the model or for the analysis presented here. Their support is nonetheless greatly appreciated.

Barry B. Hughes
Series Editor

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Abbreviations and Acronyms

ADB	Asian Development Bank
AGECC	Advisory Group on Energy and Climate Change (UN)
AICD	Africa Infrastructure Country Diagnostic
DFID	Department for International Development (UK)
DSL	digital subscriber line
EHR	electronic health record
FAO	Food and Agriculture Organization (UN)
FDI	foreign direct investment
GDP	gross domestic product
GFS	government finance statistics
GIS	geographic information system
GISMO	Global Integrated Sustainability Model (Netherlands Environmental Assessment Agency)
GLOBIO	Global Methodology for Mapping Human Impacts on the Biosphere
GNI	gross national income
HDI	Human Development Index
ICT	information and communication technologies
IEA	International Energy Agency
IFs	International Futures computer simulation model
IMF	International Monetary Fund
IRF	International Road Federation
ITU	International Telecommunication Union
JBIC	Japan Bank for International Cooperation
JMP	Joint Monitoring Programme for Water Supply and Sanitation (WHO and UNICEF)
LES	linear expenditure system
MAMS	Maquette for MDG Simulation model (World Bank)
MDGs	Millennium Development Goals
MER	market exchange rates
MFP	multifactor productivity
ODA	official development assistance
OECD	Organisation for Economic Co-operation and Development
PII	public investment in infrastructure
PISA	Programme for International Student Assessment (OECD)
PPI	Private Participation in Infrastructure Project (World Bank)
PPP	purchasing power parity
RAI	Rural Access Index (World Bank)
SAM	social accounting matrix
TFP	total factor productivity
UNAGECC	UN Secretary-General's Advisory Group on Energy and Climate Change
UNCRD	United Nations Centre for Regional Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UNSD	United Nations Statistics Division (Department of Economic and Social Affairs)
USEIA	United States Energy Information Administration
USNIC	United States National Intelligence Council
WDI	World Development Indicators (World Bank)
WEM	World Energy Model (International Energy Agency)
WHO	World Health Organization
WSP	Water and Sanitation Program (World Bank)

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Introduction

The extent and quality of physical infrastructure are among the most crucial characteristics defining development. Any traveler from the First World to the Third World will be struck by the sheer difficulty of getting around, the economic opportunities lost for lack of transport or reliable energy, the flooding during heavy rains, or the stench of untreated sewage. It is almost trite to say that physical infrastructure is the backbone of any developed economy and a pillar of quality of life. For that matter, the quality of physical infrastructure can determine which developed nations maintain this quality of life in their cities and towns by preventing the collapse of bridges, disruption of neighborhoods, emission of toxic fumes, and the loss of touch with nature as rivers disappear under concrete. Countries with very strong physical infrastructure can maintain dense populations in comfort and can move people, goods, and information swiftly and at low cost; countries with weaker infrastructure, whether developed or developing, cannot.

William Ascher and Corinne Krupp[1]

From the earliest roads to today's information superhighway and beyond, infrastructure has facilitated, and will continue to facilitate, almost all aspects of human activity. It makes possible the movement and transmission of goods, services, people, energy, and information, including ideas and culture, upon which societies rely. Infrastructure also shelters us from the vagaries of the natural world, allowing us to live and work in locations that would otherwise be forbidding or unusable.

Martin Doyle and David Havlick[2]

Millions of people in countries around the world still lack access to what those living in the developed world would consider the most basic infrastructure, including access to an all-season road and to clean water. The gap between infrastructure's potential to transform people's lives and the reality of its often poor provision results

Millions of people in countries around the world still lack access to the most basic infrastructure, including access to an all-season road and to clean drinking water.

Even over the next 50 years, many developing countries will not be able to provide universal access to basic infrastructure without outside assistance or unreasonable costs.

in part from the myriad of simultaneous challenges facing countries, from providing education and health services to defense, all of which compete with infrastructure for limited resources. Massive income inequalities between and within countries only widen provision gaps. The ways in which infrastructure is funded, structured, and managed—for example, public provision of projects that are often massive and involve long time horizons–further compound the problem for rich and poor countries alike.

The focus of this volume is on how infrastructure provision and access may change over the next half-century. To what extent might we expect those countries that are far behind in infrastructure provision today to catch up with developed countries, and what might their efforts to catch up mean for their social and economic development? And for those countries that have achieved a general level of sufficiency in basic infrastructure, what challenges might they face in maintaining and renewing these systems?

This volume explores the future of infrastructure using a dynamic, integrated model called International Futures (IFs), a model with capabilities beyond any other such forecasting system of which we are aware. IFs forecasts expected or needed levels of a wide array of physical infrastructures and the funding required to reach those levels. Uniquely, IFs incorporates forward linkages to economic productivity and human well-being. Further, it takes into consideration financial constraints due to the competition for funds from other public sectors and the trade-offs in well-being that can occur when trying to accelerate infrastructure development.

This volume focuses on core infrastructure categories that can improve the human condition, such as health benefits from improved sanitation and economic benefits from rural road access.

At the same time, our goals are limited. We are fully cognizant that infrastructure has undergone a number of significant technological transformations in the past. We have no reason to doubt that such transformations will continue, particularly given the expected growth and penetration of information and communication technologies (ICT). Forecasting such transformations, however, is beyond the general scope of this and similar studies that focus on evolutionary rather than revolutionary change. Thus, the story of the future of infrastructure in the real world cannot help but be richer and more dynamic than any we tell here.

Even so, we have much to tell. One major story suggested by our analysis is that while developing countries will continue to converge with developed countries over the next 50 years, many will likely not be able to provide their citizens universal access to basic infrastructure without outside assistance or unreasonable costs; for such countries we need to explore potential outside sources of funding and/or more reasonable targets.

The What and Why of Infrastructure

What is infrastructure?

The *Merriam-Webster Dictionary* first defines infrastructure as “the underlying foundation or basic framework (as of a system or organization)” and then includes the following as an alternative definition: “the system of public works of a country, state, or region; *also* the resources (as personnel, buildings, or equipment) required for an activity.”[3] Whether explicit or implicit, the characteristic common to all definitions and descriptions of infrastructure is that it is an enabling foundation for some other purpose and not an end in itself.

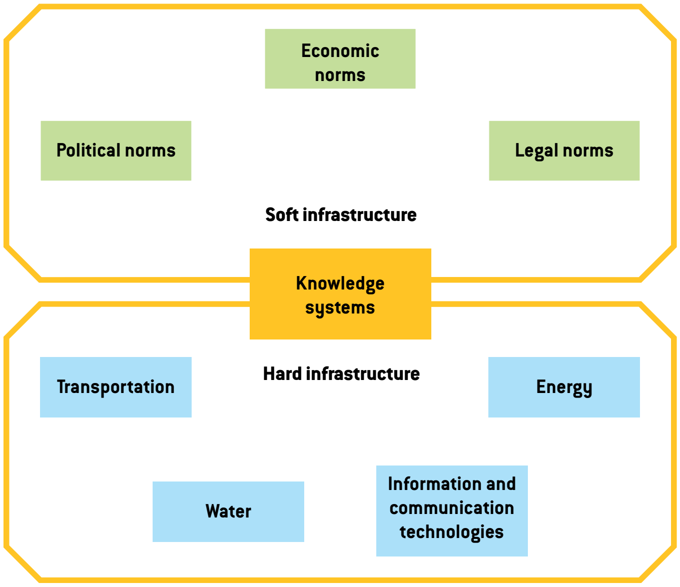
In practice, the components included in discussions of infrastructure vary widely depending on the context in which the term is used. Frequently, a distinction is made between *hard infrastructure* (e.g., physical foundations of societies such as roads and power plants) and *soft infrastructure* (e.g., social foundations of societies such as governments and legal systems) (see Figure 1.1), sometimes also called *social infrastructure* (Jones 2002). Knowledge systems, which we define as those systems and activities within a society that promote innovation and knowledge transfer through human capital development, lie at the intersection of hard and soft infrastructure. Knowledge systems fulfill two vital functions: (1) they serve a specialized role by connecting directly to hard infrastructure through improvements in technology (crucial to extending access and to sustainability); and (2) they serve a broader role by promoting those aspects of governance and other social systems that facilitate the development and use of infrastructure (and other systems) for human well-being.

Our primary focus in this volume is on hard infrastructure—the systems that provide for the movement and distribution of people and goods, energy, water and sanitation, and information. This includes, *inter alia*, roads, railways, electricity generation plants, transmission lines, dams, canals, irrigation works, water delivery and sanitation systems, and communication networks. But here again, even when definitions are limited to physical infrastructure, conceptual boundaries can be somewhat fuzzy. Take water infrastructure, for example. Does one include only the network of pipes and sewers, which require collective and generally public provision, or does one also include the household wells and septic tanks that individuals can provide on their own? For ICT, should only fixed lines and transmission masts count, or should the number of mobile phones and mobile broadband subscribers also count? The most formal approach to physical infrastructure, perhaps, would be to include only those infrastructures considered to be collective assets—the actual roads, pipes, wires, towers, and in many cases, buildings that carry or provide services to people.

Because this volume, and the Patterns of Potential Human Progress series of which it is a part, are focused on improvement of the human condition, we have chosen to focus on infrastructure categories that have clear and direct implications for that condition (such as access to improved water and sanitation) and/or that, through their impact on economic growth (such as access to roads and to ICT), have quite clear indirect implications for it. We define those categories broadly, so that they can include private (both individual and corporate), not just public provision. Of course, we also have been forced to choose indicators where data are available across a significant number of countries (see Chapter 2 for our discussion of data availability). Box 1.1 lists the categories and indicators of physical infrastructure included in the version of the IFs model used in this volume.[4]

Many studies separate infrastructure into distinct categories and treat the development of the categories as largely discrete. This makes for easier analysis, and we also take this approach to a certain extent. In reality, however, the boundaries among many infrastructure categories can be quite blurry due to complementarity,

Figure 1.1 Examples of hard and soft infrastructure with knowledge systems as a bridge



Source: Authors' conceptualization.

Box 1.1 Physical infrastructure included in the IFs model

The primary physical infrastructure categories used in the preparation of this volume, listed below, are from IFs Version 6.61. IFs Version 6.61 also includes measures of access for each indicator.

Transportation
Paved roads
Unpaved roads

Electricity
Electricity generation capacity
Electricity connections (urban and rural)

Water and sanitation
Water connections (piped and other improved)*
Sanitation connections (shared and improved)**
Area equipped with irrigation
Wastewater treatment

ICT
Fixed telephone lines
Fixed broadband subscriptions
Mobile telephone subscriptions
Mobile broadband subscriptions

** Piped water refers to household plumbing connections to piped water, while "other improved" includes piped water to a yard/plot, public taps or standpipes, tubewells or boreholes, protected dug wells, and protected springs (World Health Organization and United Nations Children's Fund 2012).*

***Improved sanitation includes flush toilets, piped sewer systems, septic tanks, improved pit latrines, and composting toilets (World Health Organization and United Nations Children's Fund 2012).*

substitution, and interdependence among different forms of infrastructure.

Physical co-locality is probably the most straightforward example of the *complementarity* of much infrastructure. A typical city street, itself a form of infrastructure, will often have power lines and telephone cables running alongside it and water and sewer lines running beneath. In such cases, the establishment of one infrastructure early on, such as roads, makes the later construction of other infrastructures easier, especially in dense urban areas where issues of zoning can become quite complex. Infrastructures can also complement each other by enhancing operation. For example, ICT infrastructure can improve the monitoring and control of energy, transportation, and water systems through smart grid applications (Organisation for Economic Co-operation and Development 2006).

Substitution occurs when one type of infrastructure either replaces or takes much of the load from an existing infrastructure. In the past, when a more efficient infrastructure was developed, it would supplant, though not always do away with, the older form. Goods, once carried along roads by carriage, moved to train, and later to air, but neither rail nor air has fully replaced roads. Historically, most substitutions, like the transition from dirt road to paved road to highway, have been closer to upgrading a given infrastructure than actually replacing it. The historical processes of substitution and upgrading continue today, but do so alongside a new form of substitution. The advent of ICT has enabled the substitution of one category of infrastructure for another. The rise of e-commerce and telecommuting has begun to supplant, on an as yet limited scale, the need for physical transportation. The ability of new technologies, especially ICT, to substitute for old has proved a boon for development by allowing developing countries to leapfrog more resource intensive infrastructure, like fixed telephone lines, for newer infrastructure, like mobile phones and mobile broadband (see Chapter 2).

We turn last to the case of *interdependence*. In the past, different infrastructures could be built and operated fairly independently of each other. A dirt road just needed human labor and simple tools. Travel over land was either on foot or required animal power and animal feed. Water could be brought to a city by aqueduct, using gravity as the only energy source. In contrast, most modern infrastructures are inherently interdependent, to the point that the lines between them sometimes become hazy. Transportation, water and sanitation, and ICT all rely on energy infrastructure to supply electricity and fuel. At the same time, electricity generation plants are heavily dependent on other infrastructure for access to energy resources. A significant amount of transport, particularly freight transport, is devoted to moving energy resources. For example, in 2007, coal and petroleum products accounted for 32.5 percent of freight transport shipments within the United States.[5] Internationally, more trade and transport is devoted to the movement of oil than any other single product.[6] The energy system also requires significant amounts of water, be it for extraction and production, refining, or power generation, most obviously in steam generators. More recently, the use of smart grid technology to manage electricity production and distribution has generated much discussion. For example, Amin and Wollenberg (2005: 37) spoke of a system in which "every node in the power network of the future will be awake, responsive, adaptive, price-smart, eco-sensitive, real-time, flexible . . . and interconnected with everything else."

The importance of infrastructure

Infrastructure has transformed our economic, social, and physical landscapes. With the exception of agriculture, the development of infrastructure has altered more land on earth than any other human activity (Alkemade et al. 2009). In the form of the light produced by the electricity network, infrastructure literally can be seen from space (see Figure 1.2).

Despite infrastructure's large physical manifestations, much of it is almost invisible to the casual observer. It may be physically hidden below ground or behind walls, or on the outskirts of communities, or even, as is increasingly the case for telecommunications, in low-earth orbit. In fact, many forms of infrastructure have come to be taken for granted to the point that they are not even noticed. Few people in the developed world think about their water or electricity supply until they turn on the tap or flip a switch and nothing happens.

Figure 1.2 Nighttime lights from space

Source: Image courtesy of NASA Visible Earth Project at http://visibleearth.nasa.gov/view.php?id=55167.

In contrast, the large numbers of people without electricity and running water are almost certainly aware of the infrastructure to which they do not have access.

Turning from how individuals perceive infrastructure (or its lack) to broader societal implications, infrastructure is widely recognized as fundamental to economic and social development. The World Economic Forum's Global Competitiveness Index places infrastructure in second place in its list of 12 pillars forming the "microeconomic and macroeconomic foundations of national competitiveness" (Schwab 2010: 4).[7] Quoting the World Economic Forum's 2010 Competitiveness report:

> Extensive and efficient infrastructure is critical for ensuring the effective functioning of the economy, as it is an important factor determining the location of economic activity and the kinds of activities or sectors that can develop in a particular economy. Well-developed infrastructure reduces the effect of distance between regions, integrating the national market and connecting it at low cost to markets in other countries and regions. In addition, the quality and extensiveness of infrastructure networks significantly impact economic growth and affect income inequalities and poverty in a variety of ways. A well-developed transport and communications infrastructure network is a prerequisite for the access of less-developed communities to core economic activities and services.
>
> Effective modes of transport, including quality roads, railroads, ports, and air transport, enable entrepreneurs to get their goods and services to market in a secure and timely manner and facilitate the movement of workers to the most suitable jobs. Economies also depend on electricity supplies that are free of interruptions and shortages so that businesses and factories can work unimpeded. Finally, a solid and extensive telecommunications network allows for a rapid and free flow of information, which increases

Infrastructure is widely recognized as fundamental to economic and social development.

overall economic efficiency by helping to ensure that businesses can communicate and decisions are made by economic actors taking into account all available relevant information (Schwab 2010: 4–5).

Infrastructure underpins economic growth, increases opportunities, facilitates education, supports effective governance, and improves health.

Aschauer, in a seminal study in 1989, looked at the relationship between government spending, various public capital stocks (including core infrastructure), and productivity in the United States (Aschauer 1989). Since Aschauer's study, many researchers have attempted to quantify the link between infrastructure and economic growth.[8] The actual magnitude of this link is a heavily debated issue in the academic and policy literature, but most now agree that the net effect is positive and significant (Straub 2011). At an aggregate level, Calderón and Servén (2003: 110) estimated that 30 percent of the difference in growth in GDP per capita between Latin America and East Asia was attributable to the slower growth in infrastructure in the former region. In a later study, Calderón (2009: 11) attributed over half of sub-Saharan Africa's improved growth performance between the 1990s and the early 2000s to infrastructure improvements, mostly in the area of telecommunications. At the same time, Calderón identified deficiencies in other forms of infrastructure, notably power, as a hindrance to growth over the same period.

The importance of infrastructure for human development and well-being goes well beyond productivity and aggregate economic growth, however. Brenneman and Kerf (2002), in an extensive literature review, provided what is still perhaps the broadest overview of the various ways in which infrastructure improves human well-being. Their review of numerous studies considered infrastructure's role in underpinning growth, increasing economic opportunities, providing direct savings, improving education, supporting effective governance, and improving health. And, indeed, a range of studies, reviewed in more detail in Chapter 3, have added to our knowledge of the role of infrastructure. We list examples here. Calderón and Chong (2004) provided strong evidence that improved infrastructure reduces income inequality. The World Bank (2008a) investigated the impacts of rural electrification, showing significant positive impacts on health and education outcomes. And the World Health Organization (WHO) explored how access to infrastructure, particularly improved sources of drinking water and sanitation and modern energy services, improves human health (Fay et al. 2005; Prüss-Üstün et al. 2004). In fact, WHO attributed nearly 2 million deaths related to diarrheal diseases (88 percent of all such deaths globally) to unsafe water and sanitation in 2004.[9] In the same year, 35 percent of all deaths from chronic obstructive pulmonary disease and 21 percent of all deaths from lower respiratory infections were due to the inhalation of indoor smoke from solid fuels.[10]

The Past and Present of Global Infrastructure

Infrastructure through the ages

Infrastructure has been with us in one form or another ever since modern humans evolved. The history of infrastructure is, in many ways, the history of human society (see Box 1.2, on p. 8 for a global timeline of a sample of historically significant infrastructure projects).

The history of infrastructure is, in many ways, the history of human society.

When human societies consisted of little more than family-group hunter gatherers, infrastructure was largely cultural and intangible in nature, like spoken language, cave paintings, and stone carvings. These cultural technologies allowed for the transmission of knowledge from one person or group to another, and thus represented the very earliest knowledge systems and information and communication technologies. For thousands of years, they remained the primary form of infrastructure, but as groups grew beyond single family groups to tribes, the first truly physical infrastructure emerged, in the form of networks of well-trod game trails and footpaths connecting seasonal encampments to each other and to favored hunting grounds, water sources, and even shrines (White 2007). As more millennia passed, and tribal societies grew larger, amassed more knowledge, and developed better ways to utilize their environments, the infrastructure we are more used to thinking about began to emerge.

The earliest true infrastructure projects began to appear about 8,000 to 9,000 years ago as the transition to agriculture-based lifestyles allowed societies to grow in size and complexity. The Jericho settlement, in what is the West Bank today, is thought to have been the site of one of the earliest instances of large-scale construction, in the form of defensive walls and barriers for flood protection (Mithen 2006). Around the same time, the people of Çatalhüyük, a settlement in what is now the Anatolian region of Turkey, developed the first known irrigation system, consisting of gravity-fed channels designed to bring river water to nearby fields (Fairbairn 2005). Such projects required a more centralized form of planning and resource mobilization than making paths, planting crops, or building houses, and the need for these projects, specifically water projects, gave rise to the first civilizations.

The earliest civilizations developed at six independent sites or "cradles" around the world: the Tigris and Euphrates River Delta, the Nile River Delta, the Indus River Valley, the Yellow River Valley, Chico Norte, and the Coatzacoalcos River Basin. At each of these sites, people first came together in centrally organized ways to manage water resources (Solomon 2010). They built irrigation networks to water their crops and constructed earthen dikes and levees to protect themselves from seasonal floods.

While the domestication of various animals began in the earliest days of the agricultural revolution, transportation and energy infrastructures really began to develop about 5,000 to 6,000 years ago. Developments such as the harness, plough, and wheel, coupled with the domestication of draft animals like oxen and water buffalo, gave people access to a new power source beyond human muscles, increasing productivity and allowing faster and greater mobility of people and goods over land (Christian 2004: 307). At the same time, the rivers around which the first civilizations developed became the world's first highways, as advances in boatbuilding enabled the movement of high volumes of people, goods, and construction materials over large distances (Solomon 2010).

The ability granted by infrastructure to produce and transport more goods helped foster the formation of the first city-states and kingdoms and gave rise to permanent trade routes between civilizations that would stretch for hundreds and even thousands of miles (Gosch and Stearns 2008: 13). Increasing levels of trade also spurred advances in information and communication technologies. The earliest known written language, cuneiform, developed in Mesopotamia about 5,500 years ago, first as a means of recording transactions and inventories and later growing into a true language. With the advent of written languages came the next advance in knowledge systems, the first library, built in Nippur, Sumeria, 4,500 years ago.

The construction of larger-scale and more advanced infrastructure helped turn early city-states into the first empires. By 4,500 years ago, advanced systems of aqueducts, dams, reservoirs, wells, and canals were supplying water to fast-growing cities. The first paved roads (using flagstones) also began to appear. Advances in communications and transportation allowed would-be empires to raise large armies and fleets and conduct coordinated warfare (Casson 1994: 163). By 3,000 years ago, such advances allowed the Phoenicians to establish the first true colonial empire. The rise of empire, in turn, further spurred the development of improved information and communication technologies as governments found themselves managing greater and greater territories.

By the time of the Roman Empire, many of the infrastructures we consider modern were already in use. Vast networks of paved roads carried armies and goods across the empire. Many buildings had running water, flush sanitation, and centralized heating. Massive public waterworks using poured concrete supported millions of people. Water-powered mills provided mechanical energy. Sail- and oar-powered ships transported goods and people from China to Britain (Hill 2009). Oil lamps replaced wood burning for lighting, and the Chinese even began to use coal as a source of fuel. Postal services, schools, and libraries spread learning and communications. With the fall of the Roman Empire, however, many of these infrastructures would not see wide development again in Europe until the Industrial Revolution more than a thousand years later.

Prior to the Industrial Revolution, a number of events laid a foundation for the infrastructure advances to come. These events can be viewed as a cluster that encouraged the development of knowledge systems, and included the establishment of the first universities in Europe, the invention of the movable type printing press, the first compulsory education, and the first daily newspaper. These events spanned the years from 1088 (the year the University

Transport infrastructure helped foster the formation of the first city-states and kingdoms.

Today, we live in the midst of an ongoing revolution in ICT infrastructure.

Box 1.2 Sample of historically significant infrastructure projects

BCE

7350: Defensive fortifications Jericho, West Bank (McClellan and Dorn 2006: 22)
4000: First paved roads Ur, Iraq (Lay and Vance 1999: 42)
4000: Terraced irrigation, Peru (Dillehay, Eling, and Rossen 2005: 17244)
3800: Irrigation systems, Mesopotamia and Egypt (Brown 2008: 75)
3000: First known large dam, Jordan (Fahlbusch 2009: 13)
2600: First known urban sewer system, Harappa, Pakistan (Delleur 2003: 564; Brown 2008: 100)
1600: Palace at Knossos (Crete) equipped with running water and flush sanitation (Langmead and Garnaut 2001: 234)
1300: Arkadiko Bridge, Greece; still in use today (Simpson and Hagel 2006: 158)
700: Earliest sections of the Great Wall of China[i]
700: 55-mile long aqueduct to Nineveh, Iraq (Aicher 1995: 3)
600: First section of Grand Canal, China (Lenman and Marsden 2005: Canals)
595: Necho's canal (Egypt), precursor to Suez Canal (Redmount 1995: 135)
500: Royal Road connects the Persian Empire (Lay and Vance 1999: 46)
312: Romans begin work on the Appian Way, Italy (McCrae 2002: 12)
312: First Roman aqueduct, Italy (Benton-Short and Short 2008: 54)
300: First water-powered mill, Greece (Tomlinson 1976: 148)

CE

200: 80,467 kilometers of roads in the Roman Empire (McCrae 2002: 9)
947: First well-documented windmills, Persia (Wizelius 2007: 7)
1300: Grand Canal (1,747 kilometers), China, completed (Lenman and Marsden 2005: Canals)
1582: First pumped city water supply system, London (Benton-Short and Short 2008: 54)
1644: Great Wall of China reaches longest modern extent, 8,850 kilometers [i]
1758: Oldest railroad still in use, Leeds, England[ii]
1865: London sanitary and intercepting sewers (21,720 kilometers of pipes) completed[iii]
1866: Transatlantic Cable laid (Hutchinson 2006: 573)
1869: Suez Canal, Egypt, opens (Hutchinson 2006: 603)
1869: First transcontinental railroad, United States (Ambrose 2000: 18)
1878: First telephone network, United States (Menon 2011: 79)
1879: First commercial power station and electric grid, United States (Kirby et al. 1990: 357)
1883: Brooklyn Bridge, United States, completed; first bridge to use steel-wire suspension (Hutchinson 2006: 729)
1887: First wind turbine, Scotland[iv]
1913: Panama Canal, Panama (Hutchinson 2008: 193)
1921: Construction of the autostrade—first highway with car-only access—begins, Italy (Taylor 2010: 26)
1933: Construction of first autobahn—high speed expressway—completed, Germany (Taylor 2010: 29)
1936: Hoover Dam, United States, completed; largest in the world at the time (Hutchinson 2008: 533)
1954: First nuclear power station to provide power to an electrical grid, USSR (Fischer 1997: 143)
1956: Containerized transnational shipping begins (Levinson 2008: 7)
1969: First linked computer network, the ARPANET, United States (Huurdeman 2003: 584)
1979: First automated mobile phone network, Japan (Menon 2011: 87)
1991: First digital mobile phone network, Finland (Menon 2011: 87)
1998: Akashi Kaikyo Bridge, Japan, completed; longest central span of any bridge to date[v]
2001: First broadband mobile phone network, Japan (Menon 2011: 87)
2006: Three Gorges Dam, China, main structure completed; largest power station built to date[vi]

Note: Most dates prior to 1500 are approximate; modern place names are used whenever possible.

Source:

[i.] *http://www.britannica.com/EBchecked/topic/243863/Great-Wall-of-China.*

[ii.] *http://www.middletonrailway.org.uk/*

[iii.] *http://www.portcities.org.uk/london/server/show/ConNarrative.153/chapterId/3182/Bazalgette-and-Londons-sewage.html*

[iv.] *Niki Nixon, "Timeline: The History of Wind Power," The Guardian, 17 October 2008.*

[v.] *http://www.fhwa.dot.gov/publications/publicroads/98julaug/worlds.cfm.*

[vi.] *"Three Gorges Dam Wall Completed,"* BBC News*, 20 May 2006.*

of Bologna was established) to the early 1700s (when the first daily newspaper was published).

The Industrial Revolution, generally regarded as beginning around 1750, brought back many lost infrastructures and also brought the advent of new forms of energy and transportation—most important, the development of steam power. The steam engine enormously enhanced production and revolutionized transportation, greatly shrinking time and space compared to wind- and animal-powered transport. The steam engine led to the great railroads that would come to crisscross continents and the steam-powered ships that were much faster and more reliable than their wind-powered predecessors (Stearns 2007: 38–39). The age of steam and its associated infrastructure made the massive wave of colonization in the 1800s and early 1900s possible and set the foundation for today's globalized world. Steam power also helped bring about modern warfare, as rapid mass deployments of troops and armaments became possible (Herrera 2006).

By the end of the nineteenth century, the age of steam had begun to give way to the age of electricity and the infrastructure most familiar to our modern perspective. The first electrical power stations (coal plants and hydroelectric dams) provided electricity to homes, businesses, and factories, supplanting oil and natural gas lamps and wood-burning stoves and powering new industries. In the twentieth century, the automobile and airplane gave rise to entirely new modes of travel and a new culture of personal mobility, and they spurred the construction of today's superhighways and airports. New shipping technologies, like containerization and tanker ships, allowed for greatly increased and globalized trade. New information and communication technologies, like the wireless telegraph, radio, and television, transformed how we communicate, enabling developments as disparate as the more efficient management of far-flung colonial empires and the rise of consumer culture. Advances in water treatment, meanwhile, led to major reductions in disease, malnutrition, and even cavities (thanks to fluoridation).

Today we live in the midst of an ongoing digital revolution in ICT infrastructure that began in the 1960s and 1970s with the digitization of phone networks, the invention of fiber optic cable, and the development of the first computer and information networks like the ARPANET. The information, or computer, age and the infrastructure that has come with it—from the internet to globalized just-in-time supply chains—has resulted in the creation of an ever-more integrated world, and has begun the transition to increasingly complex networks that encompass multiple forms of infrastructure, like smart electrical grids and smart highways. Where this will take us is one of the great uncertainties as we look to the future of infrastructure.

Infrastructure's current extent

In 2010, people (and goods) could travel over 20 million kilometers of paved roads (enough to circle the globe 500 times), enjoy the benefits of 5.0 billion kilowatts of electricity produced by the world's power plants, communicate using 1.2 billion fixed telephone lines and 5.3 billion mobile phone subscriptions, and drink from just under 1 billion household water connections.

In spite of the truly tremendous extent of modern infrastructure, large portions of humanity do not have access to it. Figure 1.3 shows the levels of access to five key forms of infrastructure for people living in countries grouped into the four World Bank country income categories (see Appendix I). The clear message is one of continued disparity even as countries around the world continue to build out their infrastructure networks.

In 2010, only 65 percent of the population of low-income countries had access to an improved source of drinking water, as compared to 99 percent of people in high-income countries. The corresponding numbers for improved sanitation are even more unequal, with 37 percent of people in low-income countries having access, compared to over 99 percent in high-income countries. These disparities translate to over 790 million people globally not having access to an improved water supply and over 1.7 billion not being served by improved sanitation infrastructure.

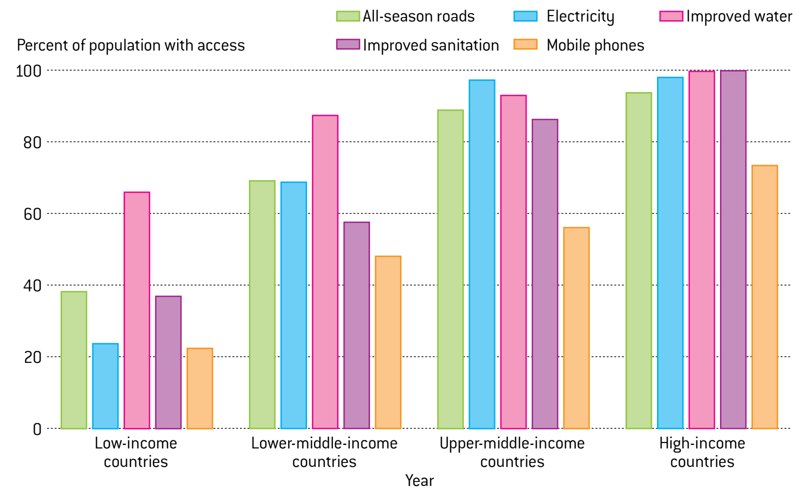
Severe disparities also exist in regard to access to transportation infrastructure. In 2010, roughly 60 percent of the rural population in low-income countries did not live within two kilometers of an all-season road (a standard measure of adequate transport access, see Roberts, KC, and Rastogi [2006: 2]), as compared to 7 percent in high-income countries.

More than half of the global population still uses solid fuels in the home and one-quarter does not have access to electricity. In the low-income countries, over 90 percent of people still use solid fuels as their primary household energy source, and only 23 percent have access to electricity. While solid fuel use is not a measure of infrastructure access, it indicates limited or no access to electricity and also generally health-adverse practices. In high-income countries, over 97 percent of all people have access to electricity and only five percent use solid fuels as their primary household energy source.

The spread of mobile phones is one of the greatest success stories in modern infrastructure in terms of the rapidity of deployment. More than an estimated 22 percent of people in low-income countries already had access to them in 2010, almost matching the portion with access to electricity, and while access to mobile phones

In spite of the tremendous extent of modern infrastructure, the clear message is one of continued disparities across countries and populations.

Figure 1.3 Selected infrastructure access rates by income group: 2010



Note: Access to all-season roads refers to the percentage of the rural population living within two kilometers of an all-season road. Since historical data for all-season road access extends only to 2004, we have used the IFs Base Case to estimate the 2010 data. Access to mobile phones is estimated from subscription rates per 100 people. Note that subscription rates can exceed 100 because of multiple subscriptions per person; we rescale subscription rates from 0–100 by multiplying them by 2/3, which assumes that 150 subscriptions per 100 persons approximates universal access.

Source: IFs Version 6.61 using data from the World Bank Rural Access Index available at http://www.worldbank.org/transport/transportresults/headline/rural-access/rai-updated-modelbasedscores5-20070305.pdf.; the International Energy Agency World Energy Statistics 2011 available at http://www.iea.org/stats/index.asp; the World Health Organization and United Nations Children's Fund Joint Monitoring Programme for Water Supply and Sanitation Data and Estimates 2011 available at http://www.wssinfo.org/data-estimates/table/; and the International Telecommunication Union World Telecommunication/ICT Indicators 2011 database available at http://www.itu.int/ITU-D/ict/statistics/.

was still 16 percentage points below access to all-season roads, keep in mind that roads have been around for millennia and ICT only a few decades. In our forecasts, we will see the likely continued rapid growth of access to both mobile phones and the broadband services that they increasingly make available.

Challenges and opportunities going forward

For all countries, rich or poor, the nature of infrastructure presents some common challenges. Most fundamentally, a large portion of infrastructure has the nature of a collective good, one that requires collective action to provide. Such goods routinely tend to be underprovided relative to the true desires of members within a population because of the logic of collective action (Olson 1965; Weimer and Vining 2005). That is, those who do not contribute to the provision of a collective good (such as a transportation or water network) can still generally benefit from its existence and therefore have incentive to free-ride rather than to contribute.

Infrastructure is a public good, and the provision of public goods poses challenges for all countries, rich or poor.

Other characteristics of infrastructure create further challenges for provision. Projects are generally large-scale, expensive, require long time-frames for completion, and have long payback periods. Long-range systematic planning, professional execution, and sustained funding are required for success. Most political processes do not favor such requirements, however, and the combined result of all these factors is frequent delays; cost overruns; and redundant, inappropriate, and/or poor quality infrastructure (see Box 1.3).

We already have commented on the fact that much infrastructure is all but invisible to users. In combination with its often high expense, this means that it does not fall into the category that most domestic and international political processes tend to favor, namely projects that attract much attention and boost the prestige of politicians or foreign donors, ideally in the near term. While true with respect to new construction, this is even more the case with respect to still less glamorous but vitally important maintenance programs.

Infrastructure is commonly neglected for yet another reason. Programs directed at supporting and extending human development and well-being have often focused on single aspects of development with clearly defined and visible outcomes (e.g., literacy programs or immunization clinics). As important as such singular or targeted efforts may be, many improvements can be realized only if programs cut across multiple development sectors to meet multiple needs, such as concomitantly advancing education and developing job opportunities. Infrastructure has a vital and often underappreciated role to play in such crosscutting efforts.

Even when the importance of crosscutting efforts is recognized, infrastructure is seldom represented at the table. Again, the long time-frame and high capital requirements of many infrastructure projects are part of the reason for this. At a more fundamental level, however, basic infrastructures like water pipes and power lines are often viewed as "boring" or negatively as "technical." As Star (1999: 377–378) noted:

> Many aspects of infrastructure are singularly unexciting. They appear as lists of numbers and technical specifications, or as hidden mechanisms subtending those processes more familiar to social scientists. It takes some digging to unearth the dramas inherent in system design creating, to restore narrative to what appears to be dead lists.

Box 1.3 The lumpy nature of large-scale infrastructure projects

"It is fitting in a way that our debates over infrastructure have been so long and drawn out. The undertakings themselves are by definition large, expensive, and protracted. The latest effort to ensure an adequate water supply for New York City, for example, has already stretched through the administrations of six mayors. The project was conceived in 1954, but construction did not begin until 1970, and fiscal crises halted work several times. The city completed excavation for the $1.75 billion second phase in 2006, leaving two more stages still to be done. Work will go on until at least 2020. . . . Like virtually all undertakings of this kind, New York's tunnel is little remarked but essential."

Bruce Seely, "The Secret Is the System," Wilson Quarterly *(Spring 2008): 47–48.*

While the above challenges are common to all countries, developed and developing countries each also face their own infrastructure challenges. Most developed countries already have extensive infrastructures and high access rates to them. Infrastructures have a natural life cycle, however, and many infrastructures in rich countries are deteriorating and/or reaching the end of their useful lives. All too often, such deterioration is occurring without plans or provision of funds for needed renewal or replacement. Infrastructure "report cards" for Australia (Institution of Engineers 2010), the United Kingdom (Institution of Civil Engineers 2010), and the United States (American Society of Civil Engineers 2009) have painted pictures of lagging efforts to maintain existing infrastructure as well as to plan for future needs.

Developing countries would be happy to have such problems. Instead, their primary infrastructure challenge remains building out basic infrastructures and expanding access to the services they provide, while at the same time facing important competing demands, including health and education, for their limited resources. At the same time, in many developing countries, widely dispersed populations across large geographic areas preclude economies of scale that make infrastructure projects easier, and differences in climate, geography, and natural resources make the task far more difficult in some countries than others. Finally, as the earlier discussion of infrastructure across the ages suggested, a sequence of major transformations in modern infrastructure technology has, in some cases, led to replacements by new forms, but has also led to a layering of additional systems on old ones over a span of centuries as new technologies emerged. Countries currently developing are attempting to build in decades what the more developed countries built and refined over centuries.

One of the consequences of the temporally compressed effort to create modern infrastructure in low- and middle-income countries is that the portion of GDP such societies devote to infrastructure spending is often higher, and sometimes considerably higher, than in countries with much greater income and wealth. At the same time, the low- and middle-income countries also face major expenditure pressures for catch-up in education and health. In addition to the burden of heavy construction and startup costs, their efforts to build and maintain physical infrastructure and to improve access are often compromised by ineffective governance and poor supplies of soft infrastructures (including knowledge systems). Finally, the higher population growth rates of many developing countries have added an extra burden to efforts to expand rates of infrastructure access. As Doyle and Havlick (2009: 362) pointed out:

> Nearly 82 million additional people in Africa, 418 million in Asia, and 79 million in Latin America gained access to a water supply through a house connection during the 1990s. Yet the population increase over this same period of time was even greater.

Still, amidst these challenges there are bright spots, many of which are related to the revolution we are seeing in information and communication technologies. ICTs are enabling lower-income countries and regions to leapfrog the development of expensive landlines and to accelerate greatly their creation of, and access to, systems based on modern computing and telecommunications capabilities, including banking services, market information, and specialized health resources, even in remote areas where roads and landlines are lacking. In developed and developing worlds alike, the more efficient use of infrastructure through sophisticated monitoring and communication systems (smart infrastructure) embedded in roads and other forms of infrastructure has the potential to improve the efficiency and environmental friendliness of infrastructure (Economist 2010; Félio 2011).

Ultimately, however, the promise of information and communication technologies is realized through human agency—specifically, through the discovery, transfer, and use of innovations (see Box 1.4, on p. 12). These actions require, and are manifestations of, knowledge and other social systems.

Programs to accelerate human development often inadequately appreciate the vital role of infrastructure in such efforts.

Developing countries today are attempting to build in decades what more developed countries built and refined over centuries.

Box 1.4 Realizing ICT's promise requires soft infrastructures as well

"If I were to summarize everything I learned through research in ICT4D, it would be this: technology—no matter how well designed—is only a *magnifier of human intent and capacity*. It is not a substitute. If you have a foundation of competent, well-intentioned people, then the appropriate technology can amplify their capacity and lead to amazing achievements. But, in circumstances with negative human intent, as in the case of corrupt government bureaucrats, or minimal capacity, as in the case of people who have been denied a basic education, no amount of technology will turn things around."

Kentaro Toyama, "Can Technology End Poverty?," Boston Review *(November/December 2010): 15.*

Note: ICT4D refers to the use of information and communication technologies to enhance development and human well-being. Italics are in original.

Looking Toward the Future of Global Infrastructure

Goals and targets

Improving infrastructure has an important place in many discussions about international development, and a number of specific and general goal sets increasingly reflect this. For example, the Millennium Development Goals (MDGs) for reducing poverty and enhancing development, adopted by the 189 member states of the United Nations in 2000, encompass 8 goals and 21 quantifiable targets measured by 60 indicators. Fay et al. (2005: 1276) pointed out that "achieving the health MDGs will require more than health and education interventions. In particular, infrastructure services have an important role to play, and a failure to recognize this in planning MDG strategies will risk undermining success." Infrastructure appears explicitly, however, in only one of the MDG targets, which calls for countries to "Reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation" between 1990 and 2015.[11]

Looking beyond the well-known MDGs, at least some goals for infrastructure exist in each of the major infrastructure categories:

- **Transportation.** Roberts, KC, and Rastogi (2006: A-25–A-26) presented several transportation targets for Africa in a report prepared for a meeting of the Africa Transport Ministers in 2005. Most of these are fairly qualitative or rely on indicators that we do not have in IFs (e.g., reducing travel time and individual costs of transport, and increasing school access). One that IFs can represent is "halving the proportion of rural population living beyond 2 kilometers of an all-season road" (p. A-25). The report put no date on this target. The United Nations Centre for Regional Development (UNCRD) and other international organizations have begun to set goals for improving transportation, especially in terms of environmental sustainability, access by the poor, and safety (UNCRD 2010; United Nations Economic and Social Commission for Asia and the Pacific 2011). Many countries have also set their own goals for improving local seaport, airport, and railroad capacity, though no international goals for those seem to exist.
- **Electricity and energy.** Several institutions and many countries have defined targets in this area. The UN Secretary-General's Advisory Group on Energy and Climate Change (UNAGECC) has put forward the goal of ensuring universal access to modern[12] energy services by 2030 (UNAGECC 2010). In that document, the Advisory Group indicated a starting target of 100 kilowatt hours of electricity and 1200 kilowatt hours of modern fuels per person per year. In its 2010 edition of the *World Energy Outlook*, the International Energy Agency (IEA) defined the targets in its Universal Modern Energy Access Case as 100 percent access to electricity and 100 percent access to clean cooking fuels by 2030 (IEA 2010c). Practical Action, a development organization working with support from the Sustainable Energy Programme of the United Nations Development Programme (UNDP) and others, has gone further by specifying energy service targets related to: lighting, cooking and water heating, space heating, cooling, information and communications, and earning a living (Practical Action 2010). And many countries have set country-level targets. Legros et al. (2009), in a joint UNDP/WHO study, compiled information on such country-level targets from a vast array of sources, with a focus on energy access in sub-Saharan Africa and Least Developed Countries.[13]
- **Water and sanitation.** WHO and the United Nations Children's Fund (UNICEF) have stated what is both a potentially more ambitious and a more ambiguous goal than that of the MDGs, namely: "to accelerate progress towards universal sustainable access to safe water and basic sanitation by 2025" (WHO

and UNICEF 2010b: 2). Individual countries and donors also have set their own targets for access to safe water and basic sanitation, some tied to the MDG target and some not (WHO and UNICEF 2010b).

- **Information and communication technologies**. Recommendation 21 of the United Nations Secretary-General's High-Level Panel on Global Sustainability (2012: 45) was that governments should work with appropriate stakeholders to provide citizens, especially those in remote areas, with access to technologies, including universal telecommunications and broadband networks, by 2025.

We will return to goals and targets in a later exploration of their feasibility, with attention also to the possibility of alternatives that are more sensitive to current levels of development in countries around the world. One of the difficulties of universal targets is that many countries have already met them, while many others may be so far from the goals that setting them with universal target levels and/or fixed dates is merely a recipe for defeat.

Existing international analyses of infrastructure policies and infrastructure futures

A number of important policy-oriented studies have highlighted the role of infrastructure for future global and regional development and human well-being. The 1994 *World Development Report* (World Bank 1994) was one of the first international studies to focus on infrastructure for development. Since that time, the World Bank and regional development banks have spearheaded further efforts to identify current circumstances, issues, and policy directions across a number of developing regions. These include, for example, studies focused on Latin America (Corporación Andina de Fomento 2009; Fay and Morrison 2007); Asia (Asian Development Bank Institute 2009; Asian Development Bank, Japan Bank for International Cooperation, and World Bank 2005); and Africa (Foster and Briceño-Garmendia 2010). These have built on and further generated a significant amount of reflection and research on the role of infrastructure in development (see, for example, Estache and Fay 2010 and World Bank 2006).

Meanwhile, the International Futures Programme of the Organisation for Economic Co-operation and Development (OECD) has undertaken a series of large-scale studies focusing on the primarily high-income countries that constitute its membership. These resulted in the publication of *Infrastructure to 2030: Telecom, Land Transport, Water and Electricity* (OECD 2006), followed by *Infrastructure to 2030: Volume 2: Mapping Policy for Electricity, Water and Transport* (OECD 2007). A third report, *Strategic Transport Infrastructure Needs to 2030* was published in 2012.

A number of other studies highlight infrastructure's status and suggest needed policy reforms for specific countries and/or regions. The Africa Infrastructure Knowledge Program of the African Development Bank Group, which grew out of the study that produced *Africa's Infrastructure: A Time for Transformation* (Foster and Briceño-Garmendia 2010), has, to date,[14] published 19 individual country reports. Since 2001, the Infrastructure Development Finance Company has produced an annual India Infrastructure Report, covering a wide range of topics from infrastructure governance to helping to create a low carbon economy (Infrastructure Development Finance Company 2011). Earlier we mentioned the periodic infrastructure report cards published for Australia (Institution of Engineers 2010), the United Kingdom (Institution of Civil Engineers 2010), and the United States (American Society of Civil Engineers 2009). There is also one being developed for Canada (Félio 2011). And, since 2007, the Urban Land Institute, in partnership with Ernst & Young, has published annual reports focused on the United States, with some global overview (Urban Land Institute and Ernst & Young 2011).

All of the reports mentioned above provide in-depth analyses across multiple infrastructure sectors (e.g., transportation, energy, water and sanitation, and information and communications). A great many other studies focus on single infrastructure sectors at global, regional, or individual country levels; an important example for our purposes is the *World Energy Outlook* series produced by the International Energy Agency (e.g., IEA 2010c).

Understandably, the studies focusing on richer countries placed relatively more emphasis

Many countries have already met universal infrastructure targets; others may be so far behind that targets with relatively near-term fixed dates for universal access assure failure.

■ Many infrastructure policy concerns are similar across developing and developed countries, including funding, public-private partnerships, governance and regulation, and increasing access for the poor. ■

■ Relatively few policy-oriented studies and analyses of infrastructure provide quantitative forecasts of future infrastructure stocks and access to them. ■

on replacing deteriorating infrastructure than the studies of developing areas, where emphasis is on building out basic infrastructure. In fact, one issue for developing countries is just what constitutes "basic" infrastructure. For example, Foster and Briceño-Garmendia (2010: 12, 15) suggested that achieving universal access to basic infrastructure in Africa would require "practical and attractive second-best solutions," such as standposts and improved latrines in place of household water and sanitation connections. It is hard to imagine a high-income country that would find it necessary to consider similar solutions for basic infrastructure.

Despite those significant differences in emphasis and opportunity, most policy concerns are similar across developing and developed countries. High on all lists are funding sources and mechanisms; efficiency (and resultant pricing); the role and efficacy of public-private (and other nontraditional) partnerships; the quality of governance and the regulatory environment; and access to basic infrastructure for the poor. In fact, the following statement from the first OECD *Infrastructure to 2030* report (2006: 20) could as easily have appeared in one of the studies focused on developing regions:

> The central message . . . is that a gap is opening up . . . between the infrastructure investments required for the future, and the capacity of the public sector to meet those requirements from traditional sources. Bridging the gap will demand innovative approaches, both to finding additional finance, and to using infrastructures more efficiently and more intelligently through new technologies, demand management strategies, regulatory changes, and improved planning.

Estache and Fay (2010) present two more policy issues to add to this list, and while the focus of their paper is developing countries and regions, the issues are also germane to developed countries. The first issue is how to allocate funds between infrastructure and competing sectors (e.g., education and health) in order to get the maximum "boost" in a budget-constrained environment. The second issue involves a similar question in terms of the "where" of infrastructure projects themselves. For example, Estache and Fay (2010: 169) note that investing in poorer regions within a county may be "welfare-maximizing" but not growth-maximizing for the country as a whole, and thus equity-efficiency trade-offs enter the debate.

Quantitative forecasting of infrastructure futures

Despite these many policy-oriented studies and analyses, relatively few quantitative forecasts of the future of infrastructure are available. In an effort originating in the World Bank, a small number of studies have begun to provide quantitative forecasts of global or regional infrastructure across multiple sectors.[15] Fay (2001) and Fay and Yepes (2003) developed and introduced a methodology to estimate future levels of transportation, power, water and sanitation, and telecommunications infrastructure and investment needs that has been used by, or served as the foundation for, most studies since. Briefly, their model uses historical data to estimate relationships between levels of infrastructure and explanatory variables, such as total GDP. These relationships are then used with assumptions or forecasts of the future levels of the explanatory variables to estimate the future levels of infrastructure. Other data are used to estimate the average unit cost of each type of infrastructure. The amount of spending required for new construction is then calculated by multiplying these unit costs by the changes in the levels of infrastructure. Annual maintenance requirements are estimated as a share of the value of the infrastructure stock, where the shares are a function of the expected lifetimes of each type of infrastructure. The value of the stock can also then be calculated for each type of infrastructure by multiplying its level by its unit cost.

These original studies—Fay 2001 and Fay and Yepes 2003—looked out only five and ten years, respectively. Bhattacharyay (2010), Chatterton and Puerto (2006), and Yepes (2005) also maintained similarly short time horizons. But others, like Stevens et al. (2006), and more recently G. Hughes, Chinowsky, and Strzepek (2009; 2010), Kohli and Basil (2011), and Kohli and Mukherjee (2011), extended the time horizon of these types of studies, looking out as far as mid-century. Each of these studies followed the same basic approach, but either re-estimated or updated: (1) the relationships between the explanatory variables and infrastructure; (2) forecasts of the explanatory variables; and (3) unit costs. Also, each of these studies included some aspect or aspects of transportation, power, water and sanitation, and telecommunications, but with some differences in specific forms or levels of detail, particularly with respect to transportation (e.g., some included only paved roads, while others included all roads; and some included rails, airports, and/or ports, while others did not). Regrettably, only one (Kohli and Basil 2011) included broadband (and even then only fixed broadband), despite broadband's explosive growth throughout the world and its promise for transforming infrastructure and infrastructure services in so many ways.

Estache and Fay (2010), among others, have been careful to note the limitations of the prevailing approach. First, most, but not all, of the studies use relationships, unit costs, and infrastructure lifetimes that do not differ across countries or over time. Second, because this approach uses historical data to estimate the relationships between the explanatory variables and infrastructure stocks, it "identifies potential demand given expected growth, not the level of infrastructure that would maximize growth or some other social goal" (Estache and Fay 2010: 163). Third, the projections do not balance the demand for infrastructure against the supply of available funds for the construction and maintenance of this infrastructure. Finally, there is no feedback from the levels of infrastructure to the drivers of infrastructure demand. For instance, such analyses do not consider the changes in population levels due to decreased child mortality as a consequence of improved water and sanitation; similarly, studies typically do not explore the changes in GDP, resulting from investments in infrastructure, that may generate still more demand for infrastructure as well as funds to pay for it.

To be fair, a number of the limitations noted above are beyond the main purpose of these studies, which focused on estimating the levels of infrastructure demand and funding requirements under assumed growth trajectories. But even with this main purpose, a number of the studies began to venture into other important areas. Fay and Morrison (2007) and Foster and Briceño-Garmendia (2010) used the costing part of the methodology to estimate the costs of meeting specific social targets for infrastructure stocks, and Yepes (2008) analyzed and compared varied trajectories (e.g., "business as usual" versus "catching up with MDGs") for access to safe water and improved sanitation. Yepes (2008) further estimated current expenditures and compared them with calculated demand (although he did not explore whether and how such gaps might be met). And a number of the studies have included sensitivity analyses centered on alternative growth assumptions or, in the case of G. Hughes, Chinowsky, and Strzepek (2009; 2010), scenarios that compare infrastructure requirements and costs with and without climate change. In summary, these studies and others do provide a valuable foundation for our work and inform our modeling approach, which is described in Chapter 4. They also provide projections against which we can compare our results starting in Chapter 5.

> Most studies that do forecast infrastructure assume relationships, unit costs, and infrastructure lifetimes that do not differ across countries or over time.

Why This Volume?

Our overarching goal with this volume is to extend and complement the existing work on the future of infrastructure and the relationship of infrastructure to human well-being. In spite of complications and uncertainties, we view forecasting as a valuable endeavor. Forecasting can help shape aggressive but reasonable goals and then to direct action to them. It can help us anticipate and avoid negative scenarios and decisions that result in misdirected resources. It can also provide insight into the broader economic and social consequences of alternative infrastructure futures.

Thus, this volume sets out to tell a story of possible futures for infrastructure across the world. While recognizing that any modeling approach has many inherent limitations, our dynamic tools allow us to address policy-relevant questions facing countries at different stages in their infrastructure development. The key questions we explore are:

- What is a likely future of infrastructure, considering the interaction of demand and supply-side forces?

> This volume tells a story of possible infrastructure futures across the world to the year 2060.

IFs is a dynamic computer simulation tool that facilitates the exploration of possible global futures through the creation and analysis of alternative scenarios.

- What might the expected future of infrastructure mean for access rates around the world?
- What might the changes in infrastructure stocks, access rates, and spending mean for human development going forward?
- How realistic are the infrastructure targets that have been specified in policy discussions, and what are the implications of pursuing these for the broader economic and social prospects of countries, regions, and the world?
- Can we develop a set of aggressive but reasonable infrastructure targets that are more realistic and that enable countries to provide important infrastructure services to more of their citizens?

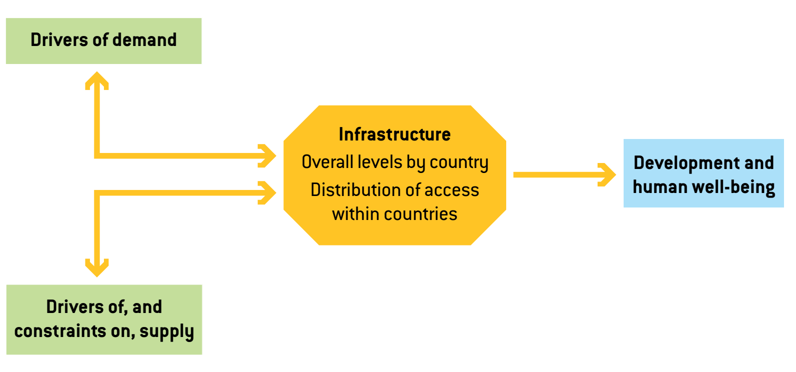
In order to explore these questions, we:

- provide forecasts of levels of key infrastructure stocks, access, and spending for individual countries and for global and regional groupings out to the year 2060;
- explore the broader social and environmental implications associated with these forecasts.

Most important, we enter new forecasting territory by:

- separately considering, and then reconciling, the factors that drive basic expectations for infrastructure development and the final supply of infrastructure through an "expectation-based, supply-modified" approach that considers available funding;

Figure 1.4 Infrastructure as a central element in human progress



Source: Authors' conceptualization.

- including additional forms of infrastructure, such as all-season rural road access and mobile broadband, in our forecasts;
- exploring selected impacts of different infrastructure scenarios on future development and human well-being and, in turn, the role that human development plays in the further demand for, and development of, infrastructure.

Figure 1.4 presents a simplified representation of our conceptual approach.

The International Futures global modeling system is the tool used for the quantitative analysis and forecasting done in this volume. IFs is a dynamic computer simulation tool developed over the last 35 years; its purpose is to facilitate the exploration of possible global futures through the creation and analysis of alternative scenarios. The system's dynamic forecasting capabilities are rooted in its integration of demographic, economic, agricultural, sociopolitical, educational, environmental, energy, and health models. This book builds on the recent development and addition of an infrastructure model that forecasts future levels of infrastructure, access to that infrastructure, and implications of that infrastructure in interaction with the other components of the modeling system.

An extensive database underlying IFs covers the time period from 1960 to the present for 183 countries. The model itself is a recursive system that can run without intervention from its initial year (currently 2010) to 2100, while the model interface facilitates interventions flexibly across time, issue, and geography. Most important, the forecasts IFs produces, although grounded in historical data, are not extrapolations, but rather represent the results of the dynamic interplay among variables in multiple domains of human development systems.

IFs includes a unique package of strengths:

- a long forecasting horizon
- the representation of complex dynamic relationships
- extensive geographic coverage
- a very large underlying database
- availability for users to explore alternative assumptions
- flexible display formats.

Despite these strengths, there are, of course, caveats about its use and limitations to its capabilities. Some of the caveats are common to all modeling tools—most especially the importance of not confusing a simulated representation with the "real world." Other caveats and limitations are specific to the topic of infrastructure and its treatment in IFs. One such limitation is that historical infrastructure data series, where they exist, are frequently spotty. Another is that many of the technological transformations that will define future infrastructures are not something we can represent in IFs and forecast with any specificity. In Chapter 4 we discuss how we deal with these and other issues. Because of these caveats and limitations, we stress that we consider IFs to be a thinking tool, not a predicting tool. As we said in an earlier volume in this series, *Advancing Education* (Dickson, B. Hughes, and Irfan 2010: 8):

> We present our results with the request that readers view them as descriptions of what might plausibly occur under alternative specifications of circumstances or policy interventions. Our hope is that by providing a structure and context for analysis and debate about possible futures, IFs will contribute to enhanced understanding and to the quality of choices made in policy arenas.

Conclusion and Road Map for This Volume

Infrastructure both drives and reflects broader socioeconomic development. Its presence is at the same time quite obvious yet often taken for granted. Clearly, though, the future of infrastructure and the future of human development and well-being cannot be separated. In this volume, we explore this interdependence as we consider possible developments over the next half-century. We make no claim to be able to predict the future. Rather, our goal is both more modest and more daring. By thinking carefully about what could be, we hope to contribute to the conversations and actions that will shape what will be.

Chapters 2 and 3 establish a foundation for exploring the future of infrastructure. Chapter 2 provides a more detailed picture of the development of infrastructure over the past few decades. It also highlights the need for improved data on both the quantity of infrastructure and infrastructure spending. Chapter 3 explores a number of the key conceptual and theoretical questions surrounding infrastructure, particularly its relationship to broader socioeconomic development.

Chapter 4 turns our attention to the future. It explores the various ways that other analysts and researchers have modeled and forecast issues surrounding infrastructure. Building on these previous studies, we describe the ways in which we have adapted IFs to forecast infrastructure stocks, access, and spending, as well as how these infrastructure elements feed forward to other parts of the model.

Chapter 5 paints a picture of the future of infrastructure as presented in the IFs Base Case. This is not a simple extrapolation of individual elements, but rather a detailed exploration of the integrated evolution of infrastructure development and spending in the context of other socioeconomic and environmental changes over the next half-century. It provides us with a rich picture of where we seem to be headed and offers a basis against which to compare our forecasts with those made by others and with infrastructure goals and targets that have been set in policy circles.

Chapter 6 turns more specifically to these goals and targets. Given the traditionally long time-frames associated with planning for and constructing infrastructure, are these goals realistic? What are their net implications for development and human well-being, recognizing that infrastructure maintenance and construction competes for funding with other sectors, such as health and education? Based on those analyses, we then ask if there might not be a still aggressive but also more realistic set of targets for infrastructure development over the next half-century.

Finally, we conclude in Chapter 7. There we present key messages for the future of global infrastructure, our reflections on the study, and recommendations for future work.

Infrastructure both drives and reflects broader socioeconomic development. Thus, the future of infrastructure and the future of human development cannot be separated.

1 William Ascher and Corinne Krupp, "Rethinking Physical Infrastructure Development," in *Physical Infrastructure Development: Balancing the Growth, Equity, and Environmental Imperatives*, ed. William Ascher and Corinne Krupp, 1–33 (New York, NY: Palgrave Macmillan, 2010).

2 Martin W. Doyle and David G. Havlick, "Infrastructure and the Environment," *Annual Review of Environment and Resources* 34, no. 1 (2009): 349–373.

3 *Merriam-Webster Dictionary 2012 Online*. http://www.merriam-webster.com/dictionary/infrastructure. Italics in original.

4 In the course of our work for this volume, we also have developed basic representations of knowledge systems (the bridge between hard and soft infrastructure in Figure 1.1), but we leave analysis and forecasting of them for a future study.

5 "Ton-Miles by Two-Digit Commodity: 2007." Data from the 2007 Commodity Flow Survey conducted by the U.S. Department of Transportation Bureau of Transportation Statistics. Data accessed at http://www.bts.gov/publications/special_reports_and_issue_briefs/special_report/2009_09_30/html/table_08.html.

6 See the U.S. Energy Information Administration Office of Oil and Gas "Oil Market Basics," available at http://www.silverbearcafe.com/beartracks/oil_market_basics/intro.htm; see links to Table of Contents and then to the section on Trade.

7 The 12 pillars are, in order: institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labor market efficiency, financial market development, technological readiness, market size, business sophistication, and innovation (Schwab 2010: 4–8).

8 See reviews of this literature by Romp and de Haan (2007) and Straub (2008a; 2011).

9 Risk factor estimates for 2004 are from the WHO Global Health Observatory Data Repository available at http://apps.who.int/gho/data/view.main.3400.

10 Risk factor estimates for 2004 are from the WHO Global Health Observatory Data Repository available at http://apps.who.int/gho/data/view.main.3400.

11 Target 7.C of the MDGs. A full description of the target can be found at http://www.un.org/millenniumgoals/environ.shtml.

12 Legros et al. (2009: 5–6) defined modern forms of energy as household connections to electricity; the use of electricity, liquid fuels, or gaseous fuels as the primary fuel to satisfy cooking needs; and the use of mechanical power (from electricity, modern fuels, traditional biomass, wind, or hydroelectric power) for productive, non-industrial applications.

13 Least Developed Countries (LDCs) is a classification system used by the United Nations Economic and Social Council to identify the 50 poorest countries in the world. Countries are identified as LDCs based on their gross national income per capita; demographic indicators like population, nutrition, health, education levels, and adult literacy; and economic indicators such as instability of agricultural production, instability of exports of goods and services, and the share of GDP of manufacturing and modern services (Legros et al. 2009: 44).

14 As of 16 July 2012.

15 A number of sector-specific studies also provide quantitative forecasts of some forms of infrastructure. A key example is the *World Energy Outlook* of the International Energy Agency, which includes forecasts of electricity generation capacity and electricity access (IEA 2010c).

2

The Story So Far

Infrastructure networks have grown markedly over the past few decades, allowing more and more people to access the vital services they provide. As we saw in Chapter 1, many of these networks are the outcome of a development process as old as humanity itself. But we also saw that significant disparities across countries remain, with millions of people in developing countries living without access to the most basic infrastructure.

In this chapter, we delve more deeply into the current state of, and recent trends in, physical stocks of infrastructure, access rates, and spending levels. In the process, we ask the following questions:

- How much infrastructure currently exists?
- How widespread is access to this infrastructure?
- How much has been spent to build and maintain this infrastructure?
- How have stocks, access, and spending changed over time?

The answers to these questions set the stage for our exploration of the future of infrastructure in later chapters. They allow us to more clearly identify those countries that have made the greatest progress in closing the gaps in infrastructure coverage and those that have the farthest to go. Finally, they provide us with a sense of the scale of past infrastructure spending and what this might mean for future efforts to close these gaps.

To make our task somewhat more manageable, we selected for our analysis a subset of possible forms of infrastructure. We review these choices in the next section and compare them to those made in other studies. That still left us with the task of finding consistent and comprehensive data on stocks, access, and spending for these infrastructures. As we will discuss, this is a much greater challenge than might be expected. In this chapter, we also summarize the data issues we encountered as well as the primary sources for the historical data we ultimately used.

In this chapter, we consider the current state of, and recent trends in, infrastructure, looking at physical stocks, access rates, and spending levels.

> A lack of complete, consistent, comparable, and reliable infrastructure data is a limiting factor for studies.

Only then are we able to address the questions set out above.

What Comprises Infrastructure?

As broadly defined, physical infrastructure is comprised of four main categories: transportation, energy, water and sanitation, and information and communication technologies (ICT). On this there is general agreement, even though what each category includes can be quite extensive and vary greatly from study to study.[1] Water and sanitation, for example, could include, *inter alia*, wells, viaducts, irrigation canals, dams, reservoirs, standpipes, household delivery systems, sewers, storm drains, and wastewater treatment facilities.

We are aware of no international study that is fully comprehensive in its coverage of infrastructure. Rather, such studies focus on a limited set of key types of infrastructure within each category (see Table 2.1). The reasons for specific choices tend not to be stated explicitly, although it is probable that, along with perceived relative importance, data availability is one key factor.

We do not attempt to be comprehensive in this study either. Our choices, too, were influenced by data availability, and they were further informed by the goals of our study (we discussed our choices in the text preceding Box 1.1).

The Challenge of Historical Data on Infrastructure

The absence of complete, consistent, comparable, and reliable infrastructure data is a limiting factor highlighted in almost every international study of infrastructure. In the Organisation of Economic Co-operation and Development's *Infrastructure to 2030* study, Stevens et al. (2006: 48) noted "the quantitative and qualitative inadequacy of the infrastructure-related statistics and data sets currently available." The flagship report of the Africa Infrastructure Knowledge Program[2] emphasized a similar issue:

> Even the most elementary data—on quantity and quality of infrastructure stocks, access to services, prices and costs, efficiency parameters, historic spending, and future investment needs—were either nonexistent or limited in coverage. Most standard global databases on infrastructure covered barely a handful of African countries (Foster and Briceño-Garmendia 2010: 32).

In the same year, Estache and Fay (2010: 155) lamented, "Compared to the information available on health or education, for instance, the information gap in the infrastructure sector is huge and shows no sign of narrowing."

While much concern has been focused on the lack of data on physical stocks of, and access to, infrastructure, the concerns about data on infrastructure spending are, if anything, even greater. Two decades ago, Easterly and Rebelo (1993: 442) pointed to the "paucity of data on comprehensive infrastructure spending in most countries." Ten years later, Fay (2001: 19) simply stated "No information is available

Table 2.1 Specific infrastructure components included in various studies

Study	Transportation	Energy	Water and sanitation	ICT
The Global Competitiveness Report 2010–2011 (Schwab 2010)	Roads, railways, ports, air transport (quality)	Electricity generation capacity (quality)	Not included	Fixed-line telephones, mobile phones
Africa's Infrastructure: A Time for Transformation (Foster and Briceño-Garmendia 2010)	Roads, railways, ports, airports	Electricity generation capacity and transmission networks	Irrigation, water and sanitation	Fixed-line telephones, mobile phones
Economics of Adaptation to Climate Change (G. Hughes, Chinowsky, and Strzepek 2009)	Roads, railways, bridges, ports, airports	Electricity generation capacity and transmission networks	Water and sanitation	Fixed-line telephones
Infrastructure to 2030 (Organisation for Economic Co-operation and Development 2006)	Roads, railways	Electricity generation capacity and transmission networks	Water supply, sanitation, wastewater, irrigation	Fixed-line telephones, mobile phones, fixed broadband, mobile broadband
World Development Report 1994 (World Bank 1994)	Roads, railways, ports, airports	Electricity generation capacity, piped gas	Dams, canal works, piped water supply, sanitation	Fixed-line telephones

on public investment in infrastructure." More recently, the Commission on Growth and Development (2008: 35) noted that "data on public investment in infrastructure is surprisingly patchy," and Estache and Fay (2010: 156–157) stated that "Data on public spending on infrastructure are largely nonexistent, as very few countries estimate how much they spend on infrastructure."

This lack of a centralized source of global data on infrastructure is related, in part, to the existing structure of international organizations. Unlike the World Health Organization (WHO) for health or the United Nations Educational, Scientific and Cultural Organization for education, there is no lead global organization that functions across categories of infrastructure. Furthermore, as Estache (2010: 67) noted, infrastructure is not a specific category in the United Nations System of National Accounts or the International Monetary Fund's Government Financial Statistics.

In terms of historical data on infrastructure stocks and access, we can turn to various international organizations with specific emphases. These include the International Road Federation (IRF) for transportation, the International Energy Agency (IEA) for energy, and the International Telecommunication Union (ITU) for telecommunications. No one organization focuses on water and sanitation systems, but a number of different organizations, such as the Joint Monitoring Programme (JMP) of WHO and the United Nations Children's Fund (UNICEF), the United Nations Statistics Division of the Department of Economic and Social Affairs, and the United Nations Food and Agriculture Organization (FAO), maintain global data related to certain aspects of water infrastructure. Table 2.2 summarizes a number of the datasets these groups maintain.

In addition to these primary data sources, the World Bank World Development Indicators (WDI)[3] and the World Resources Institute EarthTrends[4] databases act as clearinghouses for much of the same data. We can turn also to Canning (1998), Canning and Farahani (2007), and Estache and Goicoechea (2005),who have drawn on these and other sources in attempts to create global databases of infrastructure stocks and access, to increase the number of years covered for certain time-series while maintaining consistent definitions, and to correct errors. Further, as part of the Africa Infrastructure Country Diagnostic (AICD) (see again footnote

Data availability is a challenge, in part, because no lead global organization functions across categories of infrastructure.

Table 2.2 Major institutional sources of infrastructure stock and access data

Infrastructure type	Organization	Spatial coverage	Temporal coverage	Infrastructure coverage
Transportation	International Road Federation	Global	Annual data: 1968–2009	Total road network length, percent of road network paved, and road density
	World Bank	Global	Data for most recent year only	Percentage of rural population with access to an all-season road
Electricity/ energy	United States Energy Information Administration	Global	Annual data: 1980–2010	Total installed electricity generation capacity and generation capacity by energy type
	International Energy Agency	Global	Annual data: 1960–2009	Electricity production by source type; total electricity production; percent of total, urban, and rural population with access to electricity
Water and sanitation	WHO and UNICEF Joint Monitoring Programme for Water Supply and Sanitation	Global	Annual data: 1990–2010	Percent of population with access to improved, piped, other improved, and unimproved water, and to sanitation facilities
	Food and Agriculture Organization AQUASTAT database	Global	Annual data: 1960–2010	Percent of arable land equipped for irrigation and water use/withdrawals by sector
	United Nations Statistics Division, Department of Economic and Social Affairs	Global	Data for most recent year available only	Percent of population with wastewater connection and percent with connection to wastewater treatment
Information and communication technologies	International Telecommunication Union	Global	Annual data: 1960–2011	Number of telephone mainlines, cell phone subscriptions, broadband subscriptions, mobile broadband subscriptions, and number of computer/internet users

Source: IFs Version 6.61. See Appendix II for a list of intrastructure-related databases used in this volume.

2), the World Bank and the African Development Bank developed an extensive database on infrastructure in Africa.[5] Finally, G. Hughes, Chinowsky, and Strzepek (2009) and Calderón and Servén (2010a; 2010b), among others, have used and modified a number of these databases in their own studies.

Historical data on infrastructure spending present a particular challenge; sources differ on the infrastructure included, sources of funding, types of expenditures, and time horizons.

The challenge becomes even greater for historical data on infrastructure spending. In considering public investment in infrastructure (PII), some researchers have used other measures in the Systems of National Accounts, usually fixed capital formation or government outlays by economic sector, as proxies (Agénor, Nabli, and Yousef 2007; Cavallo and Daude 2008; Organisation for Economic Co-operation and Development 2009a; Ter-Minassian and Allen 2004). Lora (2007: 7), however, strongly argued against this practice

> because capital expenditures by the central or the consolidated government as measured by the International Monetary Fund's *Government Financial Statistics* . . . are a very poor measure of actual PII, which in many countries is mostly undertaken by state-owned enterprises or local governments whose operations are not well captured by this source.

Estache (2010: 67) adds:

> Neither the national accounts nor the IMF [International Monetary Fund] Government Finance Statistics (GFS) report a disaggregation of total and public investment data detailed enough to allow identifying every infrastructure sub-sector. In national accounts, energy data cover both electricity and gas but also all primary-energy related products such as petroleum. Similarly, the data do not really distinguish between transport and communication. Water expenditures can be hidden in public works or even in health expenditures.

The World Bank does collect data on private investment in infrastructure in its Private Participation in Infrastructure Project Database.[6] Unfortunately, limitations to this database make us hesitant to rely on it as a primary source of data on infrastructure investment. First, it provides data only on projects in low- and middle-income countries in which there is private participation. Second, the amounts in the database primarily reflect commitments, not actual investments. Third, it relies exclusively on information that is made publicly available. Finally, the Bank itself states that it "should not be seen as a fully comprehensive resource."[7]

This leaves us needing to rely on national, regional, and global studies and reports that provide estimates of infrastructure spending. Given their varied purposes, these studies and reports tend to differ in a number of significant dimensions: temporal coverage; types of infrastructure included; sources of funding (e.g., public versus private); and purpose of expenditure (e.g., new construction versus maintenance). Therefore, we need to be careful in comparing data across studies and in drawing conclusions from them. Even so, they provide a starting point for our exploration. Table 2.3 lists a number of these studies and summarizes some of the major elements in their approaches.

The challenges posed by limited historical data led us to create our own infrastructure database, drawn from a wide array of international governmental and nongovernmental organizations.

Building an infrastructure database for IFs

The challenge of historical data on infrastructure and our need for a relatively comprehensive infrastructure database led us to draw on the databases, reports, and papers of nearly a dozen international governmental and nongovernmental organizations, including the International Energy Agency, the United States Energy Information Administration (USEIA), the International Telecommunication Union, the World Bank, the World Health Organization, the International Road Federation, the Food and Agriculture Organization, the United Nations Environment Programme, the United Nations Statistics Division of the Department of Economic and Social Affairs, the Organisation for Economic Co-operation and Development (OECD), and the International Monetary Fund (IMF). From these disparate sources, we assembled a set of 23 core data sets for physical infrastructure and three sets on infrastructure spending. We used the former to initialize key forecast variables in the model. For reasons explained later in this chapter and in Chapter 4, we were

Table 2.3 Major sources of infrastructure spending data

Study	Spatial coverage	Temporal coverage	Infrastructure coverage	Source of funds	Purpose of expenditure
Trends in Transport Infrastructure Investment 1995–2009 (International Transport Forum and Organisation for Economic Co-operation and Development 2011)	Albania, Australia, Austria, Azerbaijan, Belgium, Bosnia, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, India, Ireland, Italy, Japan, Korea, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Malta, Mexico, Moldova, Montenegro, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States	Annual data: 1992–2009	Separate data for rail, road, inland waterways, maritime ports, and airports	Combined public and private sources for investment; only spending by public authorities for maintenance	Separate data for investment and maintenance
Africa Infrastructure Country Diagnostic (http://www.infrastructureafrica.org/aicd/tools/data)	Benin, Botswana, Burkina Faso, Cameroon, Cape Verde, Chad, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Ethiopia, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mozambique, Namibia, Nigeria, Rwanda, Senegal, South Africa, Tanzania, Uganda, Zambia	Annual average for one period: 2001–2006	Separate data for electricity, ICT, irrigation, transportation, and water supply and sanitation	Public and private	Separate data for new construction and for operation and maintenance
Infrastructure in Latin America (Calderón and Servén 2010b)	Argentina, Brazil, Chile, Colombia, Mexico, Peru	Annual data: 1980–2006	Separate data for telecommunications, power generation, land transportation (roads and railways), and water and sanitation	Separate data for public and private	Total spending (construction, operations, and maintenance)
Public Spending on Transportation and Water Infrastructure (Congressional Budget Office 2010)	United States	Annual data: 1956–2007	Separate data for highways, mass transit, rail, aviation, water transportation, water resources, and water supply and wastewater treatment	Public only, broken down by (1) federal, and (2) state and local	Separate data for capital expenditures and for operation and maintenance
Infrastructure Development in India and China—A Comparative Analysis (Kim and Nangia 2010)	China, India	Annual data: 1985–2006	Combined data for electricity, water, gas, transport, and communications	Combined public and private	Not stated
Going for Growth: Economic Policy Reforms (Organisation for Economic Co-operation and Development 2009a)	Australia, Austria, Belgium, Canada, Finland, France, Iceland, Ireland, Italy, Netherlands, New Zealand, Norway, South Korea, Spain, Sweden, United Kingdom, United States	Annual averages for four periods: 1970–1979, 1980–1989, 1990–1999, 2000–2006	Aggregate data provided separately for (1) electricity, gas, and water, and (2) transport and communications	Combined public and private	Aggregate investment (from national accounts)
Connecting East Asia: A New Framework for Infrastructure (Asian Development Bank, Japan Bank for International Cooperation, and World Bank 2005)	Cambodia, China, Indonesia, Laos, Mongolia, Philippines, Thailand, Vietnam	Annual data for select years: 1998, 2003	Separate data for transportation, telecommunications, water and sanitation, other urban infrastructure, and power	Separate data for national government, local government, state owned enterprises, and private	Not stated

Note: In some cases (e.g., Asian Development Bank, Japan Bank for International Cooperation, and World Bank 2005), we have taken the data directly from the published studies. In other cases (e.g., AICD), we have taken data from associated websites that provide updated and more detailed data. Finally, in other cases (e.g., Kim and Nangia 2010), the authors have been kind enough to provide underlying data that did not appear in the original publication or appeared only in summary form. In addition to these sources, many countries have produced their own internal reports on infrastructure spending.

Source: IFs Version 6.61.

unable to use the available historical data on infrastructure spending to initialize variables within the International Futures (IFs) system. We also assembled more than 500 supporting infrastructure data sets to further enhance analysis with the IFs model. All of our data series accompany the IFs system and therefore are available for use by others.

With respect to stock and access data, we utilize the following::

- *For transportation*, we draw especially on three main physical indicators taken from the World Bank and the IRF: total road length in kilometers, paved road length in kilometers, and the percent of total roads that are paved. These data sets include an average of 174 countries with temporal coverage ranging from 17 years (paved length) to 49 years (total road length); overall data availability is 52 percent. We also include data from the World Bank's Rural Access Index, which provides data on rural all-season road accessibility for 169 countries from 1993 to 2004.
- *For electricity*, we use two main data sets: total installed electricity generation capacity in kilowatts from the USEIA, and the percentage of population with access to electricity from the IEA. For generation capacity, we have data for 181 countries with 92 percent availability for 30 years. For the percentage of population with access, we have data for 126 countries with 26 percent coverage over 8 years.
- *For water and sanitation*, we use 16 main datasets, mostly from 2 sources: (1) the WHO and UNICEF Joint Monitoring Programme; and (2) FAOSTAT, the FAO's primary database. The datasets cover water supply (from no connections to household connections) broken out by rural, urban, and total populations; sanitation (from open defecation to household connection) for rural, urban, and total populations; irrigation (total land area equipped for irrigation and land with potential for irrigation); and wastewater (the percent of the population connected to wastewater collection and the percent of the population connected to wastewater treatment). The water and sanitation datasets cover an average of 176 countries with 91 percent availability for 20 years. The irrigation data cover an average of 143 countries with 64 percent data availability with temporal coverage for 49 years. The wastewater set, which comes from United Nations Statistics Division Environmental Indicators, has data for 78 countries with 21 percent availability for 20 years.
- *For ICT*, we use four main datasets taken from the ITU: fixed telephone lines per 100 persons; mobile phones per 100 persons; fixed broadband subscriptions per 100 persons; and mobile broadband subscribers per 100 persons. These four series cover an average of 182 countries with 82 percent data availability, with temporal coverage ranging from 12 to 39 years depending on when each technology was developed.

For infrastructure spending, the data are much sparser. Although the Structural Analysis database of the OECD,[8] the World Bank WDI series and Private Participation in Infrastructure database, and the IMF *Government Finance Statistics Yearbook*[9] all provide some data on infrastructure spending, such as gross fixed capital formation, there are problems using these as actual measures of infrastructure spending, as discussed earlier. Thus, we ended up assembling our own database from several other sources: the African Infrastructure Country Diagnostic, national account reports from various countries, and numerous individual World Bank and OECD studies and reports. From these sources we constructed three main data sets: total infrastructure investment (public and private) as a percent of GDP; private infrastructure investment as a percent of GDP by infrastructure type; and public spending on infrastructure by type of infrastructure. Total infrastructure investment covers just 32 countries for 15 years with only 3.5 percent data availability. Private investment in infrastructure has data for 107 countries for 18 years with 16.5 percent data availability. Public investment has only 51 countries, with 13 percent availability for 5 years.

New forms of infrastructure have arisen and spread quickly around the world in recent decades, and existing forms have grown in extent and complexity.

The State of, and Trends in, Infrastructure: Physical Stocks, Access, and Spending

The world's infrastructure has changed greatly over the last few decades. New forms have arisen and spread quickly, and existing forms have grown in extent and, often, in complexity. We begin our story by first looking separately at the four infrastructure categories that are the focus of our study—transportation, energy, water and sanitation, and ICT—by global region and country income category (see Box 2.1 for a description of the country groupings we use).

Physical stocks and access

Transportation

Since the beginning of civilization, transportation infrastructure has connected societies by expediting the movement of people, goods, and ideas. Advances in transportation technology and modes, from horseback to sailing ships and paved roads, have continually shrunk travel times and increased carrying capacity of goods and people. Over time, advances in transportation technologies opened new lands to exploration, trade, and exploitation, and eventually led to the rise of colonial empires and global trade (Woodman 2002). Today, transportation technologies such as the automobile, public rapid transit, and air travel have greatly enhanced personal mobility, enabling new social and economic opportunities and altering the ways in which people live. The mobility of goods has followed suit, as flexible supply chains became the norm. The advent of cargo aviation and modern high-volume shipping not only increased goods mobility even further, but also made today's globalized world possible (Gilbert 2007).

Though railways and ships continue to dominate much of domestic and international freight transport, and even as airplanes are an increasingly important aspect of moving both people and goods, roads remain the most fundamental form of transportation infrastructure. They connect and help build societies in ways that few other forms of infrastructure can. The development of new roads is often the first step in creating "somewhere" out of "nowhere." At other times, roads are the physical embodiment of the joining of what were once distinct communities.

Road infrastructure has grown significantly over the past three and a half decades. Between 1975 and 2009, the world's stock of roads grew some 64 percent, from about 20 million kilometers to just under 34 million kilometers, at an average annual rate of 1.4 percent (see Figure 2.1, on p. 26).[10] Much of this growth has occurred since 1990, as the upper-middle- and lower-middle-income countries of East Asia and Pacific and of South Asia (primarily China and India, respectively) began to rapidly build-out their road networks—helping to increase the average annual rate of global road growth to 1.7 percent from 1990–2009. The rapid growth in East Asia and Pacific has also resulted in a steady increase in the two big developing regions' share of the world's total road network, to the point that in 2009, for the first time, more roads existed outside the developed world than in it.

As the total amount of roads has increased, so has the share of roads that are paved (Figure 2.2, on p. 27). We estimate that between 1990 and 2009, the worldwide percentage of paved roads

Box 2.1 Groupings of country-level data and forecasts

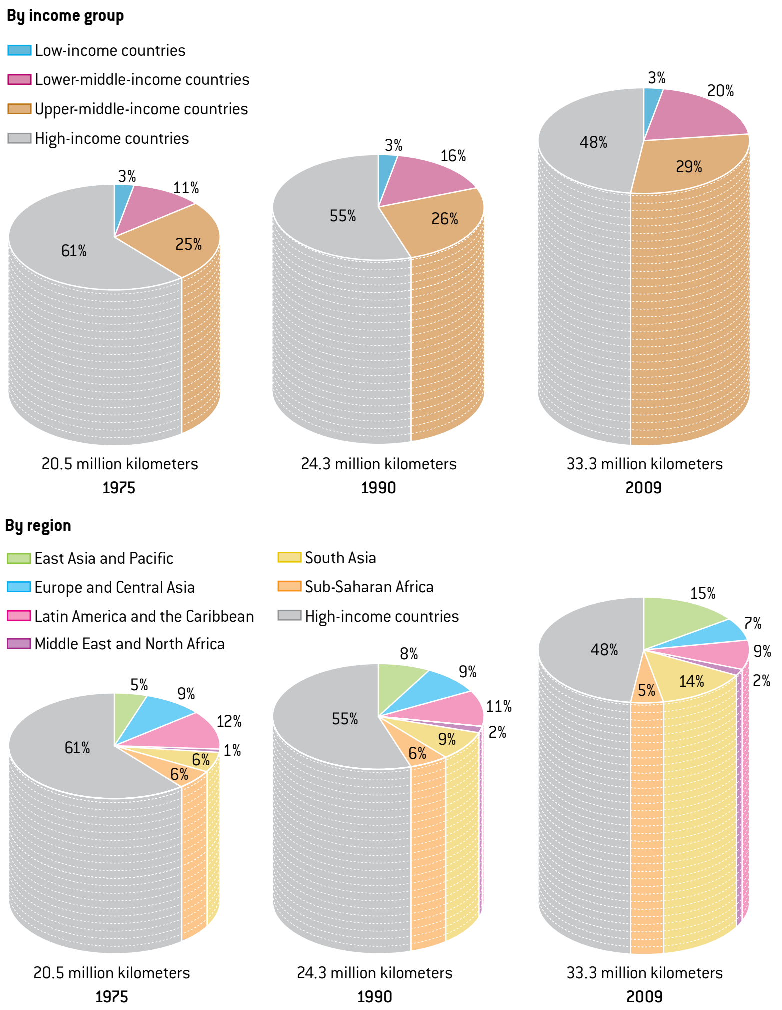
Major international organizations define world regions differently. In the case of infrastructure, different organizations use varying regional groupings for their analyses. Because we want to use a common system across infrastructure types and because of the wide use of the World Bank's geographic and income classifications in development studies, we utilize these categories throughout this volume unless otherwise noted.

The World Bank geographic classifications combine income and geographic groupings to create six developing-country regions (East Asia and Pacific, Europe and Central Asia, Latin America and the Caribbean, Middle East and North Africa, South Asia, and sub-Saharan Africa), and a seventh category that is an aggregation of all high-income countries. Its income classifications cluster countries in four groups based solely on gross national income (GNI) per capita. The groupings are low-income, lower-middle-income, upper-middle-income, and high-income countries, respectively. In this volume, we most frequently show information both by income groups and developing regions, followed by the world total. When both categories are presented in a single figure, developing regions can be compared easily to high-income countries and the world as a whole. We add high-income countries as a seventh region when looking at global percentages by region.

The World Bank updates these classifications each year on July 1 to reflect changes in income levels of populations. In this volume, we use the groupings as of July 1, 2012, which are based on 2011 GNI per capita. Appendix I to this volume identifies the members of the regions and income groups.

The world's road infrastructure has grown by 64 percent over the last three decades, with much of this growth in East Asia and Pacific and in South Asia.

Figure 2.1 Total roads (paved and unpaved) by income group and region: 1975, 1990, 2009



Note: High-income countries are included as a group in the regional analysis in order to sum to the world total.

Source: Compiled by authors using data from César Calderón (personal communication); work by David Canning (http://www.hsph.harvard.edu/faculty/david-canning/data-sets/); and the World Bank World Development Indicators, 2009 to 2012 editions, available at http://data.worldbank.org/data-catalog/world-development-indicators.

Global growth in paved roads is outpacing that of total roads, but low-income countries continue to lag far behind in terms of paved roads.

increased from 53 percent in 1990 to just under 60 percent in 2009. As with total roads, much of the growth in paved roads during these years occurred in the lower-middle- and upper-middle-income countries of East Asia and Pacific and of South Asia. The East Asia and Pacific region built 2.1 million kilometers of paved roads from 1990 to 2009, more than any other developing region—34 percent more than South Asia (1.6 million kilometers), the region that built the second most, and close behind the high-income countries (2.4 million kilometers). High-income countries continue to dominate in terms of overall network length, with 11.3 million kilometers of paved roads compared to East Asia and Pacific's 2.6 million. In summary, developing regions have dramatically increased their share of the world's paved-road network but, as of 2009, the developed world still contained 57 percent of the total length of paved roads.

Note in Figure 2.2 that lower-middle-income countries have a higher percentage of paved roads than do upper-middle-income countries. This perhaps surprising circumstance can be explained in part by the following: (1) upper-middle-income countries have longer total road networks, and hence more to pave and more expense; and (2) important differences in geography and population distribution patterns distinguish the two groups. Some of the physically largest countries in the world (e.g., Argentina, Brazil, and China) are upper-middle-income countries; paving a significant portion of the roads in such countries, especially those with low-density widely dispersed populations, is very expensive. Lower-middle-income countries tend to be smaller in land area (with India being an obvious exception), and several, including Bangladesh, India, Indonesia, and Pakistan, tend also to have a high population density and large, relatively dense, rural populations.

For all regions, growth in paved roads from 1990 to 2009 outpaced growth in total roads, but growth in the percentage of roads paved was slower in Latin America and the Caribbean, Europe and Central Asia, and in high-income countries than in other regions. Latin America, sub-Saharan Africa, and low-income countries more generally, continue to lag far behind other regions in terms of paved percent.[11] East Asia and Pacific, led by China, had the largest increase in paved percentage across the two decades. Two of the developing regions, Europe and Central Asia and the Middle East and North Africa, now have paved percentages that equal or exceed that of the high-income country group; high levels of oil production certainly contributed to that in both regions.

Putting the length of the road network in context, either by road density per unit area or per capita, is useful. Neither measure is perfect, however. Countries with large uninhabited areas (e.g., Australia, Canada, and Russia) will have a relatively low road density per unit area, even if most people have good access to the road network. Alternatively, small countries with high population densities (e.g., Singapore) will exhibit relatively low per capita road densities but have adequate or more than adequate road networks. Still, some general patterns are worth exploring, as shown in Table 2.4 (p. 28).

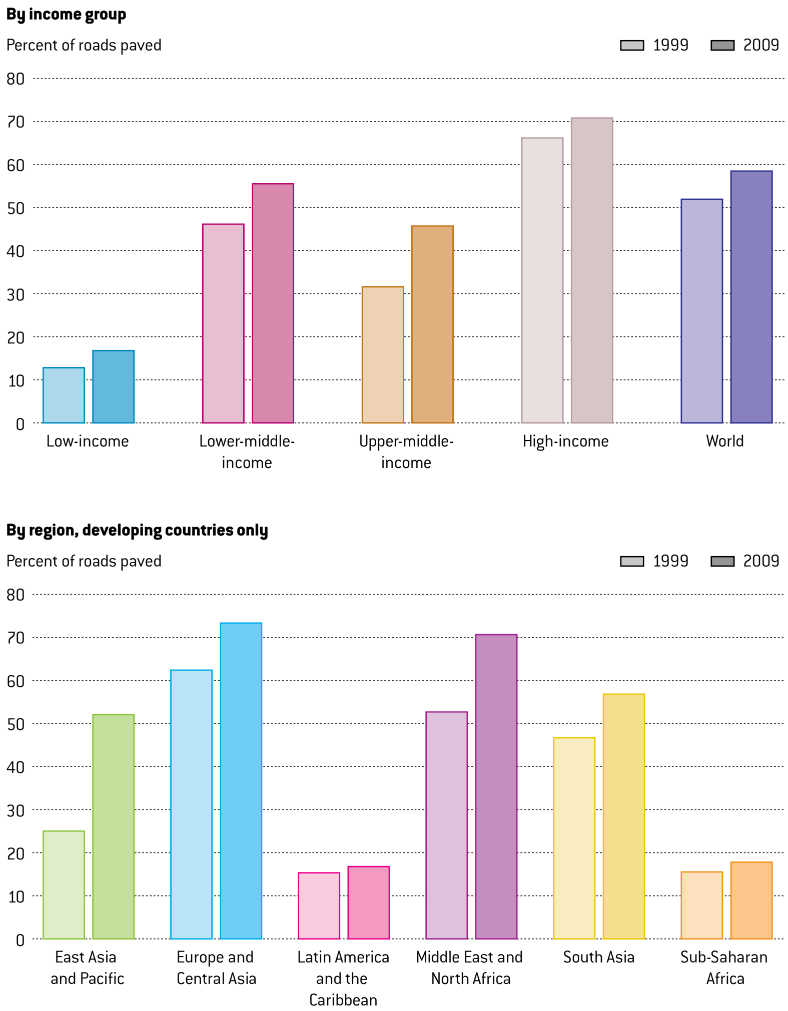
Whether road density is measured on a per unit area or a per capita basis, it has a tendency to increase with income.[12] While changes in road density per unit area indicate the growth (or lack of growth) in road kilometers in absolute terms, per capita density and changes in per capita density provide a more comparative measure of the road access that individuals experience. The most striking aspect of per capita density is the very large gap between the high-income countries and the rest of the world. This gap indicates the remaining need and potential for growth in roads across developing regions. Because of population growth, low-income countries and a number of the regional groupings have seen declines in road density per capita between 1990 and 2009, despite absolute increases in road length (see again Table 2.4). Meanwhile, total road densities per capita within high-income countries have been relatively constant at a very high level, suggesting that high-income countries, in general, are already well served by their total road lengths.

Specific regions reflect these patterns. Most notable is the rapid growth in density within East Asia and Pacific, driven by the rapid expansion in China, and the considerable growth within South Asia, largely due to India. At the same time, road growth has not kept pace with population growth in several regions, most notably sub-Saharan Africa and Latin America and the Caribbean, leading to density stagnation or even decline relative to population (although not to area). Of note is how South Asia has the greatest density of roads per unit land area but ranks much lower in terms of road density per capita; Europe and Central Asia and Latin America and the Caribbean show the opposite pattern. This, of course, reflects the dramatically different population densities and geographies across these regions, which will certainly have an effect on future infrastructure development.

Some researchers have attempted to devise better measures of access to transportation infrastructure. Roberts, KC, and Rastogi (2006: 2) defined a Rural Access Index (RAI) as "the number of rural people who live within two kilometers (typically equivalent to a walk of 20–25 minutes) of an all-season road as a proportion of the total rural population." Figure 2.3 (p. 29) shows the wide range of access across countries based on the most recent data available through 2004. This shows that even as road length has increased and many more

A very large gap remains in per capita road densities between high-income countries and the rest of the world.

Figure 2.2 Percentage of roads paved by income group and region: 1990, 2009



Source: Compiled by authors using data from César Calderón (personal communication); work by David Canning (http://www.hsph.harvard.edu/faculty/david-canning/data-sets/); and the World Bank World Development Indicators, 2009 to 2012 editions, available at http://data.worldbank.org/data-catalog/world-development-indicators.

Table 2.4 Road density per person and per unit land area: 1990, 2000, 2009

	Per person (kilometers per 1,000 persons)			Per unit land area (kilometers per 1,000 square kilometers)		
By income group	**1990**	**2000**	**2009**	**1990**	**2000**	**2009**
Low-income countries	2.14	1.89	1.55	0.51	0.59	0.60
Lower-middle-income countries	2.20	2.66	2.79	2.18	3.17	3.82
Upper-middle-income countries	3.11	2.97	4.07	0.95	1.01	1.49
High-income countries	14.08	14.41	14.68	5.65	6.20	6.70
By region, developing countries only						
East Asia and Pacific	1.22	1.31	2.59	1.38	1.68	3.58
Europe and Central Asia	5.54	4.87	6.10	0.97	0.86	1.10
Latin America and the Caribbean	6.40	5.95	5.57	0.94	1.03	1.08
Middle East and North Africa	2.09	2.05	2.07	0.69	0.82	0.97
South Asia	2.26	2.97	3.27	4.97	7.86	9.96
Sub-Saharan Africa	2.65	2.63	2.08	0.58	0.75	0.74
World	**4.80**	**4.79**	**5.15**	**1.98**	**2.27**	**2.71**

Source: Compiled by authors using data from César Calderón (personal communication); work by David Canning (http://www.hsph.harvard.edu/faculty/david-canning/data-sets/); and the World Bank World Development Indicators, 2009 to 2012 editions, available at http://data.worldbank.org/data-catalog/world-development-indicators.

The mostly rural populations that still lack access to roads face significant barriers to economic and social opportunities.

roads are paved, a large segment of the world's population, overwhelmingly in rural areas, still lacks access to roads and the transport services roads provide, which many studies see as a significant barrier to economic and social opportunities. The World Bank estimates that "over one billion (31 percent) of the world's rural population (98 percent of them in developing countries) do not have adequate access to transport [services]."[13]

Unfortunately, no historical time-series is available for the Rural Access Index, so we cannot know how rural road access has changed over time. Nevertheless, we can obtain some general insight by considering historical trends in total road density (roads relative to land area). Total road density has been growing over time in all global regions (Figure 2.1 and Table 2.4 showed the total global road length and the changing shares across income groups and regions). This growth in density relative to land area suggests that rural access has likely been increasing, unless rural populations are spreading into, or growing within, more remote areas not served by roads. Although such spread or growth may be the case for select pockets of global population, demographic data show increased urban population share and therefore concentration almost everywhere.

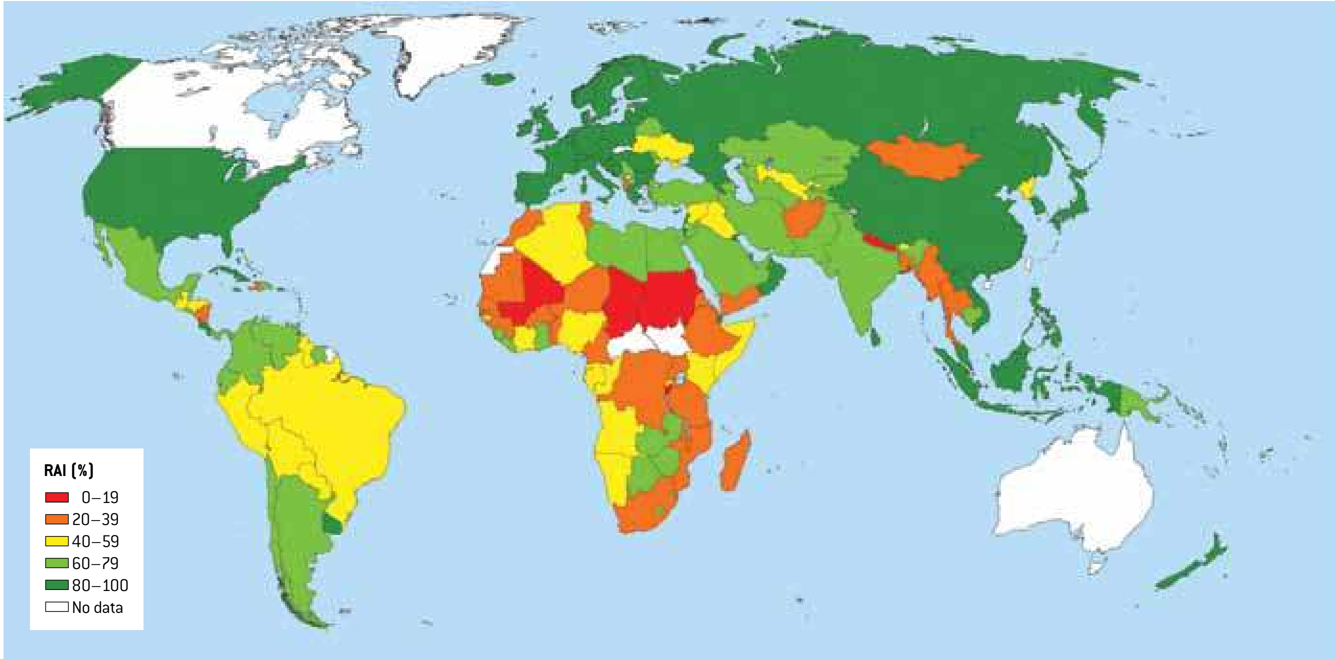
Much of the world's infrastructure is devoted to finding, refining, distributing, and using energy resources.

Energy

Energy, the capacity to do work, is a fundamental characteristic of life and a building block of human development. As late as the nineteenth century, one term for the modern notion of energy was "living force" (Ayres and Warr 2009: 151). It would be hard to overestimate the importance of the control of fire—emblematic of the ability to harness and use energy beyond that contained in the human body—as a defining point in human and societal development. The services we derive from energy are innumerable—for example, heating, cooling, lighting, cooking, and powering machinery.

It is not surprising, therefore, that much infrastructure is devoted to finding, refining, distributing, and using energy resources. An energy resource refers to a substance or process from which we are able to derive useful energy. Energy resources come in many forms, including moving water, sunshine, a team of horses, a lump of coal, and uranium ore. In most cases, energy resources are not used in their raw form and not at the site where they are found. Through various processes, they are moved and transformed from primary into secondary (or alternatively, final) energy resources (see Figure 2.4, on p. 30). Box 2.2 describes the distinction

Figure 2.3 Estimates of rural road access (variable years between 1997 and 2004)



Note: The Rural Access Index is the percentage of a country's rural population that lives within 2 kilometers of an all-season road. The RAI uses single year data for each country spanning the 1997 to 2004 period, depending on data availability.

Source: Created by authors with data available at http://www.worldbank.org/transport/transportresults/headline/rural-access/rai-updated-modelbasedscores5-20070305.pdf. Map from Wikimedia Commons (user: Nightstallion/Wikimedia Commons/CC-BY-SA-3.0).

between renewable and nonrenewable energy resources; Box 2.3 (p. 30) discusses some energy measurement concepts and terms.

Infrastructure elements are involved in each stage of energy production—exploration, extraction, conversion, and distribution. These elements vary by the type of energy resource and the stage in the process, and include such entities as coal mines, oil and gas fields, refineries, hydroelectric dams and other electricity generation facilities, pipelines, transmission lines, tanker ships, trucks, railroads, and ports.

Electricity generation capacity is the most commonly used indicator of energy infrastructure (see, for example, Fay 2001; OECD 2006; and World Bank 1994), but with the increased availability of data, some studies also have started to consider access to electricity and other modern forms of energy (see Foster and Briceño-Garmendia 2010), in juxtaposition to the use of traditional solid fuels such as wood, charcoal, and dung, especially for home cooking and heating.[14]

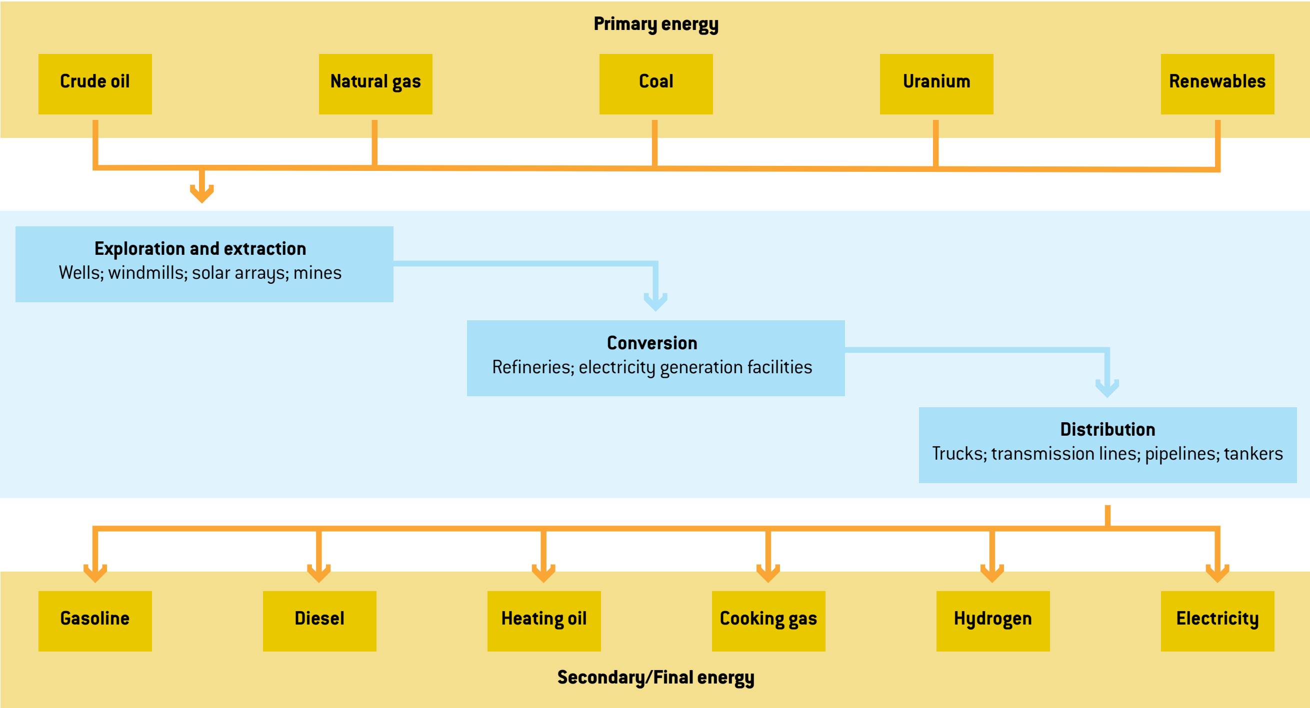
Globally, electricity generation capacity increased nearly threefold from 1975 to 2009,

Globally, electricity generation capacity increased nearly threefold from 1975 to 2009, but more than half of all capacity remains in high-income countries.

Box 2.2 Renewable vs. nonrenewable energy resources

We can make a basic distinction between renewable and nonrenewable energy resources. Renewable energy is derived from natural processes, such as wind, rain, and sunshine, which constantly replenish themselves. In general, renewable energy resources can be described as "flow-limited." That is, while there may not be ultimate limits to how much energy they can provide, the rate at which they can be utilized is heavily dependent on the rate of the natural processes that generate them. On the other hand, nonrenewable energy resources, such as coal, oil, and natural gas, are not regenerated on short time scales. In general, these are "stock-limited." That is, there is no inherent limit to the rate at which they can be utilized, but there are ultimate limits to the amount of energy they can produce, dependent on the size of the stock. Some energy resources (e.g., wood and other forms of biomass) fall in between these two broad categories.

Figure 2.4 Energy resources and energy infrastructure



Source: Created by authors.

Box 2.3 Measuring energy and power

Numerous measures exist for energy resources. They can be measured in physical quantities, such as barrels of oil, tons of coal, and cubic feet of natural gas. In general, though, using energy equivalents is preferable. The base unit for measuring energy is a joule, but other commonly used measures include the British thermal unit, calorie, ton of oil or coal equivalent, barrel of oil equivalent, and watt-hours. Since a joule and most of these other commonly used measures represent small amounts of energy, energy production and use is typically expressed in terms of orders of magnitude of these measures, such as gigajoules—a billion (10^9) joules; megawatt-hours—a million (10^6) watt-hours; and quads—a quadrillion (10^{15}) British thermal units.

Electricity generation capacity is measured in terms of power—that is, the capacity to produce energy rather than the actual delivery of energy or energy services. The base unit for measuring power is a watt, which is one joule per second. Electricity generation capacity is commonly expressed in megawatts, one million watts, or gigawatts, one thousand megawatts. One megawatt represents the capacity to deliver one million joules per second, or 3.6 billion joules per hour. How much energy a plant with a capacity of one megawatt will actually produce over a given period of time will depend on its use.

growing from just under 1,600 gigawatts to over 4,800 gigawatts during this period (see Figure 2.5 on p. 31). Even today, more than half of this capacity is located in high-income countries, although some increase in shares has taken place in the lower-middle- and especially the upper-middle-income countries. Regionally, the most significant relative changes have been in East Asia and Pacific (from under 4 percent of the global total in 1975 to more than 20 percent in 2009) and the decline in Europe and Central Asia (from over 16 percent of the global total in 1975 to less than 10 percent in 2009).

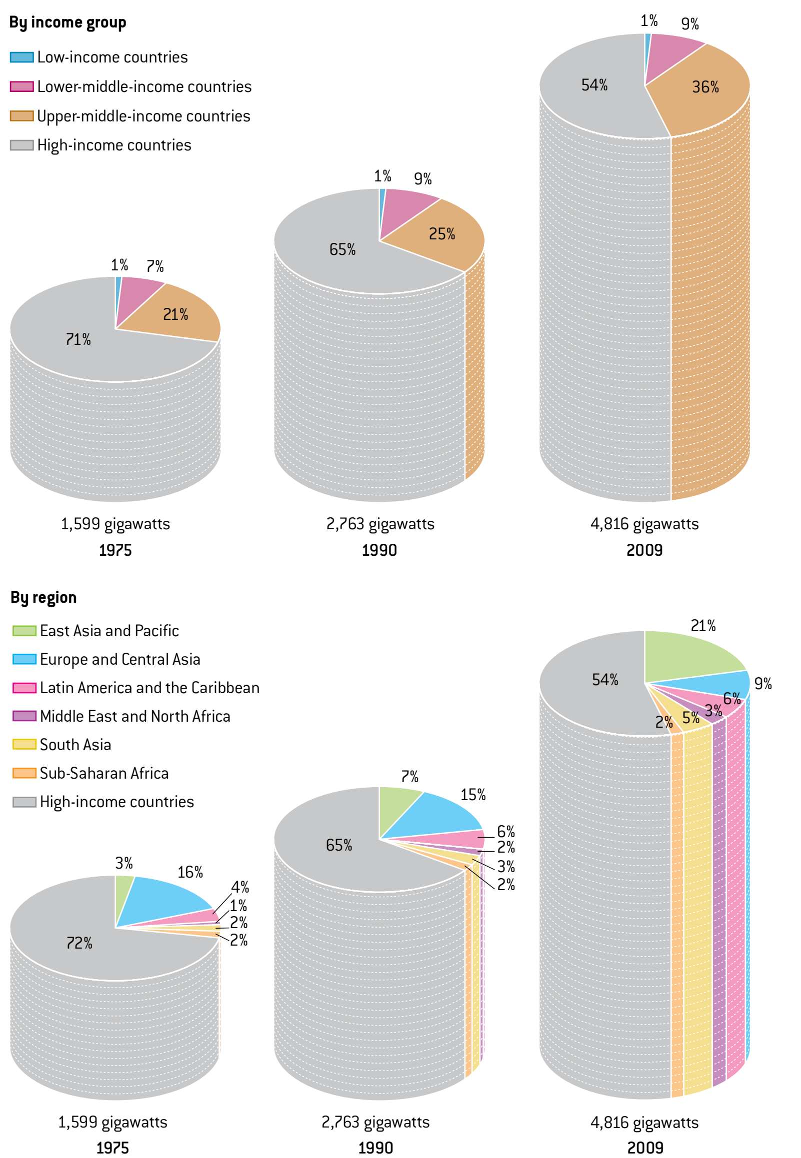
As with roads, the absolute amount of electricity generation capacity must be considered in the context of the size of the population. The interregional differences in capacity per capita are striking (Table 2.5). Not surprisingly, electricity generation capacity per capita is clearly associated with income, but what may be more significant is how this capacity has changed over time. World per capita capacity grew by 80 percent between 1975 and 2009. East Asia and Pacific

Table 2.5 Installed electricity generation capacity per capita (watts per person) by income group and region: 1975, 1990, 2009

By income group	1975	1990	2009
Low-income countries	49	64	49
Lower-middle-income countries	83	135	182
Upper-middle-income countries	209	337	707
High-income countries	1,311	1,854	2,354
By region, developing countries only			
East Asia and Pacific	45	117	530
Europe and Central Asia	758	1,034	1,091
Latin America and the Caribbean	202	361	523
Middle East and North Africa	152	255	398
South Asia	35	77	141
Sub-Saharan Africa	85	113	91
World	**393**	**524**	**711**

Source: Compiled by authors using data from the U.S. Energy Information Administration International Energy Statistics (http://www.eia.gov/countries/data.cfm), and work by David Canning (http://www.hsph.harvard.edu/faculty/david-canning/data-sets/).

Figure 2.5 Share of total installed electricity generation capacity by income group and region: 1975, 1990, 2009



Note: High-income countries are included as a group in the regional analysis in order to sum to the world total.

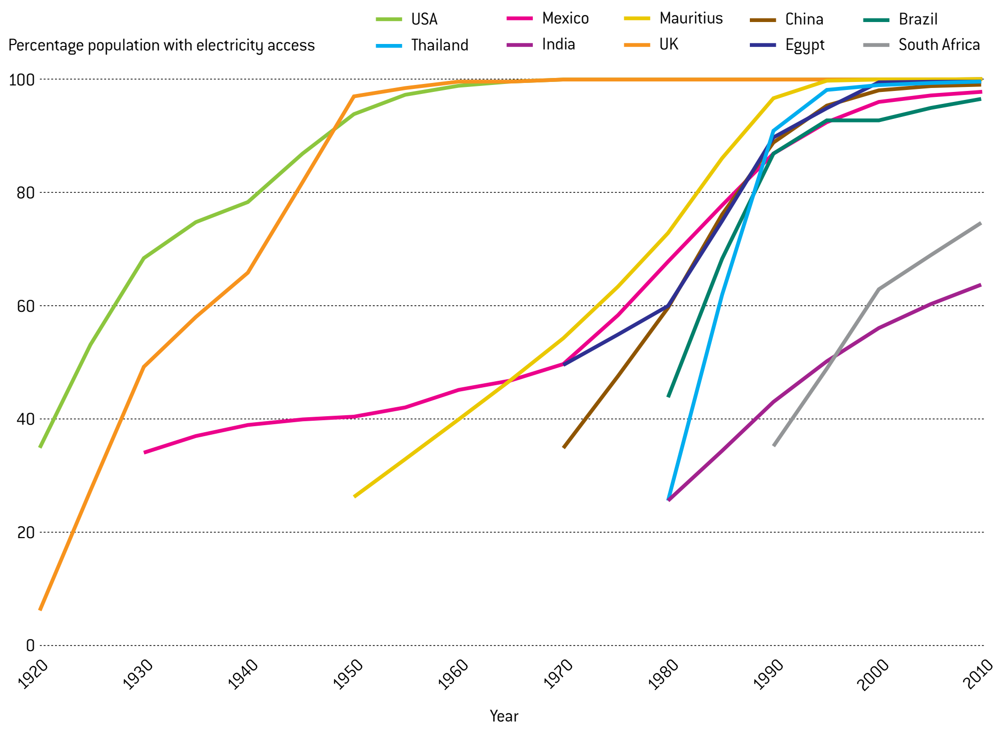
Source: Compiled by authors using data from the U.S. Energy Information Administration International Energy Statistics (http://www.eia.gov/countries/data.cfm) and work by David Canning (http://www.hsph.harvard.edu/faculty/david-canning/data-sets/).

saw a nearly 12-fold increase over the same period. Latin America and the Caribbean, Middle East and North Africa, and South Asia had more modest but nonetheless significant increase. Meanwhile, Europe and Central Asia has seen very limited growth since 1990, and sub-Saharan Africa actually experienced a decline in capacity per capita since that date, to the point that it was only slightly higher in 2009 than in 1975. In 1975, capacity per capita in sub-Saharan Africa was just less than 6.5 percent of that in high-income countries; in 2009 it was only 3.9 percent. If we exclude South Africa, which dominates electricity generation capacity in sub-Saharan Africa, these values fall to 2.6 percent in 1975 and 1.6 percent in 2009.

Figure 2.6 (p. 32), taken from work for the 2012 Global Energy Assessment (Pachauri and Brew-Hammond 2012:1414), shows the growth of access to electricity over time for selected countries, both developed and developing. The rapidity of growth is quite amazing and suggests the speed at which countries can move to universal access, an issue of relevance to our analysis in later chapters. Even a country as populous as India, and as deficient in infrastructure as India is often seen to be, was able to bring electricity to nearly 40 percent

■ *One quarter of the global population does not have any access to electricity, and half still uses solid fuels for heating, cooking, and/or lighting in the home.* ■

Figure 2.6 Historical rate of household electrification, select countries: 1920–2010



Source: Pachauri and Brew-Hammond 2012:1414. Reproduced with permission from the International Institute for Applied Systems Analysis.

Table 2.6 Percent of population without access to electricity and percent using solid fuels for heating and cooking by income group and region: 2008, 2009

	Population without access to electricity			Population using solid fuels for heating and cooking
By income group	**Percent of total population**	**Percent of urban population**	**Percent of rural population**	**Percent of total population**
Low-income countries	77	47	88	91
Lower-middle-income countries	32	11	50	58
Upper-middle-income countries	3	1	7	35
High-income countries	1	0	4	5
By region, developing countries only				
East Asia and Pacific	9	4	16	51
Europe and Central Asia	N/A	N/A	N/A	11
Latin America and the Caribbean	7	2	24	18
Middle East and North Africa	7	2	13	7
South Asia	38	12	52	65
Sub-Saharan Africa	68	43	85	82
World	**26**	**12**	**37**	**52**

Note: Data for total populations are from 2009 and rural and urban access rates are from 2008. No electricity access data are available for Europe and Central Asia for either 2008 or 2009.

Source: IFs Version 6.61 using data from Legros et al. 2009 and the International Energy Agency Access to Electricity Database available at http://www.worldenergyoutlook.org/resources/energydevelopment/accesstoelectricity.

more of its population over the 30-year period from 1980 to 2010.

The amount of electricity generation capacity per capita provides only part of the story on energy access. In the United Nations Energy for All initiative, much attention is paid to access to multiple modern forms of energy (not just electricity), with an emphasis on the use of electricity and other modern sources vis-à-vis traditional solid fuels in the home (United Nations Secretary-General's Advisory Group on Energy and Climate Change 2010).

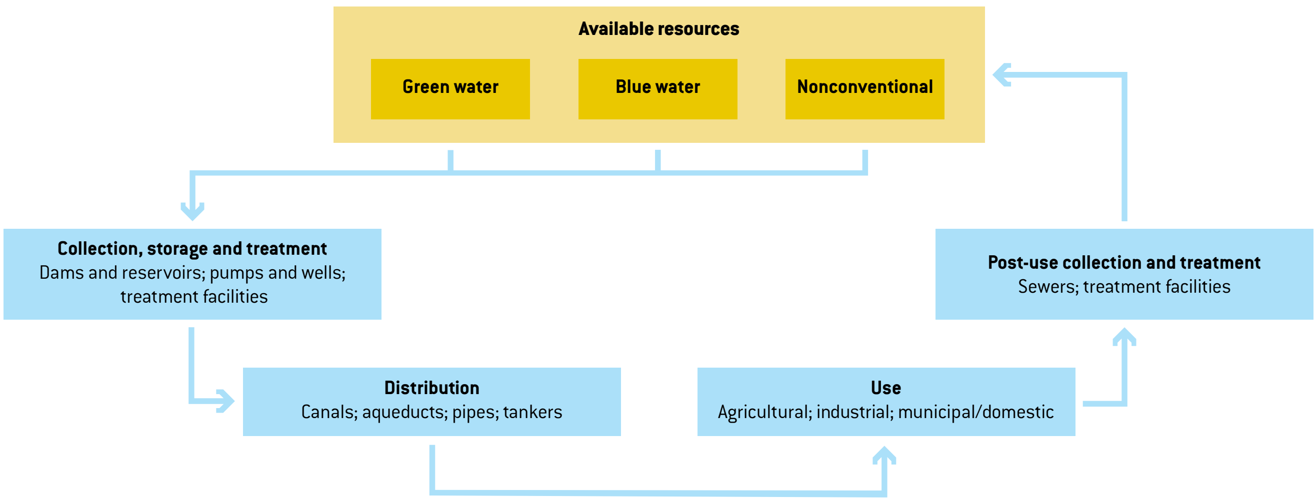
Lack of access to electricity is not always associated with the often unhealthy use of traditional solid fuels, but it frequently is. As Table 2.6 shows, over half of the global population still uses solid fuels in the home, and a quarter does not have access to electricity. In low-income countries, over 90 percent still use solid fuels, and nearly 80 percent lack access to electricity. Some of the effects of using solid fuels in the home can be ameliorated by the use of advanced cook stoves and proper ventilation, but these are not always available. Across all regions, rural populations have less access to electricity than do urban populations, and this difference is more marked in poorer countries.

Water

Water is a vital resource, not only because life on Earth depends on it but also because it makes civilization possible—from basic activities like growing food and removing waste, to advanced processes like manufacturing and electricity generation. Cooking and cleaning, cooling and heating, fire protection, transportation, and recreation—each requires the use and management of water. Indeed, managing water resources was at the heart of ancient civilizations. In Egypt, the Nile's annual floods determined everything from the size of the year's harvests to the amount of taxes levied. Each year, Egyptian priests would use the Nilometer, a simple stone column that measured water depth, to make what were perhaps the first forecasts in history: whether it would be a year of plenty or a year of hardship and hunger (Eltahir and Wang 1999). Water remains just as important today, and the level of access to clean drinking water is seen as a central measure of quality of life.

Civilizations throughout history have altered and augmented natural hydrological systems through the creation of intricate networks of canals, dams, reservoirs, pumps, wells, and sewers to harness the benefits of water. These infrastructure networks are part of an overall

Figure 2.7 Water resources and water infrastructure



Note: Blue water refers to water in lakes, rivers, and groundwater aquifers and the surface or groundwater that flows into them. Green water refers to rainfall stored in the soil and available for the growth of plants. Nonconventional sources include desalinated sea or brackish water, adequately treated domestic or industrial wastewater, and agricultural drainage water. The runoff from rainstorms channeled by storm drains is not counted as wastewater or drainage. Definitions taken from the Food and Agriculture Organization AQUASTAT glossary available at http://www.fao.org/nr/water/aquastat/data/glossary/search.html?lang=en.

Source: Created by authors.

> The largest global use of water is for irrigated agriculture; the total area equipped for irrigation worldwide has nearly doubled over the past half-century.

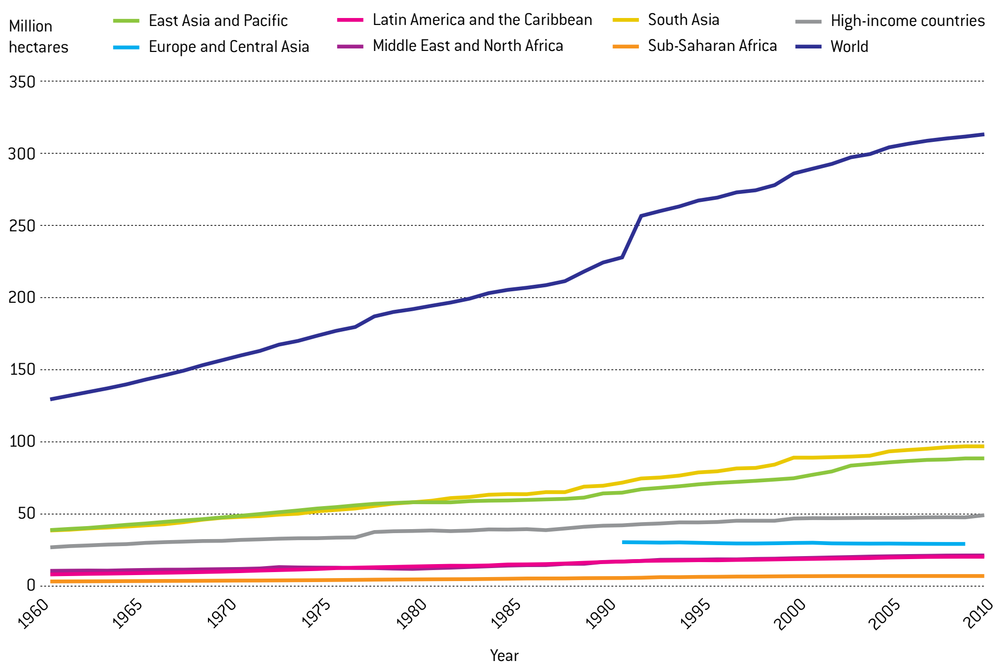
water management system (Figure 2.7, on p. 33) that performs three general functions:

1. *Water storage and distribution systems* provide better control over the spatial and temporal allocation of water resources, and also treat freshwater for certain uses.
2. *Post-use collection and treatment systems* manage and treat water after it has been used but before it is returned to the natural environment or made available for other uses.
3. *Stormwater management systems* redirect water during floods and storms.

Water networks continue to expand as people strive to make greater use of this precious resource. The largest use of water is for irrigated agriculture, accounting for more than 70 percent of global water extraction.[15] The total global area equipped for irrigation has nearly doubled in the past half-century, growing from 156 million hectares in 1961 to 312 million hectares in 2009 (Figure 2.8), with much of the growth coming from South Asia and from East Asia and Pacific. In 1961, those two regions already accounted for 60 percent of the world's irrigated land, and since then their irrigated area has grown at an average annual rate of 1.9 (fastest in the world) and 1.7 percent, respectively. Latin America and the Caribbean saw a slightly faster rate of growth than East Asia and Pacific (1.8 percent), but only accounted for 6 percent of global irrigated land in 2010.

Global growth in land area under irrigation has slowed from an average of over 2 percent a year during the 1960s and 1970s to just under 1 percent annually since about 2000. Most regions also followed this pattern of slowing growth, especially over the 2000–2009 period, when every region except East Asia and Pacific saw irrigation growth rates decrease. But the slowing in growth was not linear for all regions. Several saw growth pick up during the 1990s before seeing declines again. Irrigation in South Asia, for example, grew at an average annual rate of above 2 percent from the 1960s to 1970s, fell to a low of 1.8 percent from 1980 to 1990, and then rebounded to 2.5 percent

Figure 2.8 Global and regional areas equipped for irrigation: 1961–2010



Note: High-income countries are included as a group in the regional analysis in order to sum to the world total. Data are not available for Europe and Central Asia prior to 1992.

Source: Compiled by authors using data from the Food and Agriculture Organization FAOSTAT 2012 database available at http://faostat3.fao.org/home/index.html.

before falling again. Latin America and the Caribbean, on the other hand, saw a slowdown after 1980 that continued to 2010. In general, such slowdowns are due, in part, to a decline in the overall expansion of agricultural area, but they also reflect natural limits on irrigation. Some regions, notably East Asia and Pacific and Middle East and North Africa, have already equipped more than 70 percent of their irrigable area (Figure 2.9). Sub-Saharan Africa, and low-income countries more generally, have a larger share of their irrigable area as yet unequipped for irrigation, but they also have less total area suitable for irrigation. Moreover, for a variety of reasons (such as adequate rainfall or unfavorable rates of return on irrigation infrastructure), not all irrigable land will necessarily ever become equipped for irrigation (You et al. 2011).

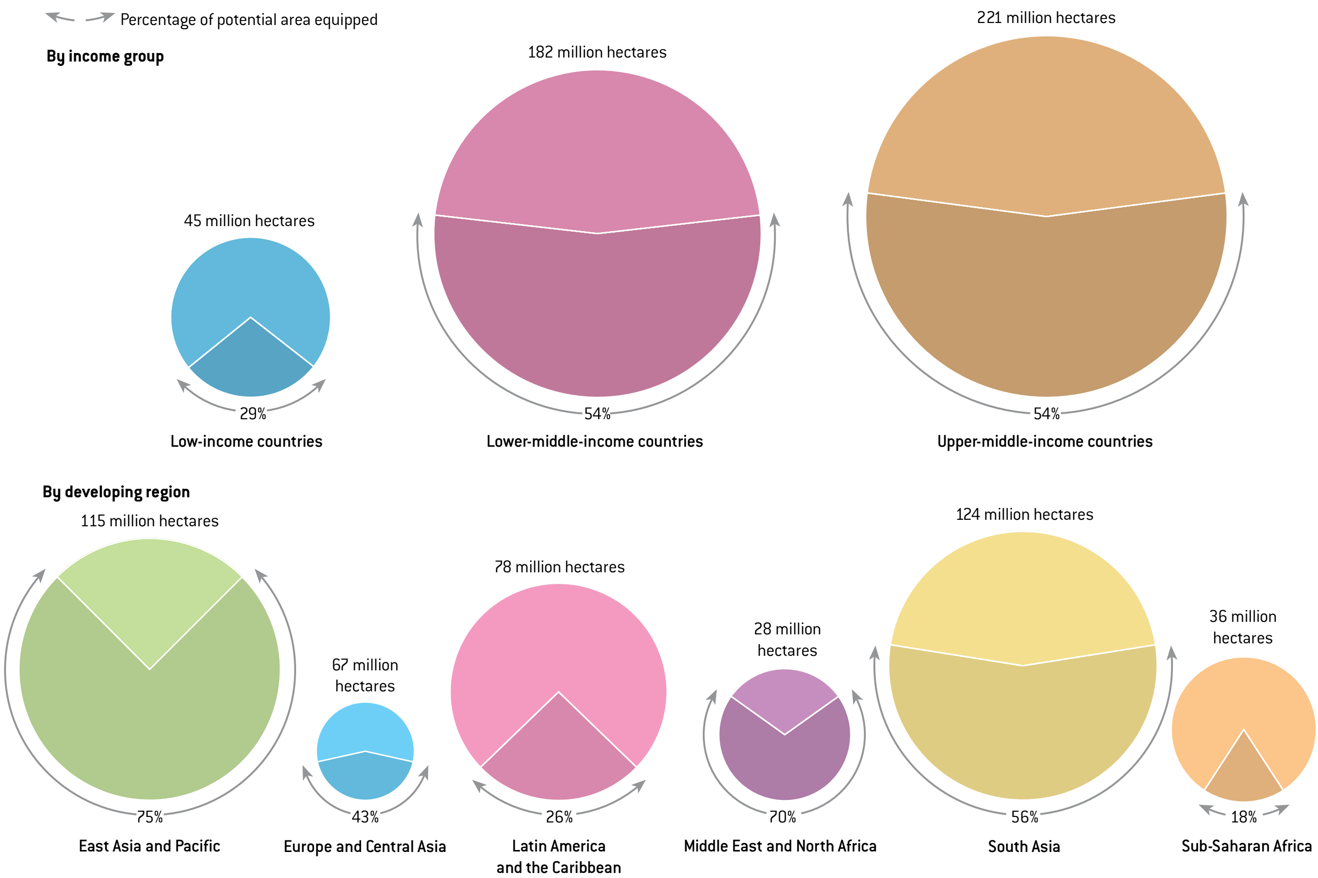
Box 2.4 Defining improved water and sanitation

The Joint Monitoring Programme of the World Health Organization and the United Nations Children's Fund defines separate "ladders" of sources of access to drinking water and sanitation. The steps on the ladder for drinking water are surface water; other unimproved sources; other improved sources (including piped water to a yard or plot, public taps or standpipes, tubewells, boreholes, protected dug wells, and protected springs); and household plumbing connections to piped water. Persons on either of the latter two rungs are considered to have access to improved drinking water. For sanitation, the steps on the ladder are open defecation, unimproved facilities, shared facilities, and improved facilities. Only persons on the final rung (which includes flush toilets, piped sewer systems, septic tanks, improved pit latrines, and composting toilets) are considered to have access to improved sanitation.

Note: See World Health Organization and United Nations Children's Fund Joint Monitoring Programme for Water Supply and Sanitation 2010b: 12, 13 and WHO and UNICEF 2012: 33 for further explanation of terms.

Although clean drinking water and sanitation require far less water than irrigation, they are key factors in human health and a significant

Figure 2.9 Area potentially irrigated and percentage equipped for irrigation by developing country income group and region: 2007



Note: Only countries with data for potentially irrigated area and also for area equipped with irrigation are included. High-income countries are excluded from the figure because complete data were available for only 18 percent of them.

Source: IFs 6.61 using data from FAOSTAT available at http://faostat3.fao.org/home/index.html and AQUASTAT available at http://www.fao.org/nr/water/aquastat/main/index.stm.

Table 2.7 Percent of population without access to improved drinking water by income group and region: 1990, 2010

	1990			2010		
By income group	**Total**	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
Low-income countries	45	16	54	34	13	42
Lower-middle-income countries	30	11	38	13	6	18
Upper-middle-income countries	24	4	37	7	2	14
High-income countries	1	0	3	0	0	3
By region, developing countries only						
East Asia and Pacific	32	5	42	10	3	16
Europe and Central Asia	10	3	21	4	1	7
Latin America and the Caribbean	14	6	35	6	2	18
Middle East and North Africa	14	4	25	11	6	18
South Asia	29	11	35	10	5	12
Sub-Saharan Africa	51	18	63	39	16	51
World	**24**	**7**	**33**	**12**	**5**	**17**

Note: Green circles denote income groups and regions that have met, or are projected to meet, the goal of halving by 2015 the percent of population in 1990 without access to improved drinking water. Red circles denote those that have not met, or are not projected to meet that goal. A simple extrapolation of recent growth rates was used to project whether countries that had not met the goal in 2010 might do so by 2015.

Source: IFs Version 6.61 using data from WHO and UNICEF Joint Monitoring Programme Water Supply and Sanitation Data and Estimates available at http://www.wssinfo.org/data-estimates/table.

Table 2.8 Percent of population without access to improved sanitation by income group and region: 1990, 2010

	1990			2010		
By income group	**Total**	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
Low-income	79	62	83	63	55	67
Lower-middle-income	70	42	82	53	35	63
Upper-middle-income	54	36	67	27	20	38
High-income	0	0	1	0	0	1
By region, developing countries only						
East Asia and Pacific	70	47	79	34	24	43
Europe and Central Asia	20	11	34	16	12	23
Latin America and the Caribbean	32	21	61	21	16	42
Middle East and North Africa	28	12	40	12	6	17
South Asia	78	46	89	61	40	71
Sub-Saharan Africa	74	62	79	69	61	76
World	**52**	**34**	**62**	**37**	**27**	**45**

Note: Green circles denote income groups and regions that have met, or are projected to meet, the goal of halving by 2015 the percent of population in 1990 without access to improved drinking water. Red circles denote those that have not met, or are not projected to meet that goal. A simple extrapolation of recent growth rates was used to project whether countries that had not met the goal in 2010 might do so by 2015.

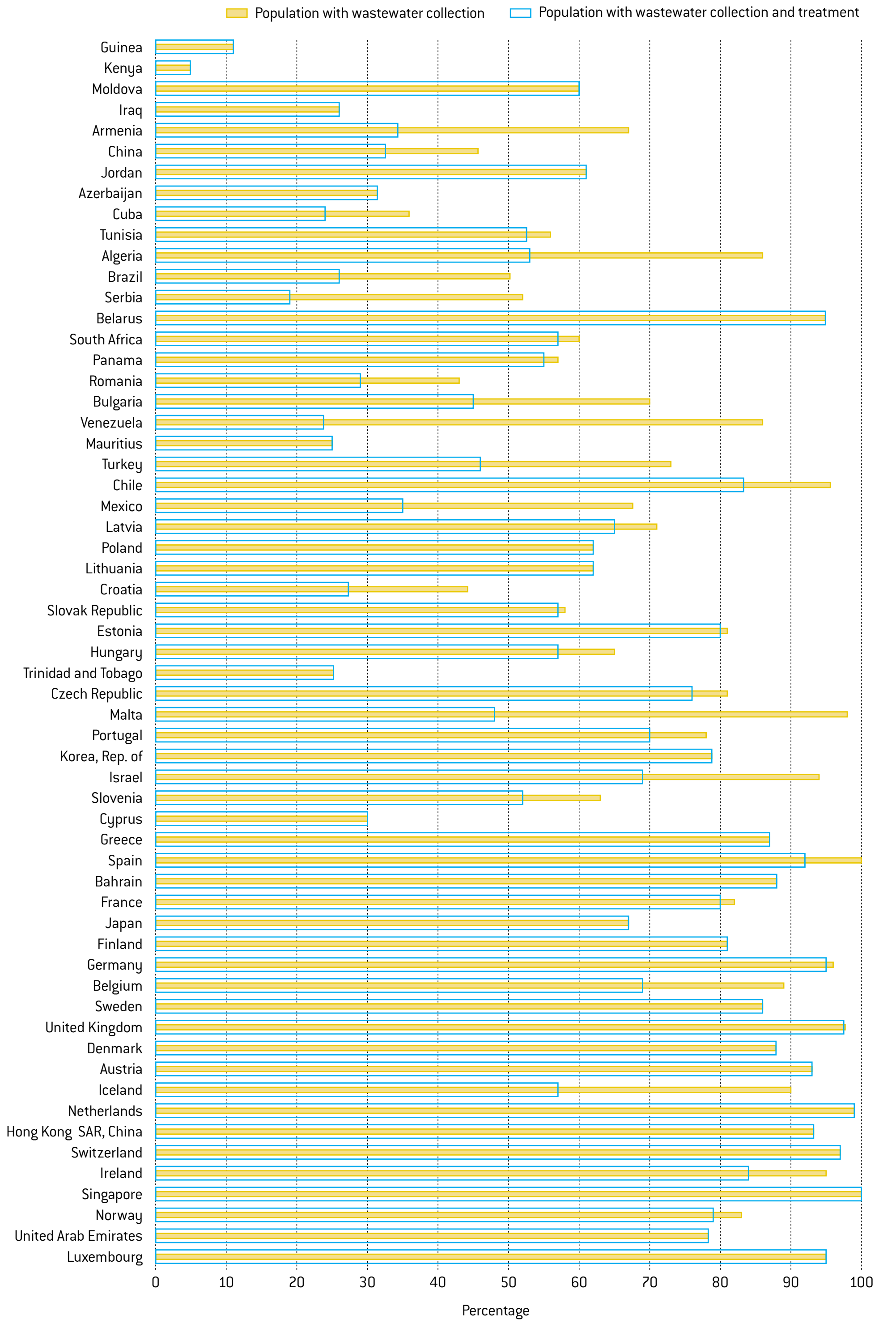
Source: IFs Version 6.61 using data from WHO and UNICEF Joint Monitoring Programme Water Supply and Sanitation Data and Estimates available at http://www.wssinfo.org/data-estimates/table.

measure of human development. As such, Target 7.C of the Millennium Development Goals calls for countries to "Reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation" between 1990 and 2015 (see Box 2.4, on p. 35, for definitions of improved water and sanitation).

In 1990, nearly 1.2 billion people, or just under a quarter of the global population, were without access to improved drinking water (Table 2.7). A little more than half of the world's population (about 2.4 billion people) did not have access to improved sanitation. Data as of 2010 indicate that the world as a whole has now met the safe drinking water target but not the sanitation target (see Table 2.7 and Table 2.8), but with large differences remaining across regions and income groups. Based on a simple extrapolation of recent trends, sub-Saharan Africa and low-income countries in general are not on a path to meet either target by 2015. In fact, even as the percentages of their populations without access to improved drinking water and sanitation fell, the absolute numbers of persons without access in these groups increased between 1990 and 2010 due to population growth. The only other region not on a path to meet the drinking water target is Middle East and North Africa, where access to improved water was already relatively high in 1990 and further access becomes more difficult to achieve. Perhaps somewhat surprising, Middle East and North Africa is one of only two developing regions (the other being East Asia and Pacific) that is on a path to meet the sanitation target (recall again that this represents a simple extrapolation of recent trends, not a dynamic forecast generated by IFs).

Eventually, water must be returned to the environment from whence it came, and care is required to avoid degrading broader water resources. Unfortunately, few data on wastewater management are available. In Figure 2.10, we plot the percentages of the population connected to wastewater collection systems and wasterwater treatment systems against average income, using the most recent country-specific data available between 1999 and 2009. We include only the 59 countries for which there are data on both collection and

Figure 2.10 Percentage of population by country with wastewater collected and treated (variable between 1999 and 2009)



Note: Country GDP per capita increases with movement from left to right on the x-axis. Only countries with data on both collection and treatment are included.

Source: IFs Version 6.61 using data from the United Nations Statistics Division of the Department of Economic and Social Affairs, available at http://unstats.un.org/unsd/environment/qindicators.htm.

In 1990, just under a quarter of the global population lacked access to improved drinking water, and a little more than half lacked access to improved sanitation.

treatment. The countries are ordered in terms of increasing average income, with the yellow bars indicating the percentage of the population connected to a wastewater collection system and the blue outline indicating the percentage of the population whose wastewater is sent to a treatment facility.

In Figure 2.10, we see a general tendency toward greater wastewater collection as average income rises, with Cyprus, Mauritius, and Trinidad and Tobago as notable outliers on the downward side and Belarus, Jordan, and Moldova as outliers on the upward side. The relationship with income is also seen, but to a lesser extent, when we look at wastewater treatment. There are countries across the income range where the level of treatment is close or equal to the level of collection, indicating that most or all of the wastewater collected is treated. However, for a number of countries, a large gap exists between the level of collection and the level of treatment. Some notable cases of gaps among the countries with higher incomes are Belgium, Iceland, and Malta. Moving down the income ladder, Algeria and Venezuela stand out. All of these countries with lower than expected treatment rates are either small islands or have significant coastlines relative to their total area, suggesting that they may be using the oceans as a "free" treatment facility.

Information and communication technologies

The basic need to communicate has existed throughout history. From the earliest examples of cuneiform clay tablets and human couriers, through the age of heliographs and semaphores followed by the telegraph and radio, to the present era of global telecommunications and the internet, technology has transformed the speed, reach, and penetration of communication.

ICT includes the hardware, software, networks, and media required to collect, store, process, transmit, and present information (World Bank 2010). ICT has changed and grown more rapidly in recent years than any other infrastructure, with profound implications for other infrastructures, society, and human well-being (Bohlin, Forge, and Blackman 2006). Modern ICT is often classified as either information technology or information and communication infrastructure (World Bank 2010). The former consists of the hardware and software required for collecting, storing, processing, and presenting information, while the latter enables transmission through physical telecommunication systems, networks, and related services. Some forms, like the internet and computer operating systems, defy simple categorization (Searls 2008; Zittrain 2006).

In previous studies of infrastructure, the most common quantitative measure of ICT has been the number of fixed telephone lines (see, for example, Fay 2001 and World Bank 1994). Some more recent studies have extended this to include mobile telephones and both wireless and fixed broadband technologies (see, for example, Bohlin, Forge, and Blackman 2006 and Bhattacharyay 2010). These measures still fall far short of the range of indicators used by the World Summit on the Information Society and the corresponding Partnership on Measuring ICT for Development (Partnership on Measuring ICT for Development 2010). Nonetheless, this set of four measures is a far better reflection of ICT infrastructure than any single indicator and is the set we used for this study as data are more available for its components than for other indicators. Some important measurement issues remain, however (see Box 2.5).

We follow the general practice of conceptualizing ICT infrastructure along three dimensions. The first is between unidirectional (e.g., TV or radio) and bidirectional transmissions (e.g., internet). The second concerns the physical means of transport, usually separated into either fixed-line or wireless technologies. Finally, the information or content provided can be separated into either voice or multimedia, which can include data, video, and also voice.[16] Most modern and future ICT will be bidirectional. This still leaves us with four possible combinations based on the second and third categories, giving us four measures that count access to differing services over distinct infrastructures (Figure 2.11).

Figure 2.12 (p. 40) shows the historical trend for our four ICT access indicators at a global level dating back to 1975 and highlights the relatively recent introduction and accelerated growth patterns of technologies other than fixed telephone lines. It also highlights the beginning of what appears to be a trend toward

Box 2.5 Measuring ICT infrastructure

The measurement of ICT infrastructure is complicated by the rapidly evolving nature of the technologies themselves. Commonly used measures for the newer technologies lack a direct correspondence with unduplicated access and actual usage. Efforts to move to more robust measures are underway, but during the transition to these new measures, time-series data for them (important to understanding and modeling of ICT trends) are not available.

Commonly used indicators for mobile phone and mobile broadband penetration illustrate the issues arising from lack of specificity in measurement. While the standard measure for mobile phone penetration is subscriptions per 100 persons, an individual could have more than one subscription. Individuals could have separate phones for work, personal life—and for travel to avoid high roaming charges when abroad or to enjoy better coverage across geographic areas.

As a result, questions arise about (1) the upper limit or saturation point for mobile phone subscriptions per person; and (2) what subscriptions per 100 persons actually means in terms of the numbers and percentages of persons with access. Further, at the turn of the century, the rates of mobile phone subscription growth began to slow among early adopters, such as Denmark, Finland, Norway, and Sweden; for those countries, a point of saturation somewhere above one mobile phone subscription per person began to emerge. Other countries (e.g., Italy and the United Arab Emirates), however, show higher overall levels of mobile phone subscriptions, with an upper end of more than two subscriptions for every one resident.

In summary, until the definition and reporting of mobile phone access indicators improves, uncertainty surrounding non-duplicative mobile phone penetration will continue. A more appropriate measure of coverage uses survey data to derive the percentage of households with a mobile phone, but such data are reported for only a small number of countries (20 in 2000, 53 in 2005, and 18 in 2010) by the International Telecommunication Union, which is the primary source for ICT data.

The mobile broadband penetration indicator used by the ITU prior to 2011 reported mobile cellular subscriptions with access to data communications at broadband speeds per 100 inhabitants. As the description connotes, the indicator measured the *potential* for broadband access, not active subscriptions or users. The ITU subsequently retired this indicator in its 2011 data release and implemented a new subset of indicators measuring active mobile broadband subscriptions.* While these new indicators are arguably more accurate, historical data for them are extremely limited. Therefore, until data coverage for the new measures improves, we have chosen to use the legacy indicator in our analyses.

**For the ITU's current indicators, see http://www.itu.int/ITU-D/ict/publications/world/material/series.pdf.*

Studies of ICT infrastructure tend to include one or two ICT indicators; we include four: fixed-line telephones, mobile phones, fixed broadband, and mobile broadband.

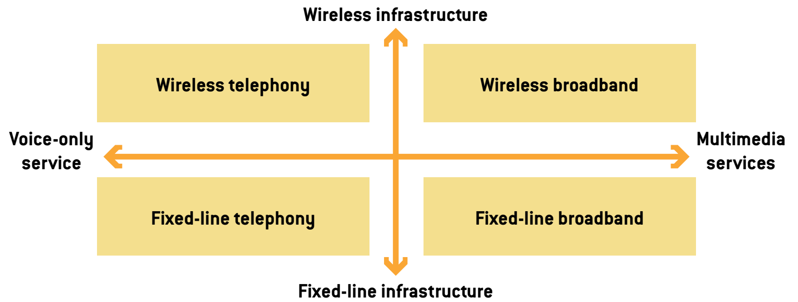
divestment in fixed telephone lines and their replacement by other technologies.

Of course, these summary trends mask considerable regional and income differences that warrant a closer look. The next several figures look at each form of ICT infrastructure by income group. We begin with fixed-line telephones.

The ITU defines fixed-line telephones as the traditional devices connected to the public switched telephone network providing voice communication. Fixed-line telephones also support dial-up data access (i.e., narrowband) to various providers and the internet, but this is quite distinct from a digital subscriber line (DSL) broadband connection, which is included in our measure of fixed-line broadband.

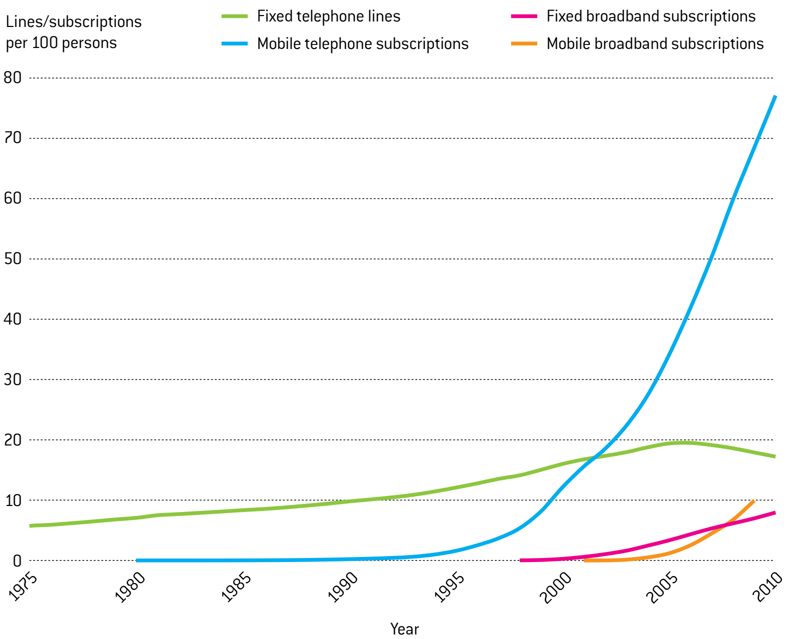
In Figure 2.13 (p. 40), we see a recent trend of slowing growth and then decline in fixed-line telephones that is most pronounced in high-income countries. For example, between 2005 and 2010, Finland, Japan, and South Korea reduced the number of fixed telephone lines per 100 persons by an average of almost 15.5 lines. A similar trend has begun in upper-middle-income and even lower-middle-income countries, albeit starting a bit later and of lesser magnitude on their lower fixed-line bases. Examples at the country level include China, Macedonia, and Turkey, where fixed telephone lines declined by an average of 5.7 per 100 persons in the five years between 2005 and 2010. Overall, only about half of the

Figure 2.11 Key dimensions of ICT infrastructure



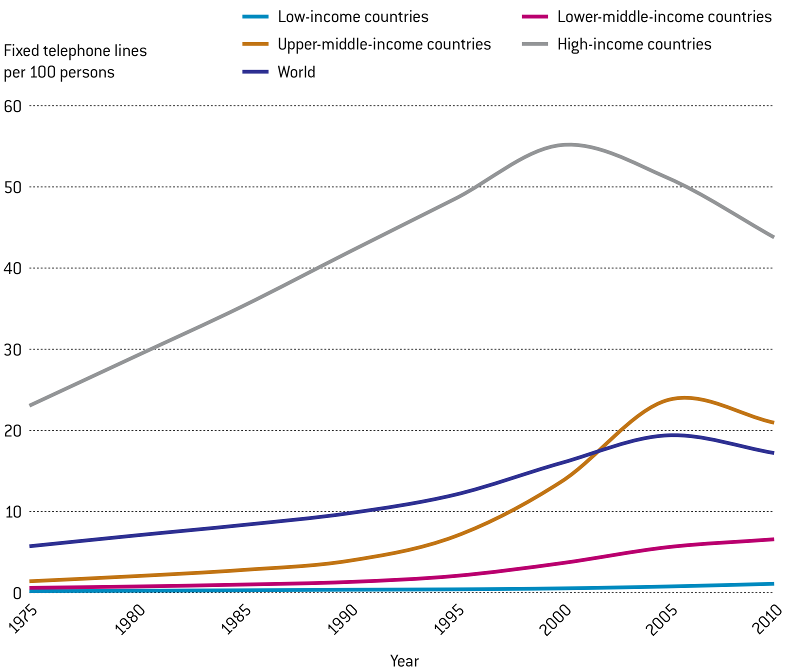
Source: Authors' conceptualization.

Figure 2.12 World total of lines and subscriptions per 100 persons by ICT type: 1975–2010



Source: IFs Version 6.61 using data from the International Telecommunication Union World Telecommunication/ICT Indicators 2011 database at http://www.itu.int/ITU-D/ict/statistics.

Figure 2.13 Fixed telephone lines per 100 persons globally and by income group: 1975–2010



Source: IFs Version 6.61 using data from the International Telecommunication Union World Telecommunication/ICT Indicators 2011 database at http://www.itu.int/ITU-D/ict/statistics.

countries with data showed an increase in the number of fixed-line telephones per 100 persons between 2005 and 2010. In the countries with least fixed-line coverage, future growth is not foreseen, as these countries are expected to leapfrog directly to mobile telephony (Daga, Manuel, and Narasimhan 2010; James 2009).

While the competitive pressures from mobile and broadband continue, the demise of the traditional telephone is far from certain. Future changes in technology will likely have the most influence on the outcome of fixed-line telephony. The effects of convergence and ubiquitous broadband continue to blur the distinction between telephony and other services as traditional telephony infrastructure gives way to broadband-based, internet-protocol communications. Because technological change is an uneven process globally, we expect significant inter-country variation for the foreseeable future. Ultimately, not unlike integrated-services digital network lines (a forerunner of DSL broadband technology), some residual amount of fixed-line telephony may persist indefinitely (OECD 2011).

The stagnation and decline in fixed-line telephony obviously is driven in large part by the revolution in the diffusion of the mobile telephone since about 1990. Global subscription rates grew from essentially zero in 1990 to 77 for every 100 persons in 2010, equating to nearly 5.3 billion subscriptions (see Figure 2.14). While the high-income countries enjoyed an early start, penetration in the developing regions continues to grow rapidly, with the rate of penetration in the developing countries in Europe and Central Asia surpassing that seen in the high-income countries in recent years (not shown). Still, gaps remain in both the level of diffusion and apparent growth rates between the highest and lowest performing countries; even in the latter, growth in mobile phone subscription rates is striking when compared to growth in other forms of infrastructure.

The ITU defines broadband, whether fixed-line or mobile, as an internet connection with downstream data transfer speeds equal to or above 256 kilobits per second (ITU 2010b). High investment costs have constrained growth in fixed-line broadband in all but the wealthiest countries (see Figure 2.15). Additionally, countries that have existing investments in fixed-line infrastructure can leverage these networks to provide broadband access through more modest technology investments. The relationship between the historical patterns in fixed-line telephony (see again Figure 2.13) and fixed-line broadband (see again Figure 2.15) shows this clearly. The most aggressive diffusion in fixed broadband has occurred in high-income countries, where fixed-line telephone infrastructure is most extensive. Conversely, regions with modest levels of fixed-line telephony have trailed, and regions with very limited fixed-line telephony have almost no fixed broadband to date.

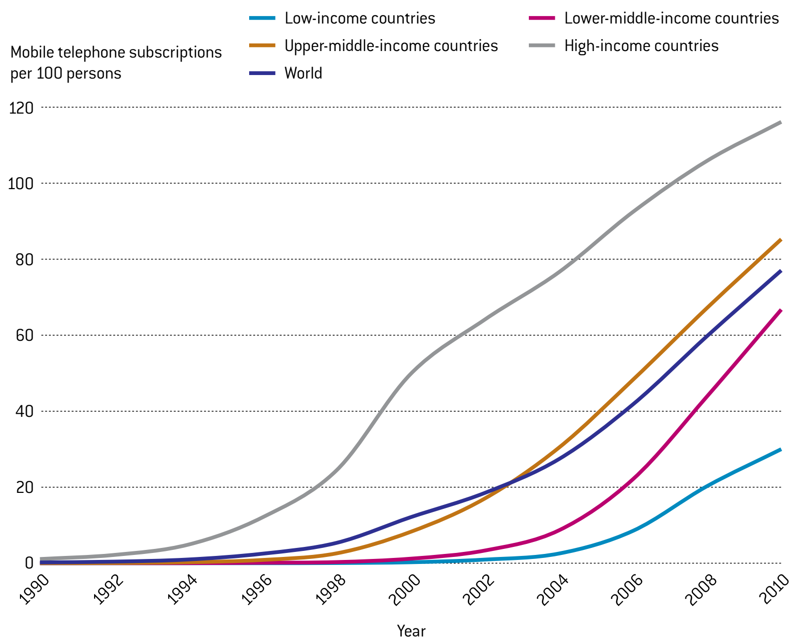
As with telephony, the lack of fixed-line broadband does not necessarily mean that countries will be left behind, but the broadband challenge may be greater. Mobile broadband is an emerging technology that offers both benefits and limitations when compared with fixed-line broadband. In general, mobile broadband provides inferior service levels and data transfer speeds; however its investment cost is lower and the service is portable. While still evolving, the historical trends suggest an exponential growth pattern similar to that of mobile telephony in at least two regions, East Asia and Pacific and Europe and Central Asia (Figure 2.16, on p 42). Following the pattern of telephony, where fixed-line infrastructure is minimal, mobile broadband is effectively substituting for fixed-line broadband (European Commission 2009). In high-income countries, the trend has been more one of coexistence of fixed and mobile broadband connections.

In summary, the recent history of ICT indicates a significant departure from the historical trends of more traditional forms of infrastructure. While gaps persist between high-income and developing countries, the rapid change in information and communication technologies has brought access to an unprecedented portion of the world's inhabitants.

Patterns in infrastructure development

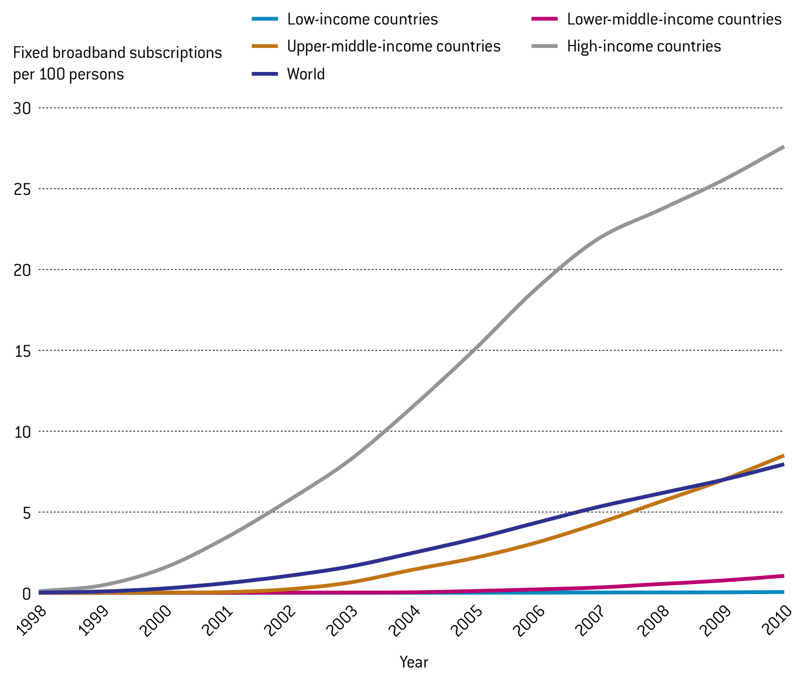
As the figures and tables in this chapter have shown, citizens in high-income countries now have near universal access to improved water, improved sanitation, electricity, and all-season roads. As countries move from low-income to high-income status, are there patterns that

Figure 2.14 Mobile phone subscriptions per 100 persons globally and by income group: 1990–2010



Source: IFs Version 6.61 using data from the International Telecommunication Union World Telecommunication/ICT Indicators 2011 database at http://www.itu.int/ITU-D/ict/statistics.

Figure 2.15 Fixed-line broadband subscriptions per 100 persons globally and by income group: 1998–2010



Source: IFs Version 6.61 using data from the ITU World Telecommunication/ICT Indicators 2011 database at http://www.itu.int/ITU-D/ict/statistics.

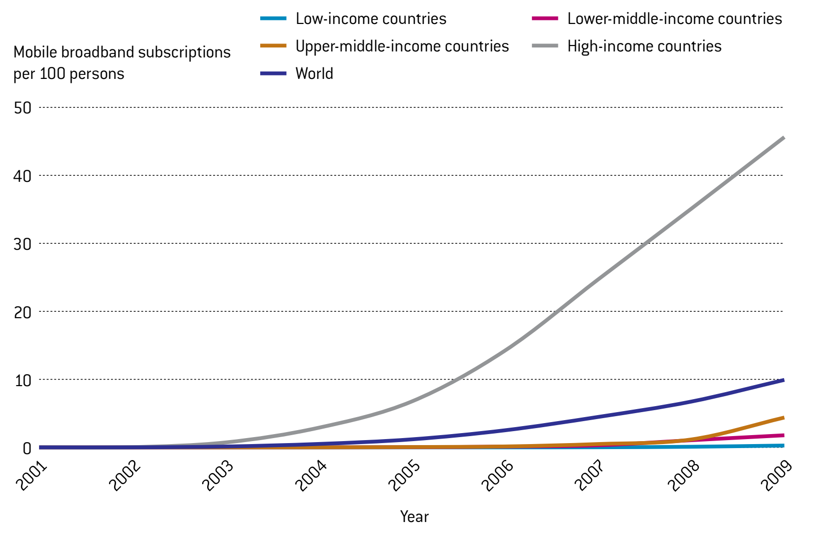
The growth in mobile telephones has been striking—global subscriptions have grown from essentially zero in 1990 to nearly 5.3 billion in 2010.

characterize the sequence of progression toward universal access? Figure 1.3 of the previous chapter and the discussion here suggest some such patterns, albeit ones that are highly variable across countries and temporal periods.

For instance, 65 percent of populations in low-income countries already had access to improved water in 2010, whereas fewer than 37 percent had access to improved sanitation, only 38 percent had access to all-season roads, and fewer than 25 percent had access to electricity. The higher rates of access to improved water almost certainly reflect the immediate health implications of unsafe water and probably also the frequently dispersed availability of sources via streams and wells. Except where water must be conveyed over long distances, it often requires less public organization and investment than do roads or electricity systems.

The lowest-income countries often have great difficulty advancing their access rates on all infrastructure forms. In some cases, as we have seen above with respect to roads in sub-Saharan Africa, they are challenged simply to keep up with their higher population growth rates. As Chapter 3 will discuss, these countries often are also handicapped by poorly developed governance capacity, which inhibits their ability to mobilize revenues and use them effectively and increases the likelihood of corruption for very expensive projects.

Figure 2.16 Mobile subscriptions with access to data communications at broadband speeds per 100 persons globally and by income group: 2001–2009



Note: The ITU changed the way it measures mobile broadband between its 2010 and 2011 publications (with 2009 and 2010 data respectively), making the 2010 data incompatible with earlier data points. The newer dataset also has much sparser data coverage, thus we have used the 2010 dataset (2009 data) to show how subscription numbers have changed over time.

Source: IFs Version 6.61 using data from the International Telecommunication Union World Telecommunication/ICT Indicators 2010 database at http://www.itu.int/ITU-D/ict/statistics.

Middle-income countries, while continuing to advance their rates of access to improved water, are more rapidly increasing access to all-season roads and, especially, to electricity (to which access is almost universal already for upper-middle-income countries). This pattern almost certainly reflects the high level of demand by citizens with increasing income levels for basic electrical service in support of lighting, refrigeration, and, of course, television, as well as cooking, heating, and cooling. Increases in income also give rise to ownership of private and commercial vehicles, which pushes up demand for higher quality roads. In addition, business people and public authorities perceive electricity and good roads as providing additional impetus to economic development. In contrast, access to improved sanitation systems tends to grow considerably more slowly with income than these other core infrastructures for several reasons. Sanitation systems are very expensive, and individuals can externalize the costs of not having them (including fouling the water of others) in ways not possible with electricity and all-season roads. In addition, the importance of sanitation for economic advance is not as clearly established in public policy (see Chapter 3, however, for a discussion of sanitation's role in health and economic growth).

Access to mobile phones is a special case. Figure 2.14 shows that in 2010 citizens of low-income countries had a lower overall access rate to them than to improved water (see again Table 2.7). Nevertheless, driven by technological change, relatively low costs, high levels of citizen demand, and delivery by the more-nimble private sector, the curve of advance in mobile phone access rates is rapidly moving up to and above those for other infrastructure forms across all country income groups. Although it may be surprising that mobile phone access rates have come to exceed those for electricity access, many phone owners use communal charging stations or depend on friends and relatives who have electricity rather than requiring their own electricity access as a precondition for mobile phone subscriptions.

In summary, although we can see some patterns in the historical data that we may expect to influence our forecasts, we must also refer back to one of the key points of Chapter 1: low- and middle-income countries are engaged in a massive catch-up process with high-income countries that built out their own modern infrastructures over the last two centuries. As the global movement toward universal access plays out, we can expect to see both rapid advance in all infrastructure forms in the developing world in general, as well as highly variable country patterns driven by idiosyncratic geographies, historical foundations, and private and public choices. Most certainly the push for catch-up will be financially expensive.

Historical spending on infrastructure

Infrastructure carries costs throughout its lifetime—from construction through operation, maintenance, renewal, and decommissioning. Even prior to construction, there are expenses related to, *inter alia*, planning, commissioning, establishing and obtaining rights of way (including to the electromagnetic spectrum), and other preconstruction activities. These costs are covered in a myriad of ways that vary from project to project: by local and national governments, domestic and international private entities, official development assistance (ODA), private foreign direct investment, and/or end users.

Ideally, we would have consistent and comprehensive data that presented a picture not only of total infrastructure spending, but also of spending by the type of infrastructure, the purpose of the spending (e.g., new construction vs. maintenance), and the source(s) of the funding. However, as discussed earlier in this chapter, such data are extremely limited and by no means consistent or comprehensive. Furthermore, we recognize that some of the data we present are themselves dated, particularly given the significant impacts on infrastructure spending of the recent global recession and the stimulus packages that followed. For all these reasons, the information provided in this section needs to be viewed with particular caution. Still, it is important for us to try to get a general sense of past historical spending on infrastructure, using the data that do exist, so that we are able to have some confidence in the forecasts we present later in this volume.

A number of studies have presented aggregate estimates of infrastructure spending in developing countries, beginning with the World Bank *World Development Report 1994: Infrastructure for Development*. In that report, the World Bank estimated that developing countries typically spent anywhere from 2 to 8 percent of their GDP on new infrastructure, with the average being 4 percent (World Bank 1994: 14). These amounts were noted as being rarely less than 30 percent and sometimes as much as 70 percent of total government spending. The report estimated that private investment and ODA accounted for about 7 and 12 percent of total infrastructure funding, respectively, leaving some 81 percent to come from domestic governments (World Bank 1994: 90, 93).

Eight years later, the UK's Department for International Development (DFID) estimated that investment in infrastructure had increased by 20 percent in absolute terms between 1994 to 2002. Meanwhile, total GDP in developing countries increased by over 28 percent from 1994 to 2002, suggesting a possible decline in spending on infrastructure as a share of GDP (DFID 2002: 20).[17] DFID also reported that the share provided by ODA had fallen to less than 5 percent of infrastructure spending and estimated that the share provided by the private sector may have been as high as 25 percent but added that this might have been overstated to the extent that it is backed by public sector funds (DFID 2002: 20).

Briceño-Garmendia, Estache, and Shafik reiterated the DFID result and provided additional analysis in 2004. They found that after declines in public sector funding as a percent of GDP during the 1990s, upper-middle-income countries were spending roughly 2 percent of GDP on infrastructure while low-income countries were spending roughly 4 percent at the time of their study. They argued that the declines in public funding as a percent of GDP came "as a result of: (i) an unmet hope for a major financing of infrastructure by the private sector, (ii) fiscal adjustment programs, and (iii) decentralization resulting in mismatches between resources and needs" (Briceño-Garmendia, Estache, and

The recent history of ICT differs significantly from the historical trends of more traditional infrastructure; rapid change has brought access to an unprecedented portion of humanity.

Shafik 2004: 16–17). As did the previous DFID study, Briceño-Garmendia, Estache, and Shafik noted a sharp fall in ODA for infrastructure in the 1990s. They also pointed to overoptimistic expectations of private sector participation in infrastructure financing. Briceño-Garmendia, Estache, and Shafik estimated that private sector *commitments* (they had no data on actual expenditures) to infrastructure amounted to 20–22 percent of total investments during the 1990s, but this was not enough to make up for the declines in public expenditure shares and ODA. Furthermore, these commitments tended to be highly concentrated in a small number of countries (p. 20–21).

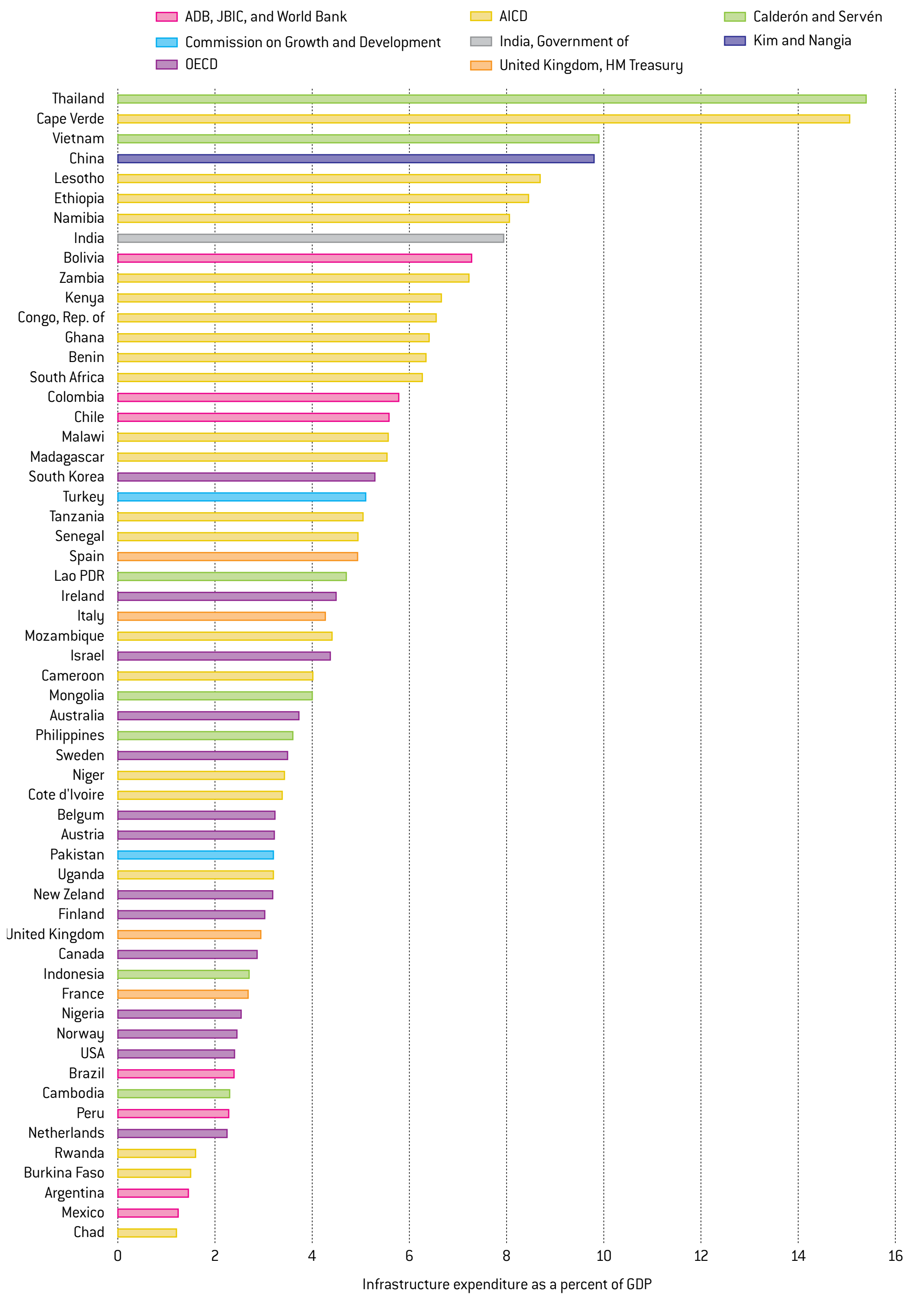
More recently, looking at the sum of public and private investment, Estache (2010: 67) reviewed a range of studies and stated that "it seems reasonable to assume that the average investment in infrastructure in the developing world is somewhere between 3 and 4.5 percent of GDP." He provided ballpark estimates of 5 percent, 3.3 percent, and roughly 1 percent for low-income, lower-middle-income, and upper-middle-income countries, respectively, while noting higher values in some fast growing middle-income countries in Asia, including China, Malaysia, and Thailand (p. 68). Estache (2010: 72) also estimated that private-sector commitments represented roughly between 25 and 19 percent of total infrastructure investment in 2006–2007, and ODA between 4.5 and 3 percent, which translates at most into 1 and 0.2 percent of GDP, respectively.

Many of the findings discussed above are based on analyses of regional studies that attempted to gather detailed data on infrastructure spending for individual countries (see again Table 2.3). For this volume, we have pulled together the data from these sources, along with data from individual country studies where these were easily available (e.g., Congressional Budget Office 2010). As we noted earlier, these studies differ on a number of significant dimensions: temporal coverage; infrastructure types; sources of funding; and purpose of expenditure (e.g., new construction versus maintenance). There are also definitional differences across countries within individual studies (see, for example, International Transport Forum and OECD 2010). Therefore, as stated earlier, the conclusions we draw from these data are highly contingent and should be viewed with caution. Except where noted, the statements presented in the next several paragraphs are from our own analysis of these data.

The data show a wide range in total infrastructure spending as a share of GDP, especially for lower-income countries. Figure 2.17 presents the most recent spending estimates gleaned from available studies for a number of countries, and while we must keep in mind the different methodologies and inclusions in these studies (see again Table 2.3), we can see some apparent patterns in the data. In sub-Saharan Africa, for example, countries spend an average of 5.5 percent of GDP per year on infrastructure,[18] but spending in individual countries ranges from high-spending countries like Cape Verde (15.1 percent), Lesotho (8.7 percent), Ethiopia (8.5), and Namibia (8.1), to low-spending countries like the Democratic Republic of Congo (0.4 percent), Chad (1.2 percent), and Rwanda (1.6).[19] In East and Southeast Asia, while spending averages 6.2 percent, Thailand spends 15.4 percent and Cambodia 2.3 percent.[20] The OECD countries, where average spending is 3.3 percent of GDP, show considerably less variation, with South Korea and Spain spending the most at 5.3 and 4.9 percent respectively, and the Netherlands, the United States, and Norway spending the least at 2.3, 2.4, and 2.5, respectively.[21]

On average, high-income countries tend to spend a lower percentage of GDP on infrastructure. Calderón (2009: 11) reported that most authors were unable to find any clear pattern between the range of investment rates and country income. The studies reported above by Briceno-Garmendia, Estache, and Shafik (2004) and Estache (2010), however, as well as our own data analysis, suggest that total and public spending on infrastructure tends to decline as a portion of GDP when GDP per capita rises. See again also Figure 2.17, which shows that although some developing countries, including Burkina Faso, Chad, and Rwanda, spend a small share of GDP on infrastructure, a large portion of the countries at that low-spending end of the scale are high-income countries. In contrast, essentially all of those countries spending high portions of GDP are developing societies.

Figure 2.17 Recent estimates of infrastructure spending as a percentage of GDP in selected countries



Note: Although the figure portrays combined public and private spending, sources vary in their treatment of these and in their coverage of infrastructure types and funding purposes (see again Table 2.3); the figure therefore is indicative, not definitive in its comparisons. When countries appeared in more than one study, we used the most recent data. Across studies, the temporal coverage of the data ranges from 2003 to 2010.

Source: Compiled by authors using data from AICD database available at http://www.infrastructureafrica.org/aicd/tools/data; Asian Development Bank, Japan Bank for International Cooperation, and World Bank (ADB, JBIC, and World Bank) 2005; Calderón and Servén 2010b; Commission on Growth and Development 2008; India, Government of 2011; Kim and Nangia 2010; OECD 2009a, and United Kingdom, HM Treasury 2011.

Table 2.9 Trends in total infrastructure spending as a percent of GDP in selected countries: 1975–2010

Source	Country	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Asian Development Bank, Japan Bank for International Cooperation, and World Bank 2005	Cambodia	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Indonesia	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Laos	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Mongolia	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Philippines	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Thailand	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Vietnam	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Calderón and Servén 2010b and personal communication with Calderón	Argentina	–	–	–	–	–	3.2	3.2	2.8	2.4	3.2	2.4	2.5	3.6	3.4
	Brazil	–	–	–	–	–	5.0	5.2	5.1	5.7	5.2	5.3	4.4	5.6	5.1
	Chile	–	–	–	–	–	2.2	2.1	2.6	4.1	4.4	4.1	3.4	3.8	2.9
	Colombia	–	–	–	–	–	3.1	3.1	3.1	3.0	2.5	3.9	3.2	2.8	4.0
	Mexico	–	–	–	–	–	1.8	2.2	2.5	2.5	2.6	2.3	2.6	2.5	2.2
	Peru	–	–	–	–	–	1.5	2.4	2.4	2.2	1.7	1.6	2.3	1.3	0.7
Congressional Budget Office 2010	United States	2.8	2.8	2.7	2.6	2.7	2.8	2.7	2.6	2.6	2.5	2.5	2.6	2.6	2.6
India, Government of 2011	India	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Kim and Nangia 2010 and personal communication with Nangia	China	–	–	–	–	–	–	–	–	–	–	3.3	3.6	3.5	3.3
	India	–	–	–	–	–	–	–	–	–	–	4.1	4.3	4.9	5.1
OECD 2009a	Australia	5.0	–	–	–	–	–	–	–	–	–	5.0	–	–	–
	Austria	4.3	–	–	–	–	–	–	–	–	–	3.9	–	–	–
	Belgium	4.1	–	–	–	–	–	–	–	–	–	3.2	–	–	–
	Canada	4.3	–	–	–	–	–	–	–	–	–	3.6	–	–	–
	Finland	5.7	–	–	–	–	–	–	–	–	–	4.1	–	–	–
	France	3.1	–	–	–	–	–	–	–	–	–	2.9	–	–	–
	Ireland	–	–	–	–	–	–	–	–	–	–	3.3	–	–	–
	Israel	6.7	–	–	–	–	–	–	–	–	–	4.5	–	–	–
	Italy	3.0	–	–	–	–	–	–	–	–	–	3.4	–	–	–
	Netherlands	3.1	–	–	–	–	–	–	–	–	–	2.7	–	–	–
	New Zealand	5.4	–	–	–	–	–	–	–	–	–	3.9	–	–	–
	Norway	7.6	–	–	–	–	–	–	–	–	–	4.8	–	–	–
	South Korea	4.2	–	–	–	–	–	–	–	–	–	6.1	–	–	–
	Spain	3.6	–	–	–	–	–	–	–	–	–	3.2	–	–	–
	Sweden	4.3	–	–	–	–	–	–	–	–	–	4.1	–	–	–
	United Kingdom	3.2	–	–	–	–	–	–	–	–	–	2.5	–	–	–
	USA	2.5	–	–	–	–	–	–	–	–	–	2.4	–	–	–
United Kingdom, HM Treasury 2011	France	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Germany	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Italy	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Spain	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	United Kingdom	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Note: Only countries with multiple years of data are included. The numbers are not necessarily comparable across studies due to different methodologies and inclusion of different infrastructures (for example, although most studies included at least some aspects of transportation, energy, water and sanitation, and telecommunications, the Congressional Budget Office report included only transportation and water-related data). Data from OECD 2009a are averages for the periods 1970–1979, 1980–1989, 1990–1999, and 2000–2009.

1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
–	–	–	–	–	–	–	–	–	2.9	–	–	–	–	2.3	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	2.6	–	–	–	–	7.3	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	3.1	–	–	–	–	2.7	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	1.7	–	–	–	–	4.7	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	2.7	–	–	–	–	4.0	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	5.6	–	–	–	–	3.6	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	5.3	–	–	–	–	15.4	–	–	–	–	–	–	–
2.6	1.4	0.9	1.6	2.4	2.5	2.3	2.0	1.6	2.0	2.0	2.2	1.5	1.4	1.3	1.8	1.9	2.1	–	–	–	–
3.3	2.4	3.0	3.4	2.6	2.1	1.3	1.7	1.9	2.5	2.5	2.6	3.2	2.1	1.5	1.8	2.0	2.0	–	–	–	–
3.2	4.0	2.6	2.8	3.1	3.6	3.3	4.3	4.9	5.6	5.8	5.2	5.9	5.9	5.1	5.1	4.9	4.3	–	–	–	–
2.7	2.3	2.3	2.4	2.4	2.3	2.9	3.7	4.0	3.6	3.7	3.0	3.5	2.7	2.4	2.2	2.8	3.0	–	–	–	–
1.4	2.0	2.3	2.4	2.4	2.7	1.4	1.3	0.9	1.3	1.3	1.5	1.5	1.1	1.1	1.4	1.2	1.2	–	–	–	–
0.6	0.2	0.2	0.3	0.7	1.2	2.0	2.3	2.4	2.6	2.6	2.4	1.8	1.3	1.3	1.5	1.5	1.6	–	–	–	–
2.5	2.5	2.5	2.5	2.4	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.4	2.5	2.5	2.4	2.4	2.4	2.4			
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5.7	6.4	7.2	7.5	7.9
2.7	3.1	3.5	3.8	4.7	5.2	4.7	4.8	5.2	6.4	6.3	6.2	5.8	5.7	7.5	8.4	9.3	9.8	–	–	–	–
5.1	4.9	4.9	5.5	4.9	5.0	4.9	4.6	4.5	4.1	4.3	5.0	5.5	4.6	5.0	4.9	4.8	4.3	–	–	–	–
–	–	–	–	–	–	3.9	–	–	–	–	–	–	–	3.7	–	–	–	–	–	–	–
–	–	–	–	–	–	3.5	–	–	–	–	–	–	–	3.2	–	–	–	–	–	–	–
–	–	–	–	–	–	3.4	–	–	–	–	–	–	–	3.2	–	–	–	–	–	–	–
–	–	–	–	–	–	3.1	–	–	–	–	–	–	–	2.9	–	–	–	–	–	–	–
–	–	–	–	–	–	3.5	–	–	–	–	–	–	–	3.0	–	–	–	–	–	–	–
–	–	–	–	–	–	2.2	–	–	–	–	–	–	–	1.8	–	–	–	–	–	–	–
–	–	–	–	–	–	3.6	–	–	–	–	–	–	–	4.5	–	–	–	–	–	–	–
–	–	–	–	–	–	3.5	–	–	–	–	–	–	–	4.4	–	–	–	–	–	–	–
–	–	–	–	–	–	3.2	–	–	–	–	–	–	–	3.4	–	–	–	–	–	–	–
–	–	–	–	–	–	2.9	–	–	–	–	–	–	–	2.2	–	–	–	–	–	–	–
–	–	–	–	–	–	2.7	–	–	–	–	–	–	–	3.2	–	–	–	–	–	–	–
–	–	–	–	–	–	3.8	–	–	–	–	–	–	–	2.4	–	–	–	–	–	–	–
–	–	–	–	–	–	5.3	–	–	–	–	–	–	–	5.3	–	–	–	–	–	–	–
–	–	–	–	–	–	2.8	–	–	–	–	–	–	–	3.5	–	–	–	–	–	–	–
–	–	–	–	–	–	3.2	–	–	–	–	–	–	–	3.5	–	–	–	–	–	–	–
–	–	–	–	–	–	2.6	–	–	–	–	–	–	–	2.9	–	–	–	–	–	–	–
–	–	–	–	–	–	2.2	–	–	–	–	–	–	–	2.4	–	–	–	–	–	–	–
–	–	–	–	–	–	3.1	2.8	2.7	2.6	2.7	2.6	2.5	2.2	2.4	2.4	2.6	2.8	2.8	2.8	–	–
–	–	–	–	–	–	3.0	2.9	3.2	3.3	3.5	3.6	3.4	2.9	2.7	2.5	2.6	2.6	2.9	3.1	–	–
–	–	–	–	–	–	3.4	3.4	3.6	3.6	3.7	3.7	3.5	3.7	4.0	4.0	4.1	4.5	4.4	4.3	–	–
–	–	–	–	–	–	3.5	3.6	3.6	3.9	3.9	5.3	5.0	5.1	5.1	4.8	5.1	5.0	5.0	4.9	–	–
–	–	–	–	–	–	3.0	3.0	3.2	3.2	3.4	3.6	3.5	3.2	2.8	2.5	2.5	2.6	2.6	2.9	–	–

Source: Asian Development Bank, Japan Bank for International Cooperation, and World Bank 2005; Calderón and Servén 2010b and personal communication with Calderón; Congressional Budget Office 2010; India, Government of 2011; Kim and Nangia 2010 and personal communication with Nangia; OECD 2009a; United Kingdom, HM Treasury 2011.

The demand for infrastructure tends to increase in absolute terms as incomes rise, but at the same time its share of the public budget tends to decline.

Private investment in infrastructure has increased in most countries in recent decades, but these increases generally have not made up for declines in public spending.

This pattern with rising income suggests that infrastructure spending has a very different character for societies than does education or health spending. In the latter instances, our own cross-country analysis shows a modest tendency for public educational expenditures to rise as a share of GDP with higher incomes and a strong tendency for public health expenditures to increase as well. (However, variations of spending rates around the average patterns are again much greater in lower-income countries than in high-income ones.) Infrastructure is what economists label a "necessary good." That is, while the demand for infrastructure increases in absolute terms as income rises, its *share* of budgets on average declines. One reason for this is that most infrastructure requires networks that have large start-up costs relative to the more modest incremental costs associated with their expansion and maintenance (an often expensive exception is extension of networks to the last and most difficult to reach households and individuals). This decreasing expenditure on infrastructure as a share of GDP with rising income has important and somewhat positive implications for the ability of societies to meet physical infrastructure targets. We will discuss these in future chapters.

Most countries have seen public spending on infrastructure as a percent of their GDP decline or remain flat over the last few decades. Table 2.9 (pp. 46–47) shows trends from the studies that provide time-series data for individual countries. Although rising incomes probably contributed to these broad trends, the country-specific patterns are complex and require more extended explanation.

Calderón and Servén (2010b) and Estache (2005) noted that in much of the developing world the debt and financial crises of the 1980s and 1990s and the resulting push for structural adjustment and austerity programs led to significant declines in public spending. These declines have yet to reverse in some countries. This is most evident in Latin America, where public sector spending on infrastructure fell by an average of two-thirds, from a peak of 3.2 percent of GDP in 1987 to a low of 0.9 percent in 2004 (Calderón and Servén 2010b: 46). Kim and Nangia (2010: 102–103) noted that while annual infrastructure investment in East Asia as a share of GDP increased "from 3.6 percent in the 1970s to 4.6 percent in the 1980s, and to 5.3 percent in 1993. . . , after the Asian financial crisis in the late 1990s, infrastructure investments collapsed in many of the affected countries." S. Jones (2006: 6), in reviewing much of the data assembled for the *Connecting East Asia* report (Asian Development Bank, Japan Bank for International Cooperation, and World Bank 2005), found a similar pattern, with public spending declining in many countries from the 1990s to the early 2000s, again due in large part to the financial crisis and response. Cambodia, India, Indonesia, Pakistan, and the Philippines saw declines in public funding, while spending increased in China, Thailand, and Vietnam (Jones 2006: 6). Nearly every OECD country for which we have data also saw its infrastructure spending as a percent of GDP fall in recent decades, with the average OECD country seeing a 13 percent decline in spending levels, from a high of 3.8 percent of GDP in 1989 to 3.3 percent in 2005.[22] In the United States, public spending on infrastructure underwent a gradual but steady decline from a high of 3.1 percent of GDP in 1963 to a low of about 2.4 in the early 2000s (Congressional Budget Office 2010).

Private investment in infrastructure has increased in most countries and in most sectors over the last few decades, but except for a few countries, these increases have not made up for the declines in public spending. A primary reason for this pattern is that most private investments have been highly concentrated in terms of sector and geography. Worldwide, ten countries accounted for 70 percent of all private investment in infrastructure during the 1990s—Argentina, Brazil, China, India, Indonesia, Malaysia, Mexico, the Philippines, South Korea, and Thailand (Briceño-Garmendia, Estache, and Shafik 2004: 20). Calderón and Servén (2010b: 2) identified Latin America as the best-performing region of the world in terms of private financing of infrastructure at 35 percent of total spending (regional average) thanks to a strong push for privatization. In 1990, private companies in Latin America provided only 3 percent of telephone and electricity connections and almost no water connections (Fay and Morrison 2007: 31–32). By 2003, private investment levels in Latin America dramatically increased from 0.7 percent of GDP in 1990 to 1.3 percent. As a result, private companies in 2003 managed 86 percent of all telecom subscriptions, 60 percent of electricity connections, and 11 percent of water connections (Fay and Morrison 2007: 31–32). Even so, the rise in private investment was "insufficient to offset the fall in public investment" (Calderón and Servén 2010b: 23). In sub-Saharan Africa, private investment provided only about 10 percent of total spending, with over 70 percent of the spending going to ICT, 20 percent to electricity, and a negligible amount to transportation and to water and sanitation (Estache 2010: 68).

The largest shares of both overall infrastructure spending and public infrastructure spending tend to be for power generation and transportation. ICT generally receives the largest share of private investment. The breakdown of type-specific infrastructure spending across regions and time does, of course, vary. In Latin America, the electricity sector attracted the largest share of public spending in the 1980s, averaging 1.5 percent of GDP, with transportation second (0.8 percent) and the ICT and water and sanitation sectors at the low end (0.4 and 0.2 percent of GDP, respectively). By 2005, spending in all sectors had become much more evenly distributed, with transportation receiving the most at 0.8 percent of GDP, electricity second at 0.7 percent, ICT a close third at almost 0.7 percent (thanks to high levels of private investment), and water at 0.3 percent. In sub-Saharan Africa, the electricity sector also saw the highest level of spending, at 2.0 percent of GDP; transportation was again second at 1.8 percent, and ICT and water and sanitation were both much lower at 0.8 and 0.7 percent respectively. East Asia's spending breakdown was similar, with electricity at 2.5 percent of GDP, transportation at 2.6 percent, and ICT and water at 0.8 and 0.7 percent respectively.

A significant proportion of infrastructure spending tends to be directed toward operations and maintenance, with higher-income countries devoting a larger share of funds to maintenance than lower-income countries. In OECD countries, maintenance tends to account for roughly half of all infrastructure spending (OECD 2006: 218). For example, since 1984, the United States has devoted an average of 50 to 55 percent of its infrastructure spending to operations and maintenance (Congressional Budget Office 2010: 7). In sub-Saharan Africa, on the other hand, maintenance and operations account for only 20 percent of total infrastructure spending, whereas 80 percent has gone to new construction (Briceño-Garmendia, Smits, and Foster 2008: 3). Although this pattern is consistent with the need of low-income countries to build much more new infrastructure, it is also one of the major factors leading to the under-maintenance that plagues Africa's infrastructure sector and those of other developing countries (Foster and Briceño-Garmendia 2010: 73).

Conclusion

Infrastructure takes many forms. Some, like roads, have been with us for much of human history. Others, like mobile broadband networks, are little more than a decade old. In this chapter, we have presented a picture of the recent history of infrastructure—how much infrastructure there is, how extensive access to it is, how much has been spent on it, and how these have varied across countries and over time. Even as some poorer countries have moved rapidly to close the gap with more developed countries, very significant differences remain in the availability of infrastructure. Progress has occurred in fits and starts, reflecting the high up-front costs of most infrastructure, the time-frames required for new construction, and the key roles that political and institutional factors play in its development and maintenance.

As we reflect on the progress described in this chapter, we must not forget that:

> Infrastructures are not an end in themselves. Rather, they are a means for ensuring the delivery of goods and services that promote prosperity and growth and contribute to the quality of life, including the social wellbeing, health and safety of citizens, and the quality of their environments (Stevens et al. 2006: 20).

In the next chapter, we therefore turn our attention to the relationships between infrastructure and human development and environmental sustainability. That will complete the conceptual foundation and historical review needed to move forward with our own analysis of infrastructure's future.

Power generation and transportation tend to account for the largest shares of public spending. ICT generally receives the largest share of private investment.

1 Some studies, e.g., G. Hughes, Chinowsky, and Strzepek (2009), also include buildings like schools and hospitals, but this is an exception among the studies we have explored.

2 Throughout this volume, we will refer frequently to the Africa Infrastructure Country Diagnostic, a project implemented by the World Bank in 2005. A multi-organization Infrastructure Consortium carried out the work of the project, which resulted in, among other reports, an assessment of infrastructure needs for 24 African countries; a flagship report titled *Africa's Infrastructure: A Time for Transformation* (Foster and Briceño-Garmendia 1010); and an extensive online infrastructure database. The website for the project is http://www.infrastructureafrica.org, and the online database is available through a link from that site. The project is now housed at the African Development Bank and is referred to as the Africa Infrastructure Knowledge Program.

3 See http://data.worldbank.org/data-catalog/world-development-indicators.

4 See http://earthtrends.wri.org.

5 See http://www.infrastructureafrica.org/aicd/tools/data.

6 The database is available at http://ppi.worldbank.org/. The methodology is described at http://ppi.worldbank.org/resources/ppi_methodology.aspx.

7 See http://ppi.worldbank.org/resources/ppi_aboutDb.aspx.

8 The database is available at http://stats.oecd.org.

9 See http://www.imf.org/external/pubs/ft/gfs/manual/gfs.htm.

10 Road statistics cited in this section include both urban and non-urban roads.

11 With respect to paved roads, Latin America and sub-Saharan Africa have lagged behind the other developing regions for many possible reasons, including unfavorable geography and relatively low population densities. Latin America has large population centers in mountainous areas and sub-Saharan Africa has widely scattered populations, both of which raise building costs.

12 The road density per unit land area for upper-middle-income countries is strongly skewed by the inclusion of Russia, which accounts for over one-quarter of the total land area of countries in this group.

13 From World Bank Rural Access Index website at http://www.worldbank.org/transport/transportresults/headline/rural-access.html.

14 Our attention to electricity is not intended to minimize the importance of other aspects of energy infrastructure, particularly given the expected shifts in the world's energy system driven by concerns over both the remaining amount of key nonrenewable resources and the potential environmental impacts of energy use. In particular, the issues of peak oil—the date when global oil production will reach a maximum and start to decline—and climate change, driven in large part by energy use, have come to dominate the global energy and environmental agendas. An examination of these issues is beyond the scope of this study.

15 See World Bank World Development Indicators online at http://data.worldbank.org/data-catalog/world-development-indicators.

16 Aspects of convergence challenge these distinctions, with any number of services accessible over a variety of physical network infrastructures.

17 Calculated using data on GDP at market prices for developing economies from WDI 2011.

18 Data are for the five-year average from 2000 to 2005. Data from AICD available at http://www.infrastructureafrica.org/aicd/tools/data.

19 Data from AICD available at http://www.infrastructureafrica.org/aicd/tools/data.

20 Data from Asian Development Bank, Japan Bank for International Cooperation, and World Bank 2005.

21 Data from OECD 2009a: 166 and HM Treasury 2011: 14.

22 Of OECD countries with data, 18 percent saw an increase in spending, whereas 82 percent experienced a decline. Data from OECD.Stat Extracts available at http://dx.doi.org/10.1787/534024158375.

3

Connecting Infrastructure, Human Development, and the Environment

Infrastructures are at the very heart of economic and social development. They provide the foundations for virtually all modern-day economic activity, constitute a major economic sector in their own right, and contribute importantly to raising living standards and the quality of life. However, infrastructures also have less desirable consequences. To name but a few—more roads may mean more traffic and more noise, power plants may add considerably to greenhouse gas emissions, and dams may entail the destruction of large areas of countryside and the displacement of population.

Organisation for Economic Co-operation and Development[1]

What vast additions to the conveniences and comforts of living might mankind have acquired, if the money spent in wars had been employed in works of public utility; what an extension of agriculture even to the tops of our mountains; what rivers rendered navigable, or joined by canals; what bridges, aqueducts, new roads, and other public works, edifices, and improvements might not have been obtained by spending those millions in doing good, which in the last war have been spent in doing mischief.

Benjamin Franklin[2]

For many people in the developed world, daily life rests heavily on infrastructure and the services it provides. Transportation infrastructure allows us to travel to and from work, the supermarket, and even vacation spots around the world. Information and communication infrastructure lets us check email and stay up-to-date on world events from our computers, laptops, tablets, and mobile phones. Energy infrastructure heats our homes in the winter and keeps them cool in the summer, and water infrastructure enables us to shower every morning. The use of infrastructure services is staggering. In the United States alone, in 2010 the average family used 11,500 kilowatt-hours

■ *Infrastructure is at once both an engine for, and a product of, economic and social development.* ■

■ *This chapter explores the coevolutionary relationship between infrastructure, human development, and the environment.* ■

of electricity[3] and 146,000 gallons of water in pursuit of daily activities (showers accounted for 16 percent of family water consumption).[4] The nation's transportation networks carried some 137 million personal vehicles on its roads and flew some 680 million passengers to destinations across the country and around the world. At the same time, its data networks supported 245 million internet users, 81 million fixed broadband connections, and 280 million mobile phone subscriptions.[5] Clearly, access to infrastructure services makes an individual's daily life better. But what role does it play, in the aggregate, in the creation of healthier, more educated, safer, and more productive societies?

Infrastructure's relationship to human development is one of interdependence. Infrastructure is at once both an engine and a product of economic and social development (see again Figure 1.4 for a graphical representation of this relationship). We use the example of South Africa to demonstrate the dynamics of this interdependent relationship. In contrast with the United States, many South African households are still without electricity. South Africa has made strides in correcting this over the past two decades and, in so doing, has seen a number of benefits in human development. In 1994, South Africa's first post-apartheid government embarked on a large-scale electrification program specifically targeting poor rural households and townships. Prior to this program, roughly two-thirds of the country's households were without electricity and more than 80 percent still relied on firewood for cooking. By 2003, 2.75 million more households (or 28 percent of all households in the country) were connected to the country's electrical grid under the program (Davidson and Mwakasonda 2004: 20; Dinkelman 2011: 3079).

Bringing electricity to these households quickly had a number of positive impacts on human development, from economic growth to health. Female employment rates in the newly electrified areas increased by 9 to 9.5 percentage points, with the greatest gain in rural areas, as time once spent collecting firewood, a predominantly female task, could now be spent more productively (Dinkelman 2011: 3080). The increase in employment rates meant greater incomes for families, enabling them to improve their diets and to send more of their children to school. The provision of energy infrastructure also had a direct effect on health by replacing wood burning stoves and decreasing indoor air pollution. Under South Africa's electrification project, the percentage of households using firewood for cooking declined by an average of 3.5 percentage points from 1996–2001, with some areas seeing declines of as much as 27 percentage points (Dinkelman 2011: 3100).[6] In turn, we can assume that the benefits from electrification likely increased demand for further infrastructure services, since the families had more time to take advantage of such services and could better afford them.

A similar dynamic exists between infrastructure and the natural environment, with terrain and climate strongly influencing the need for infrastructure and the kind of infrastructure employed, and with infrastructure, in turn, transforming natural environments. Next to agriculture, infrastructure represents humanity's most significant alteration of the natural world. Dams and roads are just two of many examples. Lehner et al. (2011) estimated that the approximately 50,000 dams in the world that are higher than 15 meters have, in the aggregate, the capacity to store one-sixth of the world's total annual river flow into the oceans. And while the more than 30 million kilometers of roadways worldwide serve as a major connective network for human society, they also represent a primary cause of habitat fragmentation for natural ecosystems.

This chapter explores this coevolutionary relationship between infrastructure, human development, and the environment. We begin with infrastructure's impact on human development and start with the relationship between infrastructure and economic growth because that connection has received the most attention from researchers and decision makers. Transportation projects, for example, have only recently begun to include potential social benefits as part of the funding process and the evaluation of project outcomes (see Odoki et al. 2008 for the development of an approach for such inclusion based on a case study in Uganda), but have long looked at the impact on trade and other economic activities. A second reason we begin with this connection is that economic growth is known to strongly influence many other aspects of human development, including income inequality, health, and education. Because of this influence, it is important to distinguish, to the extent possible, the direct effects of infrastructure from its indirect effects on these other aspects of human development via economic growth.[7] In fact, most rigorous analyses have focused only on the economic growth effects; the discussion of infrastructure's impacts on broader social development tends to be more anecdotal and does not attempt to distinguish between primary and secondary effects.

We follow our review of the forward links from infrastructure to human development with a summary of key drivers of infrastructure development in order to complete our description of this reciprocal relationship. In doing so, we draw heavily on studies that have attempted to project future demand for infrastructure and the associated funding required.

The Impact of Infrastructure on Human Development and the Environment

Brenneman and Kerf provided an important reference point for considering the impact of infrastructure on development in a literature review for the World Bank on the "poverty alleviation impact of increased access to infrastructure services in four sectors (energy, water and sanitation, information and communication technologies, and transportation)" (Brenneman and Kerf 2002: 1). They classified infrastructure's impact into eight categories, based on the work of an earlier World Bank cross-sector working group on infrastructure and poverty. The categories were: "(i) growth-enhancing impacts; (ii) increase of economic opportunities specifically targeted to the poor; (iii) direct savings; (iv) improved education; (v) improved governance framework; (vi) improved health; (vii) direct impact on well-being; (viii) fiscal impact (coupled with pro-poor policies)" (Brenneman and Kerf 2002: 1).

Although Brenneman and Kerf's review focused on the poor, the authors also pointed out that most of these impacts extend to all of society. As such, their classification serves as a good foundation for our review of infrastructure's relationship to human development. With the exceptions of categories ii, iii, and vii, we address each of their categories in separate corresponding sections. We address categories ii and iii in our discussion of infrastructure's impact on income inequality; category vii, the direct impact on well-being, is subsumed in that discussion as well as in those on the links between infrastructure and health and education. The one category we find missing in Brenneman and Kerf's review is the links between infrastructure and the natural environment which, in turn, can impact human well-being. We have added that linkage to the discussion in this chapter.

Infrastructure and economic growth

Poor infrastructure can impede economic growth. For example, many economists believe that Indonesia's economy has grown more slowly over the last few years than would be expected given an array of positive economic factors in its favor. Pilling concluded in 2011, for example, that instead of the 6 percent growth actually recorded, the country ought to be "growing at 8, 9, or even 10 percent annually."[8] The problem? Poor infrastructure. Indonesia's infrastructure, from electricity to transportation, has simply not kept up with demand. Fifty million people in the country—approximately 21 percent of the population—still lack access to electricity, and roughly five million people in the country's capital city alone lack running water.[9] In addition, the infrastructure that has been built is poorly maintained, as illustrated by the November 2011 collapse of a bridge—modeled after the Golden Gate Bridge in the United States—built only ten years earlier. At least two other such bridge collapses occurred in the same year.[10] Further, importing foreign goods is often cheaper than transporting domestically made ones. Cement, for example, costs 10 times more in Papua province (Indonesia's easternmost province) than it does on Java. Blackouts and inadequate transportation services have kept many multinational corporations from investing in the country. According to the World Economic Forum's 2011–2012 Global Competitiveness Report, Indonesia's infrastructure ranks 76th in the world in quality, with its ports 103rd, roads 83rd, and electricity 98th (Schwab 2011: 217). Clearly, poor infrastructure is taking an economic toll.

Indonesia's economy is far from unique in being hampered by poor infrastructure.

Poor and/or inadequate infrastructure pose a significant challenge for economic growth. This problem is attracting increasing attention from policy makers around the world.

Inadequate sanitation infrastructure costs South and Southeast Asian and sub-Saharan African countries on average 2.8 percent of GDP per year.

In Colombia, analysts liken the costs of poor transportation infrastructure to a 10 to 15 percent tax on all transported goods; they further estimate that the country's infrastructure deficits might be costing the country as much as 1 percent of GDP growth a year.[11] In Africa, poorly integrated regional information and communication networks result in calls from one African country to another costing almost three times as much as calls to the United States (1.23 US$ a minute versus 0.45 US$ per minute in 2006) (Foster and Briceño-Garmendia, 2010: 167). Most African countries rely on satellite connections for internet access, leading to dial-up and broadband services that cost more than twice as much as in other regions of the world (Foster and Briceño-Garmendia, 2010: 5).

The negative consequences of poor and/or inadequate infrastructure (so-called infrastructure gaps) are attracting increasing attention from policy makers. In the Seoul Summit Document (G20 2010: 3), world leaders from eight major governments included infrastructure as one of nine key pillars where "action and reform are most critical to insure inclusive and sustainable economic growth and resilience in developing countries and [low-income countries]." The G20 report further noted that "Gaps in infrastructure, including with respect to energy, transport, communications, water and regional infrastructure, are significant bottlenecks to increasing and maintaining growth in many developing countries" (G20 2010: 1).

Table 3.1 Estimated negative economic impacts of inadequate sanitation: in selected countries

Country and data year	Total cost (billions in 2005$)	Per capita costs (in 2005$)	Percent of GDP
Cambodia (2005)	0.45	32.40	7.20
India (2006)	53.80	48.00	6.40
Bangladesh (2007)	4.20	29.60	6.30
Laos (2009)	0.19	34.40	5.60
Pakistan (2006)	5.70	N/A	3.94
Indonesia (2005)	6.34	28.60	2.30
Liberia (2010)	0.17	4.90	2.00
Ghana (2010)	0.29	12.00	1.60
Philippines (2005)	1.41	16.80	1.50
Nigeria (2010)	3.00	20.00	1.30
Vietnam (2005)	0.78	9.30	1.30
Zambia (2010)	0.19	16.40	1.30
Mozambique (2010)	0.12	6.00	1.20
Uganda (2010)	0.18	5.50	1.10
Tanzania (2010)	0.21	5.00	1.00
Kenya (2010)	0.32	8.00	0.90
Average	4.83	18.46	2.81
Total	77.37		

Note: Compiled by authors from a series of Water and Sanitation Program reports. Entries arranged in terms of negative impact on percent of GDP, from greatest (top) to least (bottom).

Source: Water and Sanitation Program Economics of Sanitation Initiative country reports from 2009–2012; reports available at http://www.wsp.org/wsp/library.

Identifying the pathways of economic impact

Conceptually, the connections or pathways between infrastructure and economic growth seem readily identifiable. Exploring these paths, Hulten, Bennathan, and Srinivasan (2006) and Straub (2008b) summarized two general ways in which infrastructure can influence economic growth through production. The first arises from the fact that many infrastructure services function as intermediate inputs in the production process. To the extent that better infrastructure lowers costs for such inputs as transportation, communication, and energy, it enhances economic productivity. The second pathway refers to more general efficiency-enhancing effects of infrastructure. Straub (2008b: 7–9) identified several channels by which these more general effects occur: (1) maintenance costs are reduced and private capital has greater durability; (2) adjustment costs are lower (e.g., infrastructure lowers the logistic costs of investments and reduces the need for private investment in items such as back-up generators); (3) labor productivity is enhanced by increased communication and interaction and through wider spillover effects with better information and communication technologies (ICT); (4) labor productivity is further enhanced by the impact of infrastructure on human development (e.g., health and education); and (5) improved infrastructure, particularly transport, can lead to economies of scale and scope.

Each of these paths and channels can be complex within itself as well as interactive with others. For example, with respect to those paths that work primarily via labor force size and productivity, the partnership Water and Sanitation Program (WSP) administered by the World Bank has produced a number of reports detailing the economic consequences of inadequate sanitation for developing countries, with a primary focus on South and Southeast Asia and sub-Saharan Africa (see Table 3.1). The WSP reported that, on average, inadequate sanitation infrastructure cost the countries studied an estimated 4.8 billion dollars (2005 US$), or 2.8 percent of GDP per year, with India experiencing the largest cost in dollar terms (almost 54 billion a year) and Cambodia the largest in terms of GDP (7.2 percent).[12] The majority of this burden came from the premature deaths of children under five (94 percent of all costs in India),[13] but healthcare costs, productivity losses due to sickness, and lost tourism also contributed to it (WSP 2011: 40).

Box 3.1 provides another illustration of the way infrastructure impacts productivity, this time with respect to a particular sector of the economy, namely, agriculture and food production.

The economic impacts of improved infrastructure have a significant international component also. Mbekeani (2010) summarized the key roles that infrastructure plays in international trade. He pointed to, among other things, the importance of transportation and communications services for logistics management in increasingly globalized markets and production networks, and the important role infrastructure plays in the ability of countries to attract foreign investments. Mbekeani noted, in particular, the importance of infrastructure in promoting regional integration in Central America, Central Asia, and sub-Saharan Africa. In this vein, it is not surprising that the Organisation for Economic Co-operation and Development followed up its Infrastructure to 2030 Project (OECD 2006; 2007) with a project on transcontinental infrastructure needs (OECD 2009b). Other regional development organizations have also sponsored studies that similarly note the relationships between regional infrastructure, increased trade and foreign investment, and economic growth. Within Asia, the Asian Development Bank (ADB), the Japan Bank for International Cooperation (JBIC) and the World Bank (WB) have all invested in such studies (for example, see ADB, JBIC and WB 2005, and Asian Development Bank Institute 2009); more recently the Permanent Secretariat of the Latin American and Caribbean Economic System (2011) highlighted the importance of physical infrastructure in that region.

Analyzing the magnitude of economic impact

A rather large body of empirical research has attempted to analyze the magnitude of infrastructure's impacts on economic growth. A study by Aschauer in 1989 is generally recognized as seminal. Studies differ in

Box 3.1 Infrastructure as a key factor in the agriculture and food sector

Accessible high-quality infrastructure is vital to feeding the world. From connecting farmers to markets and allowing easier transport of inputs like fertilizer to irrigation systems providing water in otherwise dry lands, and from refrigerated trucks preventing spoilage to super-efficient GPS-directed tractors, infrastructure makes possible the modern agricultural systems of developed countries and is key to fighting hunger and rural poverty in developing countries.

Infrastructure's most important role in agriculture is to reduce the transaction costs caused by distance and/or farm isolation. Agricultural inputs (such as fertilizer) and products require time and money to transport, and the farther the distance or the poorer the infrastructure, the higher the cost (Stifel and Minten 2008). Transport costs in Africa, for example, are often five times higher than in Asia due to the region's poor road networks (Hodges, Buzby, and Bennett 2010). Costlier inputs force isolated farmers to use fewer of those inputs, limiting yields. In Madagascar, maize and cassava yields in the most isolated farms (based on geographic distance and road density) were 50 percent lower, and rice yields 33 percent lower, than those in the least isolated farms (Stifel and Minten 2008: 22). And according to an earlier International Food Policy Research Institute study, farms with better access to roads paid 14 percent less for fertilizer, saw 32 percent higher crop output, and were able to pay 12 percent greater wages than those with little to no access to road infrastructure (Spencer 1996: 9).

Lack of infrastructure impacts crop output and distribution in other ways as well. The lack of electrical infrastructure in many developing countries has made crop spoilage the primary cause of post-harvest crop losses. Estimates of total post-harvest loss, or food waste, range from 10 to 50 percent of harvested crops, with a significant part of this loss due to poor infrastructure (Gustavsson et al. 2011; Hodges, Buzby, and Bennett 2010; Parfitt, Barthel, and Macnaughton 2010). Poor electrical infrastructure is an even greater problem for meat and dairy production, where refrigeration is of paramount importance. In developed countries, most meat and dairy products are distributed via a "cold chain," a system of refrigerated transport and storage designed to keep produce at a constant temperature throughout its journey from farm to market. Such supply systems are becoming ever more important as world meat and dairy consumption continues to rise. But for many developing countries, cold chains for meat transport are limited, especially outside of major cities, where electricity access remains a challenge. Some novel energy solutions have been developed for health industry cold chains (see the Infrastructure and Health section below), but are just beginning to be applied in the agricultural sector.

Fan, Hazell, and Thorat (2000) found that although investment in improved roads and other hard infrastructure (such as irrigation systems) had the biggest impact on agricultural productivity, the provision of agricultural extension services—typically government-led education and information services that enable farmers to apply research and new knowledge about agricultural practices—also had a significant impact. The effectiveness of agricultural extension highlights the growing importance of information and communication technologies in agriculture. The spread of mobile communications throughout the developing world is enabling governments to provide more agricultural extension services to once isolated farmers, allowing them to learn about advances in agricultural practices, better communicate with each other and with markets, and access real-time information on food prices.

Countries with poor infrastructure risk continued or worsening isolation from globalized markets, production networks, and foreign investment.

terms of their measures of infrastructure (for example, whether they use physical or monetary measures) and what forms of infrastructure they include. While most examine overall economic activity, some focus on specific economic sectors, such as agriculture or manufacturing. They also differ in terms of geographic specificity, ranging from local to national, regional, or global coverage. Straub (2008a; 2011) has provided the most recent comprehensive reviews of this literature.[14] In the first of these, he reviewed macro-level empirical studies, microeconomic studies, and empirical economic-geography studies. His second review was a critical appraisal of the macro-level literature based on an analysis of 30 studies.

A number of technical issues plague the literature that attempts to analyze the magnitude of infrastructure's economic impact, and these issues raise questions about the results of individual studies, make comparisons difficult, and thus affect the value of the studies for both modeling and policymaking. Calderón and Servén (2010a) and Straub (2008a) have provided helpful summaries of these issues, which serve as a backdrop for the discussion that follows:

1. *What is the proper measure of infrastructure—spending or stocks?* Most early studies used measures of infrastructure expenditures or public capital expenditures more generally. As forcefully argued by Pritchett (2000), however, equating expenditures with levels of infrastructure stocks ignores both significant differences in the efficacy of investment and the presence of corruption in the construction of infrastructure in many countries. Spending measures can be misleading for other reasons as well. Developed countries with well-established infrastructure networks tend to spend much less as a percent of GDP than developing countries that are trying to build out their networks. At the same time, two countries spending the same amount on infrastructure per year might have very different stock levels. One country with a significant amount of infrastructure might be spending heavily on maintenance and very little on new construction, while another with very little infrastructure might be spending just as much to build out its networks. In this case, using spending as a measure would not only give a possibly faulty impression of network size, but also the network's rate of growth. Still further, long delays between spending surges and the completion of new infrastructure are common. And, as described in Chapter 2, very limited historical data on infrastructure spending is a major issue. Thus, most recent studies have tended to focus on physical stocks of infrastructure. Of course, using stocks also presents problems. For instance, the relative quality of stocks can differ across countries (Hulten 1996). Some analysts (see, especially, Calderón and Servén 2004a and b; 2010a; and 2010b) have tried to address this problem by including infrastructure quality measures in addition to quantity. Note, too, that the infrastructure pillar of the Global Competitiveness Index described in Chapter 1 (Schwab 2010) and a national infrastructure index proposed by Oswald et al. (2011) use a combination of quantity and quality measures.
2. *What about interactions between different forms of infrastructure?* As mentioned in Chapter 2, different forms of infrastructure are strongly interconnected. Furthermore, there tends to be a high degree of positive correlation between different types of infrastructure stocks—that is, if a country has a relatively large road network, it is more likely to have high ICT penetration. These interconnections and interactions make it difficult to isolate the specific impacts of individual forms of infrastructure. If an analysis includes only a single type, it will tend to overestimate the impact of that infrastructure because it is not accounting for the other, correlated types of infrastructure. Alternatively, if an analysis includes multiple types of infrastructure, each represented separately, the estimated impacts of the individual types of infrastructure are likely to be insignificant and/or highly uncertain because distinguishing between the effects of the individual types is not possible (Kennedy 2008). In Chapter 4, we introduce the use of aggregate indices of infrastructure stocks in the International Futures system (IFs), in part as an effort to deal with these problems. Most recent estimates of infrastructure's impact

on economic growth have used such an index (see, for example, Calderón and Servén 2010a and 2010b, and Dash and Sahoo 2010).

3. *What other explanatory variables need to be included?* Many non-infrastructure drivers of productivity and economic growth also need to be accounted for in order to identify the specific effects of infrastructure. These other drivers include generally observable variables, such as levels of labor and private capital, but also less tangible ones. Straub (2011) classified a number of these variables into three broad categories: regulatory frameworks and market structure; institutional quality; and political economy, including culture. Calderón and Servén (2010a) added technological factors to this list.
4. *What is the direction of causality?* Does infrastructure cause economic growth or does economic growth lead to more infrastructure? The answer is almost certainly "both." The challenge then becomes how to tease out the different effects from the historical data, which necessarily conflate the two. Both Straub (2008b) and Calderón and Servén (2010a) pointed to this as the most serious of the problems in estimating the effect of infrastructure on economic productivity and growth. Recent studies have used more sophisticated statistical techniques than earlier studies in an effort to address the problem.

Other methodological issues also are important in trying to determine the magnitude of infrastructure's impact on economic growth. For instance, most of the studies reviewed by Straub (2008a; 2011) and others have estimated a constant or linear elasticity of output with respect to infrastructure, implying that the impact of adding infrastructure does not vary with the level of existing infrastructure. Estache and Fay (2010: 159) argued that this hypothesis is clearly incorrect, referring to Hurlin (2006: 16–17), who found that:

> . . . the productivity of infrastructure (road, electricity, telephones and railways) exhibits strong threshold effects which could be interpreted as network effects. In a first step, when the stock of infrastructure in a sector actually available per worker is very low, the infrastructure investments in this sector have the same productivity as the other investments. On the contrary, when the network is sufficiently developed but not fully achieved, infrastructure investments have a productivity impact that is generally larger than that of other investments. Finally, when the level of physical infrastructure stock per worker exceeds a certain value indicating that the main network is achieved, the productivity rapidly decreases and the infrastructure investments may be not exceptionally productive at the margin. In other words, the highest marginal productivity of investments is reached when a network is sufficiently developed, but not completely achieved.

This is in line with Fernald's (1999) conclusion that the construction of the interstate highway system in the United States provided a significant boost to productivity but that further additions to the road network have had a much lesser effect. Several studies of the impact of information and communication technologies on productivity also have noted that the magnitude of ICT's impact varies at differing levels of penetration but suggest different conclusions with respect to the level of penetration at which additions have the greatest impact. For example, Röller and Waverman (2001) found a larger positive impact on productivity in countries where penetration approached universal coverage. Meanwhile, Qiang, Rossotto, and Kimura (2009) presented results showing larger growth effects from additions of ICT stock for low- and middle-income economies, which, as shown in Chapter 2, are, on average, far from universal coverage.

Still another set of methodological issues arises when one explicitly considers the trade-offs associated with investment in infrastructure. Investments in infrastructure, particularly public investments, may require redirecting public spending from other sectors (e.g., education or health), the raising of additional revenues, and/or increased borrowing, each of which can have a

Poverty is a function not only of total economic activity, but also of the distribution of income. Thus, it is important to consider the effect of infrastructure on income inequality.

dampening effect on economic growth. Therefore, even in the absence of "governance problems of a sector noted for its white elephants, cost overruns, and overly optimistic forecasts of demand" (Estache and Fay 2010: 152), it may be possible to overinvest in infrastructure. In order to address the question of whether or not an optimal level of infrastructure exists, we must also consider the possible broader economic effects of infrastructure investment. Only a few studies have done so (Adam and Bevan 2006; Perrault, Savard, and Estache 2010; Rioja 2001). These studies have looked primarily at the general equilibrium effects of increased public investment in infrastructure. Such broader effects will be a key component of our analyses in Chapters 6 and 7.

Conclusions concerning the economic impact of infrastructure development

What might we conclude from the studies of infrastructure and economic growth? In addressing this question, Servén (2010: 1) stated that the

> . . . findings are far from unanimous, but a majority of studies reports a significant positive effect of infrastructure on output, productivity, or their growth rate. This is mostly the case with studies using physical measures of infrastructure stocks; in contrast, results are less conclusive among studies using pecuniary measures such as public investment flows or their accumulation into public capital.

Straub (2011) reached a similar conclusion. In an online appendix, he provided a summary of the empirical results from 77 different specifications of the impact of infrastructure on economic output drawn from 30 studies published between 1989 and 2006.[15] Straub focused primarily on whether there was a significant positive or negative relationship between the measure of infrastructure and the measure of economic output (he did not provide specific estimates of magnitude in these summaries). He also compared the impacts of using different measures of economic growth and different statistical techniques.

Table 3.2 shows a subset of Straub's results. He found that more than half of the cases pointed to a significant positive relationship, while less than 7 percent showed a significant negative relationship. Significant positive relationships were more common in cases that:

- focused on developed countries or a mix of developed and developing countries (although lower quality data in developing countries could affect this conclusion).
- used a physical measure of infrastructure rather than a financial measure.
- used a synthetic index measure of physical infrastructure.

Even though these results suggest that a significant positive effect of infrastructure on economic output is likely, providing a simple estimate of the magnitude of that impact is not possible (Servén 2010; Straub 2011). For the many reasons discussed above, not all results are comparable due to differences in, among other things, measures of infrastructure, measures of economic output, and statistical approaches adopted. Even if we were to focus on those few recent studies that use an aggregate index of physical infrastructure and were careful to account for reverse causality, comparisons would be difficult due to differences in how the indices are defined in the different studies.

Still, we can learn something about the possible magnitude of infrastructure's impact on economic activity by looking at a few specific results. For example, Calderón (2009: 12) attributed over half of sub-Saharan Africa's improved growth performance between the 1990s and the early 2000s to infrastructure improvements. The most significant contribution was from ICT. At the same time, declines in the quality of provision of electricity services prevented ICT from having an even more positive impact on growth.

In another study, Calderón and Servén (2010a: i39) used regression analysis to attempt to quantify the effect of infrastructure development on economic growth more generally (see Figure 3.1, on p. 60). They found that between the early 1990s and early 2000s the per capita economic growth rate was increased by additions to infrastructure stocks

Table 3.2 Summary of empirical results of studies looking at the relationship between infrastructure and economic activity

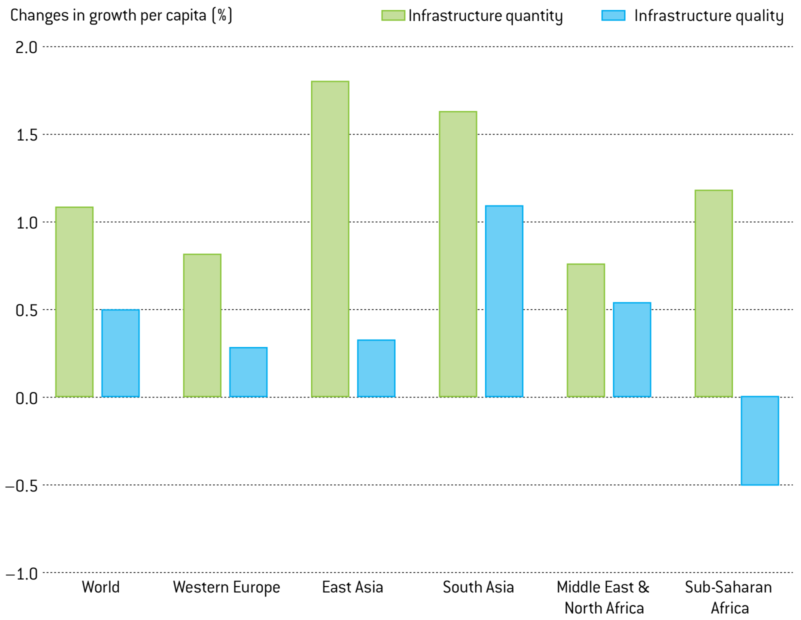
		Results	
Sample type	**-1**	**0**	**1**
Developed (23)	8.70%	21.74%	69.57%
Developing (22)	9.09%	54.55%	36.36%
Mixed (32)	3.13%	37.50%	59.38%
Dependent variable			
Output (48)	0.00%	43.75%	56.25%
Output growth (24)	16.67%	29.17%	54.17%
Productivity (4))	25.00%	25.00%	50.00%
Other (1)	0.00%	0.00%	100.00%
Independent variable			
Public Capital (34)	14.71%	44.12%	41.18%
Aggregate (27)	18.52%	48.15%	33.33%
Transport (4)	0.00%	25.00%	75.00%
Telecom (2)	0.00%	0.00%	100.00%
Water (1)	0.00%	100.00%	0.00%
Physical Indicator (43)	0.00%	32.56%	67.44%
Electricity (11)	0.00%	45.45%	54.55%
Roads (10)	0.00%	40.00%	60.00%
Telecom (14)	0.00%	21.43%	78.57%
Water (1)	0.00%	0.00%	100.00%
Sanitation (1)	0.00%	100.00%	0.00%
Synthetic (6)	0.00%	16.67%	83.33%
Theoretical framework			
Prod function (46)	2.17%	36.96%	60.87%
Cross-country reg (29)	13.79%	37.93%	48.28%
Cost function (1)	0.00%	100.00%	0.00%
Growth accounting (1)	0.00%	0.00%	100.00%
Total (77)	**6.49%**	**37.66%**	**54.84%**

Note: Numbers in parentheses refer to number of cases in each category. The column labeled -1 shows the percent of studies that showed a significant negative relationship between infrastructure and economic activity. The column labeled 0 shows the percent of studies that found no significant relationship between infrastructure and economic activity, and the column labeled +1 shows the percent that found a significant positive relationship. "Developed," "Developing," and "Mixed" refers to the development level of countries included in the studies. Refer to source listed below for further explanation of terms and categories.

Source: Table reproduced from pages 16 and 17 of Straub, Stéphane. 2008. "Infrastructure and Development: A Critical Appraisal of the Macro-level Literature." Policy Research Working Paper 4590. ©World Bank. http://hdl.handle.net/10986/6517 License: Creative Commons Attribution CC BY 3.0 (http://creativecommons.org/licenses/by/3.0).

(quantity) in all regions, and by improvements in infrastructure quality in all regions but sub-Saharan Africa. For the world as a whole, they attributed 1.6 percent of per capita economic growth to changes in infrastructure over the period—1.0 percent to infrastructure quantity gains and 0.6 percent to infrastructure quality gains (Calderón and Servén 2010a: i40). Calderón and Servén do suggest that while increasing infrastructure quantity and quality can be quite positive, tradeoffs arise, primarily from the amount of money required. They note that the massive amount of funding required for African countries to close their infrastructure quantity gap by half would incur a heavy burden on the public sector, potentially

Figure 3.1 Growth changes across regions due to infrastructure development (change in average per capita growth, 2001–2005 versus 1991–1995)



Source: Figure 2 from César Calderón and Luis Servén, "Infrastructure and Economic Development in Sub-Saharan Africa," Journal of African Economies *19 (2010): Si4; reproduced by permission of Oxford University Press.*

negatively impacting economic growth by shifting funds away from other sectors; they do not attempt to quantify this effect, however (Calderón and Servén 2010a: i54).[16]

Infrastructure and income distribution

Economic growth is generally considered a necessary condition for poverty reduction. However, as we noted in the first volume of this series, *Reducing Global Poverty* (B. Hughes et al. 2009), poverty is a function not only of total economic activity but also of the distribution of income resulting from this activity. Thus, we want to consider the effect of infrastructure on income inequality in addition to its effect on overall economic growth.

Calderón and Servén (2004a; 2010a) reviewed studies exploring the connections between infrastructure and income distribution, pointing in particular to initial work by Brenneman and Kerf (2002); Estache, Foster, and Wodon (2002); and López (2003). These studies identified pathways by which infrastructure development can be expected to benefit the poor disproportionately (thereby reducing income inequality), although they did not provide quantitative estimates of the size of these effects. Among the critical pathways are:

- In the short term, improved roads and other infrastructure improvements reduce the cost of bringing products to markets and, more generally, help to integrate underdeveloped areas into national and international economic networks.
- In the longer term, by improving levels of education (e.g., access to electricity allowing more time to study) and health (e.g., access to clean drinking water and sanitation significantly reducing child morbidity and mortality), improved infrastructure enhances the future earning potential of the poor.

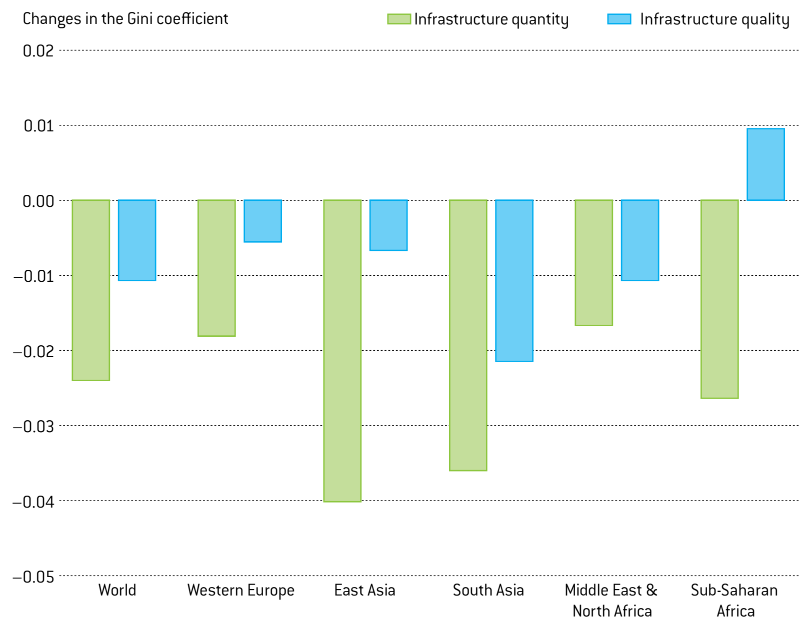
Underlying these connections is the recognition that the poor have the least access to existing infrastructure and that, even when they do have access, this infrastructure too often is of lower quality (Banerjee et al. 2008; Banerjee et al. 2009; Briceño-Garmendia, Estache, and Shafik 2004; Foster and Briceño-Garmendia 2010). Thus, infrastructure's role in reducing income inequality depends on all three aspects of infrastructure development—quantity, quality, and most important, access.

Only a small number of empirical studies analyze the infrastructure-income distribution connection (Calderón and Chong 2004; Calderón and Servén 2004a, 2010a; López 2003; López 2004; see also Box 3.2).[17] As with the studies of infrastructure and overall economic growth, some of the more recent of these (Calderón and Servén 2004a; 2010a) also considered other drivers of income inequality, including changes in average income, and addressed issues of measurement, reverse causality, and heterogeneity across countries. Unlike the somewhat mixed results linking infrastructure to overall economic growth noted earlier (see again Table 3.2), all of these studies were in agreement that improvements in both the quantity and the quality of infrastructure lead to reductions in income inequality, but only if those improvements allow for increased access by the poor. More specifically, Calderón and Servén (2010a: i465–i46) estimated that, from 1990 to 2005, growth in infrastructure stocks led to reductions in income inequality ranging from just under 0.02 to nearly 0.04 points

Box 3.2 Rural electrification and inequality

An effort to electrify rural areas in Bangladesh brought a number of benefits to residents. Newly electrified households showed a 22 percent increase in income, along with increased off-farm employment opportunities, as now-electrified businesses expanded their operating hours from nine to fourteen hours and hired more workers (Songco 2002: 4). In India, rural electrification led to the replacement of diesel pumps for well-based irrigation with electric ones. The new pumps brought increased efficiency and lower fuel costs, both of which allowed farmers to raise yields and incomes. Project impact assessments in both countries suggested that the electrification of agriculture was especially significant in reducing the incidence of absolute poverty, as access to electricity spurred farmers to move toward more modern forms of agricultural production (Songco 2002: 4).

Figure 3.2 Changes in inequality across regions due to infrastructure development (change in Gini coefficient of income distribution, 2001–2005 versus 1991–1995)



Source: Figure 3 from César Calderón and Luis Servén, "Infrastructure and Economic Development in Sub-Saharan Africa," Journal of African Economies *19 (2010): Si46; reproduced by permission of Oxford University Press.*

across all global regions, as measured by the Gini coefficient on a 0.0 to 1.0 scale (see Figure 3.2).[18] With the exception of sub-Saharan Africa,[19] all regions also saw an improvement in infrastructure quality, further reducing income inequality by 0.005 to 0.02 points.

Infrastructure and health

Infrastructure can play significant roles, both positive and negative, in human health. On the positive side, it reduces the degree to which individuals are exposed to many specific health risks, directly increases the access of individuals to healthcare, and improves the nature of healthcare itself. Properly maintained and functioning infrastructure provides direct protection from—as well as the means to deal with the aftermath of—human-caused and natural disasters (Streips and Simpson 2007). More broadly, infrastructure such as improved irrigation and rural roads can impact health indirectly through boosting agricultural productivity and thereby reducing undernutrition (see again Box 3.1). Also, to the extent that infrastructure enhances overall economic growth, reduces income inequality, and boosts education (discussed below), it further or secondarily enhances both the access to, and provision of, health and other services.

Some studies have attempted to quantify the impacts of infrastructure on health. The World Health Organization (WHO)—in its Global Burden of Disease, Comparative Risk Assessment, and Environmental Burden of Disease projects (see in particular Desai, Mehta, and Smith 2004 and Fewtrell et al. 2007)—has summarized many of the studies related to the impacts of infrastructure on specific disease outcomes. In terms of greatest impacts, WHO estimated that, in 2004, nearly 2 million deaths were attributable to unsafe water and sanitation[20] and that a similar number were attributable to indoor air pollution related to the use of solid fuels for heating and cooking (WHO 2009a). In related work, Hutton, Haller, and Bartram (2007: 489) estimated that 70 percent of all incidences of diarrhea in developing countries could be prevented if all households had direct connections to sanitation and improved sources of drinking water.

Fay et al. (2005), building on earlier work by Leipziger et al. (2003), explored the roles of infrastructure, income inequality, urbanization, education, and direct health interventions in meeting the child health-related Millennium Development Goals (reductions in infant mortality; child mortality; and stunting, which serves as a proxy for undernutrition).

Infrastructure's role in reducing income inequality depends on all three aspects of infrastructure development—quantity, quality, and most important, access.

Infrastructure can reduce the degree to which individuals are exposed to many specific health risks, increase their access to health-related services, and improve the nature of healthcare.

Specifically, Fay et al. looked at aspects of what they termed "household infrastructure": access to improved sanitation, access to piped water, access to electricity, and the presence or absence of a dirt floor. Their results indicated that improved household infrastructure has significant direct effects on child mortality (an 8 percent reduction in under-five mortality) and stunting (a 14 percent reduction), as well as smaller and indirect impacts on infant mortality operating primarily through a reduction in undernutrition (Fay et al. 2005: 1274).

With respect to electricity, in a study of nine developing countries, the World Bank (2008: 44) estimated that increased rural electrification was associated with lower levels of fertility (a reduction of 0.6 children on average), primarily due to increased health knowledge. The same study also showed a statistically significant link between rural electrification and nutrition; it found no clear link between electrification and infant and child mortality, however.

Electrification also contributes significantly to human health by enabling the production, distribution, and storage of perishable medicines. In Colombia, Mexico, and Peru, a series of national programs enhanced healthcare provision to rural areas by installing clean energy infrastructure to electrify local health clinics and to replace the often faulty kerosene refrigerators previously used to store vaccines (Jimenez and Olson 1998). Electrification helped to increase vaccination coverage, increased the speed of disease diagnosis, and resulted in overall improved health outcomes. In Africa, WHO implemented a similar program, dubbed "Cold Chain," which used solar energy infrastructure to increase vaccine safety (Jimenez and Olson 1998).

In addition, infrastructure impacts health through the vital role it plays in supplying food (see again Box 3.1). Irrigation significantly increases the yield of many crops, as do other resources that are impacted by infrastructure, such as agricultural knowledge and the availability of fertilizer. Once foodstuffs are produced, infrastructure, particularly in the form of roads and energy, is integral to their storage and transportation to the ultimate consumer. Pinstrup-Anderson and Shimokawa (2008) summarized much of the existing research on the importance of infrastructure for access to agriculture input and output markets.

In Morocco, a project to pave and upgrade some of the country's rural road networks, which serve 70 percent of the country's poor, resulted in a number of health benefits, some obvious, some less so. Rural healthcare clinics connected to the newly improved roads saw patient access rates increase and better attendance by staff workers. Easier access to the facilities also meant that they could stock more medicines, especially perishable ones, as transport times decreased. Less obvious, the improved roads also resulted in an improvement in local diets as the price of perishable foods like fish, vegetables, and fruit declined (Songco 2002; 13).

ICT infrastructure holds great potential for improving deliverability, quality, and efficiency of health services.

Today, ICT infrastructure holds perhaps the greatest potential for improving the deliverability, quality, and efficiency of health services.[21] As generally conceived, ICT is understood to impact health by improving access to information and services, providing care where otherwise unavailable, enhancing professional education, increasing quality control, and reducing costs (Hjelm 2005). Of particular importance to remote and rural areas, ICT facilitates the delivery of healthcare and the exchange of healthcare information across distances (Craig and Patterson 2005: 3).

The increased use of ICT in the medical field has spawned a number of studies that try to empirically estimate its net benefits. One set of studies, primarily looking at developed countries, focused on potential cost savings from the use of electronic health record (EHR) systems. Buntin et al. (2011), Chaudhry et al. (2006), and Goldzweig et al. (2009) conducted systematic reviews of many of these studies in developed countries. The OECD (2010b) also conducted a detailed analysis of specific cases in five developed countries. Hillestad et al. (2005) estimated that universal adoption of EHR systems in the United States could save physician offices 142 billion dollars and hospitals 371 billion dollars over a 15-year period, while the Congressional Budget Office cited work estimating that IT-enabled efficiencies could save 77 billion dollars annually (Congressional Budget Office 2008). Beyond anticipated cost reductions, the OECD study (2010b) also noted direct effects by improving patient safety and quality of care through a reduction in medical errors and better patient monitoring. And in a Canadian example, British Columbia realized a 26.8 percentage point increase in diabetes testing compliance between 2001 and 2005 through the implementation of an ICT-enabled chronic disease management toolkit and related support system (OECD 2010b: 34).

Studies on developing countries have been more concerned with how ICT can improve access to medical treatment than with the cost savings from electronic record keeping. In Mali, the deployment of a national telemedicine network helped improve distance medical learning and consultations (Geissbuhler et al. 2003). The project, while experiencing some challenges, was subsequently extended into ten French-speaking countries and expanded to include medical laboratory quality control and rural telemedicine evaluations (Geissbuhler, Bagayoko, and Ly 2007: 351). In Peru, a more extensive project deployed telemedicine capabilities in 39 rural sites in the remote Alto Amazonas province (Martínez et al. 2004). The project realized improvements in emergency evacuations, diagnosis and treatment, and epidemiological surveillance, while estimating full repayment of investment costs in 30 months. Finally, telemedicine has enabled collaborations between developing and developed countries, as in a Jordanian/Canadian joint effort to extend pediatric neuro-oncology consultations (Qaddoumi et al. 2007). Using videoconferencing, physicians were able to review and discuss cases affecting 64 patients undergoing treatment from varying types of brain tumors. Of the cases selected for consultation, 36 percent received recommendations for major changes in treatment, with a 91 percent compliance rate in subsequent treatment (Qaddoumi et al. 2007: 39).

Despite these and other positive impacts, we should also discuss the negative impacts infrastructure can have on human health. Traffic accidents and fatalities along the world's roadways are perhaps the most direct of these impacts. According to WHO estimates, more than 1.2 million people die each year on the world's roads, and between 20 and 50 million suffer non-fatal injuries (WHO 2009b: vii). While many factors determine the rate of road traffic accidents resulting in death, injury, and disability, building more roads will generally mean more vehicles and more accidents. A commitment to reduce traffic fatalities and injuries through the elimination of high-risk roads is the mission of the International Road Assessment Programme, a global nongovernmental organization established in 2006.[22] A similar concern is reflected in the inclusion of safe roads and mobility as one of five pillars of the Global Plan for the Decade of Action for Road Safety 2011–2020 under UN auspices (WHO 2011). Clearly, the design of roads and road networks can either enhance road safety or lead to more road accidents.

Along with more traffic accidents, increased transportation activity contributes to more air pollution. Urban outdoor air pollution, to which transportation contributes significantly, is known to cause a number of respiratory and cardiovascular diseases and is estimated to have been responsible for more than 1.3 million deaths globally in 2008.[23] Negative health impacts from air pollution are present to some extent across countries at all income levels (WHO 2011). Lower-middle- to upper-middle-income countries tend to be the worst affected, however, as their pollution controls and environmental awareness (which tend to increase with income) are not likely to have caught up with the rapid deployment of transportation systems.

More indirectly, the expansion and integration of transportation networks across the globe—while providing new economic opportunities, fostering international trade, and increasing migration—have also aided the spread of disease. Pathogens from influenza to HIV/AIDS are now able to move farther, faster, and in greater numbers thanks to increasing levels of mobility (Tatem, Hay, and Rogers 2006: 6242).

And finally, when infrastructure fails, the results can be devastating. Dams and levees, for example, encourage increased development in areas that traditionally have been subject to the vagaries of flooding. The largest dam disaster on record occurred in August 1975, with the failures of the Banqiao, Shimantan, and 60 other dams in Henan province in central China. The ensuing floods, famine, and epidemics killed an estimated 200,000 persons (McCully 2001; Pearce 2006). In the United States, the levee failures in and around New Orleans during Hurricane Katrina in 2005 resulted in the flooding of an estimated 80 to 85 percent of the New Orleans metropolitan area; 1,120 to 1,570 deaths (counts

Infrastructure can have negative impacts on health by increasing traffic fatalities, air pollution, and the spread of disease, and by catastrophic infrastructure failures.

Infrastructure, in the home, in communities, and in schools, can affect school enrollment, attendance, and learning.

vary);[24] and some 50 to 100 billion dollars in damages (Blake et al. 2007: 4; Jonkman et al. 2009: 683; Kates et al. 2006: 14655; Seed et al. 2005: 2–11).

Infrastructure especially facilitates school attendance of girls, whose enrollment rates still lag behind those of boys in many developing countries.

Infrastructure and education

As is the case with health, although the links between infrastructure and education are intuitively reasonable and frequently asserted, there is less empirical support for these claims than we might desire. Further, in studies of the forward linkages from infrastructure to education, typically only one infrastructure sector is considered at a time, the measures of impact vary from study to study, and the scope of any study is most often an investigation of the results of a single infrastructure project in one location. Thus, the quantitative results and stylized facts that can be generalized to other locales, countries, and regions are few and far between. Even so, the cumulative evidence from the literature is that infrastructure, in homes and communities as well as in schools, does affect school enrollment, attendance, and learning through a variety of pathways.

In fact, depending on the definition used, schools themselves can be considered a form of infrastructure. However, in this volume, we conceptualize schools and other such buildings as hubs where infrastructure services come together and aid in the provision of education and other social services (see Box 3.3).[25]

Simply getting to school often is a major challenge for students and teachers. All-season roads are key to attendence, particularly in rural areas. They shorten the travel time, including for those who walk or travel by bicycle. The presence of roads also encourages the establishment of new schools in areas that were previously remote (Anderson and Vandervoort 1982: 23). Teachers are easier to recruit when they can travel to schools by good roads, and the absenteeism of both teachers and students due to bad weather is significantly reduced. In Vietnam, for example, rural road improvements allowed for year-round access to schools as children were able to get to and from school even during the rainy season (Songco 2002: 24). Improved roads especially affect the attendance of girls (whose enrollment rates still lag behind those of boys in many developing countries) for at least two reasons: (1) travel by road is safer; and (2) reduced travel time is especially helpful for girls, who are more likely than boys to spend more hours on family responsibilities and who are more likely than boys to walk rather than have access to a bicycle (see Porter et al. 2011 for a particularly rich exploration of transport, mobility, and girls' school attendance in Ghana, Malawi, and South Africa).

Access to modern forms of energy, particularly electricity, also plays a key role in education. Having such access in the home allows students to read and study more easily at night; it also frees up more time for them to attend school and to study because they do not have to gather wood or other fuel sources. An analysis of Demographic and Health Survey data for nine countries by the World Bank Independent Evaluation Group found that children in households with electricity have higher education levels than those without electricity, even after controlling for parental education, household income, and school facilities (World Bank 2008: 46). Schools with access to modern forms of energy provide enhanced educational environments because

Box 3.3 Infrastructure goes to school

Schools are meant to provide a good learning environment, and thus the condition of school buildings and the quality of infrastructure services they provide can have a major impact on student learning. In Georgia, a multiyear program (1998–2002) to rehabilitate rural school buildings across the country increased enrollment and completion rates as the improvements, from repaired roofs, windows, and pipes, to new sanitary and heating equipment, meant the schools no longer had to close for the winter (Lokshin and Yemtsov 2004: 17–19). Primary and secondary enrollment rates at the improved schools increased by 6 percent between 2000 and 2001, while enrollment rates in non-improved school districts fell. And student completion rates in the improved schools increased more rapidly; compared to 1998, 37 percent of improved schools saw increased completion rates while unimproved schools saw a 24 percent increase. In addition, the incidence of respiratory disease in students, due to inadequate ventilation and heating, decreased by 12 percent.

Inadequate water and sanitation facilities at schools present a particular barrier to girls. One study of a rural school in South Africa without an onsite water connection noted that female students (but not boys) were expected to leave during school hours to collect water for the school (Devnarain and Matthias 2011). And with respect to sanitation, the Council for Scientific and Industrial Research (2010: 41) noted:

> Every day—directly because of lack of maintenance of the physical infrastructure especially the water and sanitation facilities—countless learners at many rural schools are deprived of learning contact hours. Girl students are most affected by this as they often have to go home to find a clean toilet. And due to the long distances they have to walk to school, they then don't return to school for the rest of the day.

The consequences of inadequate (or nonexistent) school sanitation are exacerbated for girls who are menstruating, as documented by a study of adolescent school girls in Nepal that noted, among other things: (1) high rates of absenteeism among menstruating girls in schools that lack private facilities; and (2) health complications associated with the use of unhygienic school facilities (WaterAid 2009).

of better lighting; access to educational tools (television, radio, film, computers); and adequate heating (Brenneman and Kerf 2002: 18–19). Schools with electricity in remote locations are also more successful in attracting teachers than schools in similar locations that are not electrified (World Bank 2008: 46).

Similarly, household water and sanitation infrastructures can have a significant impact on school enrollment and attendance. Many studies have documented the extensive hours that may be required to obtain water for livestock and family use in poor rural areas—a task that often is assigned to children and particularly to girls. Summarizing the findings of a number of such studies, Brenneman and Kerf (2002: 105) noted that “Connecting towns or homes to clean sources of potable water that reduce or eliminate the time that children spend collecting water often allows more children of poor families to attend school.” The cleanliness of the water is key as it also facilitates more regular attendance and better learning because of the absence of intestinal parasites and other waterborne diseases (Burrows, Acton, and Maunder 2004).

Obviously no exploration of the connections between infrastructure and education can exclude information and communication technologies, both at home and in the school. Competence as an educated person now assumes at least basic computer literacy. Beyond that, use of the internet is frequently presented as a way to expand learning opportunities by connecting both students and teachers with resource-rich environments. Even further, educators advocate ICT as a means to enhance educational outcomes through student-centered, active learning rather than passive or rote learning.

A recent report in the World Bank ICT and Education Series (Trucano 2005) tried to determine what is really known about the effective uses of information and communication technologies in education in developing countries. Supported by an extensive literature review, Trucano (2005: 6) concluded that “In general, and despite thousands of impact studies, the impact of ICT use on student achievement remains difficult to measure and open to much reasonable debate.” A lack of comparative international studies and of a common set of indicators contributed to this inconclusive finding.

Much of the conflicting evidence on ICT’s impact on education stems from the widely varying circumstances of its use in different settings. Schools in rural areas of developing countries often lack access to electricity (either totally or reliably) or the means to acquire batteries to power electronics. If they can obtain electronic equipment, they may not be able to maintain or replace it. And even if they do, its educational potential will be under-realized if it is not integrated meaningfully with the broader curriculum, which requires not only professional support and training for teachers, but also broader education system support that may be slow in coming if a culture has a tradition of rote learning. With professional development opportunities for teachers and with system support, however, there is evidence that ICT can enhance education in developing countries. For example, Light (2009) reported the positive impacts on student-centered learning of an Intel professional education program for teachers at six schools in Chile, India, and Turkey. Because one objective of the study was to evaluate the applicability of ICT for professional development of teachers in typical (as opposed to privileged) circumstances, a criterion for school selection was that the school not have access to special resources, technology, or funds.

Distance education, often with UNESCO and World Bank support, is being used to deliver a variety of tertiary and professional development programs (not just teacher education) in many developing countries, particularly in Southeast Asia and in sub-Saharan Africa. It is often adopted as a way of reducing the very high per-student costs of tertiary program delivery in many developing countries and as a means for rapidly expanding enrollment levels without having to build out and maintain new or expanded physical campuses and faculties. For example, a 2009 World Bank report focusing on the expansion of tertiary education in sub-Saharan Africa stated:

> Traditional face-to-face models of delivering postsecondary education are expensive and can limit developing country capacities for further enrollment expansion. . . .

ICT infrastructure may enhance educational outcomes through student-centered active learning and by connecting students and teachers with resource-rich environments.

> Alternative, lower-cost delivery models are needed if educational access is to grow in the years ahead. Fortunately, the elements of such a transformation are becoming discernible. They include lifelong learning, ICT applications to education, on-line distance education, open source courses, self-paced learning, and educational gameware (World Bank 2009: 109).

Increasingly, these types of programs are being offered both by existing institutions and open universities set up solely for such purposes. Enrollments in many distance education programs have grown rapidly and are often very large for relatively small numbers of teaching and administrative personnel. The website of the National Open University of Nigeria, for example, refers to 32,400 students enrolled in over 50 courses of study with a total headquarters academic, technology, administrative, and support staff of only 198 persons.[26]

A number of issues have accompanied the promise of distance education programs. One is the need for reliable technology to deliver the programs. Another is the quality of the programs. And finally, some authors (for example, Gulati 2008: unpaginated) express concern that distance education may be increasing an "educational divide" because of an IT access gap between "have" and "have nots" in developing countries (even as other reports [e.g., UNESCO 2003:11] note that distance education has improved opportunities for women and students living in rural areas).

Fewer studies have looked at the links between infrastructure and education in developed countries. In one brief analysis, the OECD's former Programme on Educational Building (now the Centre for Effective Learning Environments) compared scores on learning outcomes measured as part of the OECD's Programme for International Student Assessment (PISA) against an index of school infrastructure quality using 2003 data. This index was based on (1) school buildings and grounds; (2) heating, cooling, and lighting systems; and (3) instructional space. They did not find a strong relationship; for example, only 1 percent of the variation in math performance was explained by school infrastructure quality. They also expressed caution about this conclusion, however, noting that they were looking at a relatively small sample; the measure of infrastructure quality relied "on the judgment of school principals rather than on external observations or the views of students and teachers"; and that "data may be subject to social desirability of responses and to cross-cultural and linguistic differences."[26]

A more recent study explored the relationship between computer use and the performance of 15-year-olds on the science component of PISA in all 30 OECD member countries and 27 partner countries participating in the PISA 2006 assessment (OECD 2010a). A subset of this group (variously reported as 25 OECD countries and 14 partner countries [OECD 2010a: 19] and 23 OECD and 10 partner countries [OECD 2010a: 141]), participated in a special technology survey that allowed more extensive analysis of drivers of the outcomes. The study found that a higher frequency of computer use was associated with higher average science scores in all of the countries considered (OECD 2010a: 150). However, other variables also affected the impact of a given frequency of computer use, as noted below:

> One of the most striking findings of this study is that the digital divide in education goes beyond the issue of access to technology. A second digital divide separates those with the competencies and skills to benefit from computer use from those who do not. These competencies and skills are closely linked to students' economic, cultural and social capital (OECD 2010a: 3).

Infrastructure and governance

The role of government in infrastructure provision has received considerable attention in policy-oriented analyses, and government funding has been a central component in that discussion. The impacts of infrastructure on governance have received considerably less attention. Much of what literature there is has the character of a long-sweep historical view of the evolution of government in interaction with the development of infrastructure and infrastructure milestones of the kind shown in Box 1.2.

Without a doubt, physical infrastructure has been fundamentally important in the creation and protection of both autocratic and democratic states. Sovereigns and ruling elites have long recognized that transportation infrastructure is essential for maintaining order and exerting power within their territory, as well as protecting that territory and its people. The development of the Roman road system, the German autobahn system, and the United States interstate highway system all had those motivations, as well as that of facilitating economic intercourse and development. Roads, rail, and air enable the movement of people and ideas, shrinking distances and providing physical links among populations. They also help bridge the gaps between a state's core and peripheries and between urban and rural centers. Infrastructure is the physical manifestation of the knitting together of a state; its multiple forms are the "sinews" of nations (Webley 1985).

Throughout this chapter, we have discussed the importance of infrastructure for the basic safety and health of populations, for their education, and for their economic development and well-being. Providing infrastructure, such as water and sanitation systems and electricity networks, thereby enhances the foundations of national security and the power of the state; at the same time, the costs of that provision motivate the state to improve its capacity to mobilize and use resources for its own benefit and for that of its citizenry—even before that citizenry might be much involved in the processes of governance.

Chapter 1 introduced knowledge systems as a bridge between hard and soft infrastructure (see again Figure 1.1). The development of knowledge systems to count populations and measure their wealth has been central to resource mobilization by states through taxation and public borrowing. It is no accident that England's Domesday Book of 1086, which listed and assessed the households of the day, preceded the development of one of the first modern states, or that all modern countries put great weight on censuses, even sometimes requiring them in their constitutions. Given the large sums involved in big public projects, and even the very substantial ongoing sums tied to such often-monopolistic activities as waste collection, it is also no accident that provision of infrastructure has created many incentives for corruption in government and the misuse of the sources they mobilize (Campos and Pradhan 2007; Rose-Ackerman 1999: 27–38).

Information flows have become ever more important in the two-way linkage between governments and societies. Information is needed for government to make decisions, and information is needed for the public to participate in the decision-making process; the flow of information also helps ensure transparency within government. Of course, information channels can also be used by authoritarian governments to monitor and suppress their citizenry.

As a United Nations Development Programme (UNDP) report notes, in the modern era ICT plays critical and seemingly ever more important roles in governance (UNDP 2012). The data that information and communication technologies carry allow users to track their governments' activities; ICT also provides dynamic feedback from the public so that governments might provide services more effectively and efficiently—what Misuraca, Reid, and Deakin (2011: 7) call "ICT-enabled governance," or, more generally, e-governance, which the International Institute for Communication and Development defines as:

> . . . the application of *electronic means* in (1) the *interaction* between *government* and citizens and government and businesses, as well as (2) in internal *government operations* to simplify and improve democratic, government and business aspects of Governance[28] (Backus 2001: 2).

E-governance has become increasingly important in international development practice over the last two decades. The World Bank, for example, hosts an E-Government Practice Group to disseminate e-governance best practices as part of its E-Development Thematic Group.[29] The United Nations Educational, Scientific and Cultural Organization, the United Nations Development Programme, and the United States Agency for International Development have all published reports and/or undertaken projects dealing with e-governance issues. And, since 2001, the OECD has sponsored an e-government

Physical infrastructure knits together the state and was fundamentally important in creating it.

Information flows have become ever more important in the two-way linkage between governments and societies.

Box 3.4 ICT and democratization

Infrastructure is an essential component in effective governance because it connects governments and their publics. In recent years, ICT-related technologies have allowed a move away from the more traditional model of government as disseminator and the public as receiver to a two-way model of interaction. Perhaps ICT's greatest impact has been on the electoral process. In the 2006 elections in Thailand, the Thai Election Commission used SMS messaging to notify some 25 million voters of polling place schedules (Stein 2006: 4). In South Africa, the 2009 elections were hailed as the country's first ICT election as all four major political parties used ICT in various ways, from getting out the vote to enabling campaign donations by SMS.* In Kenya, after the postelection violence in 2007 that left 1,300 people dead, the government began a program of electronic voting that allowed polling stations across the country to transmit results electronically to more centralized voting centers.** But ICT infrastructure has done more than just affect voter turnout and transmit results. In Thailand, the same networks used to get out the vote were also used to coordinate the public protests that brought down the newly elected premier once allegations of corruption and abuse surfaced. And around the world, from the Occupy Movement in the United States to the Arab Spring in the Middle East, ICT infrastructure has enabled the flow of revolutionary ideas and the coordination of mass protests.

**Nielsen Morten, "Technology Use in the 2009 South African Elections,"* Pan European eParticipation Network*, 20 April 2009, at http://pep-net.eu/blog/2009/04/20/technology-use-in-the-2009-south-african-elections/.*

***"Use of ICT in Elections Will Deepen Democracy,"* The Standard*, 28 November 2011.*

Although its financial size and high profits provide opportunities for corruption, infrastructure can contribute to good governance through the creation of a connected and involved population.

project whose purpose is to "explore how governments can best exploit information and communication technologies (ICT) to embed good governance principles and achieve public policy goals."[30]

Where government responsiveness is lacking, ICT infrastructure provides a means for citizens to increase pressure through more effective organizing. One has only to look at the role of mobile phones, Facebook, and Twitter in the prodemocracy demonstrations that have taken place around the world in recent years. While the exact relationship between ICT infrastructure and democratization remains uncertain, some empirical studies are exploring that relationship. Shirazi, Ngwenyama, and Morawczynski (2010) built a quantitative model using a composite level of democracy index and data on ICT stocks and access in order to test whether greater ICT penetration leads to increased democratic freedom (see Box 3.4). The authors found a strong correlation between ICT growth and democratization. They also found that education tends to be an important intermediate factor, and that repressive governments, which censor information, tend to reduce ICT growth. The push for greater democratization is just one form of ICT-enabled civil action, however. Many other ICT-enabled civil actions, like environmental and zoning protests, have been less dramatic but have nonetheless pressured existing institutions and government authorities to respond to specific grievances.

Infrastructure in general (not just ICT) can support not only basic democratic forms, but also much deeper and richer inclusion (as well as government intrusiveness into what once were private domains). Brenneman and Kerf (2002) illustrated how infrastructure provision can support effective and inclusive governance by looking at its impact on women's empowerment. While gender inequality may be culturally based, lack of infrastructure or poor infrastructure quality supports and maintains it. Because of their household responsibilities, women tend to be disproportionally affected by the state of local infrastructure. As discussed earlier, where electricity is lacking, women are forced to collect firewood; where improved water is lacking, women are the ones to fetch water; where transportation is lacking, women and girls are more likely to remain at home and miss out on education. Access to modern infrastructure can decrease the time women spend on domestic duties and so can increase their ability to participate in civil society and government as well as in the formal labor force.

The huge financial size and high profits frequently associated with the funding of infrastructure, from local sanitation and electrical services to global energy systems, have often been linked to poor governance and corruption. Yet, infrastructure provision can also lead to good governance through the creation of a healthy, well-educated, and well-connected populace who is more likely to want to participate in the governance system and to do so effectively. Together and in interaction, infrastructure and good governance can enable the provision of society-building services and human development.

Infrastructure and the environment

As we noted in Chapter 1, no human activity other than the conversion of land for agriculture has had as large an impact on reshaping the physical environment as the development of infrastructure. The 30–35 million kilometers of roads in the world[31] are enough to circle the earth more than 800 times at the equator. Lehner et al. (2011: 2) estimated that worldwide there are nearly 17 million reservoirs, covering more than 300,000 square kilometers and with a storage capacity of 8,069 cubic kilometers of freshwater. This storage capacity is equal to approximately 20 percent of the total water discharged into oceans and internal sinks annually, and the surface coverage represents an area the size of Italy.[32] Roads, railways, and other human-made corridors (e.g., oil and gas pipelines and electricity transmission lines) fragment landscapes and bring increased contact between humans and the natural environment. Ports and airports dominate many coastal and urban areas. Oil and gas wells and coal, metal, and stone mines dot the planet.

The impacts of this infrastructure on the natural environment are manifold. They include not only the direct physical impacts associated with the construction, existence, use, and decommissioning of infrastructure, but also the indirect effects that result from the ways in which infrastructure shapes our interactions with the natural environment.[33] In this section, we review a number of these impacts. Remember, though, that infrastructure is a manifestation of human society and is driven by human desires. As such, while it is tempting, and almost unavoidable, to speak of the impacts of infrastructure on the environment, the underlying driver of these impacts is ultimately the human population. Furthermore, while it would be hard to avoid the conclusion that human society and its infrastructure has an overall net negative impact on the natural environment, the ways in which infrastructure manifests itself can have a profound effect on the level and nature of this impact.[34]

Benítez-Lopéz, Alkemade and Verweij (2010) and Fahrig and Rytwinski (2009) reviewed a large number of studies on the impacts of roads on species diversity and abundance. Beyond direct mortality, they point to significant impacts, extending several kilometers from the actual roads, on reproductive success and population size. It is in their ability to open up new areas for human exploitation that roads may have the biggest effect, however. Figure 3.3 illustrates the role of roads in accelerating deforestation between 1975 and 2001 following the construction of the Cuiaba-Port Velho highway through the province of Rondônia in Brazil (United Nations Environment Programme, United States Geological Survey, and University of Maryland 2005). The "fishbone" or "feathered" pattern is quite typical as loggers and farmers build out from the initial roadway.

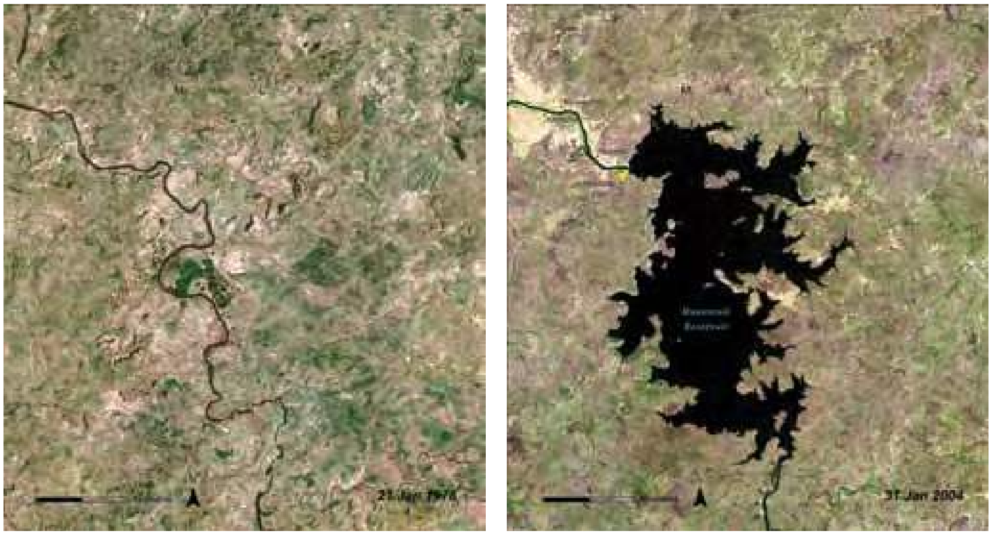
Large projects aimed at the storage and transport of water—dams, viaducts, and canals—also change and fragment the landscape (Pearce 2003; Rosenberg, McCully, and Pringle 2000; World Commission on Dams 2000). The reservoirs behind large dams drown vast areas of land (see Figure 3.4, on p. 70).

No human activity except conversion of land for agriculture has had as large an impact on reshaping the physical environment as the development of human-made infrastructure.

Figure 3.3 Changes in tropical forests in Rondônia, Brazil: 1975, 1989, and 2001

Source: Image from Atlas of Our Changing Environment*, United Nations Environment Programme Global Resource Information Database available at http://na.unep.net/atlas/webatlas.php?id=29; used with permission.*

Figure 3.4 The creation of Lake Manantali behind a dam on the Bafing River in Mali: 1977, 1999



Source: Image from Atlas of Our Changing Environment*, United Nations Environment Programme Global Resource Information Database available at http://na.unep.net/atlas/webatlas.php?id=251; used with permission.*

Dams alter sediment flows and modify many other properties of riverine systems, including flow rates and temperature, thereby affecting ecosystems both up and downstream (see Box 3.5). Furthermore, debate continues on the local and global effects of large dams on climate (Cullenward and Victor 2006).

Infrastructure is not only used to store water, but also to relocate it, often over hundreds of kilometers. These large-scale diversions of surface water can dramatically change the nature of rivers, lakes, and coastal systems. Due to the diversion of rivers for cotton cultivation, the Aral Sea, for example, is now a quarter of the size it was around 1950 (United Nations Environment Programme, United States Geological Survey, and University of Maryland 2005). Figure 3.5 shows the changes over a portion of that time, from 1986 to 2004. In the process, the Aral Sea's salt concentration

Box 3.5 Dams and fish

Dams and their effects on surrounding landscapes are among the most visible of infrastructure's environmental impacts, including the creation of whole new ecosystems (Agostinho, Pelicice, and Gomes 2008). A full accounting of the net environmental benefits or costs of these new landscapes would be very context-dependent. We do know, however, that seasonal floodplains provide some of the richest habitats for freshwater fish on the earth, and are often home to the majority of all fish species in a river basin. Dams can endanger these floodplains by restricting the natural changes in river flow and overall water levels. In Brazil, for example, the construction of the Tucurui dam on the Tocantins River in 1984 quickly led to a 60 percent decline in fish catch and a 66 percent decline in freshwater shrimp catch (Richter et al. 2010). In Cameroon, the Maga dam on the Logone River led to a 90 percent decline in fish catch from the river's wetlands. The drying of the river's wetlands from loss of flood days also had a negative impact on the region's land-based wildlife, spurring out-migration and a resulting loss in tourism revenue as photogenic fauna moved on (Richter et al. 2010). And China's Three Gorges mega dam threatens fish populations throughout the Yangtze River basin. The Yangtze is the longest river in Asia and the third longest in the world. It is home to 36 percent of all freshwater fish species in China, including 177 different species that live nowhere else in the world, 25 of which were considered endangered even before construction of the dam began (Hvistendahl, 2008: unpaginated). The dam came online in 2008, and while it is too early to judge the long-term extent of its impact on the region's fisheries, commercial fish catches on the river had fallen 50 to 70 percent below 2002 levels during the 2003–2005 construction period (Gleick et al. 2009: 143).

Figure 3.5 The shrinking Aral Sea, Kazakhstan: 1986, 1999, and 2004

Source: Image from Atlas of Our Changing Environment*, United Nations Environment Programme Global Resource Information Database; available at http://na.unep.net/atlas/webatlas.php?id=11; used with permission.*

has doubled, killing the commercial fishing trade. Meanwhile, some of the world's largest rivers, including the Colorado (North America), Murray (Australia), Nile (Africa), and Yellow (Asia), no longer reach the sea in drier years, with devastating impacts on coastal ecosystems (World Commission on Dams 2000).

On a more positive note, water can make deserts and semi-arid areas bloom. There may be no more obvious example of this than the telltale circles of green in otherwise arid landscapes in areas using center-pivot irrigation (see Figure 3.6). What might happen once the fossil groundwater on which much of this irrigation depends is depleted remains to be seen, however.

Despite its adverse effects, infrastructure can also reduce our negative impact on the environment in numerous ways. Perhaps most

Figure 3.6 Greening of the Al' Isawiyah Desert, Saudi Arabia: 1991, 2000, and 2004

Source: Image from Atlas of Our Changing Environment*, United Nations Environment Programme Global Resource Information Database available at http://na.unep.net/atlas/webatlas.php?id=107; used with permission.*

■ *Some types of infrastructure reduce our negative impact on the environment.* ■

obvious are the treatment of wastewater before returning it to natural streams and the use of pollution control systems in power plants. More indirectly, there is currently much discussion about the role of urban form,[35] including transportation and energy networks, in determining both the direct footprint of urban areas and associated energy use and its subsequent impacts on the environment.

Some of the greatest potential for reducing negative environmental impacts may lie in the ability of ICT to improve energy efficiency and accelerate the shift toward renewable resources. One particular area of hope is in smart grids, which use advanced metering, transmission, distribution, and electricity storage technologies to transform current electricity infrastructure technologies (Hledik 2009). In addition to providing greater flexibility and efficiency, smart grids facilitate more distributed production of electricity, thereby enhancing the viability of renewable resources, such as wind and solar, which present challenges due to the intermittent nature of their production. Hledik (2009: 33) estimated, in a conservative scenario assuming only technologies already commercially available, that smart grids in the United States could lead to a 4 percent reduction in overall electricity consumption by 2030 and an even larger decline in carbon dioxide emissions due to the increased penetration of renewable sources of production.

■ *Infrastructure's contribution to greater economic activity has both positive and negative indirect consequences for the environment.* ■

Based on their analysis of studies of electricity demand in the European Union (Labouze et al. 2008) and the United States (Chupka et al. 2008), Moyer and B. Hughes (2012: 923) estimated that each percentage point increase in broadband penetration (a proxy for general ICT penetration) would result in a 0.08 percent increase in energy efficiency. Chupka et al. (2008) also indicated that the renewable share in new electricity production in the United States would approach 30 percent in a scenario with high investment in ICT, as opposed to less than 20 percent in a scenario with stagnant investment.

ICT tools are of increasing importance in the agricultural sector as well. From enabling more efficient irrigation systems that can monitor exact soil conditions to GPS-guided tractors that can optimize land use, ICT tools are helping to increase crop yields and lessen agriculture's negative impacts on the environment (Fountas, Pedersen, and Blackmore 2005; Vellidis et al. 2008). The spread of ICT to more rural areas is also leading to new ways of providing agricultural extension services to poor farmers around the world, increasing both profits and sustainable practices (Aker 2010; Rodrigues 2010).

Beyond the effects of infrastructure on the natural environment discussed so far, its contribution to greater economic activity also creates a variety of more indirect consequences, some positive and some not. On the more positive side, at higher income levels, societies tend to demand better environment services. With generally more negative environmental implications, economic growth frequently stimulates further land use changes, resource extraction and exhaustion, and pollutant emissions—but growth also generates governmental resources that can help limit such damage. To date, the complex interplay of these multiple indirect consequences has discouraged detailed studies of net impacts. As infrastructure networks continue to expand in the future, hopefully more advanced and environmentally friendly forms will come to dominate in developed and developing countries alike.

While many models estimate some of the indirect effects of economic growth and energy use on the environment, few look at the more direct large-scale impacts of infrastructure on the physical environment. The GLOBIO modeling framework—developed through collaboration between the Netherlands Environmental Assessment Agency and two United Nations Environment Programme centers (GRID-Arendal and the World Conservation Monitoring Centre)—is one of the only efforts to do so. GLOBIO3, the current version of the model, is used to calculate the impact of infrastructure[36] and four other drivers—land use change (agriculture and forestry); nitrogen deposition; fragmentation; and climate change—on terrestrial biodiversity (Alkemade et al. 2009). This framework uses quantitative results from a wide range of studies that are reviewed in the meta-analysis presented in Benítez-Lopéz, Alkemade, and Verweij (2010). Alkemade et al. estimated the direct impact of infrastructure to have been second only to land-use change (and slightly greater than habitat fragmentation, to which infrastructure is a significant contributor) in driving species loss. Unfortunately, including such a framework is currently beyond the scope of IFs, thus limiting our ability to include the impacts of infrastructure on the natural environment in the analyses presented in later chapters.

Human Development and the Environment as Drivers of Infrastructure Development

The desire for the positive economic, social, and individual benefits accruing from infrastructure services underpins the expected course of infrastructure development. The specific demands for infrastructure, and the ability to satisfy them, vary significantly from country to country, however. In considering the future of infrastructure, most studies generally focus on the demand side and point to three primary aspects of societies to explain these differences—their economic makeup, their demographic makeup, and the nature of their physical environment (Fay 2001; Fay and Yepes 2003; Lawson and Dragusanu 2008; OECD 2006).

The economic makeup of a country includes the overall size of its economy, its sectoral structure, the level of affluence, and the distribution of income. Typical measures of these are GDP, the share of value added by different sectors, GDP per capita, and either the Gini coefficient or the poverty rate. All else being equal, a larger economy uses more primary resources and produces more intermediate products and final goods, increasing the demands for all types of infrastructure. Meanwhile, different sectors of the economy have differing demands for infrastructure and differing influences on its pattern of development (for example, the demand for irrigation comes almost exclusively from agriculture). Complementing the demand side, higher levels of overall GDP and average GDP per capita bring with them a greater ability to supply infrastructure and the services it provides.

In thinking about the future of infrastructure, we also cannot ignore the distribution of income. Many infrastructure services have a natural limit. For instance, once a person has access to reliable electricity in his/her home, demanding further access makes no sense; similarly, a person can only drive so many kilometers each year. Thus, the share of the population below a certain income threshold may be a critical determinant of the remaining demand for electricity access and road construction.

The demographic character of a country—for example, its overall population size, average household size, age structure, and level of urbanization or spatial distribution more generally—is also critical in thinking about the future of infrastructure.[37] It is common sense that a larger population will create a larger demand for infrastructure, although that obviously interacts with average income. Some infrastructure—for example, household access to improved sources of water and sanitation—is a function of the number of households as well as the absolute size of the population. As the average size of families changes (most often from larger to smaller as incomes increase and multigenerational homes become less common), the growth in the number of households will outpace overall population growth, thereby further increasing the demand for these and other services (de Jong and van de Riet 2004: 6).

The age structure of populations and their spatial distribution also affect demands for infrastructure. De Jong and van de Riet (2004) argued, for example, that as populations age, demand for public transport may increase as the older segments of society shift away from owning their own vehicles, particularly in developed countries. With respect to the spatial distribution of populations, many forms of infrastructure—including public transportation and infrastructure related to providing access to electricity, water, and ICT—are more economical in urban areas due to their greater population density. However, in some cases, such as Australia and Canada, countries can be heavily urbanized but still have relatively low overall population density due to their size and geographic character. In the case of these countries, the long distances between urban areas increase the demand for other forms of infrastructure.

The influence of geography on infrastructure development goes beyond the absolute size

■ *Because much infrastructure is a public good, we cannot discount the role of government policy in assessing demand for it and shaping its supply.* ■

of a country and its pattern of population distribution. For the purposes of international trade, countries with larger coastlines require greater port infrastructure; this is often coupled with rail and roads to connect the interior to the coast. Coastlines also increase the demand for protective infrastructure from coastal storms. Mountains and rivers pose barriers to roads and other forms of infrastructure, calling for, among other things, tunnels and bridges. The need for, and the ability to supply, irrigation, flood control, hydroelectric power, and other infrastructure services are also influenced by a country's geography, including its climate. Ndulu (2006) pointed to the important role of infrastructure as a measure to offset the geographic disadvantages faced by many African countries.

Finally, we cannot discount the role of government policy in determining the demand for, and actual supply of, infrastructure. As we discussed in Chapter 2, infrastructure accounts for a significant share of public spending. Some might point to "bridges to nowhere" and other "white elephants" as indications of corruption, or more politely, political largesse, but most people would agree that infrastructure's character as a public good, designed to be used by the populace at large, means that public spending on infrastructure is a proper role of governments. In addition to regular spending, public investment in infrastructure is often used as a means to stimulate economies during economic downturns. In a review of the stimulus packages of 10 advanced and 12 developing and emerging economies during the early period of the Great Recession, the International Institute for Labour Studies estimated that infrastructure spending made up 15 percent of the fiscal stimulus spending of the advanced countries and over 45 percent of the fiscal stimulus spending of the developing and emerging economies (Khatiwada 2009: 19).

Geopolitical, security, and environmental issues can also influence policy decisions on infrastructure. Concerns about energy security and the potential effects of climate change have led many countries to call for the increased use of renewable energy and its supporting infrastructure. Acts of terrorism have altered the way transportation systems are designed and operated (Stevens, Schieb, and Andrieu 2006), and environmental concerns have curtailed the demand for certain forms of infrastructure, such as hydroelectric dams and nuclear power plants (International Atomic Energy Agency 2008: 27).

Conclusion

Infrastructure, human development, and the natural environment all exist in a state of dynamic interdependence, with each influencing the other (see again Figure 1.4 for a graphical representation of this relationship). Infrastructure can impact human development directly, through enabling the provision of life-enhancing services like clean drinking water, protection from the vagaries of the natural environment, and electricity for cooking—and indirectly through enhancing economic growth, granting access to new income-earning opportunities for the poor, and strengthening governance. As countries develop and populations grow, the demand for more and better infrastructure increases, as does the capability for countries to meet the increased demand. In the best of worlds, these bidirectional positive linkages between infrastructure and human development create a virtuous cycle. Of course, the infrastructure that provides the services people desire is also part of the physical world, and as such affects and is affected by it. The need for sustainable infrastructure is becoming increasingly important as the world's stock of hard infrastructure grows.

The review we have provided in this chapter is naturally incomplete, both in its treatment of the breadth and the depth of the relationships among infrastructure, human development, and the environment. At some level, the sheer extent of interconnections and nonlinearities makes a full accounting of all the relationships impossible. Even so, we hope this review has provided a strong foundation for modeling future infrastructure development and impacts.

In the next chapter, we will look at past efforts to quantitatively model infrastructure demand, spending, and forward linkages. We will also introduce our own methodology for modeling infrastructure within the International Futures system.

1 Organisation for Economic Co-operation and Development, *Infrastructure to 2030: Telecom, Land Transport, Water, and Electricity* (Paris: Organisation for Economic Co-operation and Development, 2006), 14.

2 See http://thinkexist.com/quotation/what_vast_additions_to_the_conveniences_and/296982.html.

3 See http://www.eia.gov/tools/faqs/faq.cfm?id=97&t=3.

4 See http://www.epa.gov/watersense/pubs/indoor.html.

5 Statistics from the World Bank World Development Indicators 2011 available at http://data.worldbank.org/data-catalog/world-development-indicators.

6 A number of factors could explain the wide range of decline in firewood use, including the perceived cost of electricity and cultural tradition (Bekker et al. 2008: 3125).

7 This attribution problem arises whenever there are multiple factors in a causal relationship. Thus, we could equally argue that the influence of infrastructure on economic growth is mediated by its effects on education and health. The choice to treat economic growth as the primary driver of infrastructure or the primary factor impacted by infrastructure is therefore arbitrary, but it is consistent with most of the literature.

8 David Pilling, "Just Two Cheers for a Sputtering Indonesian Dream," *Financial Times*, 14 December 2011.

9 Pilling.

10 "11 Dead After 'Indonesia's Golden Gate Bridge' Collapses," *The Telegraph*, 28 November 2011.

11 "Bridging the Gaps," *The Economist*, 17 September 2011.

12 Inadequate sanitation includes poor sanitation practices as well as infrastructure provision, but it is the infrastructure that has the largest impact.

13 The report uses the Human Capital Approach to determine the economic loss due to premature death. The Human Capital Approach estimates the present value of future employee earnings using the labor share of GDP per worker. A special calculation is done for the present value estimation of children under five years of age, yielding an economic value of $38,706 (2005 US$) per premature death (WSP 2011: 88).

14 See Romp and de Haan 2007 for another recent review. For a quick overview, see Servén 2010.

15 The online appendix is available at http://dx.doi.org/10.1080/00220388.2010.509785.

16 Overall, Calderón and Servén's results are in line with related work by Escribano, Guasch, and Pena (2010) using firm level data. Using both survey and other data, Escribano, Guasch, and Pena showed that poor infrastructure quality is not only perceived as a constraint on growth, but that this effect can also be seen in data on productivity.

17 We have not considered studies, such as Ogun 2010, which do not distinguish explicitly between growth and distribution effects in estimating the impact of infrastructure on income poverty.

18 The Gini coefficient is a measure of the level of inequality between individuals or income groups based on the distribution of total income. Here the scale runs from 0 (income shared equally be all persons) to 1.0 (all income concentrated in one person or group). A basis point on this scale is defined as 0.01. The Gini coefficient can also be expressed on a scale from 0 to 100, in which case a basis point is defined as 1.

19 Sub-Saharan Africa saw a decline in infrastructure quality during this period due to underinvestment in infrastructure in favor of other social spending, and also from the concentration of what infrastructure spending there was on new infrastructure rather than maintenance (Calderón and Servén 2010a).

20 Earlier references to the Water and Sanitation Program administered by the World Bank discussed the implications of improved water and sanitation infrastructure for economic growth from improved health.

21 The application of ICT to healthcare has generated significant expectations about potential benefits and has resulted in new terminology, such as "telemedicine," "eHealth," and "health information technology."

22 See http://www.irap.net/.

23 Data from WHO Global Health Observatory Data Repository available at http://apps.who.int/gho/data/view.main.3400.

24 The numbers include only deaths that occurred within Louisiana.

25 See G. Hughes, Chinowsky, and Strzepek 2009 for a treatment of schools as infrastructure.

26 See http://www.nou.edu.ng/noun/About%20NOUN/contents/facts_figure%20.html#.

27 See http://www.oecd.org/document/0,3746,en_2649_39263294_37295617_1_1_1_1,00.html. No formal report seems to have been associated with this analysis.

28 Italics in original text.

29 See http://go.worldbank.org/6WT3UPVG80.

30 See http://www.oecd.org/department/0,3355,en_2649_34129_1_1_1_1_1,00.html.

31 Global road length is from the World Bank World Development Indicators 2012 available at http://data.worldbank.org/data-catalog/world-development-indicators.

32 Döll, Fiedler, and Zhang (2009) provided an estimate of 39,549 cubic kilometers total discharge per year under natural conditions. Internal sinks include lakes, such as the Great Salt Lake in the United States, which have rivers flowing into them, but no outflow leading eventually to the ocean. The CIA *World Factbook* lists Italy's area as 301,340 square kilometers, which includes area under inland water bodies but excludes offshore territorial waters (see https://www.cia.gov/library/publications/the-world-factbook/geos/it.html).

33 Consider the debate over the Keystone XL pipeline in the United States. While some opponents focus on specific potential direct impacts of the pipeline itself, many others emphasize its role in perpetuating the use of fossil fuels in general (See "An Extra-Large Row: A Controversial Pipeline looks Set to Go Ahead, to Green Fury," *The Economist*, 1 October 2011).

34 Note, too, that one person's definition of negative or positive impacts on the environment may be very different from another's.

35 "Urban form" refers to the spatial imprint of an urban transport system as well as the adjacent physical infrastructures. Jointly, they confer a level of spatial arrangement to cities. (See http://people.hofstra.edu/geotrans/eng/ch6en/conc6en/ch6c1en.html).

36 Alkemade et al. (2009: 378) focused on "linear infrastructure" in their calculations— that is, roads, railroads, power lines, and pipelines, which are included in the Digital Chart of the World database housed at Pennsylvania State University (see http://www.maproom.psu.edu/dcw/).

37 Looking internationally, migration is also a demographic factor in the demand for infrastructure. Bohlin, Forge, and Blackman (2006: 72) noted the role of increasing migration in driving ICT development, due to the desire of migrants for ways to communicate with, and to transfer funds to, their families back home.

4

Methodologies and Tools for Forecasting Infrastructure

This chapter turns to the more technical topic of how we can best forecast global infrastructure futures.

As a bridge between the largely conceptual discussion of Chapter 3 and the forecasting analyses to come, this chapter turns to the more technical topic of how we can best forecast global infrastructure futures. The choice of the most appropriate tools and methods depends on a number of factors. What aspects of infrastructure are to be considered—the size of the physical stock, annual additions, the amount of spending required, the breakdown of spending into construction and maintenance, sources and availability of funding, or the impacts of infrastructure on other systems? What specific types of infrastructure are to be modeled and at what level of detail—for example, total electricity generation capacity or capacity by specific type of power plant? What is the time horizon of interest—one year, ten years, fifty years, or one hundred years? What is the geographic scope of interest—a city, a country, a region, or the world?

As discussed in Chapter 1, we set out to explore five key questions in this volume. First, we asked what a likely infrastructure future might be based on the interaction of demand and supply-side forces. Second, we wondered how such a future might impact access rates around the world. Third, how might the forecasted changes to infrastructure stocks, access, and spending impact future levels of human development? Fourth, given their economic and social implications, are today's existing goals for improving infrastructure access realistic for all countries? And finally, if the answer to that last question is no, can we instead develop a set of aggressive but more reasonable targets that enable countries to provide important infrastructure services to more of their citizens? Addressing these five questions requires us to be able to forecast the demand for infrastructure, the ability of countries to meet such demands, and the broader socioeconomic and environmental implications associated with alternative infrastructure forecasts (including feedbacks to the explanatory variables, or drivers, of infrastructure demand and supply).

Figure 4.1 elaborates the earlier Figure 1.4 to provide an overview of the dynamic, integrated, infrastructure forecasting model we have developed for this volume. As with the poverty, education, and health models described in the previous Patterns of Potential Human Progress volumes, this infrastructure model is integrated into the complete International Futures (IFs) system. We describe that larger system in the next section of this chapter.

The integrated IFs system begins its infrastructure forecasts with expected levels of infrastructure based on a country's general level of development. These expected levels are then used in conjunction with assumptions about costs to estimate the funding required for maintaining existing infrastructure and constructing new infrastructure to meet these expectations. We estimate the funding available for infrastructure separately. Since there is no guarantee that the available funding will match exactly the funding required for expected levels of infrastructure, the actual level of infrastructure can (and often does) differ from the expected level. These actual levels then feed forward to affect various aspects of human development and well-being, which, in turn, feed back to the determinants of expected levels of infrastructure and the availability of funding in future years. These determinants also evolve over time in response to many factors that are addressed in other parts of IFs but are not shown in Figure 4.1.

This chapter fleshes out many of the details of the IFs infrastructure modeling system. As with most modeling endeavors, we owe a great debt to others whose past and ongoing work we have learned from, adapted, and extended. A review of a number of these efforts follows a brief introduction to the IFs system.

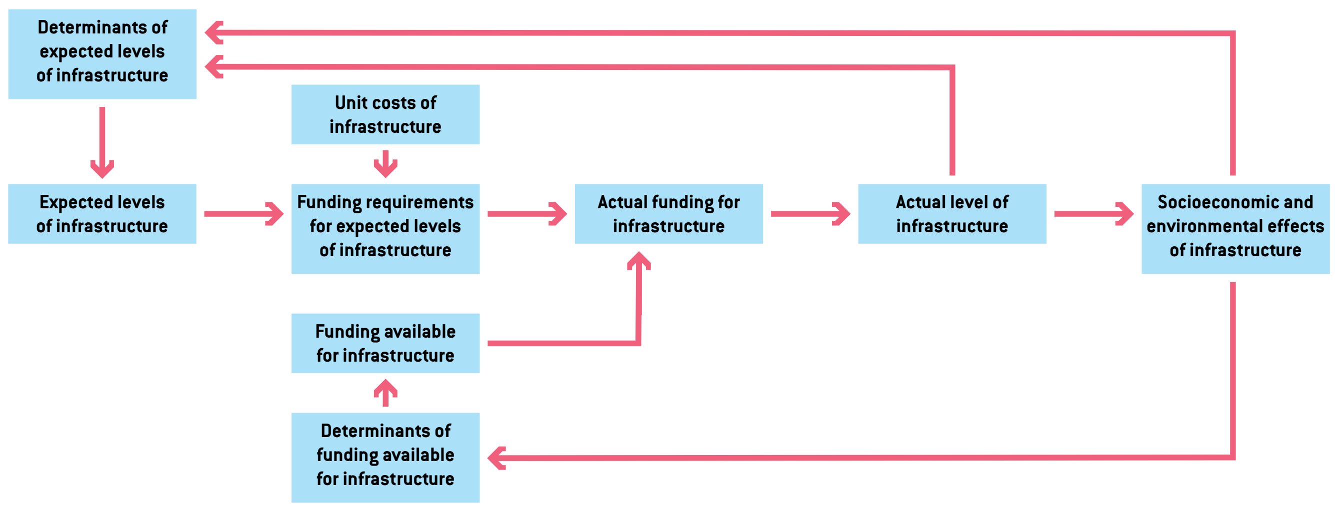
Integrating Infrastructure with Broader Human Development: The Larger IFs System

IFs is a large-scale, long-term, integrated global modeling system. It represents demographic, economic, educational, health, energy, agricultural, sociopolitical, and environmental subsystems for 183 interacting countries.[1] The model system itself runs in annual time steps from its initial year (currently 2010) with user-defined time horizons ranging out to 2100.[2] The central purpose of IFs is to facilitate exploration of global futures through alternative scenarios.

The goals that motivated the design of IFs fall generally into three categories: human development, social fairness and security, and environmental sustainability. Across these domains, the project draws inspiration from seminal writers such as Sen (1999) with his emphasis on freedom and individual

IFs is a large-scale, long-term, global modeling system that includes 183 countries.

Figure 4.1 The dynamic, integrated, infrastructure modeling system in IFs



Source: Authors' conceptualization.

■ *IFs represents typical behavior patterns of major agent-classes, such as households, governments, and firms, as they interact in a variety of global structures and systems.* ■

development, Rawls (1971) with his emphasis on fairness within society, and Brundtland (World Commission on Environment and Development 1987) with her foundational definition of sustainability. In combination, these emphases provide a philosophical framework for the exploration of human beings as individuals, of human beings with each other, and of human beings with the environment.

Fundamentally, IFs is a thinking tool, allowing variable time horizons through 2100 for exploring human agency in pursuit of key goals in the face of great uncertainty. IFs assists with:

- understanding the state of the world and the future that appears to be unfolding
  - identifying tensions and inconsistencies that suggest political, economic, or other risks in the near and middle term (a "watch list" functionality);
  - exploring longer-term trends and considering where they might be taking us;
  - working through the complex dynamics of global systems.

- thinking about the future we want to see
  - clarifying goals and priorities;
  - developing alternative scenarios ("if-then statements") about the future;
  - investigating the leverage we may have in shaping the future.

Human systems fundamentally involve agents (economists often represent them as individuals in households or firms; political scientists add governments) interacting with each other in various structures (economists focus on markets; political scientists look to action-reaction systems and international regimes; sociologists add societies and demographic structures; anthropologists focus on cultures; physical scientists extend the reach to ecosystems). In general, social scientists seek to understand the co-creation and evolution of such agent behaviors and structural characteristics.

IFs attempts to capture *some* of the richness of such systems. It is a structure-based (with extensive representation of underlying accounting systems, such as demographic structures and the exchanges of goods, services, and finance), agent-class driven (so as to provide a basis for representing change), dynamic modeling system. That is, IFs represents typical behavior patterns of major agent-classes (households, governments, firms) interacting in a variety of global structures (demographic, economic, social, and environmental). The system draws on standard approaches to modeling specific issue areas whenever possible, extending those as necessary and integrating them across issue areas. For instance, the demographic model uses the typical cohort-component representation, tracking country-specific populations over time by age and sex (extended by education). Within that structural or accounting framework, the model represents the fertility decisions of households (influenced by income and education), as well as mortality and migration patterns. Similarly with respect to health, we have attempted to build on existing approaches—particularly that of the World Health Organization's Global Burden of Disease project (Mathers and Loncar 2006; Mathers and Loncar updated n.d.)—extending those as possible and integrating them with the larger IFs system.

As well as being rooted in the theory of various disciplines and subspecializations, IFs is heavily data-driven. Data come from the various member organizations of the United Nations family and many other sources. The database underlying IFs, and integrated with the system for use by others, includes data for 183 countries over as much of the period since 1960 as possible.

Figure 4.2 shows the major conceptual blocks of the IFs system. The elements of the technology block are, in fact, scattered throughout the model, as are many elements of the infrastructure model, and for the same reason: both are fundamental underlying systems. The named linkages between blocks are a very small illustrative subset, not an exhaustive listing.

The population and economic models form the core of the IFs system. Some of the key characteristics of the population model are that it:

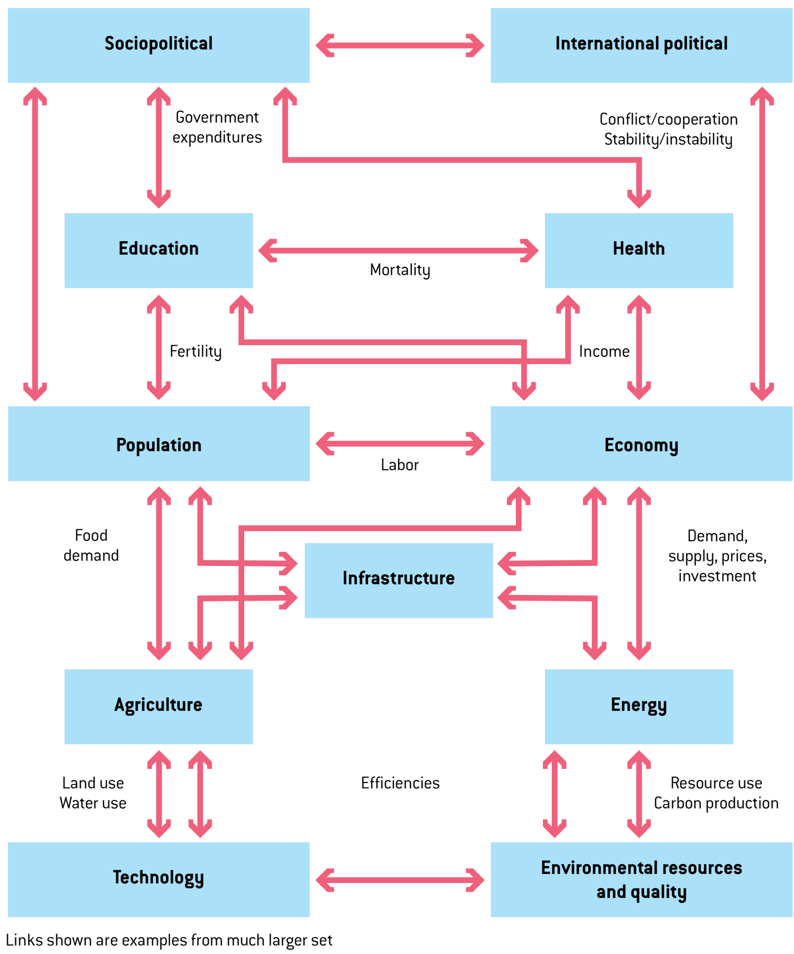
- represents 22 age-sex cohorts to age 100+ in a standard cohort-component structure (but computationally spreads the five-year cohorts initially to one-year cohorts and calculates change in one-year time steps);

- calculates change in cohort-specific fertility of households in response to income, income distribution, infant mortality (from the health model), education levels, and contraception use;
- uses mortality calculations from the health model;
- separately represents the evolution of HIV infection rates and deaths from AIDS;
- computes average life expectancy at birth, literacy rate, and overall measures of human development;
- represents migration, which ties to flows of remittances.

Some of the most important characteristics of the economic model are that it:

- represents the economy in six sectors: agriculture, materials, energy, industry, services, and information and communication technologies (ICT);
- computes and uses input-output matrices that change dynamically with development level;
- is a general equilibrium-seeking model that does not assume exact equilibrium will exist in any given year; rather it uses inventories as buffer stocks and to provide price signals so that the model chases equilibrium over time;
- contains a Cobb-Douglas production function that, following insights of Solow and Romer (see Romer 1990; 1994), endogenously represents contributions to growth in multifactor productivity from human capital (education and health), social capital and governance, physical and natural capital (infrastructure and energy prices), and knowledge development and diffusion (research and development [R&D] and economic integration with the outside world);
- uses a linear expenditure system (LES) to represent changing consumption patterns;
- utilizes a pooled-trade approach for international trade;
- is embedded in a social accounting matrix (SAM) envelope that ties economic production and consumption to representation of intra-actor financial flows.

Figure 4.2 Major models in the IFs modeling system and example connections



Source: Authors' conceptualization.

The sociopolitical model interacts with the infrastructure model as well as with the economic, demographic, health, and education models. Some of its relevant features are that it:

- represents fiscal policy through taxing and spending decisions;
- shows seven categories of government spending: military, health, education, R&D, infrastructure (core), infrastructure other, and a residual category;
- represents changes in social conditions of individuals (such as fertility rates, literacy levels, or poverty), attitudes of individuals (such as the level of materialism/post-materialism of a society from the World Values Survey), and the social organization of people (such as the status of women);

- represents the evolution of democracy and governance-character variables such as effectiveness and corruption level;
- represents the prospects for state instability or failure.

The environmental model of IFs is not as developed as that of many integrated assessment models, but among its capabilities it:

- forecasts exposure to indoor air pollution from the use of solid fuels for heating and cooking;
- computes outdoor particulate concentrations for urban areas;
- forecasts atmospheric accumulations of carbon dioxide from fossil fuel use and deforestation, and replicates findings from more extensive general circulation models to compute associated changes in temperature and precipitation at the national level that, in turn, affect crop yields.

Although initially developed as an educational tool, IFs increasingly supports research and policy analysis.

Although IFs was initially developed as an educational tool, it increasingly supports research and policy analysis. (See the volume preface for information on our flagship series, Patterns of Potential Human Progress, of which this volume is a part.) IFs was a core component of a project exploring the New Economy sponsored by the European Commission in the TERRA project (B. Hughes and Johnson 2005) and a subsequent European Commission project on information and communication technologies and sustainability (Moyer and B. Hughes 2012). Forecasts from IFs supported Project 2020 (*Mapping the Global Future*) of the U.S. National Intelligence Council (USNIC 2004), *Global Trends 2025* (USNIC 2008), and the most recent report of the National Intelligence Council, *Global Trends 2030: Alternative Worlds* (USNIC 2012). IFs also provided driver forecasts and some integrating analysis for *GEO-4*, the fourth *Global Environment Outlook* of the United Nations Environment Programme (UNEP 2007), as well as scenarios on environmental challenges to human development for the 2011 *Human Development Report* (B. Hughes, Irfan, et al. 2011). In addition, it was used as the primary tool for the African Futures 2050 project funded by the British High Commission and based at the Institute for Security Studies in South Africa (Cilliers, B. Hughes, and Moyer 2011).

The menu-driven interface of the IFs software system allows display of historical data since 1960 (in most cases) in combination with results from a Base Case and from alternative scenarios over time horizons from 2010 through 2100, facilitating user interventions flexibly across time, issue area, and geography. The system facilitates scenario development and policy analysis via a scenario tree that simplifies changes in framing assumptions and agent-class interventions. Users can save scenarios for development and refinement over time. Standard framing scenarios (such as those from the United Nations Environment Programme *GEO-4* report) are available with the model for users to explore and potentially develop further. Displays include tables, standard graphical formats, and a basic Geographic Information System (GIS) or map projection capability. Specialized display formats, such as age-sex and age-sex-education cohort structures and social accounting matrices, are also included.

IFs is freely available to all users online at www.ifs.du.edu and in a somewhat richer downloadable version at the same address. The application's help system contains primary documentation, and the website provides access to extended reports and publications. We encourage interested readers to visit the site to obtain further documentation on the model and to keep abreast of the system's ongoing development.

We are unaware of any other study that uses a model as extensively integrated as IFs to explore forecasts of infrastructure's effects and the generation of funds for its support.

Existing Efforts to Forecast Infrastructure

We have not been able to find any one study that uses the type of dynamic, integrated, infrastructure model depicted in Figure 4.1. A number of studies address parts of this whole, however. The two aspects that have received the most attention are (1) the expected levels of future infrastructure, sometimes called the demand for infrastructure (see Box 4.1 with respect to terminology on what studies forecast); and (2) the funding requirements for these expected or demanded levels. Further, as reviewed in Chapter 3, many studies have explored the socioeconomic and environmental effects of infrastructure. For the most part, however, these results have not been used in forecasting. Finally, we have not found any studies that consider explicitly the

Box 4.1 What is being forecast—demanded or expected infrastructure?

While some forecasts refer to the "demand" for infrastructure, demand may not be the most appropriate terminology. Forecasts of future levels of infrastructure typically rely on equations based on past patterns of infrastructure provision, and these patterns reflect not only underlying demand but also financial constraints, policy priorities, and trade-offs with other public spending in nearly every case. Furthermore, most infrastructure has strong public goods characteristics, and it is well recognized that funding for, and therefore provision of, public goods is often underprovided relative to underlying demand (Olson 1965). Additionally, corruption can lead to either the diversion of funds or overbuilding.

As a result, it might be best to label what is forecasted by most analyses as "expected" levels of infrastructure reflecting the interplay of multiple forces, rather than the "demand" for infrastructure. That is the terminology we will use. As we will see, our approach goes one step further by explicitly considering whether these expected levels are attainable given financial constraints and policy priorities.

funding available for infrastructure and use this to forecast actual, as opposed to expected, levels of infrastructure.

Forecasting levels of infrastructure

We can divide the existing efforts to forecast the expected (or in their frequent reference, demanded) levels of infrastructure into two broad categories. The fundamental distinction between the two categories is the degree to which the infrastructure equations are embedded in a larger modeling structure.

In the first category, we include studies that have a primary or, often, exclusive focus on infrastructure, generally oriented toward estimating expected future levels of infrastructure and the costs associated with providing it. The works of Fay (2001) and Fay and Yepes (2003) are early, often cited, examples of this approach. More recent studies using the same basic methodology include Yepes (2005; 2008), Chatterton and Puerto (2006), Lawson and Dragunsanu (2008), G. Hughes, Chinowsky, and Strzepek (2009), Poddar (2009), Bhattacharyay (2010),[3] and Kohli and Basil (2011).

The estimates of future levels of infrastructure in these studies are based on sets of equations, one for each type of infrastructure. While the equations tend to use a common set of explanatory variables, there is generally not a direct relationship between the forecasted levels of different types of infrastructure. Furthermore, in most of these studies, the forecasts of the explanatory variables are exogenous—specifically, they are not affected by forward linkages from the infrastructure forecasts themselves over time. Kohli and Basil (2011) provide an exception to this, in that, for a given year, urbanization, manufacturing, agriculture, and services shares of GDP, which are explanatory variables in the infrastructure equations, are themselves determined, in part, by the levels of infrastructure in the previous year. Furthermore, Kohli and Basil constrain their forecasts of sanitation access to not exceed those of water access.

The second category includes studies that do not necessarily have infrastructure as a primary focus but, nevertheless, do provide forecasts of the expected (or in some sense demanded or needed) levels of some types of infrastructure. Examples include the World Energy Model (WEM) of the International Energy Agency (2010b), the Maquette for MDG Simulation (MAMS) model of the World Bank (Lofgren and Diaz-Bonilla 2010), and the Global Integrated Sustainability Model (GISMO) of the Netherlands Environmental Assessment Agency (Hilderink et al. 2008). As part of modeling the broader energy system, WEM provides detailed forecasts of electricity generation capacity,[4] electricity access, and refinery capacity. MAMS couples the estimation of access to safe water and sanitation to a computable general equilibrium model, in the process establishing a link between the forecasts of these two aspects of infrastructure, along with a more generic accounting of public infrastructure stocks. Using a structure that is similar to IFs,[5] GISMO also produces forecasts of access to water and sanitation.

Each of the models in the second category is large, with greater links between the forecasts of different types of infrastructure and more endogeneity in the forecasts of explanatory variables than the models in the first category. Not surprisingly, they also require much more initial data and detailed information about the infrastructure and other sectors. Even so, as

In general, the equations used in existing studies come from econometric estimations of the relationship between "drivers" and physical infrastructure stocks or levels of access.

with the models in the first category, they rely to some extent on a set of basic equations to forecast expected levels of infrastructure.

A complete review of the methods by which the developers of the models described above derived the equations used to forecast the expected levels of infrastructure is beyond the scope of this volume. In general, however, the equations come from econometric estimations of the relationship between economic, structural, and demographic drivers and physical infrastructure stocks (e.g., paved roads, electricity generation capacity, and telephone lines) or levels of access (e.g., percentage of population with access to improved water) using available historical data. The typical set of economic, structural, and demographic drivers used to forecast the expected levels of infrastructure in these models includes population, population density, urbanization, GDP, and shares of GDP in different sectors. G. Hughes, Chinowsky, and Strzepek (2009) included costs as an explicit driver. In addition, because their study was focused on the impact of climate change on infrastructure, they also included a number of climatic and other geographic variables, such as land type, as drivers.

While it is tempting to refer to these as demand equations, and some studies (including Fay and Yepes 2003) do use that terminology, this is not strictly correct (see again Box 4.1). Fay (2001: 2) noted that such equations provide estimates of "what consumers and producers would be asking for given their income and level of economic activity." They do not reflect "some socially optimal measure of need for infrastructure service or infrastructure investment" (Fay 2001: 2). Chatterton and Puerto (2006: 1) stated that "the results of the regressions do not reflect drivers or inhibitors of investment." Estache and Fay (2010: 163), citing Lall and Wang (2006), pointed out, however, that "if past demand was rationed, it may not be a good predictor of unrationed demand," implying that these types of regressions may indeed reflect shortages of investment. Estache and Fay went on to state that this points to the need "for an approach that incorporates fiscal constraints and supply-side bottlenecks and models the gap between current and optimal level[s] of provisions" (Estache and Fay 2010: 163).

Finally, we should note that some studies do not forecast future levels of infrastructure directly, but simply posit them based on planning documents or stated targets. For example, Bhattacharyay (2010: 10), for his "bottom-up" estimates, simply included "economically viable projects . . . that have already been entered into the planning stages." Others, such as Foster and Briceño-Garmendia (2010), identify demand as the infrastructure level needed to meet the Millennium Development Goals or other targets.

Forecasting requirements for infrastructure funds

As they did for demanded (or, in our terminology, expected) levels of infrastructure, Fay (2001) and Fay and Yepes (2003) also laid out the most common approach for estimating the requirements for infrastructure funding. In this approach, once the demands for physical infrastructure are forecast, those demands are combined with the cost per unit of infrastructure to estimate the funding requirements, as follows:

- **Funding for new construction.** For each type of infrastructure, the existing level of physical infrastructure is subtracted from the forecasted level and the difference is multiplied by the unit cost. The results are then summed across the different types of infrastructure to calculate the total demand for funding for new construction. In a slight variation, rather than calculate the growth of the physical stock, Stambrook (2006) first calculated the asset value of the existing road stock by multiplying the level of the physical stock by a unit cost. He then directly forecasted the growth of this asset value, which was assumed to be equal to the investment requirements.
- **Funding for maintenance.** Although we use the term "maintenance" for this second set of infrastructure funding requirements, different studies use different nomenclature. Bhattacharyay (2010), Fay and Yepes (2003), Kohli and Basil (2011), and Yepes (2005), all use "maintenance"; Chatterton and Puerto (2006) refer to "rehabilitation." Yepes (2008) refers to "maintenance and rehabilitation." Finally, G. Hughes, Chinowsky, and Strzepek

(2009) provide separate estimates for replacement and for maintenance. In general, however, the methodology for the estimation of the funding requirements is the same across all studies. For each type of infrastructure, the funding is determined as a percentage of the dollar value of the existing infrastructure, where the dollar value is given as the amount of infrastructure in physical units multiplied by the same unit cost used for estimating the funding for new construction.[6] Fay and Yepes (2003: 10) referred to this as "the minimum annual average expenditure on maintenance, below which the network's functionality will be threatened." Later authors have more specifically related the percentage to the depreciation rate or average expected lifetime of each type of infrastructure (Chatterton and Puerto 2006; Yepes 2005, 2008).

Fundamental to this general approach are assumptions about the unit costs and what we will refer to as "maintenance percentages" used for each type of infrastructure. For the unit costs, Fay (2001: 11) and Fay and Yepes (2003: 10) referred to "best practice prices taking into account associated network costs" that were based on a range of World Bank and other sources. All later studies appear to have used similar definitions. Unfortunately, all of these studies have only a limited discussion of what is meant by best practice costs, although it can be inferred that these assume minimal amounts of waste.

In Appendix 4A to this chapter, we summarize the assumptions of unit costs and infrastructure lifetimes from other studies by type of infrastructure. The assumptions sometimes differ markedly across studies and in ways that are not always consistent. For example, compare G. Hughes, Chinowsky, and Strzepek (2009) and Kohli and Basil (2011). The former assumed much higher unit costs for water, sanitation, and fixed telephone connections than the latter, but the reverse is the case for paved roads and electricity generation capacity.[7] Despite such differences, we also see a fair amount of consistency in unit costs and lifetime assumptions across studies, to the point that some estimates have not even been updated to reflect changes in the base year of the currency used. This reflects the use of common sources and the influence of the original Fay (2001) and Fay and Yepes (2003) studies.

Of particular interest for our analysis, which cuts across countries and considers a fairly long time period, is whether the unit costs differ based on geography, the level of existing infrastructure, the level of economic development, or over time. There is logic for varying unit costs; variations in labor costs, corruption, project management skills, as well as economies of scale and experience, can make the cost of building a given unit of infrastructure quite different from country to country or in the same country at different points in time. Whether unit costs can be systematically and realistically related to these variations is not clear, however, especially if one tries to account for all factors. In general, most studies have assumed universal unit costs in order to avoid such complications.

In only a few cases, for example, G. Hughes, Chinowsky, and Strzepek (2009) and Yepes (2005; 2008), have past researchers used different unit costs for different countries within the same study.[8] Furthermore, most studies have assumed constant unit costs across time. Yepes (2005) and Chatterton and Puerto (2006) allowed the unit costs to change over the horizon of those studies, but only for mobile and mainline phones. Kohli and Basil (2011) assumed a declining unit cost for mobile phones as penetration rates increased above 30 percent, but this is the only case in which costs were assumed to change as a function of scale. Finally, G. Hughes, Chinowsky, and Strzepek (2009) made allowances for changes in unit costs as a result of changing climate parameters—precipitation, temperature, and wind—for certain types of infrastructure.

Along with their more detailed treatment of forecasting infrastructure demand, the World Energy Model (International Energy Agency 2010b) and other complex models that focus on a single sector also tend to use more detailed approaches to estimate the costs of meeting this demand. Such approaches involve, among other things, using estimates of capital and maintenance costs for specific technologies that may differ across regions. In some of these models, the unit costs change over time due to

Most studies, including our own, assume universal unit costs to avoid excessive complexity; in fact, such costs do vary across countries and time.

assumptions about learning and technological innovation. Finally, Kohli and Basil (2011) used standardized unit costs between countries but spread the cost of new infrastructure demanded over a few years to represent the long-term nature of most infrastructure projects instead of adopting the standard method of assuming that all spending on a given project occurs in a single model year.

Forecasting the socioeconomic and environmental effects of infrastructure as a function of the level of infrastructure

In Chapter 3, we discussed potential positive and negative socioeconomic and environmental impacts of infrastructure and reviewed much of the empirical evidence. For the most part, however, this knowledge has not been used for forecasting purposes. A few exceptions are described here.

In the MAMS model (Lofgren and Diaz-Bonilla 2010), public infrastructure is one of the determinants in achieving the Millennium Development Goals—specifically, the maternal mortality, under-five mortality, and primary education goals—that, in turn, affect economic development via their effect on the size and makeup of the labor force. In the model developed by Kohli and Basil (2011), the level of infrastructure affects the sectoral breakdown of economic growth, but not the overall level.

The multiple models in the IFs system allow us to include indirect linkages from infrastructure and economic productivity to socioeconomic and environmental variables.

As noted in Chapter 3, the GLOBIO framework has been used to calculate the impact of infrastructure and four other drivers—land use change (agriculture and forestry), nitrogen deposition, fragmentation, and climate change—on terrestrial biodiversity (see Alkemade et al. 2009), while the meta-analysis by Benítez-Lopéz, Alkemade, and Verweij (2010) estimated the relationships between infrastructure and species abundance. These estimates were then applied in a GIS framework to forecast the impact of future changes in infrastructure, either alone or in conjunction with other drivers of species loss.

Finally, infrastructure does play a role in determining other environmental impacts in some models. The World Energy Model (Cofala et al. 2010; International Energy Agency 2010b) forecasts emissions of carbon dioxide, sulfur dioxide, nitrogen oxides, and particulate matter from electricity generation plants. These are estimated by multiplying electricity production by forecasted emission factors that vary by type of electricity generating unit, the fuels used, and environmental controls implemented.

In earlier versions of the IFs model, there were a number of ways in which some socioeconomic and environmental effects of infrastructure were forecast. For example, physical capital, in part a function of telephone lines, roads, ICT usage, and electricity use, was (and remains) one of the factors determining changes in multifactor productivity over time (B. Hughes and Hillebrand 2006). For a previous volume in this series, *Improving Global Health* (B. Hughes, Kuhn, et al. 2011), we added direct links from solid fuel use in the home and from access to improved water and sanitation to morbidity and mortality from specific diseases. Vehicle ownership also influenced morbidity and mortality from traffic accidents, but there was (and remains) no link between vehicle ownership and infrastructure.

We had earlier also introduced forward links from ICT to overall energy efficiency and the relative costs of renewable energy. A further review of those relationships led us to remove them for the purposes of this volume, however.[9] Finally, given the multiple models in the IFs system (see again Figure 4.2), the linkages of infrastructure to variables such as economic productivity create many indirect linkages to other socioeconomic and environmental variables. We have revisited a number of these relationships in developing this volume, resulting in a much more detailed representation of infrastructure and its effects in IFs. It is to these that we now turn.

What We Do

Overview

Figure 4.1 laid out a conceptual framework for a dynamic, integrated, infrastructure modeling system. The efforts of others described above offer prototypes of many of the building blocks for such a system, but to our knowledge, no one has previously constructed a forecasting tool able to represent all, or even most, of the elements that make up the entire framework. This section describes how we implemented this framework within the overall IFs system.

In brief, the infrastructure modeling in IFs involves moving through the following sequence for each forecast year:

1. Estimating the expected levels of infrastructure
2. Translating the expected levels of infrastructure into financial requirements
3. Balancing the financial requirements with available resources
4. Forecasting the actual levels of attainable infrastructure
5. Estimating the social, economic, and environmental impacts of the attainable infrastructure

Throughout each of these steps, the infrastructure components and other parts of IFs are integrated. In particular, the drivers used to forecast the expected levels of infrastructure, the available resources, and the impacts of infrastructure are all strongly influenced by developments in other parts of the system. Furthermore, since IFs is a recursive model with an annual time-step, the results each year affect the forecasts in following years.

Table 4.1 summarizes the core infrastructure indicators currently included in the IFs system. From these, we are able to calculate numerous other indicators—for example, the number of persons with access to electricity and the ratio of total public to private spending on infrastructure. The choice of this set of indicators reflects the focus of the volume on access to infrastructure services, the availability of historical data, and the authors' determination of what could be modeled within IFs at this time. With the exception of G. Hughes, Chinowsky, and Strzepek (2009), who used a definition of infrastructure that included schools, hospitals, and municipal buildings, we are not aware of another modeling effort that covers as large a range of infrastructure types in a single study.

Although we reviewed a wide range of potential social, economic, and environmental

The choice of infrastructure indicators included in IFs reflects a focus on access to core infrastructure, the availability of historical data, and our assessment of what we could model.

Table 4.1 Summary of core infrastructure indicators in IFs

Access indicators	Rural road access: percentage of rural population living within 2 kilometers of an all-season road Electricity: percentage of population with access (rural and urban) Solid fuel use: percentage of population using solid fuels as their main household energy source Water: percentage of population with access (none, other improved, piped) Sanitation: percentage of population with access (other unimproved, shared, improved) Wastewater collection: percentage of population with wastewater collection and treatment Fixed telephones: lines per 100 persons Fixed broadband: subscriptions per 100 persons Mobile telephones: subscriptions per 100 persons Mobile broadband: subscriptions per 100 persons
Physical amounts	Roads (unpaved) Roads (paved) Electricity generation capacity Electricity connections (rural and urban) Area equipped with irrigation Water connections (other improved and piped) Sanitation connections (shared and improved) Wastewater treatment Fixed telephone lines Fixed broadband subscriptions Mobile telephone subscriptions Mobile broadband subscriptions
Spending (in dollars and as percentage of GDP)	New construction and maintenance by public and private sectors for each type of physical infrastructure Public spending on other infrastructure

Note: Values for these indicators appear in IFs at the national level for 183 countries. Electricity access and electricity connections are also provided separately for rural and urban areas. Throughout this volume, spending as a percentage of GDP is calculated using GDP measured in 2000 dollars at market exchange rates unless otherwise noted.

Source: IFs version 6.61.

impacts of infrastructure in Chapter 3, we limit our modeling of the direct effects of infrastructure to its effects on economic productivity and a small set of health impacts. As discussed in Chapter 3, we judge the empirical research on these effects to be more advanced—and the effects themselves more amenable to modeling—than the direct effects of infrastructure on factors such as income inequality, educational attainment, or governance. Finally, to the extent that direct effects and other aspects, such as spending on infrastructure, affect other systems included in IFs, infrastructure will have a number of indirect effects. In the remainder of this section, we describe in more detail the infrastructure model within IFs, looking at each of the five steps listed above in turn.[10]

Forecasting the expected levels of infrastructure

The first step in the annual sequence is to forecast the expected levels of both the access to, and the amount of, infrastructure (see again Table 4.1). Chapter 3 discussed the importance of a country's or a region's economic, demographic, geographic, and political characteristics and choices in determining these levels. Given the very nature of much infrastructure—long lead times for construction and even longer lifetimes—there is also a large degree of path dependence: the amount of infrastructure in a specific year is strongly influenced by the amount in previous years. Finally, there are certain interdependencies between different forms of infrastructure that need to be considered. For example, it is logical to assume that households without improved sanitation would not have their wastewater collected.

At the core of our forecasts is a set of estimated equations, each relating one type of infrastructure to specific drivers.

At the core of our forecasts of the expected levels of infrastructure is a set of estimated equations embedded within a set of accounting relationships. For example, estimated levels of electricity access, the ratio of electricity use to total energy demand, and distribution and transmission loss are combined with assumptions about the long-term evolution of capacity utilization and net imports of electricity to determine expected levels of electricity generation capacity. We provide more explicit details below about these equations and the accounting relationships for each of our four main categories of infrastructure.

Some general points about our equation methodology cut across the four categories. For one, each of the estimated equations relates one aspect of physical infrastructure to specific economic, structural, and demographic drivers; in some cases these equations also include other types of infrastructure, creating explicit linkages across those infrastructures. While a number of earlier studies did provide equations for forecasting future levels of some of the types of physical infrastructure we include, we chose to undertake our own analyses for the purposes of this volume. This allowed us to use more recent data to drive the relationships than earlier studies and to better integrate the resulting relationships within the broader IFs system.

Table 4.2 lists the variable estimated by each of these equations, along with the explanatory or driving variables for each of the equations. Further details on these equations, including the functional forms, summaries of the data used in their estimation, and statistical measures of fit, are provided below and in Appendix 4B to this chapter. Our choices of the driving variables ultimately included in the equations were influenced by theoretical considerations, previous efforts, the availability of data, and, of course, the analytical results themselves. Beyond population and income, the driving variables include factors related to income inequality, geography, and governance; each of these has been identified in previous studies as having an influence on infrastructure provision but has not been used to drive forecasts in those studies. All of these driving variables, other than landmass, which does not change over time, are forecast in various parts of the IFs system.

Additional elements beyond our core estimated equations are involved in specifying the expected values of infrastructure, and we handle some of these elements algorithmically. For instance, the base year calculated estimations will most often not match exactly the historical data for countries in the base year.[11] Each country has peculiarities that differentiate it from the "typical pattern"; among the factors not captured by our equations for estimating the base year country

Table 4.2 Summary of explanatory variables for the estimated infrastructure equations in IFs

		Forecasted variables														
Explanatory variables		**Roads per unit area (INFRAROAD)**	**Paved road percentage (INFRAROADPAVEDPCNT)**	**Rural road access index (INFRAROADRAI)**	**Electricity access (INFRAELECACC)**	**Ratio of electricity use to total energy demand (ENELECSHRENDEM)**	**Electricity transmission and distribution loss (INFRAELECTRANLOSS)**	**Solid fuel use in the home (ENSOLFUEL)**	**Access to improved drinking water (WATSAFE)**	**Access to improved sanitation (SANITATION)**	**Percentage of population whose wastewater is collected (WATWASTE)**	**Percentage of population whose wastewater is treated (WATWASTETREAT)**	**Fixed telephone lines per 100 persons (INFRATELE)**	**Mobile telephone subscriptions per 100 persons (ICTMOBIL)**	**Fixed broadband subscriptions per 100 persons (ICTBROAD)**	**Fixed broadband subscriptions per 100 persons (ICTBROADMOBIL)**
Population, income, and geography	Total population		■													
	Land area	■	■													
	Average income		■			■	■	■	■	■	■	■	■	■	■	■
	Urbanization										■				■	
	Percent of population living on <$1.25 per day				■				■	■						
	Income density (GDP per unit area)	■		■												
	Population density	■														
Governance	Governance effectiveness				■											
	Governance regulatory quality						■							■	■	■
	Public spending on health as a percent of GDP								■	■						
Education	Mean years of education of adults (25+)								■	■						
Other infrastructure	Roads per unit area		■													
	Roads per person			■												
	Electricity access					■		■								
	Improved sanitation										■					
	Wastewater collection															
	Fixed telephones														■	
	Mobile telephones												■			■
Technology	Technology shift													■	■	■
	Energy production					■										
	Energy demand					■										

Source: IFs Version 6.61.

values are many aspects of geography, culture, and unique historical development paths. And sometimes, of course, data errors account for such differences.

To deal with this issue of differences between our estimated values and reported data in the base year, the model calculates an additive or multiplicative country shift factor representing that difference; we allow those shifts to gradually diminish over time, thereby causing countries to approach the expected value function. Among the reasons for allowing convergence is that we quite consistently see that the patterns of higher-income countries are more similar and more like those of our general equations than are those of lower-income countries. On the assumption that countries will seldom abandon infrastructure they have already developed, however, our downward convergence is extremely slow relative to our upward convergence (which most often occurs over 50 to 100 years).

A second instance in which we make adjustments to our core estimated equations is when the dynamic trajectory of demand/supply growth in a country in recent years is inconsistent with the forecasts produced by the equations. For instance, a policy-based surge of infrastructure development like that seen recently in China may result in a historical growth rate well above the one that our functions produce in the first years of our forecasting. Making a simplifying assumption that these growth rates will change only gradually, we estimate the growth rate of physical infrastructure stock using the historical data over three to five recent years and incorporate that growth rate in the demand estimation through a moving average-based extrapolative formulation.

We make a final adjustment in those cases where we wish to modify the estimates of expected infrastructure for scenario analysis. This can be accomplished in several ways. First, most of the estimates can be adjusted with the use of a simple multiplier. Second, we can stipulate specific levels for specific types of infrastructure in a specific future year; in this case, the model will automatically forecast a linear approach to the targeted level from the base year. Third, we can modify both the rates at which the country shift factors converge and the levels to which they converge. For example, we can drive the shift factors to those of the best performing countries by a certain date. The latter two methods are used in Chapter 6, where we explore scenarios in which infrastructure targets are pursued.

The following sections provide more explicit details about the model structure for each of the four main categories of infrastructure, focusing on the core equations.

Transportation

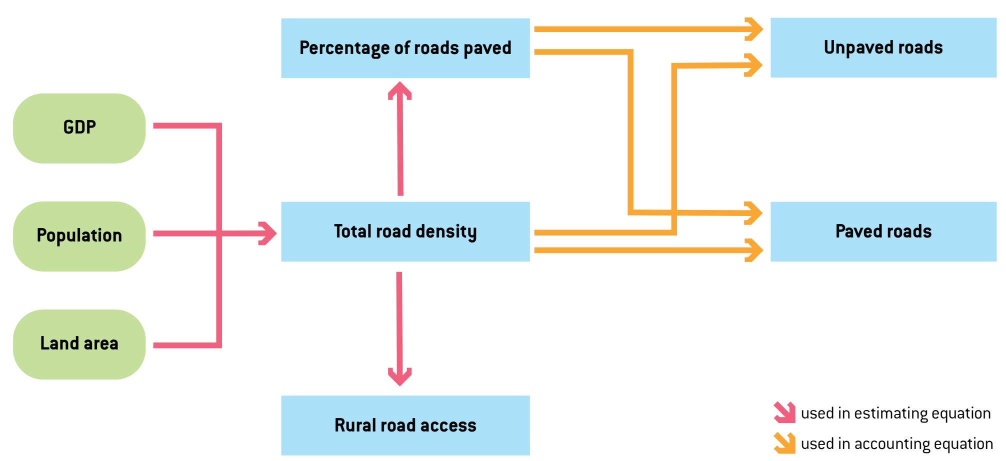
Important indicators of transportation infrastructure included in IFs are the Rural Access Index or RAI—defined as the percentage of the rural population living within two kilometers of an all-season road—and the lengths of paved and unpaved roads at the physical level (because they determine construction and maintenance costs). The general sequence of calculations is shown in Figure 4.3.

We begin by estimating total road density (in terms of road length per unit area), the percentage of roads that are paved, and the RAI, using equations derived from historical data. The RAI equation provides our core access indicator for transportation. Knowing the total road density and the percentage of roads that are paved, along with a country's land area, allows us to calculate the expected lengths of paved and unpaved roads.

The key underlying explanatory variables for the estimating equations are related to total GDP, population, and land area (see again Table 4.2). At the same time, our analysis led us to include variables based on the amount of total roads in the equations for the percentage of roads that are paved and for the RAI. Therefore, the model needs to calculate total roads first.

The estimated equations for total road density, the percentage of total roads paved, and the RAI are introduced below. Here, and for the equations for the other forms of infrastructure, the equations are presented with explanation, using the variable names utilized in the IFs model. As stated previously, further details on the equations, including estimating methods and measures of fit, are provided in Appendix 4B to this chapter.

Figure 4.3 Modeling transportation infrastructure in IFs



Note: Some of the driving variables shown on the left also affect directly the estimates of the percentage of roads paved and the Rural Access Index in addition to their effect through total road density.

Source: IFs Version 6.61.

The equation for total road density is:

$$\ln(\text{INFRAROAD}) = -2.539 + 0.483 \cdot \ln\left(\frac{\text{GDPP}}{\text{LANDAREA}}\right) + 0.183 \cdot \ln\left(\frac{\text{POP}}{\text{LANDAREA}}\right) - 0.102 \cdot \ln(\text{LANDAREA})$$

where

INFRAROAD is total road density in kilometers per thousand hectares; GDPP is GDP measured at purchasing power parity (PPP)[12] in billion year 2000 dollars; POP is population measured in million persons; and LANDAREA is total land area in million hectares.

The coefficients on income density (GDPP/LANDAREA) and population density (POP/LANDAREA) have positive values in this equation, indicating that the demand for road density increases with increasing values of these variables. The opposite is true for LANDAREA. Since land area for a given country will not change in our analysis, this implies that increasing economic activity and growing populations both lead to an increasing demand for total road density, or equivalently, total roads. If we compare countries of different sizes but equivalent income density and population density, the expected level of road density will be lower in the larger country. As we show below, however, this does not mean a demand for fewer roads.

Given the nature of the equation, which is linear in logarithms, the coefficients can be treated as elasticities. Furthermore, they are all less than 1 in absolute value, implying that the demand for total road density changes less than proportionately with a change in any of the driving variables. A 10 percent increase in income density or population density results, respectively, in approximately only a 5 percent or 2 percent increase in demand for road density (or total roads).[13] A country that is 10 percent larger than another country with the same levels of income and population density would demand a total road density that is only 1 percent lower. The larger country would still demand more roads in total.

The equation for the percentage of total roads that are paved is:

$$\text{INFRAROADPAVEDPCNT} = \frac{100}{1 + e^{-(\alpha + \sum_i \beta_i \cdot x_i)}}$$

$$\alpha + \sum_i \beta_i \cdot x_i = -1.022 + 2.779 \cdot \text{GDPPCP} + 0.833 \cdot \text{POP} - 0.726 \cdot \text{LANDAREA} - 0.276 \cdot \text{INFRAROAD}$$

where

INFRAROADPAVEDPCNT is the percentage of total roads that are paved; GDPPCP is

We forecast total road density, the percentage of roads that are paved, and the Rural Access Index using total GDP, population, and land area as key driving variables.

We forecast the percentage of people with access to electricity as a function of poverty levels and government effectiveness.

GDP per capita measured at purchasing power parity in year 2000 dollars; POP is population in millions of persons; LANDAREA is total land area in million hectares; and INFRAROAD is total road density in kilometers per thousand hectares.

This somewhat daunting-looking equation is a version of a logistic equation (see Box 4.2). The representation ensures that the estimated value for the percentage of total roads that are paved falls between 0 and 100 percent. This percentage rises with GDPP/POP (average income) and total population, but declines with total land area and the density of the road network.

Box 4.2 Estimating variables with natural minimum and maximum values

A number of variables have values that have natural minimums and maximums. For example, the percentage of roads that are paved should always be between 0 and 100 percent. Thus, it makes sense to forecast these variables using functional forms that guarantee that the forecasted values fall in this range.

One of the simplest of these functional forms is the logistic:

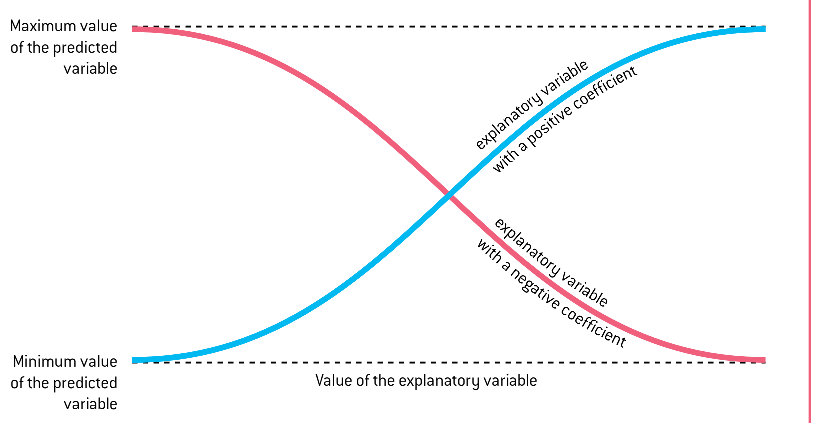
$$y = \text{minimum} + \left(\frac{\text{maximum} - \text{minimum}}{1 + e^{-(\alpha + \sum_i \beta_i * x_i)}}\right)$$

where

y is the value of the predicted variable; x_i is the value of the i^{th} explanatory variable; and α and β_i are estimated coefficients.

If an explanatory variable has a positive coefficient, β_i, then the value of the predicted variable increases with the value of the explanatory variable and vice versa (see Figure 4.4). The size of the absolute value of the coefficient determines the maximum steepness of the change in the value of the predicted variable with a change in the explanatory variable.

Figure 4.4 The impact of an increase in the value of the explanatory variable on the predicted variable in a logistic equation



Source: Authors' conceptualization.

Finally, the equation for RAI is:

$$\text{INFRAROADRAI} = 2.85 * \left(\frac{\text{GDPP}}{\text{LANDAREA}}\right)^{1.33} * \left(\text{INFRAROAD} * \frac{\text{LANDAREA}}{\text{POP}}\right)^{0.24}$$

where

INFRAROADRAI is the Rural Access Index; GDPP is GDP measured at purchasing power parity in billion year 2000 dollars; POP is total population in million persons; LANDAREA is total land area in million hectares; and INFRAROAD is total road density in kilometers per thousand hectares.

The sign of the coefficients show that RAI increases with both GDP/POP (income density) and INFRAROAD*LANDAREA/POP (total roads per capita).

Energy

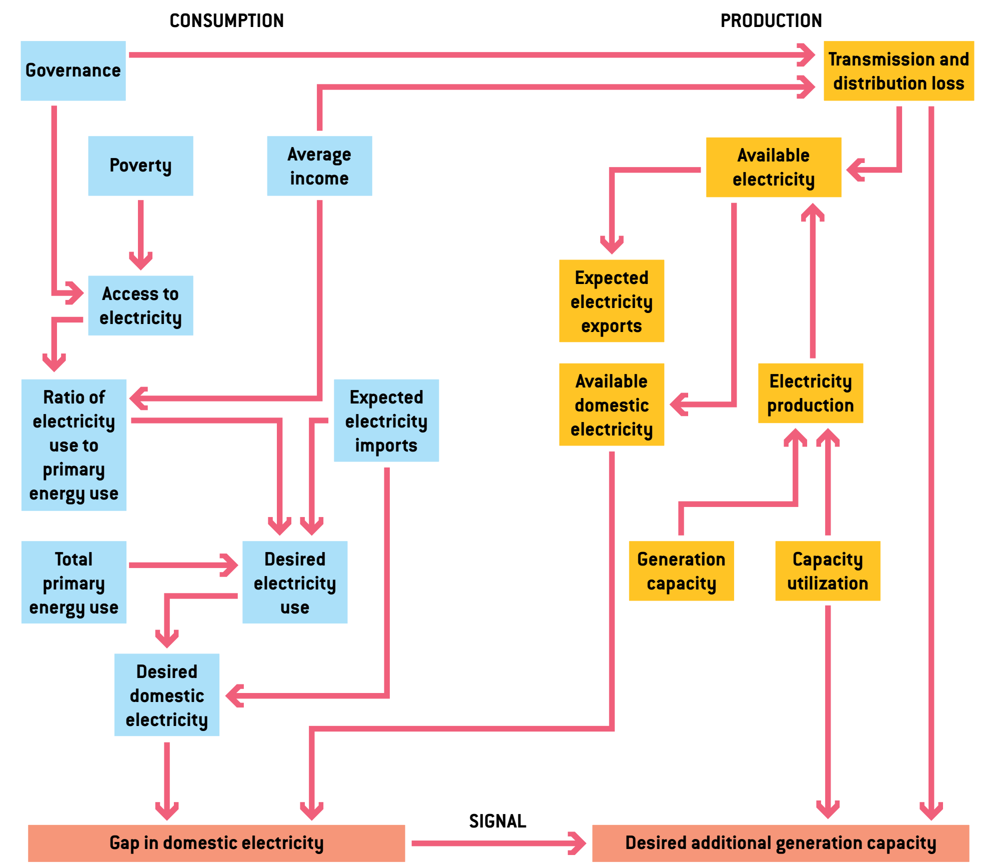
Our focus in the energy sector is on the generation and use of electricity. In terms of physical infrastructure, the key indicator we forecast is the level of electricity generation capacity (see again Table 4.1). From the user perspective, we forecast the percentage of the rural and urban populations that have access to electricity. Finally, we forecast the percentage of the population that uses solid fuels as the main source of energy.

Figure 4.5 presents an overview of the submodel that forecasts access to electricity and electricity generation capacity in IFs. It is fully integrated with the larger IFs system, described earlier, that provides forecasts of critical variables such as energy demand, energy production by primary type, poverty, and governance character. The electricity submodel contains three components—estimating consumption, estimating production, and sending a signal for additional generation capacity in the case of a gap between production and consumption. Beginning with consumption, we first estimate the percentage of the population with access to electricity. This is forecast as a function of poverty levels and a measure of government effectiveness. The levels of access, along with average income, are used to forecast the expected ratio of electricity use to total primary energy use.[14] With this ratio and the level of total primary energy use, forecast elsewhere in IFs, we then calculate the desired electricity use. This desired electricity use can then be met by either domestic production or imports. We make the simplifying assumption that the share of electricity use met by imports will remain close to the historical value for each country. This then allows us to calculate the desired amount of electricity use that must be met by domestic production.

The amount of domestically produced electricity is determined by the existing generation capacity, adjusted by a capacity utilization factor. We estimate the initial capacity utilization factor for each country based on historical data. Over the forecast horizon, the capacity utilization factor is assumed to slowly converge to a global average value, 0.55, which we derived from current data on generation capacity and production in high-income countries. We also account for transmission and distribution loss, which we forecast as a function of average income and a measure of governance. The resulting available electricity can be used for either domestic consumption or exports. Following the same logic used for imports, we assume that the share of available electricity exported will remain close to the historical value for each country.

We then compare the desired amount of domestically available electricity to the forecast of the actual amount available. If there is a shortfall, the model generates a signal to build additional generation capacity. It is this desire for additional capacity, along with the need to maintain existing capacity (and the costs of urban and rural connections) that determines the financial demand for energy infrastructure.

Figure 4.5 Modeling electricity infrastructure in IFs



Source: IFs Version 6.61.

We estimate access to electricity separately for urban and rural populations, using the following equations:

$$INFRAELECACC_{urban} = \frac{100}{1 + e^{-(\alpha + \sum_i \beta_i * x_i)}}$$

$$\alpha + \sum_i \beta_i * x_i = 1.144 - 4.858 * INCLT1CS + 0.837 * GOVEFFECT$$

$$INFRAELECACC_{rural} = \frac{100}{1 + e^{-(\alpha + \sum_i \beta_i * x_i)}}$$

$$\alpha + \sum_i \beta_i * x_i = -0.500 - 6.925 * INCLT1CS + 0.858 * GOVEFFECT$$

where

INFRAELECACC is the percentage of the urban or rural population with access to electricity; INCLT1CS is the fraction of the total population that lives on less than $1.25 per day in year 2000 dollars at purchasing power parity; and GOVEFFECT is a measure of governance effectiveness developed as part of the World Bank World Governance Indicators project (Kaufmann, Kraay, and Mastruzzi 2010).[15]

In both the urban and rural equations, increased levels of electricity access are associated with decreasing levels of poverty and increasing levels of governance effectiveness. Given the estimated coefficients, the expected values for urban access will always equal or exceed those for rural access.

We calculate the percentage of the total population with access to electricity as a population weighted average of the urban and rural values. This is then combined with average income to forecast the ratio of electricity use to total primary energy use with the following equation:[16]

$$ENELECSHRENDEM = 0.979 * GDPPCP^{0.275} * INFRAELECACC_{national}{}^{0.492} * FOSSILSHARE_{2010}{}^{-0.077} * NONFOSSILSHARE_{2010}{}^{0.128}$$

where

ENELECSHRENDEM is the ratio of electricity use to total energy use; GDPPCP is average income measured in thousand year 2000 dollars at purchasing power parity; INFRAELECACCnational is the percentage of the total population with access to electricity; FOSSILSHARE is the ratio of fossil fuel energy production to total primary energy use; and NONFOSSILSHARE is the ratio of non-fossil fuel energy production to total primary energy use.

$$FOSSILSHARE = \frac{ENP_{oil} + ENP_{gas} + ENP_{coal}}{ENDEM}$$

$$NONFOSSILSHARE = \frac{ENP_{hydro} + ENP_{renew}}{ENDEM}$$

where

ENP is energy production by source (oil, gas, coal, hydro, and other renewable); and ENDEM is total primary energy use.

The formulation for electricity access uses a functional form that is linear in logarithms, just as in our formulation for total road density.[17] Based on this and on the sign on the coefficients, we can see that the ratio of electricity use to total primary energy use increases both with increasing income and electricity access. The estimated elasticities imply that a 10 percent increase in average income, holding electricity access constant, would lead to a 2.75 percent increase in the ratio, while a 10 percent increase in access, holding average income constant, would lead to a nearly 5 percent increase in the ratio.

The only estimated equation on the production side is for transmission loss. We forecast this as:

$$INFRAELECTRANLOSS = e^{(3.125 - 0.026 * GDPPCP - 0.125 * GOVREGQUAL)}$$

where

INFRAELECTRANLOSS is the percentage of electricity that is lost during transmission and distribution; GDPPCP is average income measured in thousand year 2000 dollars at purchasing power parity; and GOVREGQUAL is a measure of governance regulatory quality developed as part of the World Bank World Governance Indicators project (Kaufmann, Kraay, and Mastruzzi 2010).[18]

This formulation implies that transmission loss falls with increasing income and improved governance regulatory quality.

Finally, although not shown in Figure 4.4, we recognize that a strong connection exists between the use of electricity and of solid fuels in the home. In general, as households move up the energy ladder, they increase their use of electricity and decrease their use of solid fuels (Holdren and Smith 2000), and we include a link in IFs from access to electricity to the use of solid fuels in the home. In previous versions of the model, where we did not estimate electricity access, we used income per capita, income distribution, and education as drivers in estimating the percentage of the population that primarily used solid fuels for heating and cooking (B. Hughes, Kuhn, et al. 2011: 98). We now have updated this formulation to include access to electricity as a key driver:

$$\text{ENSOLFUEL} = \frac{100}{1 + e^{-(\alpha + \sum_i \beta_i * x_i)}}$$

$$\alpha + \sum_i \beta_i * x_i = 2.823 + 0.166 * \text{GDPPCP} + 0.032 * \text{INFRAELECACC}_{\text{national}}$$

where

ENSOLFUEL is the percentage of the population using solid fuels as the primary fuel for heating and cooking; GDPPCP is average income measured in thousand year 2000 dollars at purchasing power parity; and $\text{INFRAELECACC}_{\text{national}}$ is the percentage of the total population with access to electricity.

As incomes and access to electricity increase, the percentage of the population using solid fuels as the primary fuel for heating and cooking decreases.

Water and sanitation

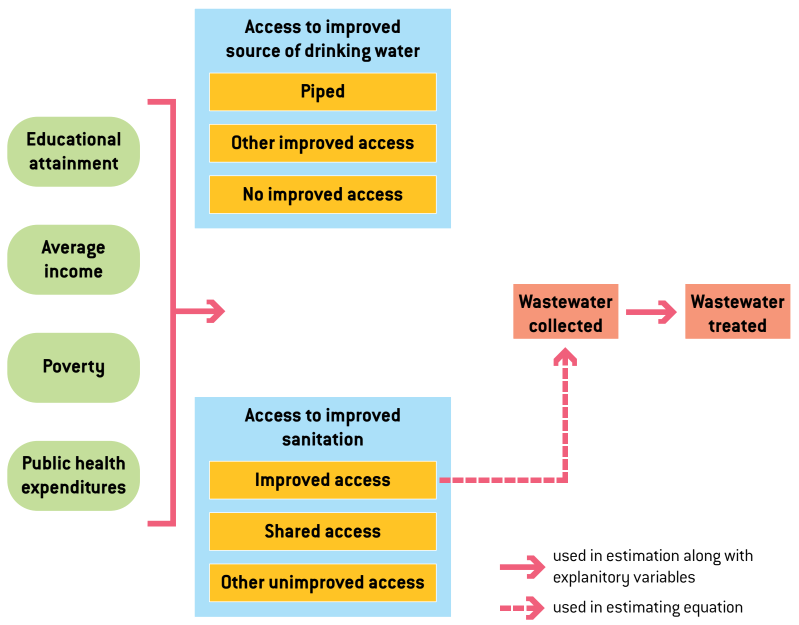
The key access indicators we include for water and sanitation infrastructure are the percentages of the population with access to different levels of improved drinking water and sanitation and whose wastewater is collected and subsequently treated (see again Table 4.1). The physical quantities include the number of connections providing these services and the amount of land that is equipped for irrigation.

We originally introduced forecasts of access to improved sources of drinking water and sanitation into IFs in support of the previous volume in this series, *Improving Global Health* (B. Hughes, Kuhn, et al. 2011), because of the health risks associated with a lack of clean water and/or improved sanitation. For the purposes of the current volume, we have extended this portion of the model to include forecasts of the share of wastewater that is collected and then treated prior to being returned to the environment. In addition, we also added a component to forecast the area equipped for irrigation.

In Box 2.4 we introduced the concept of "ladders" for drinking water and sanitation. As countries develop, they ascend these ladders, gradually moving from a situation in which the majority of households have no access to improved sources of drinking water or sanitation to a point where most have piped connections delivering clean water and access to improved sanitation. We forecast the shares of the population in each of the water and sanitation ladder categories using

We forecast the shares of population on each rung of the water and sanitation ladders using income, poverty levels, educational attainment, and public health expenditures as drivers.

Figure 4.6 Modeling drinking water, sanitation, and wastewater infrastructure in IFs



Note: Some of the driving variables shown on the left affect the estimates of collected and treated wastewater directly, in addition to their effect through access to improved sanitation.

Source: IFs Version 6.61.

average income, poverty levels (measured as the percentage of the population living on less than \$1.25 per day), educational attainment (measured as the average number of years of formal education for adults over 25), and public health expenditures as explanatory variables (see Figure 4.6). These results then feed into the forecasts of the percentage of population with wastewater collection and wastewater treatment.

In forecasting the percentages of population with access to different levels of improved water and sanitation, we want to ensure that the estimated value in each category falls between 0 and 100 percent and that the values across the categories sum to 100 percent of the population. We accomplish this by using nominal logistic models (alternatively called multinomial logit models). Our approach, in effect, estimates a set of coupled logistic equations that are then used to calculate the percentages (see Box 4.3).

The estimated coefficients for the two sets of nominal logistic models used to forecast access to sources of improved water and sanitation in IFs are shown in Table 4.3. While the underlying equations are reminiscent of those for the logistic equations described in Box 4.2, the interpretation of the coefficients is less straightforward since there are more than two categories. The general results show that countries move up the ladders as income, educational attainment, and government spending on health increase and poverty levels decrease. Furthermore, the formulations forecast lower levels of access to improved sanitation than drinking water, reflecting the situation in most countries (see again our discussion of the historical data in Chapter 2).

Although we use a separate equation for the percentage of the population connected to a wastewater collection system (see again Table 4.2), we do not allow that percentage to exceed the percentage of the population that has access to improved sanitation (see Box 4.4). We then forecast the share of the population whose collected wastewater is also treated; this is not allowed to exceed the percentage of the population connected to a wastewater collection system. These equations are as follows:

$$\text{WATWASTE} = \frac{\text{SANITATION}_{imp}}{1 + e^{-(\alpha + \sum_i \beta_i * x_i)}}$$

$$\alpha + \sum_i \beta_i * x_i = -2.4 + 0.043 * \text{GDPPCP} + 0.042 * \text{POPURBANPCNT}$$

$$\text{WATWASTETREAT} = \min\left(\text{WATWASTE}, \frac{100}{1 + e^{-(\alpha + \sum_i \beta_i * x_i)}}\right)$$

$$\alpha + \sum_i \beta_i * x_i = -2.482 + 0.038 * \text{GDPPCP} + 0.029 * \text{WATWASTE}$$

where

WATWASTE is the percentage of the population connected to a wastewater collection system; SANITATION_{imp} is the percentage of the population with access to improved sanitation; GDPPCP

Box 4.3 Estimating a nominal logistic model

In many situations, we wish to forecast the shares of population that fall into a finite set of categories. The logistic equation described in Box 4.2 is a special case, applicable when there are only two categories. When there are three or more categories, we can use a nominal logistic model for this purpose.

Assume that we have data showing the population divided into *m* categories, each representing a share *p* of the population, where the values of *p* sum to 1. Furthermore, assume that we wish to estimate a set of equations using a set of *n* explanatory variables.

We can estimate the values of *p* as:

$$p_i = \frac{s_i}{1 + \sum_{i=1}^{m-1} s_i} \quad \text{for i = 0 to m-1}$$

and

$$p_m = 1 - \sum_{i=1}^{m-1} p_i$$

where

$$s_i = e^{(a_i + \sum_{j=1}^{n} b_{i,j} * x_j)} \quad \text{for i = 0 to m-1}$$

where a_i and $b_{i,j}$ are estimated coefficients and x_j is the value of the explanatory variable.

The values for s_i can be shown to be the ratios of p_i to p_m, i.e., the ratios of the percentage of the population in category i to the percentage of the population in category *m*. The knowledge that the probabilities need to sum to 1 allows us to calculate one fewer equation than there are categories.

The resulting values of p_m will all fall between 0 and 1 and sum to 1. These are then multiplied by 100 in order to obtain values that range between 0 and 100 and sum to 100.

Table 4.3 Estimated coefficients in the nominal logistic models for access to water and sanitation in IFs

	Estimated coefficients				
Water	**Intercept**	**Educational attainment**	**Average income**	**Poverty**	**Public health expenditures**
s_0	0.47200933	-0.4414453	-0.7033376	0.0253734	-0.1616335
s_1	1.17414971	0.13867779	-1.1508133	0.01181508	-0.2769033
Sanitation					
s_0	0.73081107	-0.6420051	-0.4497351	0.02170283	-0.1562885
s_1	-2.1593291	0.22539909	-0.3555466	0.02823687	-0.1579957

Note: See Box 4.3 for a description of nominal logistic model. The three categories for access to improved water and sanitation are shown in Figure 4.6.
Source: Authors' estimates as represented in IFs Version 6.61.

is average income measured in thousand year 2000 dollars at purchasing power parity; POPURBANPCNT is the percentage of the population living in urban areas; and WATWASTETREAT is the percentage of the population whose wastewater is collected and subsequently treated.

Once again, this is a logistic equation. The percentage of the population whose wastewater is collected and subsequently treated increases with both average income and the percentage of the population with wastewater collection.

We use these access measures with our forecasts of population and average household sizes to then forecast the number of connections to water, sanitation, and wastewater treatment. Because of their different costs, we separately estimate the number of connections for each category of access to improved water and sanitation. We assume that the costs for connections to wastewater collection facilities are covered in the costs for improved sources of sanitation, so do not calculate a separate value for those connections. We do, however, include an additional cost for wastewater treatment.

There have been few forecasts of the area equipped for irrigation, and those that do exist tend to be based on very detailed analyses of specific situations. In a recent report from the United Nations Food and Agriculture Organization (FAO) looking out to the year 2050, Bruinsma (2011: 251) stated that the "projections of irrigation presented in this section are based on scattered information about existing irrigation expansion plans in different countries, potentials for expansion (including water availability) and the need to increase crop production." Another report looking at global agriculture over the next half century (Nelson et al. 2010), this one from the International Food Policy Research Institute, relies on exogenous assumptions of the growth in irrigated area. The authors do not specify the source of these assumptions, but some of the same authors (You et al. 2011) have reported on the irrigation potential for Africa, basing their conclusions on agronomic, hydrological, and economic factors.

Rather than attempt to replicate the level of detailed analysis of most previous studies, we forecast the area equipped for irrigation based on data from the FAO's FAOSTAT and AQUASTAT databases on historical irrigation patterns and the area that could potentially be equipped for irrigation.[19] These data are incomplete; for area equipped for irrigation, data are provided for 168 of the 183 countries included in IFs,

We forecast the area equipped for irrigation based on historical irrigation patterns and the area that could potentially be equipped for irrigation.

Box 4.4 The relationship between household sanitation connections and wastewater collection in historical data

We obtain data on access to improved drinking water and sanitation from the World Health Organization and United Nations Children's Fund Joint Monitoring Programme (JMP) for Water Supply and Sanitation Data and Estimates; the data originate from national and international surveys and are available at http://www.wssinfo.org/data-estimates/table/.

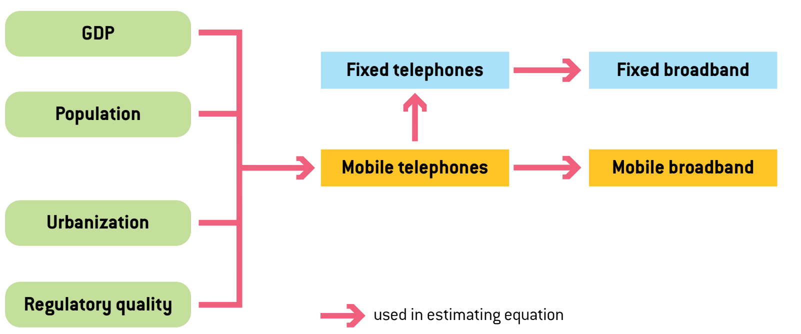
For wastewater collection and treatment, we take data from the Environmental Indicators Database of the United Nations Statistics Division (UNSD), Department of Economic and Social Affairs. The data are derived from UNSD/UNEP Questionnaires on Environment Statistics, the Organisation for Economic Co-operation and Development (OECD) /Eurostat Questionnaire on the State of the Environment, and the OECD Environmental Data Compendium, and are available at http://unstats.un.org/unsd/environment/qindicators.htm.

Unfortunately, the JMP no longer provides information on household connections to piped sewer systems separately from other types of improved sanitation. In order to address this issue, we compared the data on wastewater collection against those on access to improved sanitation. Of the 181 country-year pairs with data on both indicators, there were only 14 cases (covering 7 countries) where the value for wastewater collection exceeded that for access to improved sanitation. This supports the assumption that the percentage of the population with wastewater collection should not exceed that with access to improved sanitation. For the initialization of the model, therefore, we adjust the data on wastewater collection to match that of access to improved sanitation when the former exceeds the latter.

and for the potentially irrigable area, data are provided for 117 of 183 countries. In our examination of these historical data, we found that a number of countries had already reached an apparent plateau in the amount of area equipped for irrigation that was often well below the potential indicated. For example, Argentina's equipped area has stayed at a bit over 1.5 million hectares since the late 1970s, even though its potential is given as more than 6 million hectares. Why a country saturates below its ultimate potential is often unclear, but one obvious reason for some countries is that they receive enough rainfall to not warrant further irrigation.

As a result of this analysis, we assume that countries that appear already to have attained a level of saturation in their area equipped for irrigation will remain at their current level, even if this is below the potentially irrigable area. This applies to 67 countries. For the remaining countries, we extrapolate their recent growth in area equipped for irrigation, while not allowing them to exceed a specified level of saturation. If they do have a value for potentially irrigable area, we use this information and the current amount of equipped area to determine the saturation level. Specifically, the closer that a country's current equipped area for irrigation is to its potentially irrigable area, the closer we set its saturation level to the latter value. For those countries without data on potentially irrigable area, we arbitrarily assume a saturation level that is slightly above their current equipped area, taking into account their total agricultural area, which is also provided by the FAO datasets.

Figure 4.7 Structure of estimated equations for ICT infrastructure in IFs



Source: IFs Version 6.61.

The forecasted expected levels for additional areas equipped for irrigation and people with wastewater treated are passed to the IFs financial model directly. Physical connections for drinking water and sanitation, however, are generally attributed to households and not individuals, and our costs for them are per household. Therefore, in order to calculate those costs, we convert the forecasts of access to drinking water and sanitation from percentages of the population to numbers of people and then to numbers of households using country specific average numbers of persons per household, which are forecast elsewhere in the model.

Information and communication technologies

The most dynamic changes in infrastructure in recent years have been in the area of information and communication technologies (ICT). The rate of change in this sector, both qualitative and quantitative, presents a serious challenge to forecasting for all but the shortest time horizons. However, the importance of the sector means that it cannot be ignored. With that in mind, we forecast four basic indicators of ICT infrastructure: fixed telephone lines, fixed broadband subscriptions, mobile telephone subscriptions, and mobile broadband subscriptions, all per 100 persons (see again Box 2.5 on measuring ICT infrastructure).

Our forecasts for the different forms of ICT infrastructure are driven in part by cross-sectional relationships with a variety of socioeconomic drivers. As Figure 4.7 shows, however, there are also interactions among the different forms of ICT. We describe how we handle these interactions after presenting the cross-sectional relationships for each of the ICT forms in IFs.

The cross-sectional relationships for each of the forms of ICT in IFs follow below:

$$\text{INFRATELE} = 1.03 + 2.55 * \text{GDPPCP} - 0.03 * \text{GDPPCP}^2$$

$$\text{ICTMOBIL} = 43.94 + 23.92 * \ln(\text{GDPPCP}) + 1.41 * \text{GOVREGQUAL}$$

$$\text{ICTBROAD} = -12.58 + 2.53 * \ln(\text{GDPPCP}) + 6.50 * \text{GOVREGQUAL}$$

$$\text{ICTBROADMOBIL} = -21.83 + 9.14 * \ln(\text{GDPPCP}) + 9.36 * \text{GOVREGQUAL}$$

where

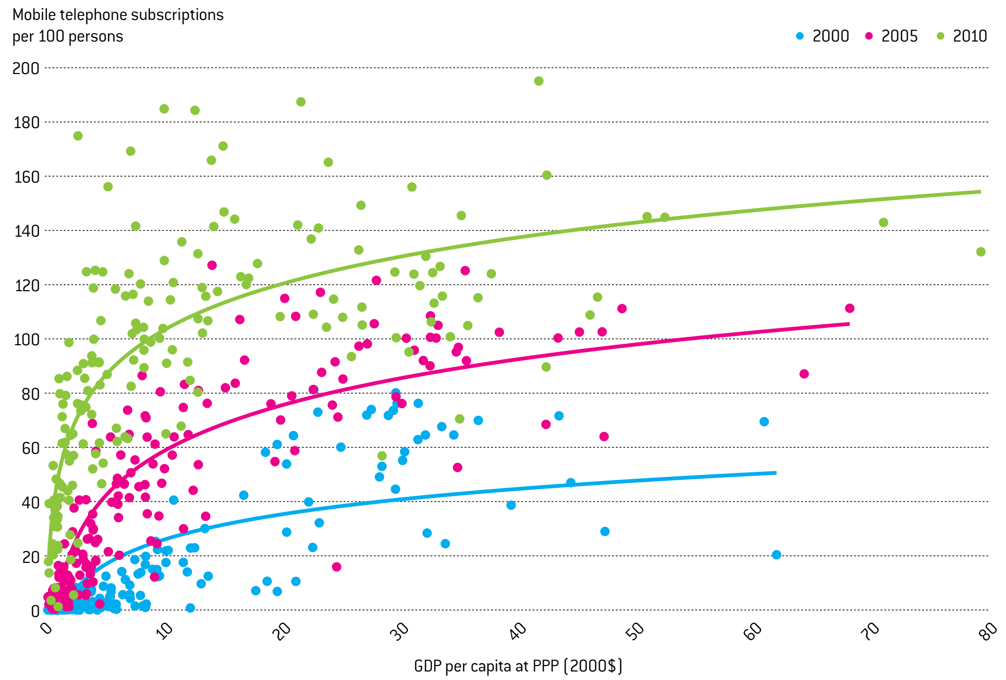
INFRATELE is fixed telephone lines per 100 persons; ICTMOBIL is mobile phone subscriptions per 100 persons; ICTBROAD is fixed broadband subscriptions per 100 persons; ICTBROADMOBIL is mobile broadband subscriptions per 100 persons; GDPPCP is average income measured in thousand year 2000 dollars at purchasing power parity; and GOVREGQUAL is a measure of governance regulatory quality developed as part of the World Bank World Governance Indicators project (Kaufmann, Kraay, and Mastruzzi 2010).

For each technology, we found strong relationships indicating that usage levels (our proxies in this case for access) increase with rises in average income and governance regulatory quality; in the case of fixed broadband, we also found urbanization to be important, as one might expect for a technology whose installation is supported by population density.

As for the interactions between the different forms of ICT, we start with fixed telephone lines. Given the potential for substitution by mobile telephone lines, we assume that the demand for fixed telephone lines will decline as mobile usage increases. Already we see this happening in the data, especially, but not exclusively, in high-income countries. Our analysis of the historical data indicates a level of approximately 30 mobile telephone subscriptions per 100 persons as the point at which fixed-line telephone decline begins, so we build this into our forecasts algorithmically. We do not expect that fixed telephone line usage will completely disappear. Rather, we assume arbitrarily that it will settle at a low level; this is set by default to 2.5 lines per 100 persons, but model users can change it. Furthermore, we also assume that: (1) mobile broadband subscriptions will never exceed mobile telephone subscriptions; and (2) any decline in fixed telephone lines will boost the growth in fixed broadband because countries that have existing investments in fixed-line infrastructure are able to leverage

For ICT, our forecasts of usage levels (a proxy for access rates) are based on income, governance regulatory quality, and in the case of fixed broadband, urbanization.

Figure 4.8 Changing relationship between mobile telephone subscriptions and average income over three points in time: 2000, 2005, and 2010



Source: IFs Version 6.61 using data from the World Bank World Development Indicators available at http://data.worldbank.org/data-catalog/world-development-indicators and the International Telecommunication Union World Telecommunication/ICT Indicators database available at http://www.itu.int/ITU-D/ict/statistics/.

We estimate infrastructure spending needs both for new construction and for maintenance and renewal of existing infrastructure.

these networks to provide broadband access with rather modest investments.

The cross-sectional relationships with income do not remain static across time for mobile phones, fixed broadband, and mobile broadband. Figure 4.8 shows this for mobile telephone subscriptions. The individual points reflect historical data for country access rates for the years 2000, 2005, and 2010. The lines are logarithmic curves fit through these data. The upward shift over time reflects advances in information and communication technologies that are making ICT cheaper and more accessible around the world. These advances are, in turn, driven by various systemic factors ranging from product and process innovation to network effects.[20]

In order to capture the effect of this rapid change in our forecasts of future access, we combine the use of the cross-sectional function with an algorithmic approach that simulates the upward shift of the curves for mobile phones, fixed broadband, and mobile broadband. The algorithmic element assumes a standard technology diffusion process in which the growth in penetration rate associated with the technological shift rises from a low annual percentage point increase at low levels of penetration to a maximum at the middle of the range (the inflection point) and falls again as saturation is approached (see Figure 4.9).[21] For each of the three technologies, we have looked at historical patterns to estimate the minimum and maximum growth rates, expressed as annual percentage points of absolute change. These are summarized in Table 4.4 and can be modified by the user.

Table 4.4 Minimum and maximum annual increases in ICT infrastructure in percentage points

	Minimum	Maximum
Mobile telephones	1.0	3.0
Fixed broadband	1.0	2.5
Mobile broadband	1.0	8.0

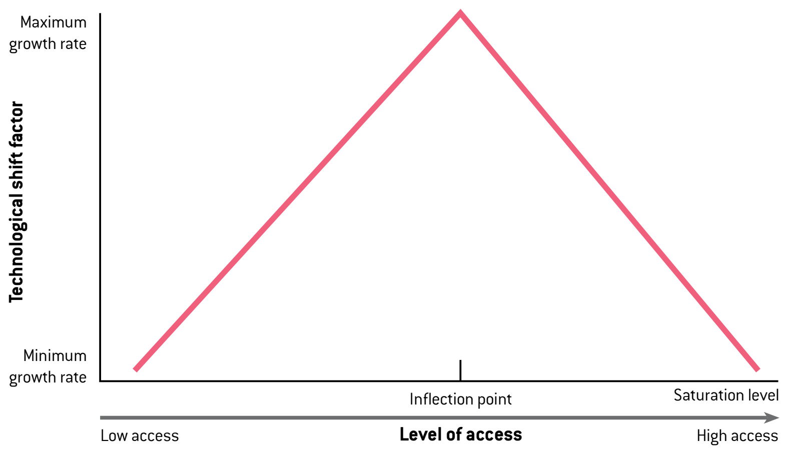
Note: The minimum increases effectively drop to 0 as penetration reaches saturation.

Source: IFs Version 6.61.

The choice of saturation levels is obviously quite important. Data from the International Telecommunications Union show penetration rates for mobile phones that exceed 100 subscriptions per 100 persons (e.g., approaching 200 in Hong Kong). At the same time, some countries (e.g., Denmark) seem to be reaching a saturation level for fixed broadband well below 100 subscriptions per 100 persons. Uncertainty remains over the proper level of saturation to assume for these subscriptions, and therefore, different researchers use different values. Specifically, we define saturation as 50 subscriptions per 100 persons for fixed broadband and 150 subscriptions per 100 persons for both mobile technologies.[22] In addition, we assume that mobile broadband penetration cannot exceed mobile phone penetration.

As with the other forms of infrastructure, prior to calculating financial forecasts, we convert the forecasted demand for the four indicators of ICT infrastructure, which are given in terms of per 100 persons, to actual numbers of subscriptions. In this case, this is done in a quite straightforward fashion by multiplying by total population divided by 100.

Figure 4.9 Determining the technological shift factor in IFs as a function of level of ICT access



Source: Authors' conceptualization.

Translating the expected levels of infrastructure into financial requirements

In estimating the financial requirements to achieve the expected levels of infrastructure, we adopt the approach introduced by Fay (2001) and Fay and Yepes (2003) described earlier. Recall that in this approach, there are two components to the financial requirements for each type of infrastructure each year. First there is the cost of maintenance/renewal of existing infrastructure. This is determined as a percentage of the "dollar value" of the existing infrastructure, where the dollar value is given as the amount of infrastructure at the start of the year multiplied by the infrastructure's unit cost. Second, there is the cost of new construction. This is calculated as the expected net change in the amount of physical infrastructure over the year multiplied by the same unit cost.

The annual maintenance/renewal percentages and unit costs are obviously key assumptions in the estimates of the financial requirements. Earlier we noted that there are a number of questions related to modeling unit costs for each type of infrastructure. Should they differ based on a country's political, economic, or geographic circumstances? Should they differ depending on the level of existing infrastructure? Should they differ depending on whether the investments are made by the public or private sector?

With a few exceptions noted in our discussion of other studies earlier in this chapter, most previous studies have held unit costs constant across countries, levels of infrastructure, and time. For this reason, as well as the lack of data needed to specify variable costs and the complications this lack would introduce to the analysis, we also assume temporally fixed and geographically universal unit costs by infrastructure type (one cost per infrastructure type).

The unit costs we use, expressed in constant dollars at year 2000 market exchange rates, are summarized in the third column of Table 4.5. The values reflect our judgment, informed by the previous studies discussed earlier in this chapter and summarized in this chapter's Appendix 4A.

The fourth column in Table 4.5 presents our Base Case assumptions for the average lifetimes of the various types of infrastructure, and the fifth column translates these into annual maintenance/renewal percentages. The average lifetimes were determined in the same way as the unit costs, and are also held constant across countries and time for similar reasons. The annual maintenance/renewal percentages are determined using the average lifetimes and assuming a simple exponential decay.[23]

We separate total funding requirements into public and private components.

Table 4.5 Unit costs, lifetimes, and public shares of funding by infrastructure type in IFs

Infrastructure type	Unit	Unit cost 2000$ per unit	Average lifetime (years)	Equivalent annual recurrent cost (Percent of stock value)	Public share (Percent)
Paved roads	Per kilometer	425,000	50	1.39	80
Unpaved roads	Per kilometer	40,000	10	6.93	80
Electricity connection – rural	Per connection	1,750	40	1.73	80
Electricity connection – urban	Per connection	850	40	1.73	80
Electricity generation capacity	Per kilowatt of added capacity	1,900	40	1.73	80
Irrigation	Per hectare	5,000	40	1.73	80
Improved water connection – piped	Per household connection	500	40	1.73	80
Improved water connection – other improved	Per person	45	20	3.47	80
Sanitation connection – improved	Per household connection	750	40	1.73	80
Sanitation connection – shared	Per person	95	20	3.47	80
Wastewater treatment	Per person	120	30	2.31	80
Fixed-line telephone	Per line	200	12.5	5.55	20
Fixed-line broadband	Per subscription	250	12.5	5.55	10
Mobile telephone	Per subscription	125	12.5	5.55	5
Mobile broadband	Per subscription	150	12.5	5.55	5

Note: Values are based on prior studies and authors' judgment. Unit costs are expressed in year 2000 dollars at market exchange rates (MER). Costs for electricity generation capacity include transmission and distribution. Unit costs for some countries are adjusted by a factor determined in the first year in order to balance government expenditures with historical data; these gradually converge to the values shown in the table.

Source: IFs Version 6.61.

There is no guarantee that requirements for infrastructure funds will match those made available; in the case of a funding shortfall, the forecasted levels of infrastructure will be constrained.

Finally, given that in the real world funding for infrastructure comes from both public and private sources, we wanted to separate the funding requirements into public and private components. More specifically for our purposes, the balancing of the financial requirements with the available resources included in IFs and described in the next section only considers the public sector. We assume a specific share of public and private funding for each type of infrastructure. This, in effect, implies that public spending on infrastructure leverages a certain amount of private spending. Again, these shares differ by type of infrastructure (note especially the far greater share of private spending associated with ICT than with the other core infrastructure types), but are constant across countries and time. The final column of Table 4.5 summarizes our assumptions about these shares. Our choices for these shares were based on limited historical data and our own judgment.

The IFs user can modify the assumptions on unit costs, infrastructure lifetimes, and public shares. In Chapters 5 and 6, we explore the sensitivity of many of our key results to variations in a number of these assumptions.

Balancing the financial requirements with available resources

There is no guarantee that the requirements for infrastructure funds will match those made available. In determining whether this is the case, we focus on the public spending for infrastructure. In IFs, government domestic revenues and net foreign aid are allocated between transfers (pensions and other social payments) and direct government spending. The latter is divided among broad categories—defense, education, health, research and development, basic infrastructure (those types represented explicitly in IFs), "other" infrastructure (see Box 4.5), and a residual category of other government spending. It is through this process of allocating government revenues that the amount of public funding for infrastructure ultimately is determined. The IFs model does allow some imbalance between revenues and total expenditures year to year, but neither debt nor surpluses can accumulate indefinitely; as their percentages of GDP change, signals adjust revenues and expenditures over time.

Once the total funds available for direct government spending are determined, they are compared to the total funding requirements across the various categories.[24] In the case of demand-supply mismatches, the default rule is to allocate the subtractions from, or additions to, specific categories based on their relative share of total funding requirements. It is also possible to prioritize funding for two specific categories—education and infrastructure—in the case of funding shortfalls.[25] In this case, the user-defined portion of the desired funding for the prioritized category or categories is funded first, up to the level of total government spending. Any remaining available government spending is then allocated proportionately to the remaining (unprioritized) portion of desired funding for these and the other categories.

Box 4.5 Public spending on "other" infrastructure

Our focus in this volume is on what we have called "core" infrastructure—roads, electricity generation, improved water and sanitation, and ICT—and on access to it. Although we do not represent other forms of infrastructure explicitly, we do estimate spending on them in order to avoid almost certainly underrepresenting the total demand for infrastructure. Based on historical data, we estimate that spending on "other" infrastructure gradually increases with average income from around 1.8 percent of GDP to 2.2 percent of GDP. Therefore, our forecasts also include a demand for funding for "other" infrastructure that is purely a function of GDP per capita.

Determining the forecasted levels of physical infrastructure actually attained

Once the total amount of public funding for infrastructure is determined, we can forecast the levels of infrastructure that will be attained. If there is a match between the estimated funding requirements and the estimated funding available, the process is fairly straightforward: the level of infrastructure constructed and maintained will be equal to the expected level of infrastructure. In the case where there is a demand-supply mismatch, the forecasting becomes more complicated.

In the case of a budget shortfall, we make three simplifying assumptions. First, we assume that all forms of infrastructure are affected equally; specifically, each receives the same proportionate cut in the amount of public funding received. Second, with the exception of ICT infrastructure (fixed and mobile telephones and broadband), we assume that the amount of private funding is reduced by the same proportion. This is based on our premise, stated earlier, that public funding for infrastructure leverages private spending, so less public funding also means less private spending. We make the exception for ICT because this is a less-tenable assumption for that sector given the degree to which private spending historically has driven ICT development. Specifically, private funding for ICT is not reduced even in the case of a reduction of public funding. Third, we assume that the reductions in funding affect spending on both maintenance and new construction equally.[26] The net result is that there will be less new construction of infrastructure than desired, as well as less maintenance of existing infrastructure. This can lead to an absolute decline in some forms of infrastructure when the new construction is not enough to make up for the amount of infrastructure lost due to inadequate maintenance.

When there is a budget surplus, the extra funds go to additional new construction because the maintenance/renewal requirements are already covered. The default is for the surplus to be spread across the different forms of infrastructure based on: (1) their initial share in public infrastructure funding; and (2) the distance from universal access. In some cases, however, the additional funds would result in illogical levels of access, such as more than 100 percent of the population having access to electricity. In such instances, the excess funds are redistributed to other forms of infrastructure. Private funding is not affected by increases in public funding from "surplus funds."

Finally, we recognize that, much like Rome, infrastructure is not built in a day. Nor is it built in a year. The appearance of new infrastructure generally reflects investment that has occurred over a number of years and, especially in the case of major water projects, even decades. The foundational patterns of our forecasts do not explicitly represent such delays, however, because for aggregate infrastructure categories in countries as a whole, it is reasonable to smooth both spending and construction completion patterns. In some cases, however, including scenario analyses like those of Chapter 6 in which infrastructure-related targets are pursued, we do forecast dramatic increases in funds being made available for infrastructure from one year to the next, reflecting a ramping up of infrastructure development. In these cases, we hold back a portion of the new funds being made available and gradually release the money over a number of years. In this way, we approximate the time lags in the conversion of spending on infrastructure to its actual attainment.

Estimating the economic, social, and environmental impacts of physical infrastructure

We described a number of the social, economic, and environmental impacts of infrastructure in Chapter 3. We divided these into impacts on economic growth, income distribution, health, education, governance, and the environment. Given the limited empirical support for many of these linkages and, thus, a high level of uncertainty about whether and how to represent them, we have limited our inclusion of direct links from infrastructure to the links from infrastructure to economic growth and health.[27] Important indirect linkages supplement the direct linkages that we describe here. For example, the forward linkages from economic growth to environmental impact (via paths such as increased energy use and food demand) and from improved health to demographic change are present in the current model. In fact, the indirect linkages via both of these paths are pervasive across the model.

Impacts on productivity and economic growth

We estimate the impact of infrastructure on economic growth through its effect on multifactor productivity. Most economic models relate aggregate growth to changes in factors of production, typically capital (K) and labor (L), and an additional component, which is variously called the Solow residual, the technological change parameter, total factor productivity (TFP) or multifactor productivity (MFP); here we use the MFP label. Analyses have long shown that MFP

While new infrastructure generally reflects investment that has occurred over a number of years or even decades, our forecasts do not explicitly represent such delays.

■ *The impact of infrastructure on multifactor productivity in IFs is a function of a composite index of physical infrastructure.* ■

can be quite large (Solow 1956; 1957).[28] Within IFs, we treat MFP as an endogenous variable that human capital, social capital, physical capital, and knowledge capital influence (B. Hughes 2007). Infrastructure is a key component of physical capital, along with natural resources. The impact of the latter is represented through the effect of energy prices on MFP.

In estimating the impact of infrastructure on MFP, we build on the insights of the studies reviewed in Chapter 3. First, we relate the impact to measures of physical infrastructure and not to measures of infrastructure spending. Second, because of the interaction effects across infrastructure types, we do not attempt to estimate the impact of individual forms of infrastructure but rather estimate the impact as a function of a composite index of infrastructure. Due to the very different historical and expected growth patterns of more traditional infrastructure—transportation, energy, and water—vis-à-vis ICT, however, we create a separate index for ICT and link it to MFP in a different way.

For the more traditional forms of infrastructure, we construct our composite index following the approach that Calderón and Servén (2010a) presented. We use the indicators shown in Table 4.6, which include a mix of measures of infrastructure quantity and quality (such as paved roads). A first step in index construction is to scale each measure by a meaningful factor, for example, population or land area; it obviously makes more sense to compare countries in terms of, for example, roads per person than total roads. Second, we normalize and standardize each indicator by taking the logarithm of the scaled measure, calculating the difference between this value and the mean value across countries, and then dividing the result by the standard deviation of these values across countries.[29] The mean value and standard deviation for each indicator are based on the country-level data for 2010, the base year of our model. A negative (positive) value of a transformed indicator implies that a country ranks below (above) the average country in 2010 for that indicator. For example, a country with a negative value for total roads per 1,000 persons in our forecast for 2030 would have fewer roads per person than the average country in 2010.

We then take a simple average of the resulting values for each transformed indicator in a category to calculate the index for that category.[30] The Transportation Index, for example, is calculated as one-quarter of the sum of the transformed values for total roads per 1,000 persons, total roads per 1,000 hectares, the Rural Access Index, and the percentage of roads paved. Finally, we calculate a simple average of the Transportation, Energy, and Water indices to produce the overall Traditional Infrastructure Index.[31] As with the transformed values of the individual indicators, the value of the overall index can be positive or negative, indicating how a country compares against the average country in 2010. The values of the overall index range from approximately -2 (Chad and Togo) to +1 (Sweden) in 2010. There is also a natural ceiling of approximately +1.2, as each of the components of the index has a clear upper limit (e.g., the access measures that cannot exceed 100 percent) or shows a clear pattern of saturation.

We use the overall Traditional Infrastructure Index to calculate the impact of traditional infrastructure on MFP in the same way as we do for most factors that influence MFP. As described by B. Hughes (2007: 15–16), we do this by comparing the value of the index for a country to a benchmark function that indicates what value we would expect to see

Table 4.6 Components of infrastructure indices in IFs

Traditional Infrastructure Index	
Transportation	Total roads per 1,000 persons
	Total roads per 1,000 hectares
	Rural Access Index
	Percentage of roads paved
Energy	Electrical generation capacity per capita
	Percentage of population with access to electricity (total)
	Transmission loss percent
	Ratio of electricity use to total primary energy use
Water	Percentage of population with access to improved water
	Percentage of population with access to improved sanitation
	Percentage of population with wastewater treatment
Modern Infrastructure Index	
ICT	Mobile phone subscription rate
	Fixed broadband subscription rate
	Mobile broadband subscription rate

Source: IFs version 6.61.

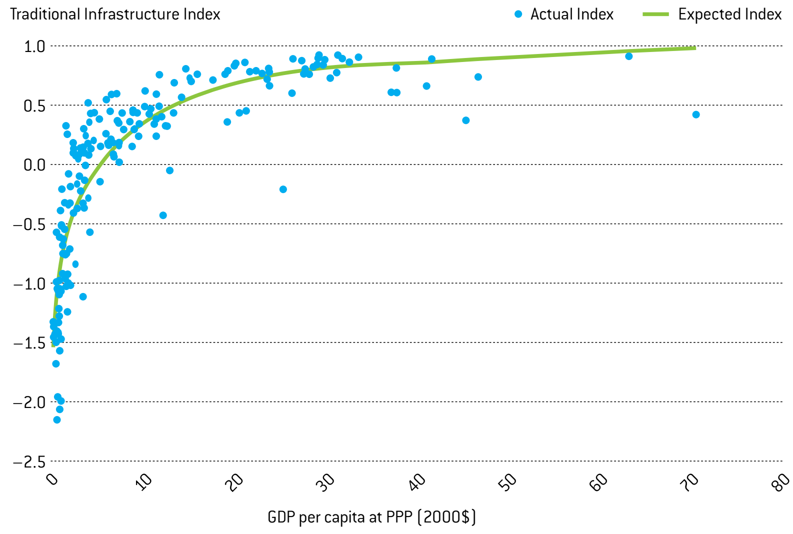
for a country given its current level of GDP per capita (see Figure 4.10). A country whose index falls above (below) the benchmark value receives a boost to (reduction from) its MFP. For example, Gabon and Latvia have similar levels of GDP per capita in 2010, but Latvia's Traditional Infrastructure Index falls well above the benchmark line, while Gabon's falls well below. Thus, the former will receive a boost to its MFP due to traditional infrastructure, while the latter will receive a reduction. The size of the boost or reduction depends on the distance from the benchmark value and a factor relating this distance to productivity. Calderón and Servén (2010a: i35) presented a value of 2.193 percentage points as their estimate of the increase in the annual average growth rate of GDP per capita associated with an increase of 1 unit in their index. Based on this, we use a default value of 2 percentage points for the effect of traditional infrastructure on MFP. Specifically, if the value of the Traditional Infrastructure Index for a country is a full point above its expected value in a given year, it would receive a 2 percentage point boost to its MFP, which roughly translates into the same increase in growth in GDP per capita, over the coming year.[32] The model user can change this value, allowing for exploration of the sensitivity of model results to the traditional infrastructure parameter.

When considering the impact of ICT infrastructure on MFP, however, this same structure runs into problems. Recall that our formulation for forecasting ICT infrastructure includes a technology shift factor. Therefore, any relationship between GDP per capita and the expected level of ICT would not remain stable over time; for example, a country with a GDP per capita of $5,000 in 2015 would be expected to have more ICT infrastructure than a country with a GDP per capita of $5,000 in 2010.

We therefore associate the growth contribution from ICT advances with annual changes in the ICT Index (see again Table 4.6), rather than with the level of the index as we do for traditional infrastructure. The ICT Index is an average of access rates for different kinds of ICT.[33] We multiply the annual unit change in the ICT Index by a factor representing the increase in MFP resulting from a unit change. Qiang, Rossotto and Kimura (2009: 45) estimated that each 10 percent increase in broadband penetration in developing countries increased the growth rate of per capita GDP by 1.38 percentage points (by 1.21 percentage points for developed countries) during the 1980 to 2006 period.[34] We arbitrarily reduce the impact by using a default and user-changeable parameter of 0.8 because our index is a mixture of several types of ICT infrastructures, not all of which might have as strong an impact on economic productivity as does broadband. Thus, a 10 point increase in the value of the ICT index would result in a 0.8 addition to MFP, or an approximate increase of 0.8 percent in GDP per capita.

There is one obviously questionable implication of this approach. When a country reaches saturation in the ICT Index, it will no longer receive a productivity boost from ICT. Given the current rapid increase in mobile telephones and mobile broadband that together make up two-thirds of the ICT Index, we see in most scenarios a near-term boost to MFP from ICT in much of the world, followed by little or no contribution later in the horizon. Our uncertainty with respect to appropriate treatment of the longer-term contribution of ICT points to one of the limitations of trying to forecast rapidly changing technologies.

Figure 4.10 IFs Traditional Infrastructure Index vs. GDP per capita: Benchmark function 2010



Note: The benchmark function is based on data from 2010, the base year of the model.

Source: IFs Version 6.61.

■ *IFs explicitly models the health impacts of unsafe water, sanitation, and hygiene, and also of indoor air pollution.* ■

Impacts on health

Chapter 3 reviewed many ways in which infrastructure can affect human health. We have chosen to limit our inclusion of these effects to a small set, specifically the impact of (1) unsafe water, sanitation, and hygiene directly on diarrheal diseases, and indirectly on diseases related to undernutrition; and (2) indoor air pollution on respiratory infections, such as pneumonia, and respiratory diseases, such as chronic obstructive pulmonary disease. These health outcomes are influenced directly by infrastructure via our measures of access to improved sources of drinking water and sanitation and the use of solid fuels in the home. These measures serve as proxies for the environmental health risks linked to infrastructure in IFs. We explored these effects in a previous volume in this series, *Improving Global Health* (B. Hughes, Kuhn, et al. 2011: 95–100), and have some confidence in the reasonableness of our results.

Since B. Hughes, Kuhn, et al. (2011: 44–47) presented in detail our approach for estimating the impact of these health risks and the approach has not fundamentally changed,[35] we provide only a brief overview here. In general, we compare the forecasted values of these infrastructure indicators to values that we would anticipate based only on income and educational attainment (distal drivers). If the estimated and expected values differ, we adjust the levels of mortality and morbidity for the associated diseases forecasted based only on the distal drivers. For example, if the levels of access to improved sources of water and sanitation are higher than expected, we reduce the mortality rate from diarrheal diseases. The amount by which the mortality rate is reduced is based on the analysis presented in the Comparative Risk Analysis work of the World Health Organization (Ezzati et al. 2004). This general approach, comparing forecasted values with expected ones and translating the difference into impact in a forward linkage, is fundamentally similar to the method described earlier in this chapter for linking infrastructure development and economic productivity.

Conclusion

Modeling the future of infrastructure presents many challenges. A comprehensive infrastructure forecasting system would include a representation not only of the expected levels of infrastructure, but also the ability for those expected levels to be met, and the socioeconomic and environmental impacts of building and maintaining infrastructure or of failure to do so. As we have seen, there are both theoretical and empirical (e.g., lack of good historical data) hurdles to clear in creating such a forecasting capability.

In fact, we are not aware of any previous attempt to model a fully integrated infrastructure system. Most work has focused solely on the expected levels of future infrastructure, often with some attention to the funding potentially needed to meet those expected levels, so as to alert policy makers to that need. Previous efforts do, however, help us understand some of the needed foundational elements. We have built on these efforts to implement a dynamic, integrated infrastructure model within the broader IFs system. This will allow us to explore more completely not only the likely, but also the more desirable, future patterns of infrastructure development and their two-way interaction with broader socioeconomic development.

We recognize that any model, ours included, simplifies reality. We do not cover all forms of infrastructure. In addition, our representations of the expected developmental pattern for infrastructure, the budgeting process, the actual construction and maintenance of infrastructure, and the forward linkages of infrastructure, are all subject to errors.

The role of infrastructure in development processes is too important for us to let the challenges deflect us from seeking to better understand its future, however. We therefore will move ahead in the next chapter to present a Base Case scenario of the availability of, and access to, infrastructure, as well as the associated costs. Chapter 6 will then consider the costs and benefits of more aggressive pursuit of infrastructure development than we will see in the Base Case.

1 For an introduction to the character and use of the model, see B. Hughes and Hillebrand 2006.

2 More technically, the model structure is recursive; that is, it computes equations sequentially in each time-step without simultaneous solution. It combines features of systems dynamics (notably, the accounting structures with careful attention to both flows and stocks) and econometrics (with estimated parameters specifying the dynamic behavior of the agent classes).

3 Bhattacharyay takes two approaches to forecasting expected levels and costs: a "top-down" approach that estimates national-level infrastructure based on population, GDP, and other characteristics; and a "bottom-up" approach for regional or international projects. His top-down approach follows a similar methodology to the other studies cited here.

4 An earlier version of WEM provided the electricity generation capacity forecasts for the Organisation for Economic Co-operation and Development *Infrastructure to 2030* study (Morgan 2006).

5 GISMO, in fact, directly uses the basic IFs economic model (Hilderink et al. 2008: 73–83).

6 G. Hughes, Chinowsky, and Strzepek (2009) used separate percentages to calculate replacement and maintenance.

7 These differences are much too large to be explained by the use of different base years (2005 for G. Hughes, Chinowsky, and Strzepek [2009] and 2009 for Kohli and Basil [2011]). In some cases, they are explained by inter-regional price differences and changes in technology; for example, ICT infrastructure costs have gone down substantially over time.

8 Kohli, Szyf, and Arnold (2012: 112) describe an update to the infrastructure model presented in Kohli and Basil 2011 in which they incorporate regional price level differences.

9 In developing this volume, we made significant changes in our approach to forecasting ICT. We also recognized the need to further develop the energy model within IFs, which remains to be completed. This raised questions about the relationships between ICT and energy efficiency and the relative costs of renewable energy. Consequently, those relationships have been removed for the time being.

10 Further details can be found in the IFs help system and in additional technical documentation on the infrastructure model, both of which are available at http://www.ifs.du.edu.

11 Not all countries have data for all indicators included in the model in the base year. IFs includes a preprocessor that uses a series of algorithms that draw on historical data for previous years, the estimated equations, and other factors to initialize these missing data.

12 Standard data sources, such as the World Bank World Development Indicators, provide financial variables at market exchange rates (MER), and therefore we use MER for economic accounting systems (including national revenues and expenditures) throughout the Ifs system. Causal relationships built across countries benefit, however, from the more accurate comparison of countries inherent in representations at purchasing power parity (PPP), and therefore we use PPP in estimations and forecasting of such causal relationships.

13 Ingram and Liu (1999: 17) found the elasticity between income density and total road density to be about 0.7. Thus a 10 percent increase in income density would yield a 7 percent increase in road density. Glover and Simon (1975: 464) find roughly the same elasticity of 0.7 between population density and total roads.

14 Total primary energy use is forecast elsewhere in IFs as the product of total GDP and energy use per unit GDP. Energy use per unit GDP decreases as a function of increasing per capita income, using a relationship derived from historical patterns. As with many other equations within IFs, the forecasts also include country-specific shift factors estimated from the differences between predicted and actual values in the base year.

15 The World Bank governance effectiveness measure ranges from -2.5 to +2.5, with a higher value indicating greater effectiveness. For our estimation and forecasts, we shift the scale to range from 0–5.

16 In estimating this ratio, we found that a significant fraction of the variation not explained by average income or electricity access was related to a country's energy production relative to its consumption, but that the direction of the effect depended on the type of energy produced. Large producers of fossil fuels (e.g., many Middle Eastern countries) use much less electricity than expected. Meanwhile, large producers of hydroelectric (e.g., Tajikistan) or other forms of renewable energy (e.g., Iceland), use much more electricity than expected. Given the extreme uncertainty in the expected changes in the shares of renewable and nonrenewable energy production in the future, we keep the fossil and non-fossil fuel shares of energy production constant over time.

17 It is possible to argue that we should use a logistic function here as the ratio of electricity use to total energy use must necessarily fall between 0 and 1. Because we know that there must be some energy loss in the transformation from primary energy to electricity, however, the maximum value for the ratio is some unknown value less than one. This unknown value makes the logistic formulation difficult to use. Fortunately, the logarithmic form behaves well, staying below 1 for even extreme values of the explanatory variables.

18 The World Bank governance regulatory quality measure ranges from -2.5 to +2.5, with a higher value being better. For our estimation and forecasts, we shift this scale to range from 0–5.

19 These are available at http://faostat3.fao.org/home/index/html and http://www.fao.org/nr/water/aquastat/main/index.stm, respectively. The area potentially equipped comes from country and regional studies that use inconsistent methods and consider different factors.

20 Kalba (2008) discusses this in great detail.

21 This would result in a standard S-shaped growth pattern over time in the absence of the growth expected from the changes in the explanatory variables in the cross-sectional functions.

22 For an example of a different assumption, see Kohli and Basil (2011: 78). They assume a saturation level of 250 mobile phone subscriptions per 100 persons in their forecasts.

23 This means that the annual maintenance/renewal percentage is calculated as the natural logarithm of 2 divided by the average lifetime.

24 The government budgeting submodel, representing all revenue and expenditure streams and their balancing over time, is part of the larger dynamic social accounting matrix structure of IFs (for more information, see B. Hughes and Hossain 2003).

25 Sixty percent of the desired education funding is protected in the IFs Base Case. While infrastructure funding is not protected in the Base Case, it can be protected in user-defined scenarios, and we do so in some of the explorations in Chapter 6.

26 A reviewer of a draft manuscript of this volume pointed out that infrastructure maintenance (other than wages and salaries of public sector workers) gets a much lower priority than new construction in most developing countries. Changing our assumption that expenditure reductions impact new construction and maintenance equally would change the breakdown between spending on new constructions and maintenance in our model, but would not affect the overall amount of infrastructure. This is because we define "maintenance" as being equivalent to renewal, and use the same unit cost (pro-rated over expected lifetimes for maintenance) as the basis for both new construction and maintenance. Furthermore, since we do not deal explicitly with the vintage and quality of infrastructure, other model results would not be affected.

27 In the development of IFs, we often include relationships that are quite obviously existent and important even when we do not have strong bases for specific formulations and parameters, because we believe that an explicit and rough estimate of such relationships is better than an implicit and clearly wrong omission of them. We expect over time to extend our infrastructure modeling to incorporate directly some of the relationships we have omitted here, including, for instance, the effects of rural roads on increasing educational enrollment rates and on reducing spoilage of agricultural products that otherwise cannot reach markets.

28 The estimate by Solow (1957: 320) that technical change accounted for 87.5 percent of growth in economic output per worker-hour in the United States from 1909–1949 focused the minds of everyone interested in growth on the Solow residual. From growth accounting estimates in four panels of countries, Barro and Sala-i-Martin (1999: 380–381) reported unweighted average estimates of TFP that were considerably lower, but still impressive: 40.7 percent for seven OECD countries from 1947–1973 (33.6 percent for the U.S.); 34.8 percent for the G-7 countries from 1960–1990 (13.2 percent for the U.S.); 24.3 percent for seven Latin American countries from 1940–1980; and 14.2 percent for four East Asian countries from 1966–1990. Even though it is generally understood that the productivity share of growth is lower in less developed countries than in OECD countries, it is clearly sufficiently high and variable to be an important factor in growth forecasting and development analysis.

29 Standardizing the data by dividing the difference from the mean by the standard deviation insures that changing the units of measures (e.g., from kilometers to miles) does not affect the results and creates comparability across measures.

30 This is slightly different from Calderón and Servén (2010a), who used the coefficients of the first principal component of their infrastructure variables as the weights in their index. Their weights were roughly similar to ours in any case.

31 One could imagine the use of a geometric mean for combination of individual indicators so as to represent some of the interaction effects across measures (Fleming and Wallace 1986); the use of logarithms in the transformation process for each indicator helps avoid the possibility that increases to extreme values on one infrastructure measure might be interpreted as comparably important as increases at more modest levels on a second measure.

32 The model represents interaction effects across the various contributions to MFP. Thus, in the absence of somewhat parallel advance in the MFP human capital and social capital terms, a very large increase from infrastructure development in the MFP physical capital term will have less impact on economic growth than such an increase in the context of more balanced development.

33 The subscriptions for mobile phones and mobile broadband are multiplied by 2/3 so that they range from 0 to 100 prior to taking the average of these and fixed broadband subscriptions.

34 Qiang, Rossotto and Kimura (2009) do not appear to take into account any delays in broadband's impact or changes in that impact over time, and neither do we.

35 While our approach has not fundamentally changed, we have updated it by: (1) using more detailed data from the WHO/UNICEF Joint Monitoring Programme; (2) reestimating the equations; and (3) renaming the water and sanitation categories to match similar changes recently made by JMP (see WHO and UNICEF Joint Monitoring Programme for Water Supply and Sanitation 2012).

Appendix 4A: Unit Cost Assumptions Used by Other Studies for Infrastructure Construction and Maintenance

As noted in the body of this chapter, the unit costs and annual maintenance/renewal rates assumed in previous studies that forecast infrastructure spending requirements can differ markedly. In this Appendix, we compile the various estimates we have found (listed by date of publication). Since the purpose of this review was to provide us with ballpark estimates, we have not tried to fully reconcile the differences across the studies. With the exception of G. Hughes, Chinowsky, and Strzepek, who provided us with detailed spreadsheets, the values in the tables are taken directly from the published papers cited. We encourage the interested reader to look at the original studies for further details on these assumptions.

Note that G. Hughes, Chinowsky, and Strzepek multiplied their unit costs by a country-specific building cost factor that ranged from 0.8 to 1.1; these are not shown in the tables. Also, while some studies did use different unit costs for different regions or over time for some forms of infrastructure, in most cases a single unit cost was provided for each form of infrastructure.

Roads

Table 4A.1 Unit costs used by other studies for building and maintaining paved roads

Study	Regional coverage	Unit of measure	Cost per unit of new construction	Annual recurrent cost per unit (Percent of stock value)
Fay (2001: 11)	Latin America	1995$ per kilometer	200,000	Not included
Fay and Yepes (2003: 10)	Global	1995$ per kilometer	410,000	2
Yepes (2005: no page number)	East Asia and Pacific	$ per kilometer	417,995	2
Chatterton and Puerto (2006: 7, 9–10)	South Asia	$ per kilometer	425,000	2
Yepes (2008: 7, 10, 11, 15)	Global	2005$ per kilometer	410,000	4 to 5
G. Hughes, Chinowsky, and Strzepek (values used in 2009 study; spreadsheet provided by authors)	Global	2005$ at PPP per kilometer	600,000	2
Asian Development Bank Institute (2009: 27–28) for new construction costs; Bhattacharyay (2010: 10) for annual recurrent costs	Central Asia, East Asia and Pacific, Southeast Asia	2008$ per kilometer	425,000	2
Kohli and Basil (2011: 96)	Latin America	2009$ per kilometer	895,000	2

Note: All values are in constant U.S. dollars, with currency year and whether based on purchasing power parity (PPP) or market exchange rates (MER) shown when specifically identified in the original source. Unit costs for roads are per one kilometer of two-lane road. In general, the unit costs for roads (both paved and unpaved) stem from the Road Costs Knowledge System, a database of country-specific roadwork costs and related data gathered and disseminated annually by the World Bank and available at http://go.worldbank.org/ZF1I4CJNX0. Most studies assume a single best-practice cost regardless of country or region. Maintenance costs for roads reflect only general upkeep and do not include costs associated with rehabilitation.

Table 4A.2 Unit costs used by other studies for building and maintaining unpaved roads

Study	Regional coverage	Unit of measure	Cost per unit of new construction	Annual recurrent cost per unit (Percent of stock value)
Yepes (2008: 7, 10, 11, 15)	Global	2005$ per kilometer	50,000	7.3
G. Hughes, Chinowsky, and Strzepek (values used in 2009 study; spreadsheet provided by authors)	Global	2005$ at PPP per kilometer	40,000	10

Note: See note accompanying Table 4A.1.

Electricity generation

Table 4A.3 Unit costs used by other studies for building and maintaining electricity generation capacity

Study	Regional coverage	Unit of measure	Cost per unit of new construction	Annual recurrent cost per unit (Percent of stock value)
Fay (2001: 11)	Latin America	1995$ per kilowatt	1,500	Not included
Fay and Yepes (2003: 10)	Global	1995$ per kilowatt	1,900	2
Yepes (2005: no page number)	East Asia and Pacific	$ per kilowatt	1,900	2
Chatterton and Puerto (2006: 7, 9–10)	South Asia	$ per kilowatt	1,900	3
Yepes (2008: 7, 10, 11, 15)	Global	2005$ per kilowatt	2,000	4
G. Hughes, Chinowsky, and Strzepek (values used in 2009 study; spreadsheet provided by authors)	Global	2005$ at PPP per kilowatt	1,500	2.5
Asian Development Bank Institute (2009: 27–28) for new construction costs; Bhattacharyay (2010:10) for annual recurrent costs	Central Asia, East Asia and Pacific, Southeast Asia	2008$ per kilowatt	1,900	2
Kohli and Basil (2011: 96)	Latin America	2009$ per kilowatt	4,000	2

Note: All values are in constant U.S. dollars, with currency year and whether based on purchasing power parity (PPP) or market exchange rates (MER) shown when specifically identified in the original source. Unit costs for electricity generation capacity include both the cost of increasing generation capacity by one kilowatt and the cost of distributing that kilowatt via associated transmission networks. The breakdown between generation and distribution costs varies slightly by study; in general, most studies, like Chatterton and Puerto (2006) and Kohli and Basil (2011), assume that generation represents 70 percent of the overall unit cost and distribution accounts for 30 percent. While Fay and Yepes (2003: 10) suggested that the breakdown depends on the technology used and the population density of the area in question, they generally assumed that generation capacity accounts for 60 percent of the unit cost, distribution 30 percent, and transmission 10 percent.

Table 4A.4 Unit costs used by other studies for building and maintaining household connections to electricity

Study	Regional coverage	Unit of measure	Cost per unit of new construction	Annual recurrent cost per unit (Percent of stock value)
G. Hughes, Chinowsky, and Strzepek (values used in 2009 study; spreadsheet provided by authors)	Global	2005$ at PPP per household connection	Urban: 850 Rural: 1,750	2.5

Note: All values are in constant U.S. dollars, with currency year and whether based on purchasing power parity (PPP) or market exchange rates (MER) shown when specifically identified in the original source.

Improved water and sanitation, wastewater treatment, and irrigation

Table 4A.5 Unit costs used by other studies for building and maintaining sources of improved water and sanitation

Study	Regional coverage	Unit of measure	Cost per unit of new construction	Annual recurrent cost per unit (Percent of stock value)
Fay and Yepes (2003: 10)	Global	1995$ per connection	Water 400 Sanitation: 700	3
Yepes (2005: no page number)	East AsiaPacific	$ per connection	Water 400 Sanitation: 700	3
Ashley and Cashman (2006: 253)	High-income countries	$ per person	Water supply: 450–1800 Sewage disposal: 650–2200	Not provided
Chatterton and Puerto (2006: 7, 9–10)	South Asia	$ per connection	Water: 400 Sanitation: 700	3
Yepes (2008: 7, 10, 11, 15)	Global	2005$ per person	Water, urban: 80 Water, rural: 150 Sanitation: 150	3
G. Hughes, Chinowsky, and Strzepek (values used in 2009 study; spreadsheet provided by authors)	Global	2005$ at PPP per connection	Water: 600 Sanitation: 2000	Water: 2.5 Sanitation: 1.67
Asian Development Bank Institute (2009: 27–28) for new construction costs; Bhattacharayay (2010: 10) for annual recurrent costs	Central Asia, East Asia and Pacific, Southeast Asia	2008$ per connection	Water: 400 Sanitation: 700	3
Kohli and Basil (2011: 96)	Latin America	2009$ per person	Water: 101 Sanitation: 176	3

Note: All values are in constant U.S. dollars, with currency year and whether based on purchasing power parity (PPP) or market exchange rates (MER) shown when specifically identified in the original source. Throughout the table, unit costs are per household connection except where otherwise noted. The study by Ashley and Cashman includes only centralized systems in developed countries (including centralized waste treatment systems), and it is not clear whether the study includes construction and maintenance or just construction.

Table 4A.6 Unit costs used by other studies for wastewater treatment

Study	Regional coverage	Unit of measure	Cost per unit of new construction	Annual recurrent cost per unit (Percent of stock value)
Yepes (2008: 7)	Global	2005$, per person	120	3

Note: All values are in constant U.S. dollars, with currency year and whether based on purchasing power parity (PPP) or market exchange rates (MER) shown when specifically identified in the original source.

Table 4A.7 Unit costs used by other studies for building and maintaining irrigation

Study	Regional coverage	Unit of measure	Cost per unit of new construction	Annual recurrent cost per unit (Percent of stock value)
Inocencio et al. (2007: 18)	Developing countries in East Asia, Latin America and the Caribbean, Middle East and North Africa, South Asia, Southeast Asia, and Sub-Saharan Africa	2000$ per hectare	ALL: 8,213 (4,785) East Asia: 8,221 (4,101) Latin America and Caribbean: 4,903 (3,663) Middle East and North Africa: 6,590 (8,464) South Asia: 3,393 (2,526) South East Asia: 9,709 (3,861) Sub-Saharan Africa: 14,455 (5,726)	Not provided

Note: All values are in constant U.S. dollars, with currency year and whether based on purchasing power parity (PPP) or market exchange rates (MER) shown when specifically identified in the original source. Values in parentheses are for "successful" projects, where success was defined by the economic internal rate of return. Inocencio et al. also looked in some detail at what influences unit costs. Among their basic findings were that: unit costs for new construction have not changed over time but have declined for rehabilitation; larger projects have a lower unit cost; more government support leads to lower unit costs; and higher GDP per capita leads to higher unit costs (and is also associated with greater failure of projects).

ICT

Table 4A.8 Unit costs used by other studies for building and maintaining fixed telephone lines

Study	Regional coverage	Unit of measure	Cost per unit of new construction	Annual recurrent cost per unit (Percent of stock value)
Fay (2001: 11)	Latin America	1995$ per subscription	1,000	Not included
Fay and Yepes (2003: 10)	Global	1995$ per subscription	400	8
Yepes (2005: no page number)	East Asia and Pacific	$ per subscription	China: 451 in 2000, 210 in 2005, 96 in 2010 Rest: 451 in 2000, 280 in 2005, 127 in 2010	8
Chatterton and Puerto (2006: 7, 9–10)	South Asia	$ per subscription	400 for 2000–2004, 280 for 2005–2009, 261 for 2010 onward	8
Yepes (2008: 7, 10, 11, 15)	Global	2005$ per subscription	127–580 (varies by region)	Not provided
G. Hughes, Chinowsky, and Strzepek (values used in 2009 study; spreadsheet provided by authors)	Global	2005$ at PPP per subscription	2,000	2.5
Asian Development Bank Institute (2009: 27–28) for new construction costs; Bhattacharyay (2010: 10) for annual recurrent costs	Central Asia, East Asia and Pacific, Southeast Asia	2008$ per subscription	280 for 2006–2010, 261 for 2011–2015	8
Kohli and Basil (2011: 96)	Latin America	2009$ per subscription	160	8

Note: All values are in constant U.S. dollars, with currency year and whether based on purchasing power parity (PPP) or market exchange rates (MER) shown when specifically identified in the original source.

Table 4A.9 Unit costs used by other studies for building and maintaining fixed broadband access

Study	Regional coverage	Unit of measure	Cost per unit of new construction	Annual recurrent costs per unit (Percent of stock value)
Kohli and Basil (2011: 96)	Latin America	2009$ per subscription	40	8

Note: All values are in constant U.S, dollars, with currency year and whether based on purchasing power parity (PPP) or market exchange rates (MER) shown when specifically identified in the original source.

Table 4A.10 Unit costs used by other studies for building and maintaining mobile phone access

Study	Regional coverage	Unit of measure	Cost per unit of new construction	Annual recurrent cost per unit (Percent of stock value)
Fay and Yepes (2003: 10)	Global	1995$ per subscription	700 in 2000; 580 after 2005	8
Yepes (2005: no page number)	East Asia and Pacific	$ per subscription	China: 210 in 2000, 80 in 2005, 96 in 2010 Rest: 280 in 2000, 185 in 2005, 127 in 2010	8
Chatterton and Puerto (2006: 7, 9–10)	South Asia	$ per subscription	280 for 2000–2004, 185 for 2005–2009, 127 for 2010 onward	8
Yepes (2008: 7, 10, 11, 15)	Global	2005$ per subscription	127–451 (varies by region)	Not provided
Asian Development Bank Institute (2009: 27–28) for new construction costs; Bhattacharyay 2010: 10) for annual recurrent costs	Central Asia, East Asia and Pacific, Southeast Asia	2008$ per subscription	185 for 2006–2010, 127 for 2011–2015	8
Kohli and Basil (2011:96)	Latin America	2009$ per subscription	111 up to 30% saturation, falling linearly to 45 at full saturation	8

Note: All values are in constant U.S. dollars, with currency year and whether based on purchasing power parity (PPP) or market exchange rates (MER) shown when specifically identified in the original source.

Appendix 4B: Additional Details of the Statistical Analysis Underlying the Estimated Equations for Physical Infrastructure and Access

This appendix provides some additional details about the statistical analyses underlying the estimated equations for physical infrastructure and access that appear in the body of this chapter.

When data for multiple years were available, we used pooled cross-sectional data to estimate causal relationships. Otherwise, we used the most recent data available for each country. Certain theoretical considerations, along with our exploration of the historical data, led us to use a variety of functional forms in our estimated equations. A number of variables have values that have natural minimums and maximums. For example, the percentage of roads that are paved should always be between 0 and 100 percent. In other cases, such as access to improved sources of water, we knew that the sum of the percentages of population in each category needed to add to 100. Finally, even where there was not an obvious limit (for example, for roads per unit area), an examination of the historical data showed that the relationships between the dependent and independent variables were obviously non-linear. Thus, we forecasted our range of variables using a variety of functional forms and statistical techniques that refleced these various considerations. Some of the more important functional forms and statistical techniques are summarized in table 4B.1.

Table 4B.1 Additional details on the estimated equations for physical infrastructure and access in IFs

Predicted variable	Data for estimation	Model fitted	R-squared
Roads per unit area	Pooled cross-section	Ordinary least squares	0.79
Percentage of roads that are paved	Pooled cross-section	Ordinary least squares	0.45
Rural access index	Cross-section	Ordinary least squares	0.51
Electricity access	Cross-section	Generalized linear model	rural 0.77 urban 0.68
Ratio of electricity use to total energy demand	Cross-section	Ordinary least squares	0.65
Electricity transmission and distribution loss	Pooled cross-section	Ordinary least squares	0.85
Solid fuel use in the home	Cross-section	Generalized linear model	0.81
Access to improved drinking water	Pooled cross-section	Nominal logistic	0.85
Access to improved sanitation	Pooled cross-section	Nominal logistic	0.87
Percentage of population whose wastewater is collected	Pooled cross-section	Ordinary least squares with country random effect	0.34
Percentage of population whose wastewater is treated	Pooled cross-section	Generalized linear model	0.59
Fixed telephone lines per 100 persons	Cross-section	Ordinary least squares	0.70
Mobile telephone subscriptions per 100 persons	Cross-section	Ordinary least squares	0.53
Fixed broadband subscriptions per 100 persons	Cross-section	Ordinary least squares	0.74
Mobile broadband subscriptions per 100 persons	Cross-section	Ordinary least squares	0.70

Note: The R-squared is only a proper measure of fit for models using ordinary least squares without fixed or random effects. Where we fit models using other methods, the values presented are the R-squares for a fit of the predicted values against the actual values.

Source: Authors' calculations.

5

Infrastructure Development and Spending in the IFs Base Case

Countries do not proceed at a consistent pace toward improved infrastructure. Consider China, whose recent story of infrastructure development is one of superlatives.[1] By 2010, China had 1,194 kilometers of high-speed railroad (already nearly half that of Japan, the world's leader), and a stunning 9,032 kilometers under construction. Even given setbacks associated with safety on the rail network, the strength of China's high-speed lines in the future is clear. Highway construction has also proceeded at a blistering pace, increasing 30-fold since 1951 to create a total road length in 2011 of 4.2 million kilometers and over 83,230 kilometers of expressway. Remarkably, 97 percent of China's rural population now lives within two kilometers of an all-season road. In yet another arena, we estimate that in 2012 China overtook the United States to become the world leader in electrical generation capacity. With the main structure of the Three Gorges Dam completed in 2006, China has the largest power station in the world. About 90 percent of China's population now has access to improved water and 65 percent to improved sanitation, compared to just 67 and 24 percent in 1990. And finally, access to mobile phones is already approaching universality.

China's dramatic rate of infrastructure development in recent decades compares with slower rates of development in India, the other Asian giant, with the result that China has surpassed India in most measures of infrastructure stocks and infrastructure access. India is still planning the development of its first high-speed rail lines, for example, and is quite slowly building out its 3,633 kilometer-long Golden Quadrilateral expressway to link Delhi, Mumbai, Chennai, and Kolkata. Further, although India's overall road density relative to land area is about three times that of China's, 70 percent of India's rural population (compared to 97 percent in China) lives within two kilometers of an all-season road. And finally, while about 90 percent of the populations of both countries have access to sources of improved water, India's access rate to improved sanitation facilities is only about 35 percent (compared to China's 65 percent). As in China, India's rate of mobile phone access is rapidly approaching universality, reflecting the recent dramatic growth in mobile telephony throughout the developing world.

The differences between China and India do not mean that India is not making progress with respect to infrastructure development, but rather that China has improved its infrastructure at an extraordinary rate in recent decades. Unique circumstances have made China's leap possible (in particular, a policy-driven focus on infrastructure development by China's centrally controlled government).

Inernational Futures (IFs) and other large-scale modeling systems are not capable of forecasting just where and when such "take-offs" might occur. We have much reason to believe, however, that countries tend to follow generally comparable paths toward development of infrastructure over the long run, especially as their incomes rise, and these paths are reflected in the IFs Base Case. Such paths, and changes in the driving variables that underlie them, allow us to explore questions about the future of infrastructure across individual countries and globally. For example, how will the world's road networks evolve? How much more electricity generation capacity will there be? How will peoples' access to clean water and sanitation change over time? Will information and communication technologies continue to become increasingly pervasive?

As we try to answer these questions for countries around the world, we would expect—given the generally comparable paths and broader patterns that are the foundation of our Base Case—that the current infrastructure gaps between the two Asian giants may begin to narrow at some point in our forecast horizon and, more generally, that low- and especially middle-income countries will become more like high-income ones. But how rapidly might such convergence happen?

Any pattern of convergence will depend on financing. So there is another critical question for us: how much will it cost to build and maintain likely infrastructure development? Not counting transfer payments to households, the governments of the world today spend most of their resources in four general categories—defense, health, education, and infrastructure. In the global aggregate, these numbers are 2.7 percent of GDP on defense, 5.4 percent on health, 3.9 percent on education, and 3.4 percent on infrastructure.[2] Given their focus on catching up, it is not surprising that low-income and lower-middle-income countries spend at a higher rate on infrastructure—we estimate public spending of about 5.8 percent of GDP in each of those two groupings, compared to only 2.6 percent in high-income countries.[3] These are difficult rates for developing countries to maintain. Mobilizing private spending on top of such public rates is also not simple. To what extent will financial constraints restrict the ability of countries to meet the demand for infrastructure?

Our exploration of all these questions begins with a reference, or Base Case, scenario. The Base Case is a scenario portraying an internally consistent and reasonable dynamic evolution of current trends and typical patterns of development across countries. Unlike many previous studies, which only estimated the demand for infrastructure, this study focuses on the path jointly determined by both the demand for infrastructure and the funding available for it. Thus, the actual amount of infrastructure forecast will reflect fiscal constraints. This will be important to remember when we compare our results later in the chapter against other studies that did not explicitly consider such constraints.

We are also interested in how our forecasts compare to various formal and informal infrastructure goals and targets. Given the aspirational and generally aggressive nature of such targets, it would not surprise us if they are not met in a considerable number of countries in our Base Case, which does not presume any special effort to accelerate the development of infrastructure. In Chapter 6, we explore what countries would have to do to meet such targets, and what the broader developmental implications of doing so might be.

We are able to present only a subset of the results from our Base Case in the body of this report. The tables at the end of this volume provide more detailed information for the 183 countries included in the IFs system.

Despite unique current circumstances and past infrastructure trajectories across countries, there are broad patterns over time that support our exploration of infrastructure futures.

The IFs Base Case is a reference scenario portraying a reasonable and internally consistent dynamic evolution of trends and typical patterns of development across countries.

The IFs forecasts for population, GDP per capita, and educational attainment are foundational underpinnings of its infrastructure forecasts.

Base Case Results

Introducing the IFs Base Case

The IFs Base Case scenario is the output of the fully integrated IFs system. It is not a simple extrapolation of variables, but rather a dynamic, nonlinear depiction of the future given the structure of the model and our Base Case assumptions about model parameters. Because the IFs system represents multiple issue areas (see again Figure 4.2), infrastructure variables respond to changes in all areas of the model, including demographics, economics, and education, and in turn, recursively affect variables throughout the model. Among the most obvious consequences of this integration are that changes in infrastructure result in changes in population and GDP, which can either accelerate or retard further changes in infrastructure outcomes via positive and negative feedbacks.

The forecasts that IFs produces of key variables, such as population (total and urban), GDP per capita, and educational attainment, are thus foundational underpinnings of its infrastructure forecasts. B. Hughes et al. (2009: 56–71) explored the IFs forecasts of such variables, comparing them to other forecasts such as those of the United Nations Population Division and the International Monetary Fund. As a general rule, the IFs Base Case produces behavior that tends to be quite similar to medium variant or reference forecasts of such analyses (see also B. Hughes 2004a and B. Hughes and Hillebrand 2006).

The current starting year for IFs forecasts is 2010.[4] To the extent that historical data exist, all variables are assigned actual values for that year. For other data, we estimate 2010 values based either on recent country-level data and trends or cross-sectional relationships as described in Chapter 4. All values for future years are forecast by the model, so they may not match the most recent historical data (2011 or 2012) exactly. For the purposes of this volume, the forecast horizon extends through 2060.

Table 5.1 summarizes the population and GDP per capita growth rates forecast in the Base Case for the world as a whole and for income class and regional groupings (see again Box 2.1 on the country groupings). Remember that these are determined within the model; they are not exogenous assumptions. The results highlight faster population growth rates in the poorer countries and in sub-Saharan Africa in particular; however, all regions are likely to see their population growth rates slow in the later years, with two developing regions (East Asia and Pacific and Europe and Central Asia) experiencing absolute decreases. Despite the slowing of population growth rates, overall

Table 5.1 Annual population and GDP per capita growth rates in the IFs Base Case

	Population growth rates		GDP per capita growth rates	
By income group	**2010–2030**	**2030–2060**	**2010–2030**	**2030–2060**
Low-income countries	2.05	1.45	3.23	3.71
Lower-middle-income countries	1.31	0.70	3.64	2.93
Upper-middle-income countries	0.44	-0.11	3.34	2.36
High-income countries	0.35	0.01	1.13	1.09
By region, developing countries only				
East Asia and Pacific	0.49	-0.13	4.15	2.83
Europe and Central Asia	0.08	-0.23	2.26	1.08
Latin America and the Caribbean	0.95	0.33	2.05	1.42
Middle East and North Africa	1.46	0.75	1.79	1.34
South Asia	1.19	0.57	4.36	3.37
Sub-Saharan Africa	2.32	1.66	2.61	3.11
World	**0.96**	**0.49**	**1.89**	**1.73**

Notes: Growth rates are expressed in percentages; GDP per capita is measured using purchasing power parity.

Source: IFs Version 6.61.

population size will continue to increase, and associated with that increase is continued urbanization (not shown in Table 5.1). Globally, the urban share of total population is forecast to grow from just over 50 percent in 2010 to nearly 70 percent in 2060, reflecting increases in all income groups and regions. East Asia and Pacific (which includes China) and South Asia (which includes India) have the fastest growth in GDP per capita, at least in the period out to 2030. With the notable exception of the low-income economies, this growth also slows later in the horizon.

Stocks of infrastructure

Increases in physical stocks of infrastructure are a primary pillar for increasing infrastructure access (with attention to distribution being the other major pillar). In Chapter 2, we reviewed how the total stock of infrastructure has grown in recent decades. We forecast this growth to continue over the next half century as the world strives to meet the needs of its existing and growing population. At the same time, we start to see some hint of leveling off closer to the end of this period, as economic and population growth slow (see again Table 5.1) and many countries reach levels of saturation in certain forms of infrastructure (Table 5.2 displays global stocks of infrastructure in 1990, 2010, and forecast for 2060, while Figure 5.1 (p. 116) emphasizes the magnitude of change over the forecast period).

The most spectacular growth, particularly over the next decade, will be in mobile and fixed broadband subscriptions (see Figure 5.1 inset), followed in terms of growth rates by the completion of the rapid movement toward nearly universal mobile phone subscriptions. We anticipate that ICT growth rates will be especially high, partly because of relatively low current base levels, but, significantly, also because of their rapid increase toward saturation levels in recent years (see again Figure 5.1). Meanwhile, more established forms of infrastructure will likely experience steady but less dramatic growth. By 2060, electricity generation capacity and connections to improved sanitation, for example, increase by 250 and 240 percent, respectively, in the Base Case, while household connections to electricity and the length of paved roads more than double and connections to improved sources of water almost do so. The area equipped for irrigation increases only by about 20 percent, reflecting the inherent limitations imposed by water availability and land suitability. Meanwhile, the length of unpaved roads falls by about 15 percent, as the addition of new unpaved roads is slower than the rate at which currently unpaved

We expect that the most spectacular growth in infrastructure will be in mobile and fixed-line broadband subscriptions.

Table 5.2 Global stocks of infrastructure: 1990 actual, 2010 estimate, and 2060 Base Case forecast

Infrastructure category	Units of measurement	1990	2010	2060	Ratio of 2060 to 2010
Roads, unpaved	Million kilometers	10.66	14.46	12.39	0.86
Roads, paved	Million kilometers	14.92	20.58	43.74	2.12
Electricity generation capacity	Gigawatts	2,763	4,986	12,818	2.57
Electricity connections	Million connections	N/A	1,463	2,897	2.08
Irrigated acreage	Million hectares	252	313	373	1.19
Improved water	Million improved connections	879	1,592	2,959	1.86
Improved sanitation	Million improved connections	618	1,219	2,726	2.40
Fixed-line telephones	Million lines	517	1,184	323	0.27
Mobile telephones	Million subscriptions	12	5,334	14,873	2.79
Fixed-line broadband	Million subscriptions	N/A	525	4,644	8.84
Mobile broadband	Million subscriptions	N/A	893	14,586	16.33

Note: Recall that improved water includes piped water to a yard or plot, pubic taps or standpipes, tubewells, boreholes, protected dug wells, and protected springs in addition to household connections to piped water. Flush toilets, piped sewer systems, septic tanks, improved pit latrines, and composting toilets constitute improved sanitation facilities. The earliest year for which data on broadband exist is 1998.

Source: IFs Version 6.61.

■ The bulk of growth in physical infrastructure in the Base Case occurs in the developing world. ■

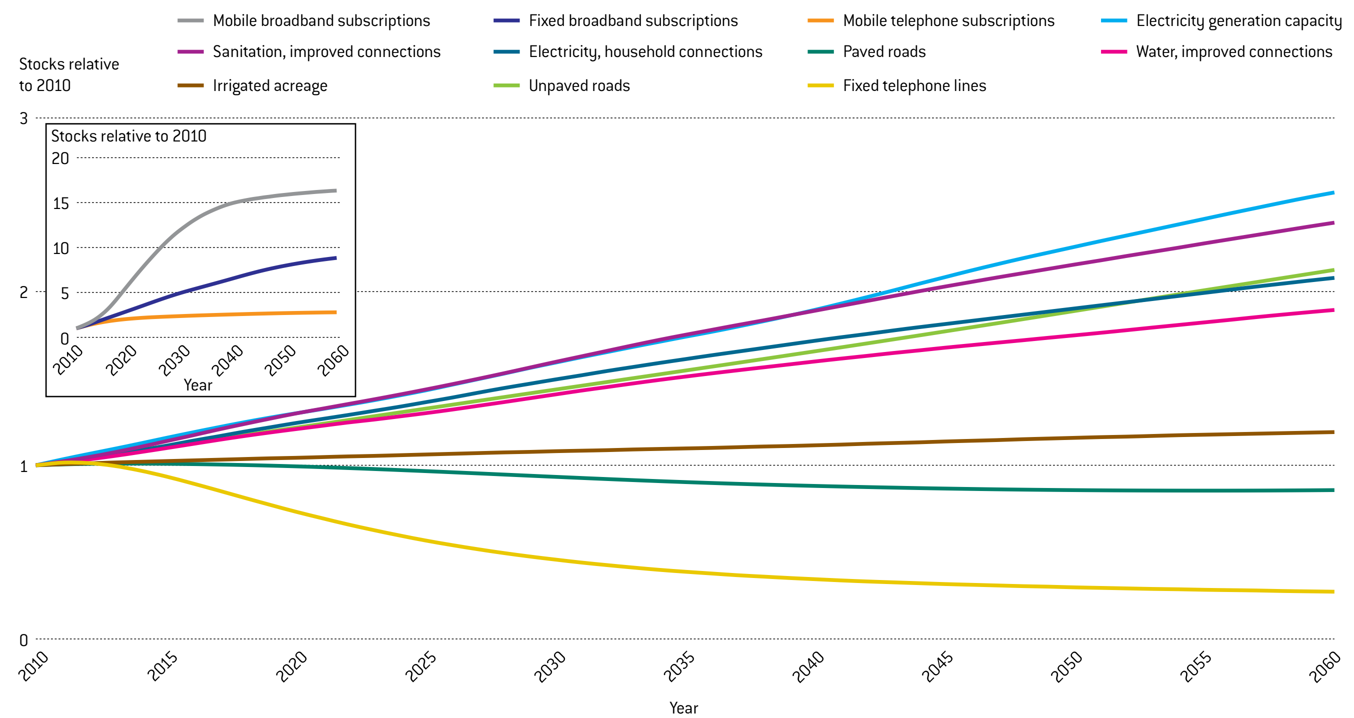
roads are paved. Finally, while not completely disappearing, the number of fixed telephone lines will gradually fall as they are replaced by newer technologies.

In our Base Case forecast, the bulk of infrastructure stock growth occurs in the developing world. Figure 5.2 illustrates this for electricity generation capacity. In 1980, 80 percent of global capacity was in high-income economies. This fell to 53 percent in 2010 and is forecast to be only 29 percent in 2060. Meanwhile, the share held by the upper-middle-income economies surges from 15 percent in 1980 to a forecast of 43 percent in 2030, and should remain at a similar percentage in 2060. The low-income and lower-middle-income economies will continue to see their shares increase over the full forecast horizon, though the former are forecast to still have only 4 percent of the global electricity generation capacity in 2060.

On a regional basis, East Asia and Pacific and South Asia have seen, and will continue to see, the greatest increases in their percentages of global electricity generation capacity. Sub-Saharan Africa's share also continues to grow, albeit from a very small base. Meanwhile, we foresee little or no growth in the global shares held by the Middle East and North Africa, Latin America and the Caribbean, and the developing countries of Europe and Central Asia, even as their absolute capacity increases.

This pattern of more rapid growth in electricity infrastructure in the developing economies also occurs in other forms of infrastructure and reflects the more rapid population and economic growth forecast for these countries compared to the developed economies (see again Table 5.1). It obviously also reflects the much greater "headroom" that they have to build out their infrastructure so as to meet the needs of existing populations who currently have no access to electricity and other modern infrastructure and, as we will see, it also reflects the greater proportion of GDP they devote to doing so.

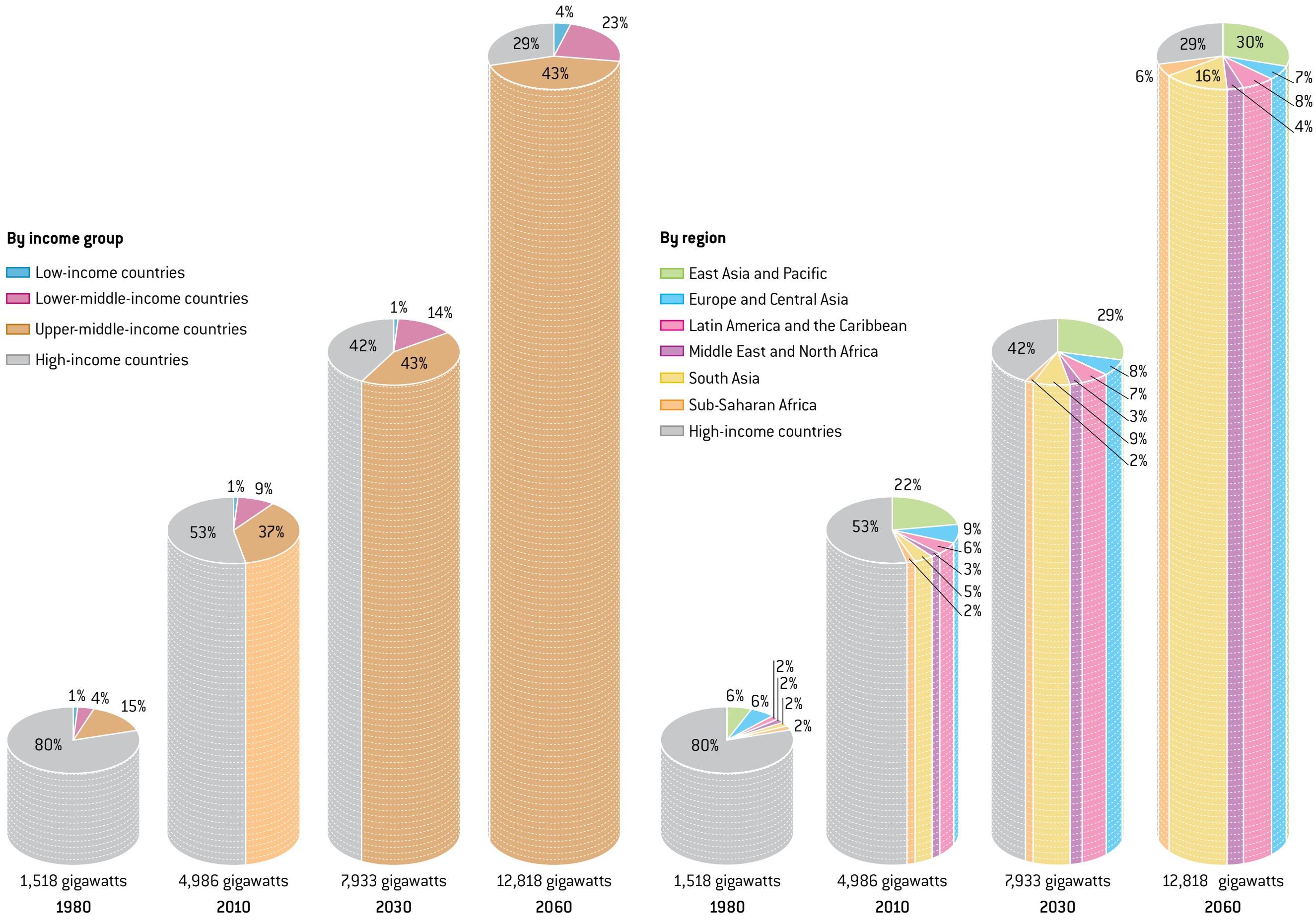
Figure 5.1 Global change in total stocks of infrastructure: Forecast values relative to 2010



Note: Values are ratios of forecasted future stock levels to those in 2010, and infrastructure types are listed in the legend from left to right according to magnitude of change (greatest increase to largest decrease). The large figure includes all of the listed infrastructure types except mobile phones and mobile and fixed broadband, which are shown instead in the inset figure. The inset uses a different scale to reflect our forecast of dramatic growth rates for those infrastructures.

Source: IFs Version 6.61 Base Case.

Figure 5.2 Percent of global installed electricity generation capacity by income group and region: History and forecast



Note: High-income countries are included as a group in the regional analysis in order to sum to the world total. Numbers may not exactly add to 100 percent due to rounding.

Source: Historical values compiled by authors using data from the U.S. Energy Information Administration International Energy Statistics (http://www.eia.gov/countries/data.cfm) and work by David Canning (http://www.hsph.harvard.edu/faculty/david-canning/data-sets/). Forecasts from IFs Version 6.61 Base Case.

Access to infrastructure

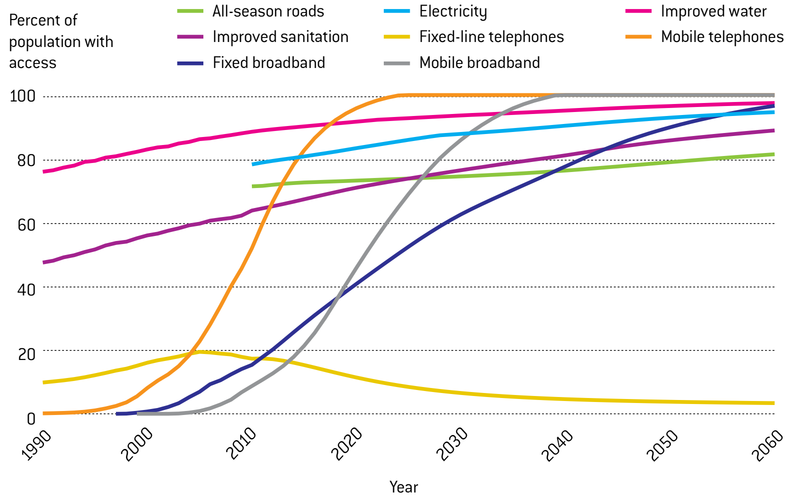
In this volume, we are particularly interested in access to infrastructure, not simply the total size of physical stocks. As we have discussed, large numbers of people currently lack access, particularly in poorer countries. How does this change over time in our Base Case? The answer is that global access to all forms of infrastructure, with the exception of fixed-line telephones, increases, continuing past trends (Figure 5.3, on p. 118). The decline in fixed telephones itself continues a trend that began soon after 2000, driven by the penetration of mobile telephones and other substitutes.

We forecast that, worldwide, access to mobile telephones will be near universal by 2025 and to mobile broadband by 2040.[5] Access to fixed broadband lags a bit behind, but it also approaches saturation by 2060.[6] The shares of the population with access to improved sources of water and to electricity reach or exceed 95 percent by 2060, with access to improved sanitation not far behind.[7] The least growth occurs in access to all-season roads in rural areas. The primary reason for the relatively slow growth in all-season road access is that the length of road network additions, and therefore the marginal costs of providing them, increases steadily and significantly for each incremental percentage point of population served.

The global numbers reflect a significant closing of the gap in access across countries,

Access to mobile phones is near universal by 2025 and to mobile broadband by 2040; by 2060, access to electricity and improved water reach or exceed 95 percent.

Figure 5.3 Global access rates to infrastructure: History and forecast



Note: History for access to all-season roads and electricity is not represented because of inadequate historical data, Even though we assume that fixed broadband subscriptions will saturate at 50 per 100 persons, and that mobile telephone and mobile broadband subscriptions will saturate at 150 per 100 persons, all access series are scaled from 0 to 100 to facilitate comparison (that is, 50 fixed broadband subscriptions per 100 persons are assumed to indicate universal access, as are 150 mobile telephone and broadband subscriptions).

Source: Historical data from the World Health Organization and United Nations Children's Fund Joint Monitoring Programme for Water Supply and Sanitation Data and Estimates available at http://www.wssinfo.org/data-estimates/table/; and the International Telecommunication Union World Telecommunication ICT Indicators 2011 database available at http://www.itu.int/ITU-D/ict/statistics/. Forecasts from IFs Version 6.61 Base Case.

but important differences do persist, primarily for traditional infrastructure and fixed broadband. Table 5.3 shows a consistent direct relationship between access and country income through 2060. More striking, though, is the amount by which the low-income economies will even then likely still lag behind countries in the other income groups, which by then may not differ by much in rates of access. On a regional basis, the major forecasted gap lies between sub-Saharan Africa and the other developing regions.

We have already noted that global access to mobile telephones and mobile broadband basically saturates in our Base Case, indicating almost complete convergence. The two developing giants, China and India, are both likely to reach our assumed saturation level of 150 subscriptions per 100 persons for both mobile phones and mobile broadband by 2040, within about a decade of each other. Only a few countries (Eritrea, Micronesia, Myanmar, North Korea, the Solomon Islands, and Somalia) are likely to need the years through 2060 to reach, or come very close to, saturation. Our forecasts that mobile phone and even mobile broadband penetration rates will exceed those of electricity

Table 5.3 Percent of population with access to traditional infrastructure and fixed broadband by income group and region: 2010 and 2060

	All-season roads		Electricity		Improved water		Improved sanitation		Fixed broadband	
By income group	**2010**	**2060**	**2010**	**2060**	**2010**	**2060**	**2010**	**2060**	**2010**	**2060**
Low-income countries	38	60	23	77	66	90	37	74	0	89
Lower-middle-income countries	69	89	69	98	87	99	47	89	2	97
Upper-middle-income countries	89	95	97	100	93	100	73	95	16	100
High-income countries	93	100	98	100	99	100	99	99	52	100
By region, developing countries only										
East Asia and Pacific	90	96	91	99	90	100	66	94	14	99
Europe and Central Asia	79	91	87	99	95	100	84	97	18	100
Latin America and the Caribbean	61	82	94	99	94	99	80	93	14	99
Middle East and North Africa	62	83	94	99	88	100	88	95	2	98
South Asia	65	88	64	98	90	99	39	87	2	96
Sub-Saharan Africa	40	61	29	81	61	91	30	77	0	91
World	**71**	**81**	**78**	**95**	**88**	**97**	**64**	**89**	**16**	**97**

Note: All values are per 100 persons. Access to all-season roads is measured as the percent of rural populations living within 2 kilometers of an all-season road; all other access rates are for total populations (rural and urban combined). For all-season roads, electricity, improved water, and improved sanitation, values are direct measures of access (that is, the percent of the population with access). Access to fixed broadband is estimated from subscription rates per 100 persons and scaled with the assumption that universal access is attained when there are 50 subscriptions per 100 persons (for example, 25 subscriptions per 100 persons would be a 50 percent access rate).

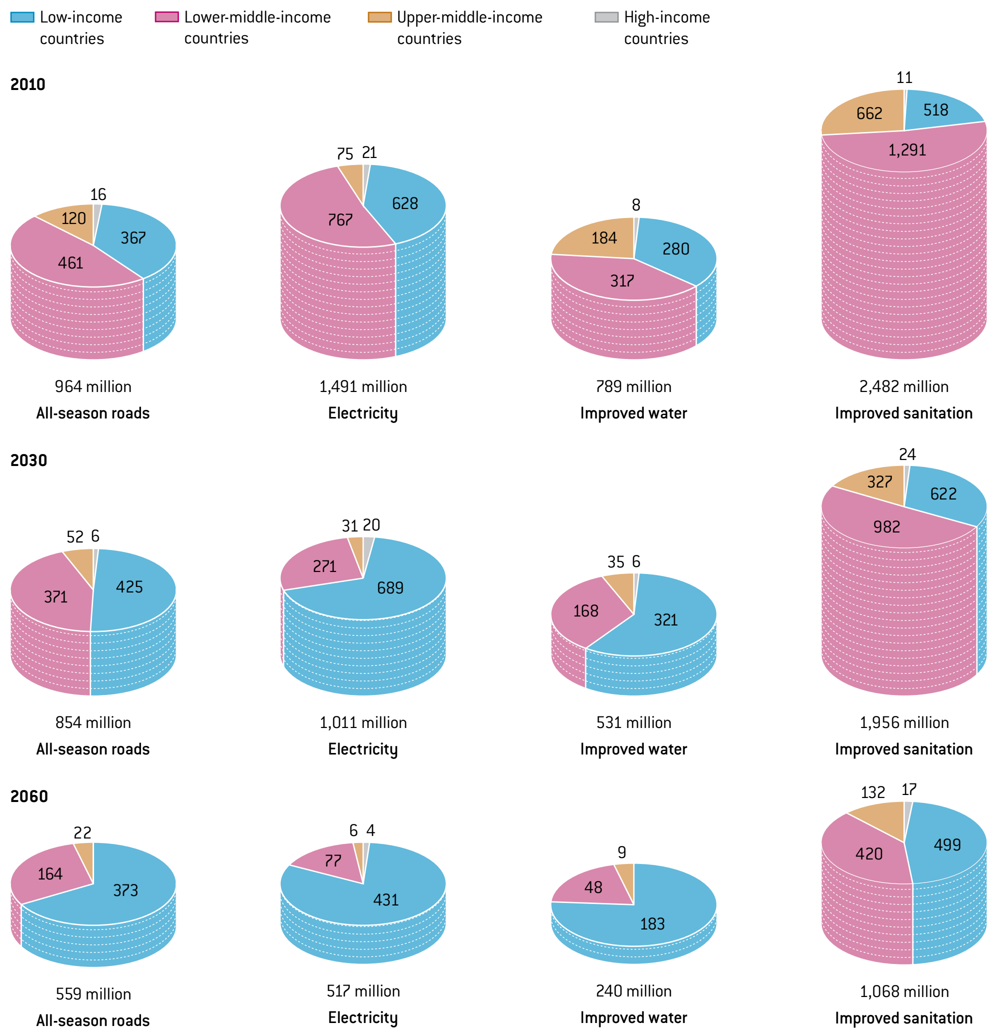
Source: IFs Version 6.61 Base Case.

in a very short time, and continue to outstrip them for much of our forecast horizon, may be surprising—after all, it takes electricity to charge the phones. The fact is, however, that recent data suggest that many countries—including Chad, Kenya, Liberia, Rwanda, Sierra Leone, Uganda, and Vanuatu—already have higher access rates for mobile telephones than for electricity. In such countries, where the mobile phone penetration rate can be several times that of electricity, mechanisms such as communal charging stations and electricity access from relatives and friends can provide battery recharging capability.

Globally, between 2010 and 2060, the absolute number of people lacking access to basic traditional infrastructure services will decline significantly (Figure 5.4 and Figure 5.5, on p. 120). The number of persons without access to all-season roads, electricity, improved water, and improved sanitation will fall by 400 million, 970 million, 550 million, and 1.4 billion, respectively, even as the global population increases by more than 2.7 billion. This represents a 42 percent decline in the number of rural persons without access to all-season roads and an average 64 percent decline in the number of all persons without access to other forms of

The number of people worldwide without access to basic infrastructure services decreases, on average, by 64 percent (840 million people) between 2010 and 2060 in the IFs Base Case.

Figure 5.4 Persons (in millions) without access to basic infrastructure services by income group: 2010, 2030, and 2060



Note: Numbers may not exactly add to totals due to rounding.

Source: IFs Version 6.61 Base Case.

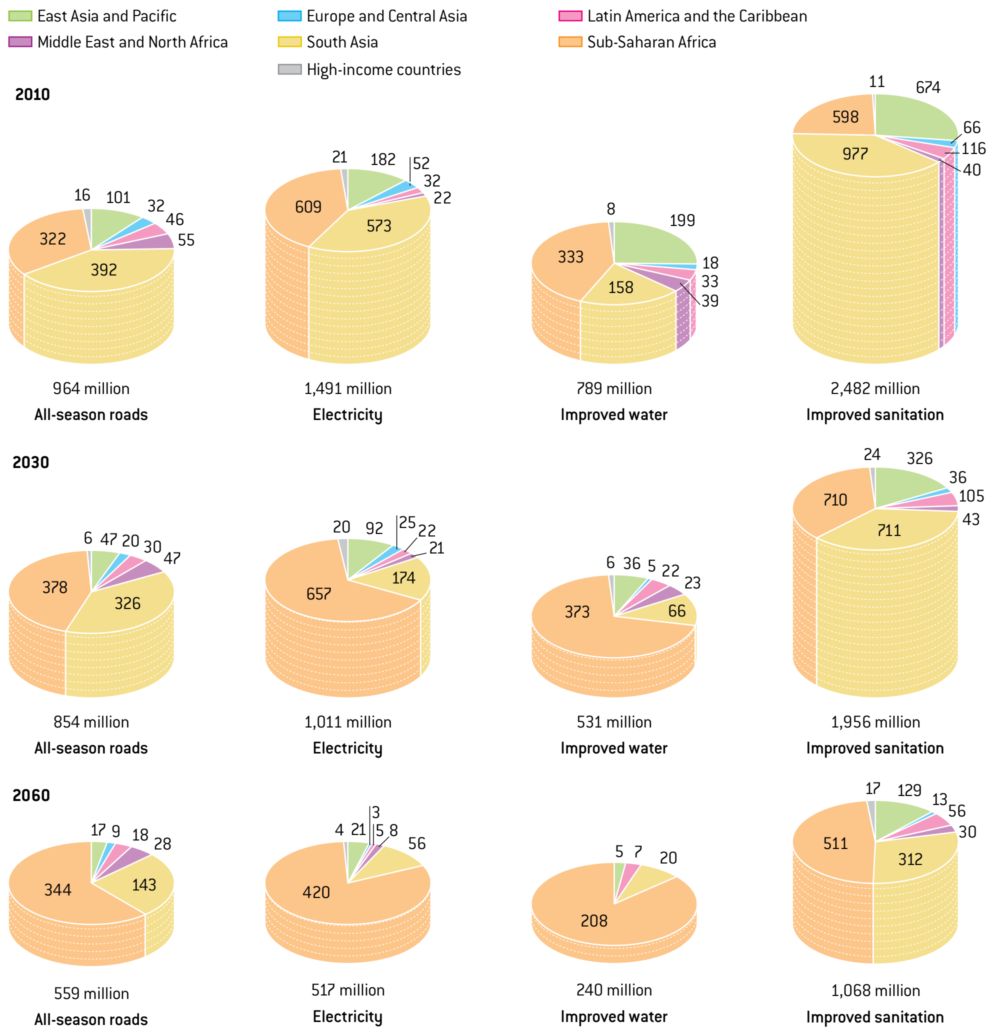
traditional infrastructure. Even so, this leaves more than 560 million people lacking access to all-season roads, approximately 500 million without access to electricity, 240 million without access to improved water, and 1 billion still lacking improved sanitation (see again Figure 5.4).

Those persons without access will be increasingly concentrated in the lower-middle-income and, especially, the low-income countries. By 2060, the populations of low- and lower-middle income countries are forecast to account for more than 90 percent of all persons without access for each type of infrastructure.

Furthermore, in the low-income economies, the absolute number of citizens without access to electricity and improved water and sanitation increases between 2010 and 2030, before the numbers come down later in the forecast period. That is, although access in percentage terms grows over the entire forecast period, the population growth is large enough that the absolute numbers without access do not decline until late in the period.

On a regional basis (see Figure 5.5), the declines in the number of persons in East Asia and Pacific, in Europe and Central Asia, and

Figure 5.5 Persons (in millions) without access to basic infrastructure services by region: 2010, 2030, and 2060



Note: High-income countries are included as a group in the regional analysis in order to sum to the world total. Numbers may not exactly add to totals due to rounding.

Source: IFs Version 6.61 Base Case.

Table 5.4 Countries forecast to have lowest levels of access to traditional infrastructure in 2060

Country and forecasted access rate by infrastructure type (percent)							
All-season roads		**Electricity**		**Improved water**		**Improved sanitation**	
Madagascar	32	Burundi	26	Madagascar	68	Madagascar	27
Chad	34	Niger	37	Niger	70	Togo	36
Togo	36	Comoros	38	Chad	75	Niger	39
Burundi	37	Madagascar	39	Central African Republic	76	Guinea Bissau	45
Guinea	38	Central African Republic	44	Haiti	78	Haiti	48
Mali	39	Guinea Bissau	45	Afghanistan	80	Guinea	51
Congo, Dem. Rep. of	40	Chad	47	Togo	82	Chad	54
Mauritania	42	Togo	47	Papua New Guinea	83	Comoros	59
Central African Republic	44	Malawi	55	Equatorial Guinea	84	Eritrea	60
Burkina Faso	46	Congo, Dem. Rep. of	57	Solomon Islands	84	Solomon Islands	63

Source: IFs Version 6.61 Base Case.

in South Asia without access to electricity, improved water, and improved sanitation are approximately 80 to 90 percent between 2010 and 2060. That still leaves a significant number of people, such as 129 million in East Asia and Pacific and 312 million in South Asia, without access to improved sanitation, due to the large populations in these regions. Latin America and the Caribbean and the Middle East and North Africa perform as well in reducing the numbers of persons without access to electricity and improved water, but see lesser declines, about 25 to 50 percent respectively, for access to improved sanitation. Meanwhile, the decreases in those without access in sub-Saharan Africa are only about 15 to 40 percent, depending on the type of infrastructure. As a result, by 2060 we anticipate that large majorities of those who still lack access to traditional infrastructure will live in sub-Saharan Africa.

We can look deeper to identify those countries that have the largest infrastructure gaps at the end of our forecast horizon (see also Box 5.1 on intra-country differences). Table 5.4 lists the 10 countries with the lowest levels of access for each of the four types of traditional infrastructure. Not surprisingly, the large majority of these countries are in sub-Saharan Africa. Furthermore, a number of countries appear multiple times, with Chad, Madagascar, and Togo showing up in all four infrastructure categories. This reflects the common forces driving development across different types of infrastructure. Reflecting the global patterns, the results also show that even the countries with least access generally do better in achieving access to improved water and have the most difficulty providing access to all-season roads.

Box 5.1 Urban-rural differences in access to infrastructure

In 2060, important discrepancies in access will remain within as well as across countries. The IFs model is limited in its ability to forecast access to specific groups within countries. However, in addition to focusing on access of rural populations to all-season roads, we also calculate separate values of electricity access for urban and rural areas. The electricity access rates do not differ significantly in high- and upper-middle-income countries, where access in 2010 already exceeded 95 percent in both urban and rural areas. In lower-middle-income economies, however, while rates exceeded 90 percent in urban areas, they were only about 55 percent in rural areas; in low-income economies, these figures were 53 percent for urban areas and only about 13 percent for rural areas. In our Base Case, we forecast electricity access in the lower-middle-income economies to exceed 95 percent in both urban and rural areas by 2060, but these are forecast to reach only 89 percent in urban and 64 percent in rural areas of the low-income economies.

Although we do not calculate separate urban–rural access rates for other infrastructure types, both literature and conventional wisdom point to similar urban–rural differentials for a range of infrastructure types and services.

■ In the Base Case, global infrastructure spending over the next 50 years is over 171 trillion in 2000 dollars. ■

Spending on infrastructure

Infrastructure, and access to it, have high costs for countries. Box 5.2 summarizes how we estimate infrastructure spending (see again Chapter 4 for a more complete description). Building on our discussion of the ongoing transitions in the physical types and patterns of global infrastructure, forecasting of spending allows us to (1) consider the likely evolution of total infrastructure spending globally; (2) explore the changing size of infrastructure spending in global and national economies; and (3) drill down into infrastructure-specific spending.

Global spending totals

In our Base Case, global infrastructure spending over the next 50 years is over $171 trillion in year 2000 constant dollars. Our value of $46 trillion from 2010–2030 is very much in line with an earlier Organisation for Economic Co-operation and Development (OECD) estimate of $53 trillion from 2000–2030 (Stevens, Schieb, and Andrieu 2006: 29). Annual spending gradually increases from $1.8 trillion in 2010 to $5.6 trillion in 2060 (see Figure 5.6). The bulk of this increase is due to increased public spending on "other" infrastructure (see again Box 5.2), which grows from just over $700 billion in 2010 to $4 trillion in 2060, a more than 500 percent increase. Meanwhile, the annual public and private spending on "core" infrastructure, that is, those infrastructure types we model explicitly, only increases by 60 and 40 percent, respectively, over this period. The global ratio of public to private spending on core infrastructure starts at a bit over 2-to-1, rising to about 2.40-to-1 by 2060. This gradual shift to a larger public contribution is due to a combination of the greater current private share

Box 5.2 Estimating infrastructure spending in IFs

In Chapter 2, we described the difficulty in finding comprehensive and comparable data on infrastructure spending, and in Chapter 4 we explained our approach to estimating spending on infrastructure in our base year (2010), as well as in our forecast years. In brief, we estimate spending for two broad categories of infrastructure: those types of infrastructure explicitly identified in our modeling, which we refer to as "core" infrastructure,* and "other" infrastructure, for example, railroads, airports, and seaports. Other infrastructure would also include new not-yet-known forms with potentially transformative importance, including assisting in shifts toward sustainable infrastructures for the future. Spending for the core category is estimated from the bottom-up, based on levels of physical infrastructure and assumptions about unit costs and lifetimes for each type of infrastructure. We calculate spending on new construction and on maintenance separately and use infrastructure-specific share parameters to divide the spending between public and private sources. For spending in the other infrastructure category, we consider only that portion provided by the public sector (which we assume is almost all of it) and estimate this as a simple function of GDP per capita.

Some key assumptions of our approach are:

- The infrastructure-specific unit costs, lifetimes, and public shares do not vary across country, time, income level, or existing levels of infrastructure.
- For the most part** the spending is attributed to the year that the infrastructure is completed and "comes online"—that is, we do not try to spread out the spending on new construction over the life of individual projects, which is often many years.
- Only public sector spending is used when calculating the balance between spending demands and available funds.
- Any shortfalls in public spending are matched by proportionate reductions in private sector spending except for ICT, which remains unchanged.

The spending values for the starting year of forecasts (2010) are estimated from historical data on growth in the amount of physical infrastructure. While these are not forced to match the few existing estimates of actual spending, our analysis showed that the numbers were roughly comparable.

Finally, all spending figures in dollars are presented in year 2000 constant dollars based on market exchange rates. Spending as a percentage of GDP is determined by the spending in dollars divided by GDP based on market exchange rates.

** Core infrastructure includes paved and unpaved roads, electricity generation capacity, improved water, improved sanitation, wastewater treatment, irrigation, fixed-line telephones, mobile phones, fixed broadband, and mobile broadband.*

*** When exceptional spending surges are forecast, we spread their translation into additional capacity across several years (see Chapter 4).*

we identify for ICT infrastructure (see again Chapter 4) and the relative decline in spending on ICT infrastructure in later years, as ICT access reaches saturation before other forms do.[8]

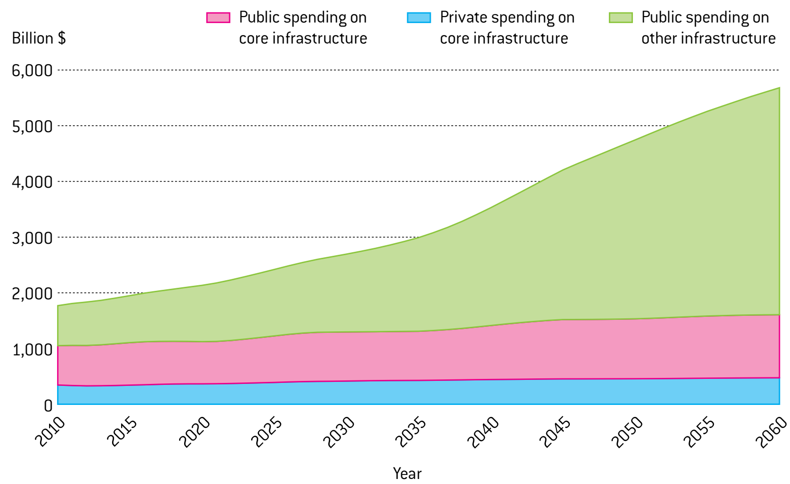
Spending as a portion of GDP

While total expenditures rise substantially, annual global spending on infrastructure as a share of world GDP falls from approximately 4.3 percent to 3.3 percent between 2010 and 2060 in the Base Case (see Figure 5.7, on p. 124). Spending by the public sector on core infrastructure falls from over 1.7 percent of GDP to under 0.7 percent, while for the private sector, the decline is from about 0.8 percent to 0.3 percent—a total of about a 1.6 percentage point decline in public and private spending on core infrastructure as a percent of GDP. Meanwhile, global public spending on other infrastructure increases from 1.7 to 2.4 percent of GDP as average incomes increase in almost all countries.

Box 5.2 described the difference between "core" and "other" infrastructure in our approach. The results presented here indicate the expected importance of spending on the other forms of infrastructure, and a key challenge for future efforts to forecast infrastructure will be to find ways to include them. More and better data will help, but the impossibility of knowing how infrastructure forms will evolve—or possibly even transform quite dramatically—will continue to be a problem. For now, we focus on the core category as we further elaborate the spending story of the IFs Base Case.

The decline in spending on core infrastructure as a percentage of GDP, even as absolute spending increases, is in line with historical trends in many countries. Beneath the general picture of declining core infrastructure spending as a share of GDP, however, are a number of important likely developments, and two in particular, that have historically unique elements. The first, of course, is the saturation in the development of core global infrastructure that we discussed above, thereby moving increasing shares of infrastructure spending from new construction to maintenance. The second, which we will return to below, is the playing out of the accelerated infrastructure transitions of

Figure 5.6 Global infrastructure spending in billion dollars: Forecast to 2060



Note: Core infrastructure includes those infrastructure types for which we estimate the costs from the bottom up: paved and unpaved roads, electricity generation capacity, improved water, improved sanitation, wastewater treatment, irrigation, fixed-line telephones, mobile phones, fixed broadband, and mobile broadband.

Source: IFs Version 6.61 Base Case.

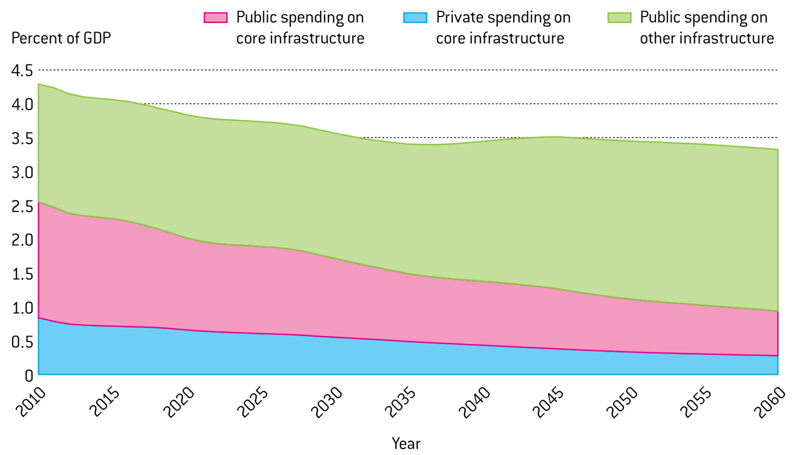
developing countries in the face of their simultaneous pushes in many areas.

With respect to saturation of infrastructure, Figure 5.3 showed the movement we anticipate toward universal access to core infrastructure, and we have seen also the resultant slowing of growth in physical infrastructure stocks that will follow from that. By 2060, therefore, growth in need for new construction, which tends to be more expensive than maintenance or renewal, will slow. Figure 5.8 (p. 124) shows that total global spending on new construction of core infrastructure is forecast to remain fairly constant in dollar terms, resulting in a fairly steady decline as a share of GDP. Meanwhile, spending on maintenance and renewal is forecast to continue to increase. For a while, this increase keeps pace with increasing GDP. Eventually, though, the spending on maintenance and renewal as a share of GDP also begins to decline, but not as rapidly as is the case for new construction. Presently, the ratio of global spending on new construction to that on maintenance is about 3-to-2. Our Base Case suggests that the global balance will move to predominantly maintenance spending by about 2030 (at least for the core forms of infrastructure about which we have some basis for forecasting).

A second part of the story behind our forecast of decreasing global percentage

While total expenditures on infrastructure rise substantially, spending as a percent of world GDP falls from about 4.3 percent to 3.3 percent between 2010 and 2060.

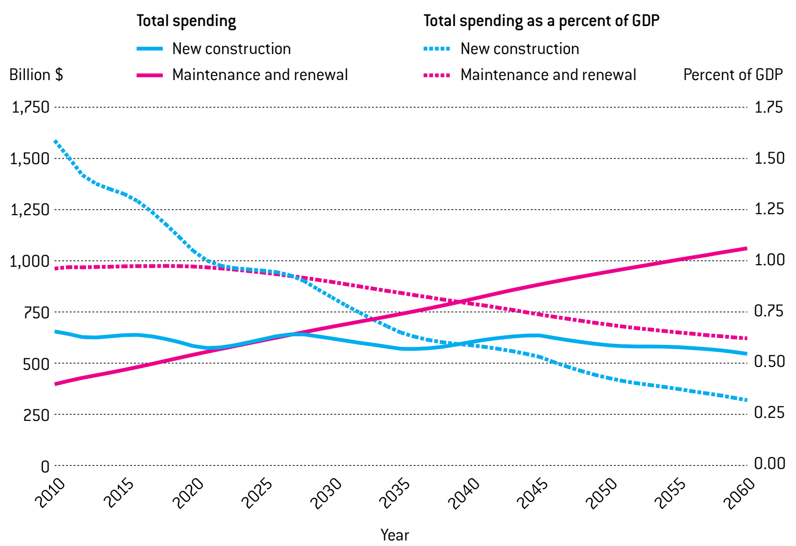
Figure 5.7 Global infrastructure spending as a percent of GDP: Forecast to 2060



Source: IFs Version 6.61 Base Case.

expenditure on core infrastructure is related, but also richer. Chapter 2 emphasized that developing countries today are playing catch-up, in that they seek to build not only the basic transportation and water and sanitation infrastructures that richer countries began creating centuries ago, but also the newer ones resulting from technological revolutions around electricity and ICT. These patterns almost certainly mean that they will move

Figure 5.8 Global spending on core infrastructure (new construction and maintenance and renewal) in billion dollars and as a percent of GDP: Forecast to 2060



Note: Includes both public and private funding; values are expressed in 2000 dollars.

Source: IFs Version 6.61 Base Case.

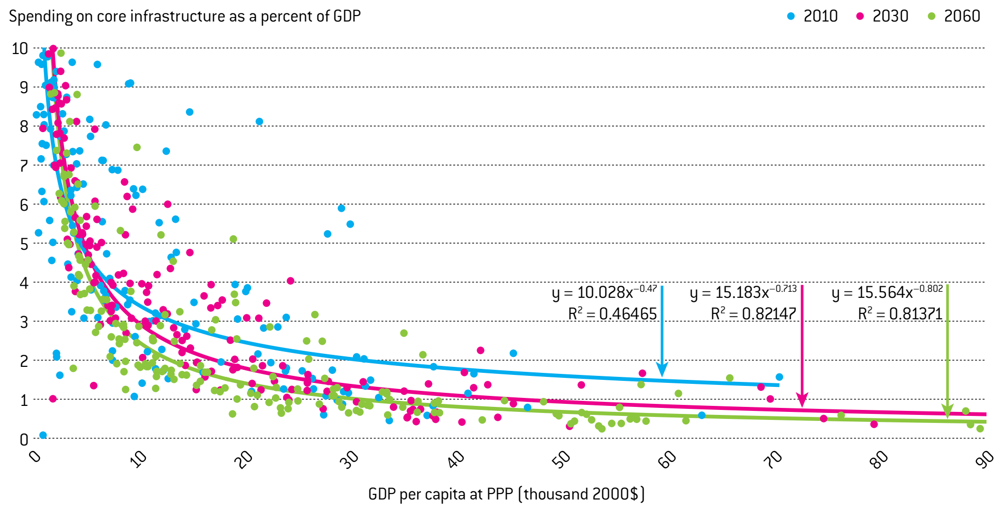
through the progression from higher spending as a percentage of GDP to lower spending more rapidly than did current high-income countries. Figure 5.9 helps us see this pattern. The lines in Figure 5.9 are fit to our estimates across countries of spending as a portion of GDP in 2010 and to our forecasts of that spending ratio in 2030 and 2060. The saturation effect by itself helps explain the steep downward slope of the line for 2010. The slope of the line is also consistent with the notion that infrastructure spending is an early emphasis of societies as they become more sociopolitically inclusive. North, Wallis, and Weingast (2009), for example, analyzed the typical pattern of provision of public goods as societies and states transition through various stages of development. They described modern states with inclusive criteria for citizenship and access to public goods as "open access orders" and stated that

> Historically, open access orders have provided different types of public goods in a sequence. In the beginning of the first transitions, societies extended the rule of law from elites to all citizens. Next typically came infrastructure and the beginning of mass education. For example, transportation infrastructure often transformed large areas of traditionally organized, low-income, and self-sufficient peasant economies into specialized food producers in integrated, regional, national, or international markets (North, Wallis, and Weingast 2009: 118).

This early attention to infrastructure in the development process, combined with saturation over time, gives rise to the strong inverse relationship between spending on core infrastructure as a percent of GDP and GDP per capita in 2010.

In addition, however, we see that the fitted lines for 2030 and 2060 are lower than that of 2010 for incomes above approximately $4,000. Similar analysis shows that countries will tend to achieve higher levels of infrastructure access at lower levels of GDP per capita in the future due, in part, to the fact that developing countries today are attempting to undertake

Figure 5.9 Forecast of public and private spending on core infrastructure (percent of GDP) as a function of GDP per capita: 2010, 2030, and 2060



Note: GDP per capita is measured in constant 2000 dollars using purchasing power parity. Countries with GDP per capita over $90,000 or core infrastructure spending above 15 percent of GDP are not shown but are included in the statistical analysis.

Source: IFs Version 6.61 Base Case.

In the Base Case, the majority of global spending on core infrastructure shifts from new construction to maintenance spending by 2030.

multiple, simultaneous infrastructure transitions even while at low levels of GDP per capita. This pattern differs from the historical pattern of today's richer countries, which began some of these transitions only at higher levels of GDP per capita. The push toward multiple simultaneous infrastructure transitions implies high contemporary expenditure burdens for today's poorer countries; it also suggests that such countries might expect some compensatory relief at higher income levels in the future. In the aggregate, this trend over time explains part of the decline in spending on core infrastructure as a percent of GDP.

Spending by type of infrastructure

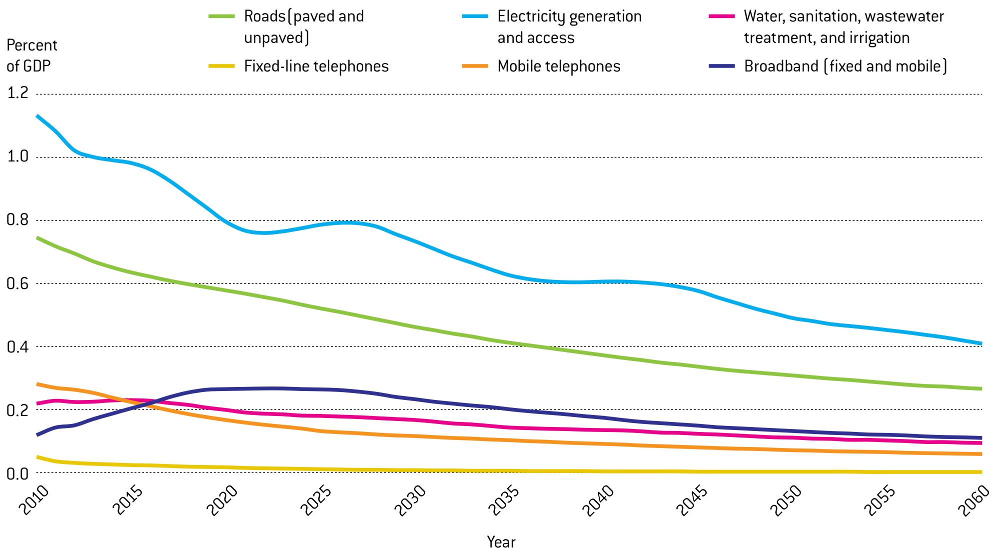
We can further elaborate this story of transition by looking at spending as a portion of GDP by type of infrastructure. Approximately three-quarters of the 2.5 percent of GDP that global public and private sectors now spend on core infrastructure falls into two categories: (1) electricity generation and access; and (2) roads (with 85 percent of road spending for paved roads) (see Figure 5.10, on p. 126). These are the "big two" globally, although their contribution is somewhat exaggerated by spending in China, to which we will return later. Spending on mobile telephony and collectively on irrigation, water, sanitation, and wastewater treatment each makes up about a tenth of the total. We forecast that expenditures for water-related infrastructure will decline only slightly over the next decade, while spending on mobile phones will fall below that of broadband (both fixed and mobile) as mobile phones reach saturation and attention continues to shift toward broadband.

Spending by income category and region

We need to go to the income group and regional levels to tell a more complete story about patterns of infrastructure spending. Mirroring what we saw earlier with physical stocks, global spending on infrastructure shifts toward the developing countries over time, rising from just under 50 percent of the world total in 2010 to 70 percent in 2060 (Table 5.5, on p. 126). In 2060, East Asia and Pacific, by itself, will account for a larger share of global spending than will the high-income countries as a group. By that time, the Base Case suggests that sub-Saharan Africa will spend more than Europe and Central Asia, Latin America and the Caribbean, or the Middle East and North Africa. This reflects not only sub-Saharan Africa's growing population, but also the fact that a number of countries in the

Developing countries are attempting to undertake multiple infrastructure transitions at lower levels of GDP per capita than today's richer countries did in the past.

Figure 5.10 Global spending on core infrastructure as a percent of GDP by category of infrastructure: Forecast to 2060



Note: Includes both public and private funding.

Source: IFs Version 6.61 Base Case.

In our Base Case, infrastructure spending shifts toward developing countries, increasing from just under 50 percent of the global total in 2010 to 70 percent in 2060.

region still will be working to achieve broad infrastructure access across their populations, thereby requiring much continued new construction.

Figure 5.11 presents total infrastructure spending as a percentage of GDP by income group and region, respectively. The forecast long-term decline in infrastructure spending as a share of GDP seen at the global level (see again Figure 5.7) also plays out across income groups and regions. In addition, once again a general inverse relationship exists between spending and GDP per capita when we look across country groupings in individual years. In both cases, though, there are some important nuances.

One such nuance is that the inverse relationship is not completely stable (see again Figure 5.11). This is related, in large part, to

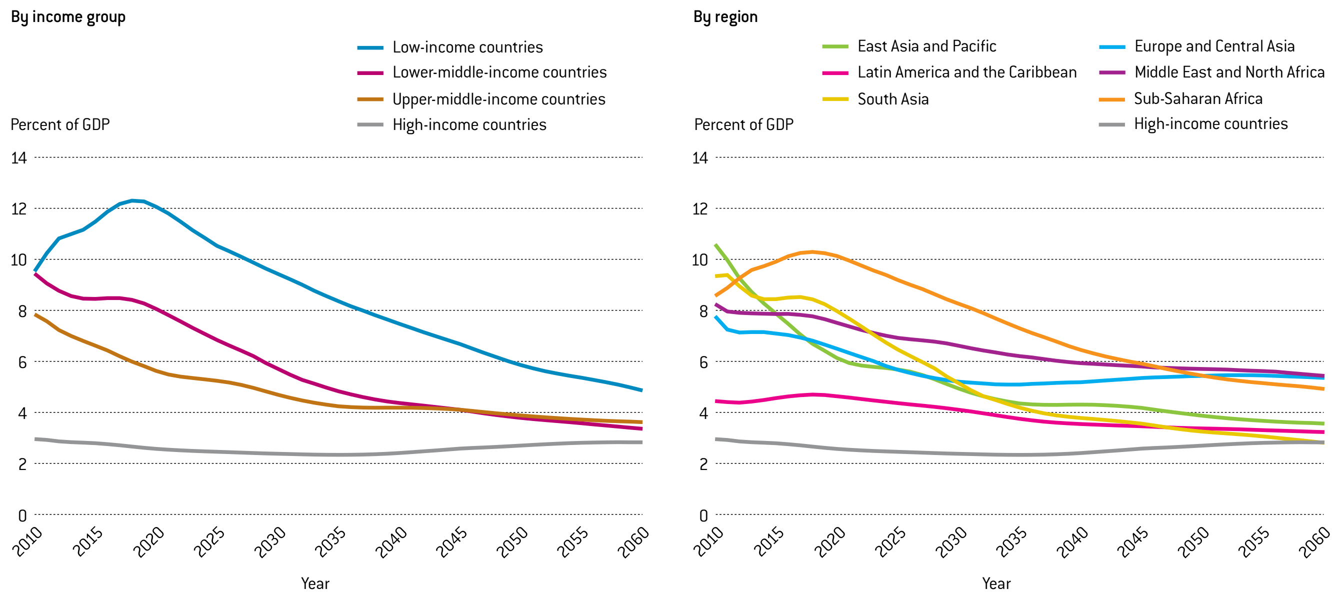
Table 5.5 Forecast shares (percentages) of global total spending on infrastructure by income group and region: 2010, 2030, and 2060

By income group	**2010**	**2030**	**2060**
Low-income countries	1.6	3.4	5.5
Lower-middle-income countries	11.9	17.8	23.3
Upper-middle-income countries	35.2	41.5	41.3
High-income countries	51.3	37.3	29.9
By region, developing countries only			
East Asia and Pacific	24.5	28.5	30.5
Europe and Central Asia	4.9	4.9	4.5
Latin America and the Caribbean	7.1	9.5	7.3
Middle East and North Africa	3.1	3.8	3.8
South Asia	6.5	10.6	14.8
Sub-Saharan Africa	2.6	5.4	9.3
World	**100.0**	**100.0**	**100.0**

Note: Total spending includes public and private spending on core infrastructure and public spending on other infrastructure.

Source: IFs Version 6.61 Base Case.

Figure 5.11 Total infrastructure spending as a percentage of GDP by income group and region: Forecast to 2060



Note: Total spending includes public and private spending on core infrastructure and public spending on other infrastructure.

Source: IFs Version 6.61 Base Case.

the reconciliation of the demands for public spending to achieve the expected levels of infrastructure with the ability of governments to provide associated funds. Chapter 4 described the approach we take to reconciling competing basic spending expectations, (e.g., for education, health, and the military as well as for infrastructure) within the context of overall financial resources of governments and societies. If a country is unable to meet the total funding requirements, less is spent on each sector, and the amount of infrastructure will be less than expected. Alternatively, if a country has "excess funds" relative to total basic expectations, there will be additional spending, and the amount of infrastructure will exceed expected levels. Either variation from expected levels has obvious effects on the amount of spending on infrastructure as a percentage of GDP.

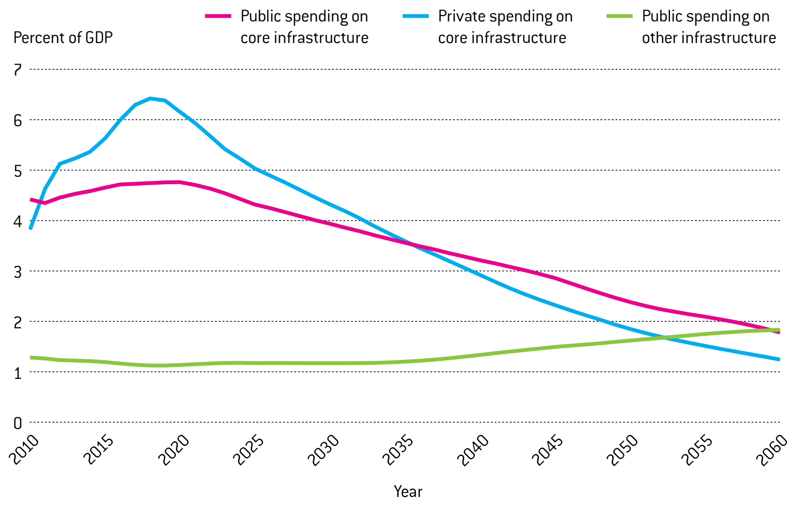
Not surprising, in our Base Case, the low-income countries tend to have spending deficits until later in the forecast horizon. Meanwhile, the lower-middle- and upper-middle-income countries generally develop surpluses over much of the period, with the latter having the larger of the two. These surpluses enable upper-middle-income countries to push their infrastructure spending as a percentage of GDP above that of the lower-middle-income countries after the year 2045 (see again Figure 5.11). For the same reason, at the regional level, East Asia and Pacific shows a strong surplus in the early years (again, we will return to China below), which gradually declines over time, while the developing countries of Europe and Central Asia and the Middle East and North Africa start with small surpluses that grow over time. The growth in surpluses over time leads to the latter two regions having a higher level of spending as a percentage of GDP than sub-Saharan Africa in the later years (see again Figure 5.11).

Mind the bubbles: Infrastructure type in interaction with income categories

In drilling down with respect to the forecasts of infrastructure spending as a portion of GDP, perhaps the most obvious of the "nuances" across country groupings is the short-term bubbles in spending in the low-income countries and sub-Saharan Africa. Figure 5.12 (p. 128) separates the spending for the low-income countries into spending by the private and public sector on core infrastructure and the public sector on other infrastructure. Figure 5.13 (p. 128) further breaks down the

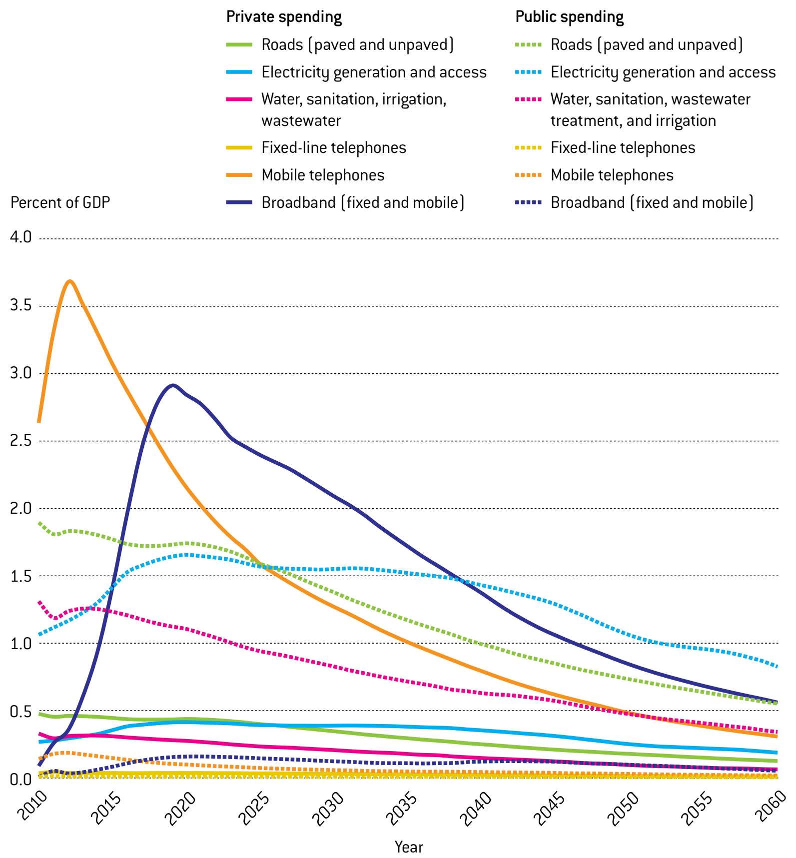
Much of the spending in developing countries in the near term is going toward leapfrog-enabling ICT technologies, thanks to significant support from the private sector.

Figure 5.12 Total core and other infrastructure spending by source as a percentage of GDP in low-income countries: Forecast to 2060



Source: IFs Version 6.61 Base Case.

Figure 5.13 Spending on core infrastructure as a percentage of GDP in low-income countries by source and specific infrastructure type: Forecast to 2060



Source: IFs Version 6.61 Base Case.

spending on core infrastructure by category. Together, the figures illustrate clearly that the major driver of short-term increases in spending, where such increases occur, is the rapid build out of mobile telephones, followed closely by fixed and mobile broadband. Funding for these categories is primarily provided by the private sector. The amount of spending as a portion of GDP on these potentially leapfrog-enabling infrastructure technologies is obviously very substantial for low-income countries and would presumably not be possible were the private sector not shouldering the burden for most of it.

As mentioned previously, the bubbles associated with ICT spending in low-income countries cause some spending forecasts to deviate from the stylized steady decline in share of GDP directed to infrastructure as income increases. Other forecasts may also deviate from our general expectations. For example, we have seen that the ratio of spending on new construction to maintenance generally falls as GDP per capita increases. Figure 5.14 generally bears this out, but patterns are complex. The early shift toward new construction in low-income countries again reflects the ICT bubble. In addition, the large amount of new construction in China somewhat skews the numbers in the early years for upper-middle-income countries. Still, for low-income countries, this ratio is now above 2-to-1, whereas it is already below 1-to-1 in high-income countries, consistent with the expected pattern, as is the general forecast of decline for all income categories. Even in 2060, however, the ratio will likely remain above 1-to-1 for the low-income countries.

The special case of China

The discussion of general patterns in our forecasts has more than once noted the importance of China, and Figure 5.15 demonstrates how the country-specific behavior of China influences global patterns. Given its demographic and burgeoning economic size, as well as the major push the country has made in recent years to build infrastructure, this is not surprising. Returning to the two major categories of infrastructure spending globally, Figure 5.15 shows the global spending on electricity and roads as a portion of GDP with

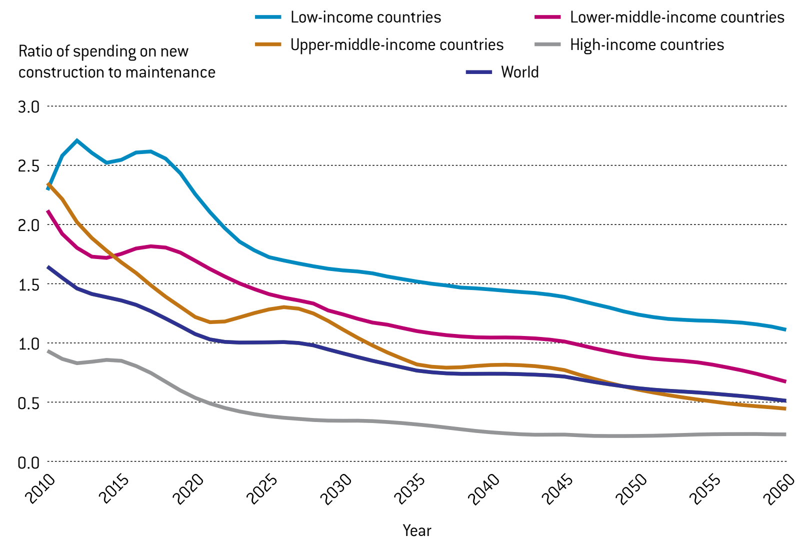
China (solid lines) and without China (dashed lines) With respect to electricity generation and access alone, China raised the global total by about 0.4 percent of GDP in 2010, and it added more than another 0.1 percent to the value for road construction and maintenance.

Furthermore, most of the sharp decline that our Base Case anticipates over the next decade in global spending on electricity infrastructure, and more than half of the decline in spending on roads, reflects our forecasts for slowing infrastructure growth in China. China has been expanding its electricity generation capacity dramatically in recent years, with data from the United States Energy Information Administration (USEIA) showing an increase from about 520 gigawatts in 2005 to 880 gigawatts in 2009; Nangia's study documented even more dramatic growth over a longer period of time, from only 69.2 gigawatts of capacity in 1981 to 1,151.2 in 2011.[9] Nangia's 2011 value somewhat exceeds the USEIA expectation that China would reach a capacity of 1,050 gigawatts by the end of 2011[10] and our own forecast of 1,042. China has stated plans to increase capacity to 1,440 gigawatts by 2015 and 1,760 by 2020.[11] These numbers are significantly larger than our forecast of 1,283 and 1,462 gigawatts in 2015 and 2020, respectively. The IFs Base Case expects both slowing Chinese economic growth and rebalancing toward a more consumer-driven economy. We do not foresee China reaching 1,460 gigawatts until 2021. Alternative forecasts for the country, such as those we explore in Chapter 6, would significantly affect regional and even global totals.

Overall patterns of change in spending with income advance

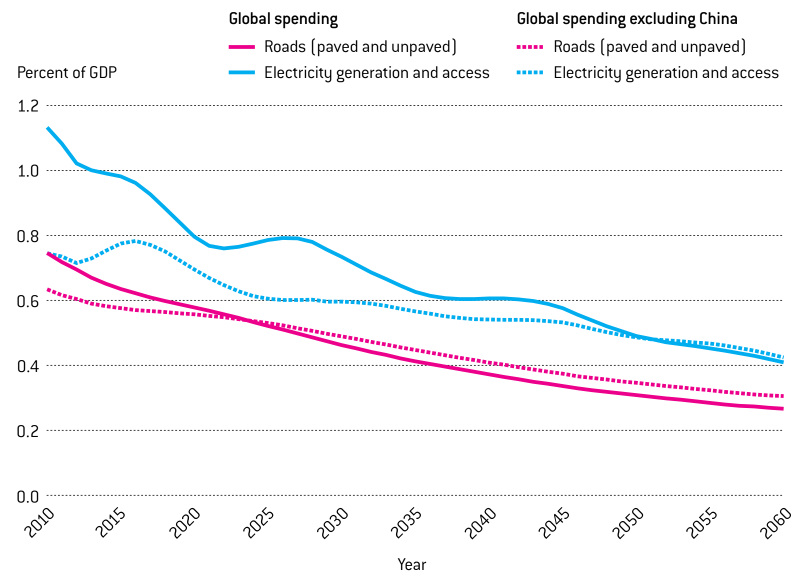
Numerous factors, from technological transitions to country-specific choices, shape infrastructure development at the country level. Despite such variations, we can make many generalizations about infrastructure development patterns not only globally but also in countries across income categories. Figure 5.16 (p. 130) shows that spending on core infrastructure categories tends to vary systematically and significantly across income groups and indicates that there is a typical sequencing of attention as income changes over time. For example, in 2010, the share of total infrastructure spending devoted to electricity increased greatly as we move from low-income countries to high-income ones. For low-income countries, spending on electricity is less than that for most other core infrastructure categories (roads; water, sanitation, wastewater treatment and irrigation; and mobile phones),

Figure 5.14 Ratio of core infrastructure spending on new construction to spending on maintenance and renewal by income group and globally: Forecast to 2060



Source: IFs Version 6.61 Base Case.

Figure 5.15 Global spending on roads and electricity generation and access, with and without China, as a percentage of GDP: Forecast to 2060



Source: IFs Version 6.61 Base Case.

China's efforts to build out its infrastructure networks are having, and will continue to have, a major impact on global patterns of provision and spending.

while for upper-middle- and high-income countries it represents the single greatest share. At the same time, we can see that the share of spending devoted to water, sanitation, wastewater treatment, and irrigation steadily diminishes as income levels increase. Spending on ICT follows a similar pattern, decreasing significantly as incomes rise, reflecting the head start high-income countries currently enjoy with respect to modern forms of ICT and the rapid catch-up underway everywhere else.

Figure 5.16 also shows that the spending patterns of developing countries, in general, will move toward convergence with high-income countries as spending shifts from water-related infrastructure and ICT to electricity and roads. At the same time, it shows that different income groups will progress at different rates, with low- and lower-middle income countries even in 2060 still spending a significantly greater share on water and ICT and less on electricity and roads than upper-middle- and high-income countries. Spending by today's upper-middle-income countries, on the other hand, will closely resemble that of today's high-income countries. In short, we expect that current differences in the patterns of core infrastructure spending across income groups will diminish (but not disappear) over our forecast horizon, and that regional patterns, in general, will reflect this evolution.

Comparing Base Case Results to Targets

In Chapter 1, we reviewed a wide range of sources to find existing or proposed international or regional infrastructure goals and targets. The most immediate of these is Target 7.C of the Millennium Development Goals (MDGs), which is for developing countries

Figure 5.16 Distribution of core infrastructure spending by infrastructure type and income group: 2010, 2030, and 2060

Note: Spending is total of public and private sources.

Source: IFs Version 6.61 Base Case.

to "halve, by 2015, the proportion of people without sustainable access to safe drinking water and sanitation," with 1990 being the base year from which the reductions are to be measured.[12]

Moving beyond the MDGs, we built on the somewhat disparate goals we found in the literature to create a set of targets cutting across infrastructure categories as a basis for our analysis of possibilities and constraints. We specified a date of 2030 for countries to meet each of these targets; the targets themselves are summarized in Box 5.3. We should be clear that such longer-term, and (mostly) universal, targets had not been formally adopted at the time of the preparation of this volume. However, they are likely to be among those that will be discussed as the United Nations develops its post-2015 agenda (United Nations System Task Team on the Post-2015 UN Development Agenda 2012).

The reader should keep in mind that our Base Case does not assume any special push on infrastructure. It is meant to forecast what we might expect as far as infrastructure development, not necessarily what we might desire. Nonetheless, in our Base Case forecast, the MDG target for access to improved water will be met at the global level[13] and by both of the middle-income country groups (Table 5.6, on p. 132). However, these aggregates hide the fact that half of all developing countries, including two-thirds of the low-income countries, will not meet the target. Regionally, sub-Saharan Africa and the Middle East and North Africa as a whole will not achieve the target, but for very different reasons. Sub-Saharan Africa is currently far from the target, requiring it to bring improved water infrastructure to a large segment of its population. The Middle East and North Africa, on the other hand, already has quite high levels of access, so it will have to provide infrastructure for ever-smaller and more isolated pockets of population, which is more expensive than provision at lower levels of access.

The situation for access to improved sanitation is even less sanguine than that for water, both in terms of the absolute levels of

Our Base Case does not assume any special push on infrastructure. It is meant to forecast what we might expect, not necessarily what we might desire.

Box 5.3 Infrastructure access targets beyond the MDGs

Our intent in identifying infrastructure targets was to contribute to ongoing discussions by developing and evaluating a set of targets that encompass a wide range of core infrastructure categories. The targets we eventually selected, by category of infrastructure, are:

- *Transportation*: reduce by one-half the portion of rural populations living beyond 2 kilometers of an all-season road, with a maximum target level of 90 percent access (that is, if a reduction of one-half implies a target level above 90 percent access, we set the target level to 90 percent.
- *Energy*: provide universal access to electricity and eliminate unventilated indoor use of solid fuels.
- *Water and sanitation*: provide universal access to improved sources of water and sanitation.
- *Information and communication technologies*: provide universal access to mobile broadband, where we define universal access for this goal as 150 subscriptions per 100 persons.*

The reader may wonder why we do not target universal access for all-season roads. First, the goal originally stated by Roberts, KC, and Rastogi (2006: A–25) in their analysis for the World Bank was simply to work at reducing the portion of the rural population without access. Second, as noted by Foster and Briceño-Garmendia (2010: 56), "Because of low population densities in rural Africa, raising this Rural Access Index to 100 percent for Africa would be essentially unaffordable." This conclusion is supported by our analysis, which shows that the amount of road needed to increase access grows exponentially as access goes much above 80 percent. This gives rise to rapidly increasing costs with the pursuit of each additional percentage point of access, making attainment of universal all-season road access extraordinarily expensive for countries with widely dispersed low-density populations. Unlike roads, which by definition require "grid access," electricity (with generators and increasingly with distributed renewable production), water (with wells or transport of water), sanitation (with cesspools), and mobile broadband can be "off-grid," making the pursuit of truly universal access a more reasonable goal.

Finally, although universal targets mean 100 percent access (or 150 subscriptions per 100 persons for mobile broadband), in this chapter and the next, we use a 97.5 percent access rate as a proxy for assessing whether a country or region has effectively attained universal access.

**Based on the International Telecommunication Union's ideal value of 150 mobile phone subscriptions per 100 persons used in their ICT Development Index (ITU 2009: 18).*

Table 5.6 MDG targets for access to improved water and sanitation compared to IFs Base Case forecast by income group and region: 2015

	Water			Sanitation		
By income group, developing countries only	Target percent of population with access	Base Case forecast of percent of population with access	Percent of countries meeting target	Target percent of population with access	Base Case forecast of percent of population with access	Percent of countries meeting target
Low-income countries	76	67 ●	34	63	40 ●	6
Lower-middle-income countries	86	89 ●	56	66	53 ●	23
Upper-middle-income countries	88	97 ●	60	73	80 ●	30
By region, developing countries only						
East Asia and Pacific	84	95 ●	63	65	74 ●	42
Europe and Central Asia	95	97 ●	59	91	86 ●	18
Latin America and the Caribbean	93	95 ●	67	84	81 ●	37
Middle East and North Africa	93	90 ●	39	86	89 ●	31
South Asia	86	93 ●	75	61	45 ●	25
Sub-Saharan Africa	74	63 ●	33	63	34 ●	0
Developing world	**86**	**89 ●**	**52**	**69**	**62 ●**	**21**

Note: A green circle indicates that we forecast the income group or region will achieve the target level by 2015; a red circle indicates that we forecast the income group or region will not achieve the target level by 2015. High-income countries are not included in the MDG targets so are not included in this analysis.

Source IFs Version 6.61.

coverage and the achievement of the target. Not only is the sanitation target not met globally by the MDG target year of 2015, but also four-fifths of all developing countries and almost all low-income countries do not achieve it, nor does a single sub-Saharan African country. On the other side, upper-middle-income countries manage to meet the sanitation target, as do East Asia and Pacific and Middle East and North Africa regions.

Although the Base Case forecasts significant progress, it is not enough for many countries to meet most existing infrastructure goals.

Turning to the broader set of targets that might characterize a post-MDG set for 2030, we have already seen (see again Figure 5.3 and Table 5.3) that universal access is not achieved at the global level in our Base Case for many forms of infrastructure by 2060, much less by 2030. This is primarily because of lack of access in low-income countries, especially in sub-Saharan Africa.

Figure 5.17 shows the percentage of countries in each income group and developing region that we forecast will have attained the access levels specified in the potential post-MDG targets for the years 2010, 2030, and 2060. The figure highlights the fact that, although the Base Case forecasts significant progress, it is not sufficient for many countries to meet most of the targets. By 2060, only the target for mobile telecommunications is globally achieved. For all-season roads, electricity, and improved water, approximately just under half of all countries (and 30 percent of developing countries) achieve the target levels by 2030 and just less than three quarters (and 65 percent of developing countries) by 2060. Access to sanitation lags significantly behind the rest, with only slightly under a quarter of all countries (and 6 percent of developing countries) achieving the target levels in 2030, reaching only to 34 percent (and 16 percent of developing countries) by 2060.

Much of this pattern of outcomes is related to rates of economic growth. In 2060, the average GDP per capita of $5,300 (in 2000 dollars) in the low-income countries is still likely to be less than that of upper-middle-income countries in 2010, which was $7,700. Thus, as discussed earlier, even though infrastructure levels are likely to be higher in future years at any given level of GDP per capita than they are today, our forecasts of future economic growth are not enough to stimulate achievement of the target levels of infrastructure.

We will explore these targets in more detail in Chapter 6. It is clear from the Base Case results, however, that achievement of the targets would require an acceleration of infrastructure development above that which might be expected given the forecasted levels

Figure 5.17 Percentage of countries forecast to achieve potential post-MDG infrastructure target levels by 2010, 2030, and 2060

Source: IFs Version 6.61 Base Case.

of economic growth. A key question we will ask is whether choosing to undertake such an acceleration makes sense. Making additional funds available for faster infrastructure development would necessarily divert resources from other sectors, such as health and education, with associated impacts on human well-being, and we will want to explore the costs as well as benefits of doing so.

The Sensitivity of the IFs Base Case to Alternative Unit Cost Assumptions

All forecasts are fraught with uncertainties. Our forecasts of future levels of infrastructure and infrastructure access, the spending associated with them, and the economic and social implications of infrastructure development are no exception. Chapters 2 and 4 emphasized that one of the key uncertainties surrounding the forecasting of infrastructure is a very basic one, the cost of construction and of maintenance or renewal. For example, available data show that unit costs can vary widely depending on a multitude of factors—geography, extent of existing infrastructure, and levels of corruption, to name but a few—and many of the factors are not easily captured in a model. In substantial part for this reason, we chose to use the same unit costs across countries and time (see again Table 4.5 for our unit cost assumptions). But what if those costs are considerably too high or too low, at least for some or many of our countries?

In order to test the general sensitivity of results to our cost assumptions, we have explored two scenarios: a Low Cost scenario, in which we assume unit costs that are half those in the Base Case, and a High Cost scenario, in which we assume unit costs that are 50 percent higher than those in the Base Case. In both instances, we introduced the change in costs in the second model year, 2011. The reason is that our model's data preprocessor fills data holes, identifies and adjusts unreasonable values, and reconciles all model data for 2010, including all government spending and revenue values, thereby making a variety of adjustments that can offset part, or all, of the introduction of significantly higher or lower unit cost values. However, what we want in our sensitivity analysis is to see the fullest potential consequences of alternative values, so we begin that analysis in 2011.

Table 5.7 shows the impact that different unit cost assumptions have on access to electricity in 2060. At a global level, the difference in access rates between the two scenarios is not great—in fact less than two percentage points. This is in large part because the world is likely to achieve almost universal access to electricity by 2060 even in the high unit cost scenario. When we turn to low-income countries, however, we see a considerably larger

Table 5.7 Forecast of electricity access and percentage point change in access by income group and region under differing IFs unit cost scenarios: 2060

	Percent of population with access			Percentage point change from Base Case	
By income group	**Low Cost scenario**	**Base Case**	**High Cost scenario**	**Low Cost scenario**	**High Cost scenario**
Low-income countries	81.76	77.25	72.67	4.51	-4.58
Lower-middle-income countries	98.55	98.02	97.37	0.53	-0.65
Upper-middle-income countries	99.80	99.79	99.76	0.01	-0.03
High-income countries	99.68	99.69	99.66	-0.01	-0.03
By region, developing countries only					
East Asia and Pacific	99.09	98.96	98.81	0.13	-0.15
Europe and Central Asia	99.62	99.16	98.21	0.46	-0.95
Latin America and the Caribbean	99.39	99.31	99.02	0.08	-0.29
Middle East and North Africa	98.89	98.58	97.92	0.31	-0.66
South Asia	98.20	97.66	97.15	0.54	-0.51
Sub-Saharan Africa	85.04	81.13	77.20	3.91	-3.93
World	**95.80**	**94.61**	**93.34**	**1.19**	**-1.27**

Source: IFs Version 6.61 Low Cost, Base Case, and High Cost scenarios.

Table 5.8 Forecast of GDP per capita at PPP and percentage change in GDP per capita at PPP by income group and region under differing unit cost scenarios: 2060

	GDP per capita (thousand $ PPP)			Percent change in GDP per capita from Base Case	
By income group	**Low Cost scenario**	**Base Case**	**High Cost scenario**	**Low Cost scenario**	**High Cost scenario**
Low-income countries	6.14	5.34	4.65	14.99	-12.99
Lower-middle-income countries	14.72	14.12	13.52	4.25	-4.25
Upper-middle-income countries	30.30	29.73	29.60	1.92	-0.44
High-income countries	51.48	51.31	51.23	0.33	-0.16
By region, developing countries only					
East Asia and Pacific	28.19	27.61	27.51	2.10	-0.36
Europe and Central Asia	20.86	20.38	20.02	2.36	-1.77
Latin America and the Caribbean	20.60	20.16	19.80	2.18	-1.79
Middle East and North Africa	12.40	11.97	11.51	3.59	-3.84
South Asia	16.95	16.38	15.80	3.48	-3.54
Sub-Saharan Africa	8.26	7.34	6.53	12.56	-10.97
World	**21.97**	**21.28**	**20.74**	**3.24**	**-2.54**

Source: IFs Version 6.61 Low Cost, Base Case, and High Cost scenarios.

difference, about 9 percentage points, between the two framing scenarios. On a regional basis, that is echoed in sub-Saharan Africa, with a nearly 8 percentage point gap.

Turning to the broad systemic consequences of such alternative cost assumptions, Table 5.8 shows the differences in GDP per capita in 2060 across the three scenarios. The differences here reflect, among other things (1) the direct costs of spending more or less to pursue expected levels of infrastructure; (2) the implications this can have on other government spending; and (3) the resulting differences in infrastructure attainment.

At an aggregate global level, the impact on GDP per capita is not terribly great—a negative swing of slightly less than 6 percent in GDP per capita from the Low Cost to the High Cost scenario. This is because the high-income countries account for the bulk of global GDP, spend a relatively low fraction of their GDP on infrastructure, and can at least relatively afford to maintain high infrastructure access even under assumptions of quite different cost structures. In contrast, however, the difference in GDP across scenarios around unit costs for low-income countries reaches about 28 percent and more than 23.5 percent for sub-Saharan Africa.

Our sensitivity analysis suggests the importance for future work in the forecasting of infrastructure to include a focus on improved understanding of unit costs. We acknowledge that it is an important source of uncertainty in our forecasting of infrastructure futures. We see too that the interaction of infrastructure costs and economic growth emphasizes once again the importance of analyzing infrastructure futures in the context of a fully integrated system in which infrastructure not only responds to broader socioeconomic development, but also significantly affects it within complex feedback systems.

Comparing the IFs Base Case to Forecasts of Others

In Chapter 4, we reviewed previous efforts of others to forecast infrastructure stocks, access, and spending. We want to compare the forecasts provided by those studies with our own Base Case, partly as a form of validation of our work and also to help understand the reasons for differences that might appear between the patterns we anticipate and those anticipated by other analyses.

Some studies have focused heavily on the future of stocks and access. Among those is the *World Energy Outlook 2011* (International Energy Agency 2011), which provided forecasts for electricity generation capacity and electricity access through 2025. Because several forecasts have looked at electricity, we first compare our stock and access forecasts with that set.

Cost assumptions are a key uncertainty in the forecasting of infrastructure.

Figure 5.18 Comparing forecasts of electricity generation capacity: 2005–2050

Note: IEO Reference Case refers to a scenario from the United States Energy Information Administration's International Energy Outlook 2011 *and is based on country policies in place as of mid-2011. HCS No Climate Change scenario refers to the No Climate Change scenario of G. Hughes, Chinowsky, and Strzepek 2009. Two scenarios are from the International Energy Agency's* World Energy Outlook 2011; *WEO Current Policies is based on country policies in effect as of mid-2011, while WEO New Policies is based on assumed implementation of recently announced new or proposed country commitments and plans.*

Source: USEIA 2011; G. Hughes, Chinowsky, and Strzepek 2009; IEA 2011; IFs Version 6.61 Base Case.

A number of other studies have focused on spending or have added spending to their interest in stocks and/or access. The majority of these studies have forecast the need for infrastructure stocks as a function of a small set of economic, structural, and demographic drivers using empirically estimated equations. The future values of the drivers were, in most cases, provided exogenously. The stock estimates were then combined with assumptions about unit costs to produce forecasts of spending needs. A few studies used larger, integrated structural models, but in those cases, infrastructure was not the primary focus, and the infrastructure forecasts were just one output of many. After considering electricity stock and access, we next turn to comparison of the IFs Base Case with such spending forecasts, even though some of them (1) are quite short term (e.g., Bhattacharyay 2010 looks out only to 2020); (2) focus on only a subset of global regions; and (3) build on forecasts of infrastructure demand without necessarily considering financial constraints.

Finally, there are relatively few studies that devote attention to a number of infrastructure types in an integrated fashion, consider spending as well as stocks and access, and look out longer-term. The primary study in this category is that of G. Hughes, Chinowsky, and Strzepek (2009), which has extensive forecast coverage and is most comparable to our work, Some studies by Kohli and co-authors also fit into this category (see Kohli and Basil 2011; Kohli and Mukherjee 2011; and Kohli, Szyf and Arnold 2012). We look also at comparisons of the IFs Base Case with the results of these integrated studies and especially those of the G. Hughes, Chinowsky, and Strzepek study (which we refer to as "HCS" for ease of presentation in the tables and figures of this section).

Comparing electricity generation capacity and access to electricity

The United States Energy Information Agency and the International Energy Agency (IEA) produce international energy outlooks each year that include projections of electricity generation capacity (see USEIA 2011 and IEA 2011).[14] Figure 5.18 compares our forecasts against the most recent projections of these two groups, as well as those provided by G. Hughes, Chinowsky, and Strzepek (2009). Each of these studies forecasts steady growth in capacity over the next few decades. Our forecasts are quite close to those of the IEA for both the OECD and the non-OECD countries, while the USEIA projects somewhat slower growth for both sets of countries.

If we compare our results to those of the HCS study, which are significantly lower, we see that the primary reason for the difference in the forecasts for OECD countries is that HCS starts with initially lower values; the rates of growth are quite similar at approximately 0.9 percent per year from 2005 to 2050 in their case and 2010 to 2050 in ours. The initial values of the two studies for the non-OECD countries show less of a difference, but the rate of generation capacity growth that the HCS study forecasts is also much lower—approximately 2.3 percent per year from 2005 to 2050 versus 3.4 percent per year in the IFs Base Case. As we shall see below, this almost certainly has much to do with their lower expectations for economic growth in developing countries.

Almost no studies provide forecasts of electricity access. The IEA did so in the *World Energy Outlook 2011*, but only at a regional level and for a single year (2030). However, G. Hughes, Chinowsky, and Strzepek (2009) do provide country-level forecasts of electricity access at five-year intervals to 2050. Since electricity access is primarily of concern in the developing countries, we focus our comparison on those countries, using the IEA regional groupings as shown in Table 5.9.

At the global level, all three forecasts of access are very much in line. The larger global

Table 5.9 Comparing forecasts of electricity access rates for all developing countries and by developing region: 2009/2010, 2030, and 2050

	Year		
All developing countries	**2009/2010**	**2030**	**2050**
HCS No Climate Change scenario	79	91	97
WEO New Policies scenario	75	84	N/A
IFs Base Case	73	85	92
Africa			
HCS No Climate Change scenario	47	70	91
WEO New Policies scenario	42	58	N/A
IFs Base Case	41	58	77
Latin America			
HCS No Climate Change scenario	93	98	99
WEO New Policies scenario	93	98	N/A
IFs Base Case	93	96	99
Middle East			
HCS No Climate Change scenario	98	100	100
IEA WEO New Policies scenario	89	98	N/A
IFs Base Case	90	93	96
Non-OECD Asia			
HCS No Climate Change scenario	86	97	99
IEA WEO New Policies scenario	81	91	N/A
IFs Base Case	79	94	97

Note: Countries are grouped according to IEA developing regions rather than the World Bank categories we typically use. Values represent percent of population with access. IEA initial year values are for 2009; HCS and IFs initial year values are for 2010. We use the HCS No Climate Change scenario because it is their reference case and also because their much more detailed treatment of the impact of climate change on infrastructure would skew the comparison. We use the IEA's New Policies scenario (instead of their Current Policies scenario) because they specify it as the central scenario in World Energy Outlook 2011. *It takes into account recently announced commitments and plans, even if they are yet to be formally adopted and implemented.*

Source: G. Hughes, Chinowsky, and Strzepek 2009 and personal communication from Gordon Hughes; IEA 2011; IFs Version 6.61 Base Case.

values for 2050 in the HCS study are almost entirely explained by their use of initially higher values. The three studies are also consistent in forecasting that, while access rates in Africa will grow considerably, they will continue to lag behind those in other regions—although G. Hughes, Chinowsky, and Strzepek are more optimistic about progress in access rates in Africa than we are, in spite of their greater conservatism about growth in generating capacity.

Comparing infrastructure spending forecasts

Comparing forecasts of infrastructure spending is generally trickier than comparing forecasts of infrastructure stocks and access for a number of reasons. First, while future investment levels depend on forecasts of stocks and access, they also rely on assumptions about such factors as unit costs and depreciation rates (see Chapter 4 and Box 5.2). Second, the measures of stocks are more easily compared—a kilometer of paved road in one study is generally the same as a kilometer of road in another study. Even when spending estimates use the same currency (usually US dollars), however, studies often use different base years for that currency. Third, what the estimates include—public spending, private spending, or both; new construction, replacement, general operations and maintenance; or all of the above—is not always clear. The second of these problems can be partially addressed by comparing spending estimates in relative terms, for example, as a percentage of GDP. We use that approach in the comparisons that follow. Understanding whether remaining observed differences are due to the first or third problems requires being able to find detailed information about the studies, which is not always provided in publications.

Given the many measurement issues discussed above, understanding (let alone interpreting) differences in spending forecasts is especially difficult. Nonetheless, the comparisons can provide a partial understanding of how and why our spending forecasts are similar to, or different from, those of others in terms of magnitude and change over time. In the remainder of this section, we compare a number of our spending forecasts against those of a global study and two studies that focus on specific regions.

Earlier in this chapter, we noted that our estimates of total global spending on infrastructure in absolute dollars out to 2030 are quite similar to those presented in the OECD's Infrastructure to 2030 report. We can make a further comparison to the OECD's forecasts of decadal average infrastructure spending for various types of infrastructure at the global level as a percentage of GDP, and do so in Table 5.10.

These results show less congruence between the two studies than the forecasts of total global infrastructure spending out to 2030. They also point out the difficulties in making such comparisons across studies when the definitions of infrastructure and included infrastructure items differ, as those differences obviously affect the associated costs. For example, the OECD's figures for electricity do not include the actual construction of generating plants, while construction forms a large share of IFs estimates for electricity costs. Alternatively, the OECD figures for

Table 5.10 Comparing global spending forecasts of OECD and IFs for selected infrastructure items as a percent of GDP: 2010–2020 and 2020–2030

	2010–2020		2020–2030	
	OECD	IFs	OECD	IFs
Roads	0.32	0.64	0.29	0.53
Electricity	0.24	0.94	0.24	0.78
Water	1.01	0.24	1.03	0.22
Telecommunications	0.85	0.45	0.17	0.40

Note: OECD electricity costs are for transmission and distribution only, and their estimates for water are for OECD countries and Brazil, China, India, and Russia only rather than for all countries. Values from the OECD are 10-year-period averages for roads and electricity; their water and telecommunications estimates are for the single years 2015 and 2025 rather than averages for the decade. Values from IFs are 10-year-period averages in all cases.

Source: Stevens, Schieb, and Andrieu 2006: 29; IFs Version 6.61 Base Case.

expenses related to water include a much broader set of costs, including for water quality improvements, which IFs does not consider. Their inclusion of water quality improvements and other costs leads the authors of the OECD report to conclude that water infrastructure will require the most funding over the next two decades, whereas, for us, it is the sector requiring the least amount of resources.

At the regional level, Bhattacharyay (2010) estimated costs for the period 2010–2020 in four infrastructure sectors for four subregions of Asia and for Asia as a whole. Table 5.11 compares results from Bhattcharyay's Low Cost scenario with those in our Base Case, using his regional definitions. Overall, our results are similar, and both studies point to the larger share of expenditures for transport and electricity than for the other sectors. However, Bhattacharyay's estimates are generally higher for both transportation and electricity than ours. Some of the differences in our estimates for transportation spending arise because he included spending on airports, ports, and railways in addition to roads, while we consider only roads. Meanwhile, our estimates for spending on water and sanitation consistently exceed his; this is due in part to our unit costs being higher. Our unit costs for both fixed and mobile phones are somewhat higher than Bhattacharyay's. In addition, he imposes a cap on mobile phones at 90 per 100 persons, while our saturation level is 150 phones per 100 persons. Both differences help explain our higher spending forecast for telecommunications.

Another regional study is that of Kohli and Basil (2011), who provided infrastructure cost estimates for 21 Latin America countries for the period 2011–2040. Figure 5.19 (p. 140) compares the cost estimates in their Business as Usual scenario to our Base Case by sector, using only those types of infrastructure that appear in both studies. The results are quite comparable for water and sanitation and for ICT, with much of the difference attributable to our use of higher unit costs for those infrastructure types.[15] Meanwhile, our unit costs for electricity generation capacity are lower ($1,000–2,000 per kilowatt vs. $4,000), which explains part of the magnitude difference in the forecasts but not the difference in the shape of the curves. Finally, although we use a significantly lower unit cost for roads than do Kohli and Basil ($150,000–400,000 per kilometer vs. $895,000), this does not explain either the magnitude or shape differences in our estimates. The explanation likely lies in part in the fact that the current percentage of roads paved in Latin America is very low given its current level of GDP per capita. Our forecast assumes that this will be addressed, leading to an acceleration of paving and, therefore, of investment in roads. Unfortunately, Kohli and Basil did not provide their estimates of physical changes in infrastructure, which would allow us to explore the differences in our results in more detail.

Comparisons with integrated, longer-term studies

The forecasts of G. Hughes, Chinowsky, and Strzepek (2009), like those of IFs, cover

Infrastructure spending forecasts depend not only on forecasts of stocks and access, but also on assumptions about unit costs and depreciation rates. Comparisons are often tricky.

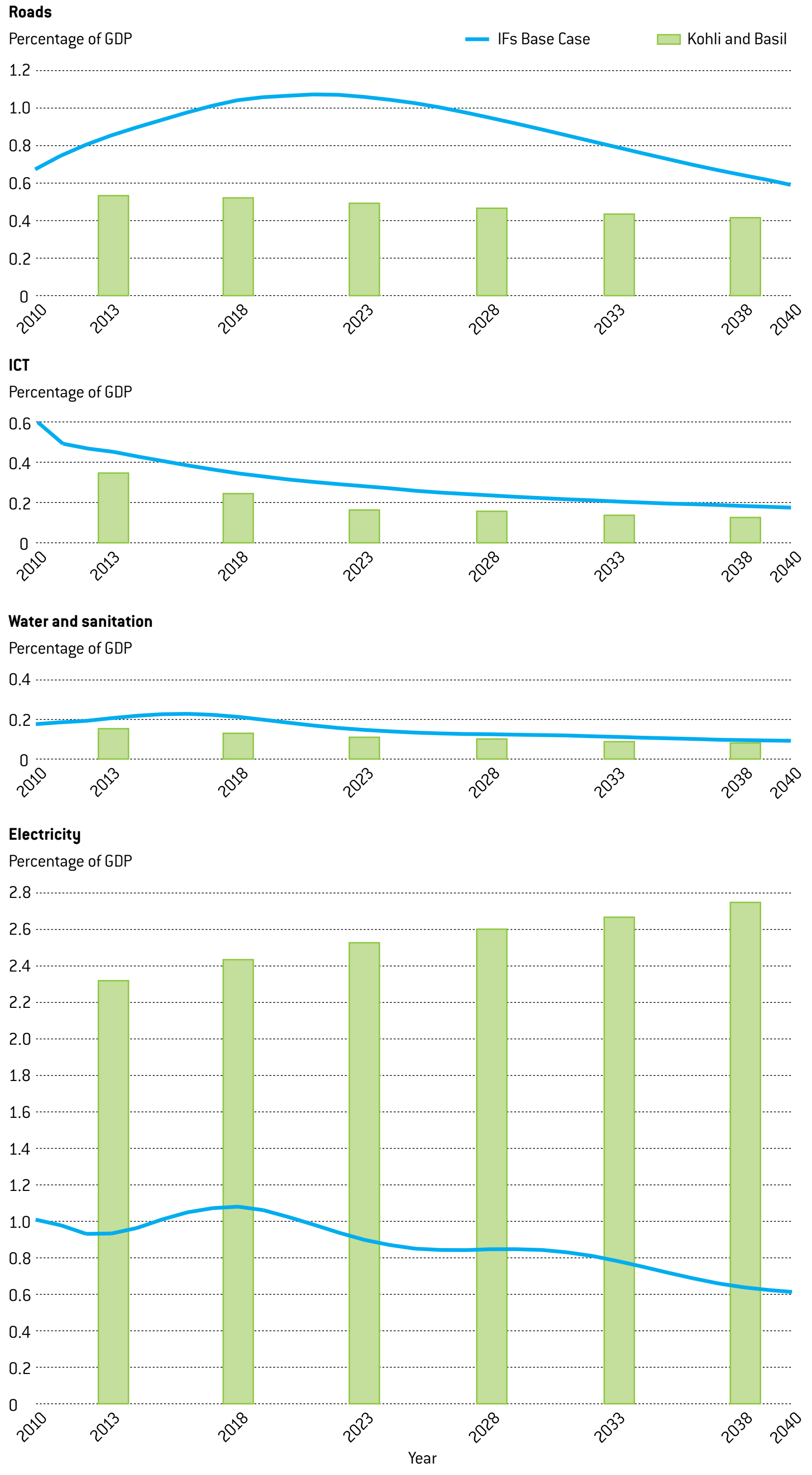
Table 5.11 Comparing Asian subregional and regional infrastructure spending forecasts of Bhattacharyav (Bhat) and IFs as a percent of GDP: 2010–2020

	Total		Transport		Electricity		Water and sanitation		Fixed and mobile phones	
	Bhat	IFs	Bhat	IFs	Bhat	IFs	Bhat	IFs	Bhat	IFs
Central Asia	6.64	6.87	1.86	2.38	2.97	2.22	0.42	0.53	1.40	1.75
East and South East Asia	5.54	4.86	1.61	1.21	3.22	2.65	0.17	0.40	0.53	0.60
South Asia	11.00	5.71	5.55	1.73	3.03	2.20	0.39	0.54	2.02	1.25
The Pacific	3.55	6.43	2.60	2.03	N/A	1.46	0.30	0.69	0.65	2.25
Total Asia	6.52	5.11	2.30	1.36	3.17	2.54	0.22	0.44	0.82	0.78

Note: Bhattacharyay considered a Base Case and Low Cost and High Cost scenarios. We compare IFs forecasts with his Low Cost values because the source we used (Bhattacharyay 2010) provided results only for that scenario. It assumed managerial constraints and slower GDP growth than his other scenarios (Bhattacharyay 2010: 11). Bhattacharyay did not provide a forecast for spending on electricity in The Pacific in the source we used.

Source: Bhattacharyay 2010: 15; IFs Version 6.61 Base Case.

Figure 5.19 Comparing spending forecasts of Kohli and Basil and IFs by infrastructure sector as a percent of GDP for Latin America and the Caribbean: 2010–2040



Note: Kohli and Basil data available for selected years only. ICT includes fixed and mobile telephones and fixed broadband; mobile broadband is not included.

Source: Kohli and Basil 2011 (various pages); IFs Version 6.61 Base Case.

countries around the world, look across multiple infrastructure categories, extend through 2050, and treat both physical expansion of infrastructure and spending on it. Therefore, they provide a very important basis for comparison, and Gordon Hughes was extraordinarily generous in providing the detail of those forecasts to us. G. Hughes, Chinowsky, and Strzepek presented both a No Climate Change reference scenario and two climate change scenarios. We consistently compare our results to their No Climate Change scenario, both because it is their reference scenario and also because their treatment of climate change is very different from ours, hence making comparisons difficult.

As in IFs, the HCS infrastructure forecasts are responsive to population and GDP per capita forecasts. The two sets of population forecasts are quite similar, although IFs anticipates slightly higher growth resulting in a global population in 2050 of 9.31 billion versus 9.18 billion in HCS, with much of the variation due to differences in sub-Saharan Africa (Table 5.12).[16] As Table 5.12 shows, the GDP per capita growth forecasts are also similar at the global level, but differ significantly by region.[17] Based on recent data that include both the strong economic performance of emerging countries in the first decade of the century and the global recession after 2008, IFs anticipates less growth than HCS forecasts in high-income countries and more in low-income countries, especially sub-Saharan Africa. These differences, of course, affect our respective infrastructure forecasts, as noted earlier with respect to electricity.

G. Hughes, Chinowsky, and Strzepek (2009) focused their study on the potential economic costs of climate change on infrastructure. Their primary emphasis was on differences in infrastructure costs between scenarios with, and without, climate change (we used their No Climate Change scenario for our comparisons), rather than on the absolute amount of infrastructure stocks, access, or costs within any single scenario. Therefore they did not force initial levels of stocks and access to exactly match historical data, but rather used the same equations to calculate initial values as they used for their forecasts. For this reason, their initial values will often differ from those in the IFs Base Case and from actual historical

Table 5.12 Comparing HCS and IFs forecasts of population and GDP per capita growth rates by income group and region: 2010–2050

	Annual average growth rate (percent)			
	Population		GDP per capita	
By income group	**HCS**	**IFs**	**HCS**	**IFs**
Low-income countries	1.72	1.82	2.03	3.52
Lower-middle-income countries	0.93	1.06	2.81	3.48
Upper-middle-income countries	0.24	0.21	3.00	3.05
High-income countries	0.22	0.20	1.56	1.10
By region, developing countries only				
East Asia and Pacific	0.58	0.23	3.49	3.75
Europe and Central Asia	-0.14	-0.04	2.65	1.79
Latin America and the Caribbean	0.66	0.69	2.13	1.82
Middle East and North Africa	1.12	1.18	1.93	1.66
South Asia	0.91	0.93	3.19	4.09
Sub-Saharan Africa	1.79	2.07	1.44	3.05
World	**0.72**	**0.77**	**1.86**	**1.90**

Note: Comparison is with HCS No Climate Change scenario.

Source: G. Hughes, Chinowsky, and Strzepek 2000 and personal communication from Gordon Hughes; IFs Version 6.61 Base Case.

data. Therefore, in our comparisons with HCS forecasts, we emphasize future values relative to those of 2010 rather than looking at the absolute values.

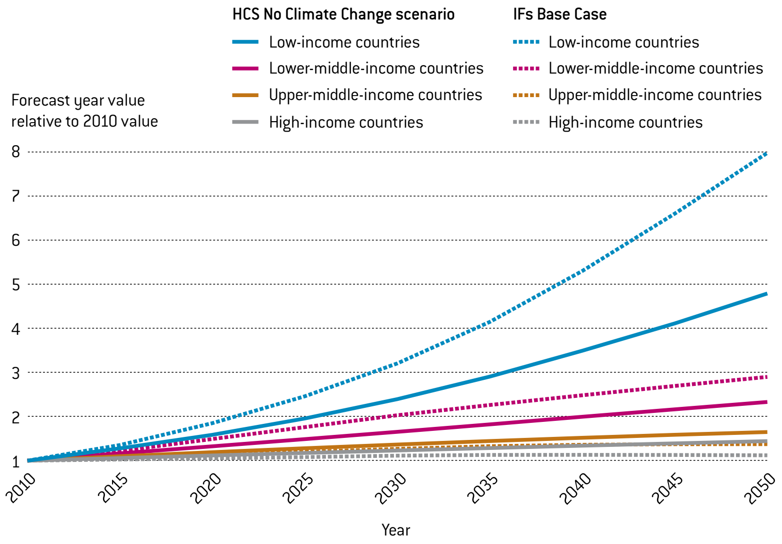
In Chapter 2, we surveyed the patterns of historical growth in infrastructure. For instance, we noted that paved roads grew globally at an annual rate of 1.8 percent between 1990 and 2009. Even with that growth, the portion of roads paved in both Latin America and the Caribbean and in sub-Saharan Africa reached only approximately 18–20 percent (see again Figure 2.2), and the roads per capita of all developing regions remained far below the levels of high-income countries. Thus, much headroom exists for continued growth, and IFs forecasts anticipate a 1.6 percent annual growth globally through 2050, compared to 1.0 percent by HCS. IFs anticipates a six-fold increase in paved roads in low-income countries; that jump is twice the one anticipated by HCS, with much of the difference explained by our higher economic forecasts. We also expect faster growth of paved roads in middle-income countries. Overall, the differences across a full 40-year period are significant, but understandable given differences in underlying assumptions.

Similar differences between the two sets of forecasts are true for the number of household electricity connections (see Figure 5.20, on p. 142), and are even more clearly related to the differences in economic forecasts. IFs foresees greater extension of connections for both low-income and lower-middle-income countries, and somewhat less extension for upper-middle and high-income countries.[18]

Table 5.13 (p. 142) illustrates some of the difficulties in making comparisons across studies. The definitions for household connections to water are similar in the two studies, both specifically referring to piped water connections. Differences in the forecasts for growth in water connections in the two studies are quite consistent, once again reflecting the differences in economic growth assumptions. Comparing household connections to sanitation, however, presents a definitional challenge. For HCS, we used their data on sewer connections, while for IFs we used connections to improved sanitation. With the exception of sub-Saharan Africa, the HCS forecasts for growth in access to improved sanitation are uniformly higher than those in IFs. Given the relative consistency of the electricity and water connection growth forecasts after accounting for differences in GDP per capita, the forecasts of sanitation connections would most likely also be closer if the definitional challenges

The forecasts of G. Hughes, Chinowsky, and Strzepek—similar to ours in terms of scope, time horizon, and inclusion of both stocks and spending—provide an important basis for comparison.

Figure 5.20 Comparing forecasts of growth in HCS and IFs electricity connection forecasts by income group: 2010–2050



Note: Future year forecasted values are shown relative to values in 2010; that is, both sets of forecasts are scaled to their own values in 2010.

Source: G. Hughes, Chinowsky, and Strzepek 2009 and personal communication from Gordon Hughes; IFs Version 6.61 Base Case.

Table 5.13 Comparing HCS and IFs forecasts of growth in access to improved water and sanitation by income group and region in 2050

	Values in 2050 relative to values in 2010			
	Water		Sanitation	
	2050		2050	
By income group	**HCS**	**IFs**	**HCS**	**IFs**
Low-income countries	8.31	11.21	9.57	4.90
Lower-middle-income countries	5.05	5.42	7.59	3.70
Upper-middle-income countries	2.62	1.74	2.93	1.71
High-income countries	1.45	1.14	1.50	1.10
By region, developing countries only				
East Asia and Pacific	3.87	2.19	4.38	1.91
Europe and Central Asia	1.53	1.29	1.76	1.20
Latin America and the Caribbean	2.11	1.89	2.33	1.97
Middle East and North Africa	2.62	2.42	3.16	2.29
South Asia	7.58	6.96	19.20	4.30
Sub-Saharan Africa	6.46	11.16	6.58	6.82
World	**2.62**	**2.40**	**2.60**	**2.16**

Note: Growth is expressed in percentage point changes. Comparison is with the HCS No Climate Change scenario. Note that the definition for household connections to sanitation is not consistent across the two studies. The HCS measure is sewer connections only, while the IFs measure uses the broader definition of "improved facilities" from the World Health Organization and United Nations Children's Fund Joint Monitoring Programme for Water Supply and Sanitation. Both sets of forecasts are scaled by their own values in 2010.

Source: G. Hughes, Chinowsky, and Strzepek 2009 and personal communication from Gordon Hughes; IFs Version 6.61 Base Case.

could be addressed (see Box 2.4 for our definition of improved sanitation).

Moving to spending on infrastructure, we again look at changes over time relative to the values in 2010 (Figure 5.21). And, again, we face some definitional challenges. For example, HCS included only fixed telephones in their ICT infrastructure category, and they used different assumptions about unit costs and lifetimes than those in IFs.[19] Still, comparing the forecasts is valuable in order to better understand their similarities and differences.

The key similarity between the two forecasts is that spending on core infrastructure as a percentage of GDP eventually falls over time in all regions. In contrast to the rather smoothly downward-sloping trends of spending in the HCS forecasts, however, those of IFs show a near-term bubble of expenditures as a portion of GDP for sub-Saharan Africa and, to a considerably lesser degree, for Latin American and the Caribbean. IFs also shows small near-term rises relative to the downward trends for other developing regions.

What accounts for such bubbles? The explanations vary to some extent by region. In the case of Latin America, the bubble is related primarily to the jump in spending on paved roads, which we discussed earlier in our comparison with Kohli and Basil (2011). For sub-Saharan Africa, while we do forecast some short-term increase in spending as a portion of GDP on all forms of traditional infrastructure, the major contributor to the IFs bubble is spending on mobile telephony and broadband, infrastructures that the HCS study does not include. As discussed earlier in this chapter, we expect similar bubbles in a number of regions as the rapid build-out of this infrastructure continues, with the largest of these occurring in those regions where it has been later to start, notably sub-Saharan Africa and South Asia.

We can compare some of our results with the integrated analysis of Kohli and Mukherjee (2011), who investigated the possible costs to Asia of falling into a Middle Income Trap scenario relative to a high growth scenario (their Asian Century scenario). The economic growth foundations of the two scenarios are very different. For example, in Asian Century, China's GDP increases by a factor of 10.6 between 2011 and 2050, compared to a factor of only 3.1 in the Middle Income Trap scenario (2011:

296). For comparison, the corresponding GDP increase in the IFs Base Case is 9.6. In the case of India, the factors of GDP increase in the two Kohli and Mukherjee scenarios are 31.2 and 8.2, respectively, while that in the IFs Base Case is an intermediate 17.0. Almost all Chinese and Indians would have access to an improved water source by 2050 in either Kohli and Mukherjee scenario. IFs makes the same forecast. In the case of improved sanitation, however, the percentages without access in India would drop from 65 percent in 2011 to 9 percent in the Middle Income Trap and decline to 0 percent in the Asian Century scenario (almost all in China would have access in either scenario). In the IFs Base Case, the decline in lack of access to improved sanitation for India is from 55.6 to 12.3 percent, so we are somewhat less optimistic. For Asia overall, Kohli and Mukherjee's two scenarios present a range of 4 percent to 9 percent for those without access to improved sanitation, and we anticipate 6.5 percent for the Asia and Pacific region. Kohli and Mukherjee also look at non-urban paved road density, a variable we do not forecast.[20]

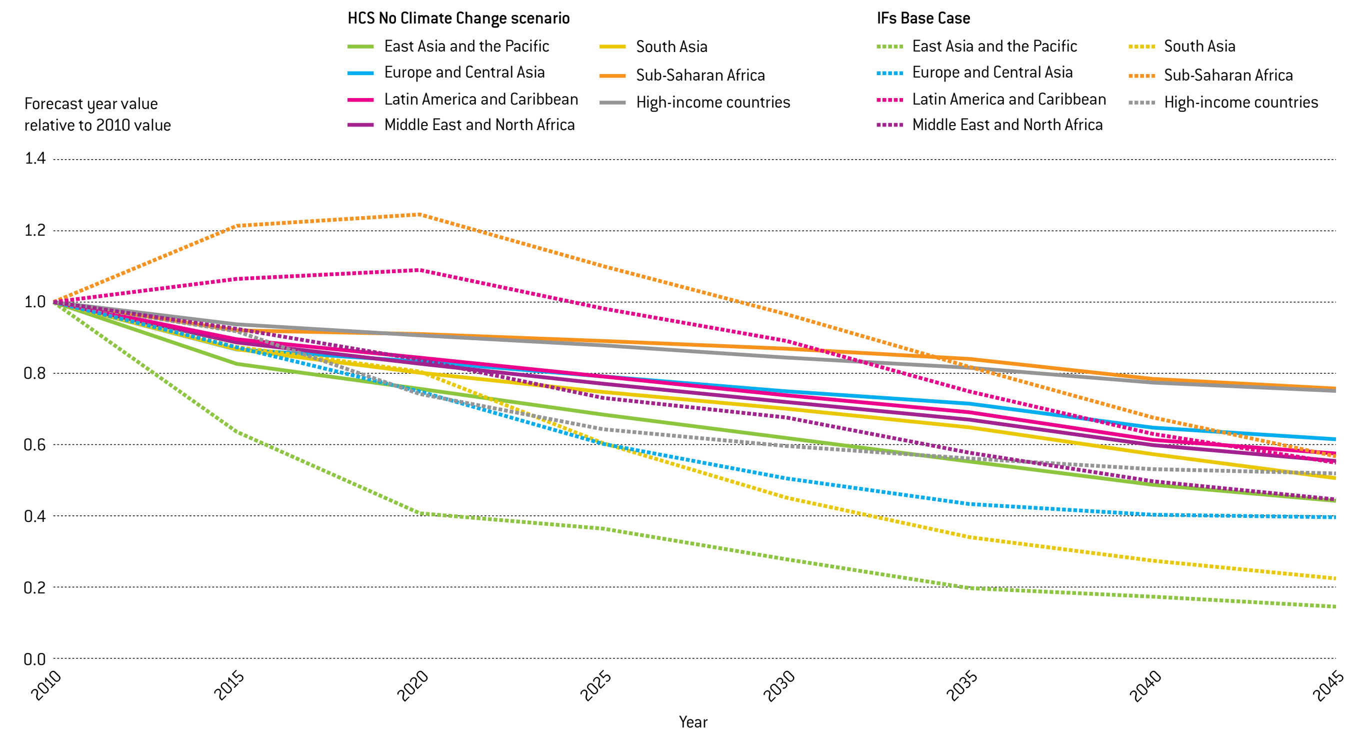
Summary of forecast comparisons

Comparing infrastructure forecasts across studies presents a number of challenges related to the different purposes, definitions, modeling approaches, and assumptions in each study. Nonetheless, such comparisons are valuable for lending confidence to our forecasts. Given our long time horizon, it was especially useful that we were able to compare in some depth the temporal dynamics of our forecasts with those of G. Hughes, Chinowsky, and Strzepek (2009).

Overall, our forecasts of stocks of physical infrastructure are broadly comparable with those of others, showing very similar patterns of expected growth. Not surprisingly, differences are greater for developing countries than for high-income ones. Such differences have many roots, including greater uncertainties about economic growth of developing countries and the complications around forecasting their

Many developing countries see near-term bubbles in spending as they attempt to rapidly build out their infrastructure; the largest bubbles occur in those countries furthest behind.

Figure 5.21 Comparing HCS and IFs forecasts of changes in spending on core infrastructure as a share of GDP by region: 2010—2050



Note: Values shown are relative to values in 2010; that is, both sets of forecasts are scaled by their own values in 2010.We exclude "other" infrastructure from the IFs forecasts in order to make the comparison more congruent with the HCS approach.

Source: G. Hughes, Chinowsky, and Strzepek 2009 and personal communication from Gordon Hughes; IFs Version 6.61 Base Case.

Our forecasts of physical infrastructure are broadly comparable with existing forecasts, showing very similar patterns of expected growth.

Studies tend to agree that as countries become richer and complete their build-outs of systems, spending on core infrastructure as a percentage of GDP will decline.

degree of attention to infrastructure given the many competing demands for their resources.

With respect to spending on infrastructure, the forecasts made by IFs and other studies differ more significantly. Yet, especially when considering the sometimes very different specifications of the infrastructure analyzed, of the unit costs, and presumably (but not always explicitly) of underlying physical system growth, the differences are generally reasonable. Furthermore, there tends to be agreement that, as countries become richer and complete their build-outs of systems, spending on core infrastructure as a share of GDP will decline. This also leads us generally to anticipate both lower shares of GDP directed to infrastructure in higher-income countries at any given point in time than in lower-income ones and decreasing shares of GDP spent within most countries over time (however, there can be bubbles of spending as a share of GDP for low-income countries as they accelerate the build-out process).

Conclusion

Our Base Case forecast indicates that, over the next half century, we can expect countries to increase their stocks of core infrastructure as well as their rates of access to core infrastructure services, even as populations grow. Still, significant numbers of people will continue to lack access to basic infrastructure services. For example, we forecast that in 2060 approximately 250 million people will not have access to an improved source of drinking water, half a billion people will not have access to electricity or live within two kilometers of an all-season road, and 1 billion people will not have access to improved sanitation. The vast majority of these people will be in low-income and lower-middle-income countries in sub-Saharan Africa and elsewhere. In fact, in the IFs Base Case, most developing countries will not achieve the proposed targets of universal, or near-universal, access to these services by 2030, and many will not achieve them even by 2060.

The formulations within IFs that determine the basic levels of infrastructure development that we expect are rooted in historical patterns of relationship between actual infrastructure development and the underlying drivers of it, such as population and income size. Thus, our forecasts are not of some unconstrained concept of demand. What individuals, after all, would not want all-season roads, electricity, household connections to water and sanitation, and high-quality information and communication technologies? The reality is, of course, that both private and public spending on infrastructure are constrained by alternative demands on limited budgets. Private purses are also devoted to food, shelter, and other needs and wants, and are largely driven by the expectation of private returns. Public purses must also support other public services such as health, education, and defense. Many governments find it impossible to meet even the constrained infrastructure expectations of our forecasting functions.

These realities and Base Case forecasting results raise obvious questions about the infrastructure targets discussed in the literature and summarized in Box 5.3. Are they achievable? What are the benefits and costs of achieving them? If greater spending would provide benefits (ideally larger than the costs), what assistance would governments need from other investors—public and private, domestic and international—in order to realize these benefits, and is this likely to be forthcoming? We explore these questions in our next chapter.

1 Comparative numbers come primarily from various databases in IFs and from the website and blogs of Rita Nangia at http://www.infranomics.org; see, for example, Rita Nangia, "Bloomberg: 'In God we trust. Everyone else, bring data,'" *Infranomics*, http://www.infranomics.org., 21 April 2012. Insights from Kim and Nangia (2010), augmented with selected public sources. Express road information also from "Expressways of China" at http://en.wikipedia.org/wiki/Expressways_of_China#cite_note-0; "India's Highway," *National Geographic*, May 2012 at http://ngm.nationalgeographic.com/2008/10/india-highway/belt-text/2. Electricity from "China Overtakes U.S. to Become World's Biggest Energy Consumer," *Financial Times*, 20 July 2010: 1; and "Lights and Action: China is Parlaying Its Hunger for Power into Yet More Economic Clout," *The Economist*, 29 April 2010: 72 (reporting on analysis by Edward Chen of Credit Suisse). High-speed rail from "High-speed Rails in the World by Country," *The Washington Post* at http://www.washingtonpost.com/wp-srv/world/highspeedrail.html (table using 2009 data from the International Union of Railways); and "Japan Inc. Shoots Itself in the Foot on Bullet Train," *Financial Times*, 9 July 2010: 14.

2 These are estimates from IFs, and the data from which we derive these estimates present many challenges.

3 We estimate that combined public and private expenditures for all infrastructure (both "core" and "other") total about 4.3 percent of global GDP, ranging from an average of 9.5 percent of GDP in low- and lower-middle-income countries to 2.9 percent in high-income countries.

4 The World Bank has continued to use 2000 dollars for its monetary variables at market exchange rates when expressing values in constant dollars, so we also continue that practice. For consistency, we also use 2000 dollars for monetary variables at purchasing power parity.

5 We assume that multiple subscriptions push the saturation or universal access level for mobile telephony up to about 150 subscriptions per 100 persons (see again Chapter 4). In reality, of course, there will always be some persons without access to modern infrastructure, if only by choice.

6 We assume a saturation level for fixed broadband of 50 subscriptions per 100 persons (see again Chapter 4).

7 Of course, global access rates mask some real regional disparities, particularly with respect to sanitation and all-season roads (see Table 5.3).

8 In spite of the importance of the issue of privatization and the heat it often generates in public debate, we make no assumptions in our forecasting about possible privatization (or re-nationalization) of infrastructure sectors. Hence, the shift in spending across infrastructure types, to which we assign different public-private spending shares (see Table 4.5), determines the overall public-private balance in our forecasts.

9 See http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=2&pid=2&aid=7; Rita Nangia, "Bloomberg: 'In God We Trust. Everyone Else, Bring Data,'" *Infranomics*, http://www.infranomics.org., 21 April 2012.

10 Du Juan, "Nuclear Power to Become 'Foundation' of Country's Electrical System," *China Daily*, 7 December 2011.

11 Judy Hua and Tom Miles, "China Power Sector to Boom as Oil Sector Goes Slower," Reuters, 6 January 2011.

12 See http://mdgs.un.org/unsd/mdg/Host.aspx?Content=Indicators/OfficialList.htm.

13 In fact, the World Health Organization and the United Nations Children's Fund (2012) announced that the global drinking water target was met by 2010.

14 In *Infrastructure to 2030*, the OECD used the projections from an earlier IEA reference scenario for their analysis of investment needs for electricity (see Morgan 2006).

15 For example, Kohli and Basil (2011) used unit costs for mobile phones that began at $111 per subscription and fell to $45 per subscription as penetration increased. Our unit cost for mobile phones is a constant $125 per subscription.

16 Both HCS and IFs population forecasts have ties to the median variant population forecasts of the UN Population Division (UNPD). The HCS analysis used median variant forecasts from the UNPD's 2006 Revision; we used values from the 2010 Revision as a foundation from which we generated our own forecasts (generally quite close to the median variant). The 2010 Revision had generally higher forecasts than the 2006 Revision, especially for Africa.

17 The HCS analysis constructed its GDP per capita forecasts by averaging those of five integrated assessment models (G. Hughes, Chinowsky and Strzepek 2009: 8); IFs produces its own GDP per capita forecasts.

18 This may seem at odds with the fact that Table 5.9 shows HCS forecasting higher electricity access than IFs in a number developing regions in 2030. However, HCS also starts from higher computed historical levels of access. The forecasted percentage point growth in access is actually higher in most regions in the IFs Base Case.

19 The assumptions G. Hughes, Chinowsky, and Strzepek (2009) used about unit costs and lifetimes are presented in Chapter 4 in the tables of Appendix 4A. HCS used a basic set of unit costs and lifetimes that differs somewhat from ours. They also applied a country-specific adjustment factor to the unit costs that adjusted each country's unit costs for all forms of infrastructure uniformly. Finally, in some scenarios, they adjusted the unit costs in future years as a function of expected climate changes; however, we compare results with IFs to their No Climate Change scenario.

20 In additional work, Kohli, Szyf, and Arnold (2012) presented details about their integrated model and provided results from three scenarios, supplementing two related to the earlier Kohli and Mukherjee (2011) study with a third scenario built around convergence patterns to best-practice global productivity levels. The 2012 study presented information on the same infrastructure categories as the Kohli and Mukherjee 2011 study that we refer to in this chapter; however, the complexity of the third scenario makes it quite difficult to compare with the IFs Base Case.

6

Achieving Infrastructure Goals and Targets: The Potential Human Well-being Effects

It is surprising that many infrastructure goals are the same for all countries given their vast differences in infrastructure attainment and levels of development.

Pursuing Infrastructure Goals and Targets

We opened Chapter 5 with a contrast of infrastructure development in China and India in recent decades. Here we consider a second contrast, that of Brazil and Chad. Both are developing countries—the World Bank classifies Brazil as upper-middle-income and Chad as low-income. In addition to their membership in the developing world, the countries have many other similarities, including that they both rank among the least densely populated countries of the globe, and both produce significant quantities of oil. What strikes most observers clearly, however, are their differences. They sit on different continents and have extremely different topography and climate. Brazil has the ninth longest coastline in the world, while Chad is land-locked. The population of Brazil is nearly 20 times that of Chad. And the GDP per capita (at purchasing power parity) of Brazil in 2010 was approximately nine times that of Chad ($8,900 versus just under $1,000).

Their differences in infrastructure perhaps are less well-known. In 2010, 57 percent of rural Brazilians lived within two kilometers of an all-season road, but only 10 percent of those in Chad did. Ninety-eight percent of the population of Brazil had access to electricity, while one estimate put the access rate in Chad (in 2004) at only 3.5 percent.[1] Ninety-eight percent of Brazil's population had access to improved water in 2010, but only 51 percent of Chad's did; for improved sanitation, the numbers were 80 percent and 19 percent, respectively. Even the differences in mobile phone subscriptions were striking—104 subscribers per 100 persons versus 23.

Given such differences, it may be somewhat surprising that, with the exception of rural access to all-season roads, the goals for infrastructure that Chapter 1 discussed and that Chapter 5 generalized into a set for our analysis (see again Box 5.3) are for universal access by 2030 without distinguishing between countries.

Even the goal for rural access to all-season roads—closing half the gap to a maximum of 90 percent by that date—would require Brazil to move from 57 percent to 73 percent (an increment of 16 percentage points or somewhat less than one sixth), while it would require Chad to move from 10 percent to 50 percent, a quintupling of its current level.

In this chapter, we consider the ability of such incredibly disparate countries to meet the existing infrastructure targets that we have drawn from multiple international sources and combined into a common set. In Chapter 5, we saw that many countries will almost certainly not meet the targets in our Base Case scenario, which represents the path we seem to be on. We begin this chapter with a brief recap of those likely failures and the reasons for them. We then turn to a Universal Targets Pursuit scenario in order to consider whether a big development push would potentially allow most or even all countries to achieve the targets, and we consider what the costs and benefits of such an effort might be. In fact, given the distance that Chad and a significant number of other countries are from the targets, the cost of meeting the targets is likely to be unacceptable for many—at least without significant external assistance (which we also will consider). We conclude this chapter by exploring alternative targeting approaches that might point to still aggressive but more reasonable goals for infrastructure development for at least some of the less-developed countries.

Missing Global Targets in the Base Case

In Chapter 5, we saw that the combined set of core infrastructure targets are not met at the global level in the IFs Base Case by 2060, let alone by the target year of 2030. Of the four targets with a goal of 100 percent access (electricity, water, sanitation, and mobile broadband), the world comes closest to meeting that for improved water, with a forecasted 94 percent access rate in 2030 (Table 6.1). Access to electricity and mobile broadband are forecast to be slightly below 90 percent in the Base Case, while just over three-quarters of the global population is expected to have access to improved sanitation. We forecast approximately the same share of the world's rural population to have access to all-season roads, a percentage that lags behind the population-weighted global goal of 86 percent.[2]

Despite many countries not meeting the universal targets, the Base Case portrays a future with developing countries, as a whole, increasing their access to core infrastructure by considerable margins. However, the increases in access reflect

In the Base Case, the world comes closest to meeting the universal target for improved water, with 94 percent access in 2030, while sanitation lags at just over 75 percent.

Table 6.1 Percent of population with access to selected core infrastructure in the IFs Base Case: 2010, 2030

	All-season roads		Electricity		Improved water		Improved sanitation		Mobile broadband	
By income group	**2010**	**2030**	**2010**	**2030**	**2010**	**2030**	**2010**	**2030**	**2010**	**2030**
Low-income countries	38	46	23	44	66	74	37	49	1	78
Lower-middle-income countries	69	77	69	91	87	95	47	69	2	88
Upper-middle-income countries	89	93	97	99	93	99	73	88	5	81
High-income countries	93	97	98	98	99	99	99	98	38	100
By region, developing countries only										
East Asia and Pacific	90	94	91	96	90	98	66	85	2	79
Europe and Central Asia	79	84	87	94	95	99	84	91	21	90
Latin America and the Caribbean	61	71	94	97	94	97	80	85	4	78
Middle East and North Africa	62	72	94	95	88	95	88	90	2	82
South Asia	65	74	64	91	90	97	39	65	0	93
Sub-Saharan Africa	40	47	29	52	61	73	30	48	2	78
World	**71**	**74**	**78**	**88**	**88**	**94**	**64**	**76**	**9**	**86**

Note: All-season road access rates are based on rural populations only. Mobile broadband is assumed to saturate at 150 subscriptions per 100 persons, and the mobile broadband access rates shown are therefore subscription rates per 100 persons multiplied by two-thirds for easier comparison with other access measures.

Source: IFs Version 6.61.

In the Base Case, many countries are unable to muster the resources required to reach infrastructure levels we might expect based on their levels of development, let alone meet universal targets.

quite different rates of progress by infrastructure type over the period from 2010 to 2030 (along with sometimes very large differences between individual countries). As a group, developing countries show an average gain of 80 percentage points toward the target of universal access to information and communication technologies (ICT) over this period. For access to all-season roads, electricity, improved water, and improved sanitation, the average distance covered by developing countries toward target levels is 3, 11, 6, and 15 percentage points, respectively.

While the required additional development generally increases as we move from the high- to the low-income countries, the size of the challenge becomes most apparent when we look at individual countries. Table 6.2 shows the ten countries with the largest remaining access gaps for each of the targeted five core infrastructure types in 2030. Chad and Madagascar stand out by appearing on the forecasted "bottom ten" lists for all five measures. To achieve 100 percent access to all-season roads, electricity, improved water, and improved sanitation in 2030, Chad would need to exceed its Base Case forecasts by providing access to an additional 82, 85, 41, and 75 percent of its population respectively. For Madagascar, the forecasted numbers are 73, 73, 41, and 79 percent.[3] Further, in the Base Case, both countries, like many others, had at least one year in which they were unable to meet even the expected values for infrastructure for countries at their levels of development as measured by GDP per capita.

In all, in the Base Case, 150 countries (82 percent) do not meet one or more of the infrastructure targets by 2030.[4] What accounts for the failure of so many countries to meet global infrastructure targets in the IFs Base Case? Some reasons could simply be consequences of our modeling and forecasting approach. For instance:

- *Conservatism in the model's equations for expected infrastructure*: As explained in Chapter 4, our estimates of expected levels of infrastructure are based on equations derived from historical levels, and the equations reflect both an underlying demand for infrastructure and its actual provision. To the extent that historical infrastructure provision was limited by financial constraints, we can assume that these equations underestimate the future underlying demand.[5, 6]
- *Fixed assumptions related to official development assistance (ODA), foreign direct investment (FDI), and private sector contributions to infrastructure:* The Base Case assumes that ODA, FDI, and the contribution of the domestic private sector to infrastructure spending will follow historical patterns in their relationship to public spending. These relationships may also be conservative.

Table 6.2 Countries with largest gaps between Base Case forecasts and universal access in 2030

Country and forecasted access rate by core infrastructure type									
All-season roads		**Electricity**		**Improved water**		**Improved sanitation**		**Mobile broadband**	
Chad	18	Burundi	7	Niger	58	Niger	19	Myanmar	28
Mali	24	Chad	15	Chad	59	Togo	20	Somalia	30
Burundi	25	Central African Republic	16	Madagascar	59	Madagascar	21	Madagascar	36
Togo	27	Somalia	17	Papua New Guinea	60	Eritrea	24	Eritrea	37
Madagascar	27	Comoros	19	Ethiopia	63	Chad	25	St. Lucia	42
Guinea	28	Guinea Bissau	19	Afghanistan	64	Guinea Bissau	25	São Tomé and Príncipe	42
Yemen	32	Malawi	20	Congo, Dem. Rep. of	65	Haiti	26	St. Vincent and the Grenadines	43
Nepal	32	Niger	20	Tanzania	65	Benin	28	Gambia	44
Eritrea	32	Congo, Dem. Rep. of	23	Equatorial Guinea	66	Sierra Leone	31	Malawi	45
Cameroon	32	Rwanda	23	Mozambique	67	Guinea	32	Ghana	47

Note: The actual targets for all-season road access vary by country because they are stated in terms of a reduction by half of the current percentage of rural populations without such access (rather than universal access). Even so, the targets are far beyond the Base Case forecast levels shown here (e.g., 55 percent for Chad and 67 percent for Madagascar).

Source: IFs Version 6.61.

However, other reasons for missing targets in the Base Case are undoubtedly related to real constraints that countries may have fundamental difficulties overcoming:

- *Insufficient public resources*: In this chapter, we will eliminate the potential conservatism seen in the Base Case by tying the demands for infrastructure growth directly to the universal targets. This does not guarantee that the targets will be met, however. Infrastructure development, which relies heavily on public funding, must compete with other categories of public spending, such as security, education, and health. Even if expenditures on these other categories were reduced to a bare minimum, countries may not have adequate funds to achieve the infrastructure targets due to lack of strength in the economy and/or inadequate government resource mobilization.
- *Insufficient benefits from achieving the targets to justify the costs*: Chapter 3 reviewed a number of the potential positive and negative impacts of infrastructure. Achieving the targets would certainly bring increased benefits, but at the same time, pursuing the targets would have direct and indirect costs. Potential direct costs include not only the increased spending on infrastructure, but also the social and environmental costs associated with the increased infrastructure footprint. Indirect costs include the loss of potential benefits as a result of diverting funds from other expenditure categories (e.g., security, health, and education) to infrastructure. Because the systems involved are complex, policy makers cannot be certain beforehand what the net effect of achieving the infrastructure targets would be, and some might believe, rightly or wrongly, that, given the potential costs, pursuing the infrastructure targets may not be in the country's best interest.

This chapter explores a number of issues related to the deliberate pursuit of global infrastructure targets, including, especially, an analysis of net benefits, by comparing alternative scenarios against the IFs Base Case.

In each alternate scenario, we substitute target values (universal or other targets) applicable to one or more infrastructure types for the expected infrastructure equations of the Base Case (see again Box 4.1 for an explanation of "expected" infrastructure). Specifically, in this chapter we force infrastructure demand to grow linearly from its level in 2010 to a target level in a target year.[7] Otherwise, the assumptions of the scenarios are identical to those of the Base Case. In addition, for forms of infrastructure without targets (e.g., irrigated acreage and fixed-line telephones), we continue to use the standard functions for computing expected infrastructure (see again Chapter 4). However, because of the integrated nature of IFs, the pursuit of target functions for some forms of infrastructure leads to some generally small changes in demand for, and provision of, other forms of infrastructure as well.

As noted earlier, in many countries, efforts to achieve targets may not succeed because of financial constraints, even after diverting public resources from other sectors (see Box 6.1 on page 150 for an explanation of how government finances are treated in IFs). Furthermore, pursuing certain targets may not be in the best interests of all countries because the negative impacts of diverting resources from other investments that also contribute to development may be greater than the benefits of the additional infrastructure. Therefore, after comparing an initial scenario based on the global universal access targets for 2030 against the Base Case, we consider if there might not be an alternative set of still aggressive but more reasonable targets that could better guide infrastructure development. We will consider the possibilities that (1) the time horizons for targets should be relaxed; (2) the target levels should vary depending on the initial development of a country's infrastructure; and (3) some forms of infrastructure should be prioritized over others. The most desirable targeting strategies will likely be highly variable by country, but we will also look for commonalities across countries.

We develop a series of alterative scenarios to test whether there are more reasonable but still aggressive targets that could better guide infrastructure development.

A Universal Targets Pursuit Scenario

We first explore a Universal Targets Pursuit (UTP) scenario, which uses the targets for 2030 described in Box 5.3. In comparing this scenario

Box 6.1 Financial constraints in IFs targeting scenario analysis

Chapter 4 explained the overall working of the IFs infrastructure model in the context of the larger International Futures forecasting system, but some reiteration and additional detail relevant to scenario analysis may be useful as a prelude to our exploration of alternative scenarios.

Methodologically, our directed pursuit of infrastructure targets in this chapter is based on substituting the expected path of core infrastructure development in the Base Case with a desired path. This results in changes in the financial costs of building new infrastructure, as well as of maintaining existing infrastructure and of financing the other infrastructure that we do not specify by physical type (e.g., current seaports and potential future spaceports). As in the Base Case, the model similarly calculates the expected governmental expenditures on security, education, health, research and development, and on a residual category for all other spending; various modules of the IFs system provide some of these expected expenditures, and simpler functions provide the rest. Remember that the expected values are based on historical patterns of funding that relate to the level of development of economies and societies. The sum of all expected expenditures is then compared with the total available funding from government sources for such consumption. As Chapter 4 explained, we allocate total funding to all categories proportionally, based on their expected value, meaning that they may all receive somewhat more or less than expected depending on the actual availability of funding (we partially protect education from such reallocations and guarantee all other categories a bare minimum of funding).

Since the pursuit of infrastructure targets typically leads to an increase in the desired funding for core infrastructure, the total expected funding across all government spending categories is more likely to exceed the available funding and, therefore, to lead to proportional constraints on actual spending across all categories. The IFs system has the option for its users to give priority to infrastructure so that those funding expectations will be met first, at least up to the level of total government spending. However, we do not use that option since it could lead to almost no funding for other categories. Therefore, when a funding shortfall is forecast, core infrastructure will not get the full funding requested, with the result that affected countries will fall off the target path. The shortfall in funding for core infrastructure is allocated to each type of infrastructure based on the additional funding requested.

The accelerated development of core infrastructure in a scenario with targets has positive effects, for example, on multifactor productivity and economic growth as well as on educational advance and health. At the same time, the diversion of public funds from other categories (specifically health, education, and other infrastructure), vis-à-vis a scenario without targets, has negative consequences in various parts of the larger IFs system. The net effect of these countervailing forces will propagate through the entire system, impacting demographic and economic dynamics as well as the future availability of government revenues and the course of infrastructure development. In summary, because the IFs system is fully integrated, the net results of target pursuit can be positive or negative as well as variable across countries and across time.

The Universal Targets Pursuit scenario represents a concerted push by countries to meet existing global and regional infrastructure access targets.

to the Base Case, we are interested not only in the additional access that pursuing these targets might achieve, but also in the additional costs involved and whether these costs outweigh the benefits associated with the additional access.

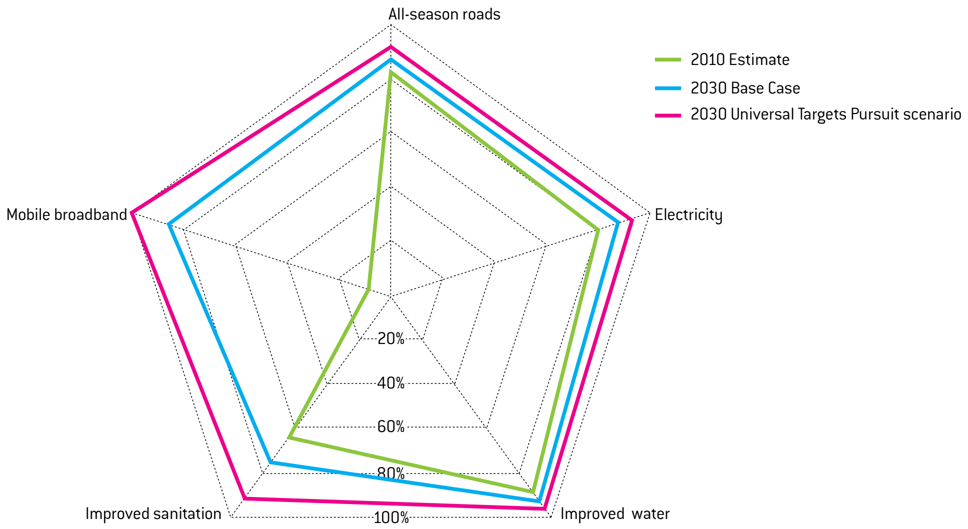
Changes in infrastructure access and target achievement

Compared to the Base Case, the UTP scenario increases access to the targeted infrastructures (see Figure 6.1). Other than for ICT, however, the UTP scenario does not achieve universal access on a global basis. Global access to the other targeted infrastructures is 93, 92, 97, and 91 percent for all-season roads, electricity, improved water, and improved sanitation respectively. These represent increases from 2010 levels of 10, 14, 8, and 28 percentage points for roads, electricity, water, and sanitation. Recall that in the Base Case these increases were only 4, 10, 5, and 12 percentage points, respectively (see again Table 6.1).

Under the Universal Targets Pursuit scenario, access to all core infrastructures passes 90 percent globally but still does not reach universality.

Table 6.3 summarizes the access levels for the targeted forms of infrastructure in the UTP scenario in 2030 by country income group and region. Access levels consistently increase, and a larger percentage of countries achieve target levels as countries move up the income ladder from the low- to the high-income categories. (We consider a country to have achieved a target level when it is within 2.5 percent of it.) Yet, with the exception of mobile broadband, which is primarily funded by the private sector, the low-income countries lag far behind in access; less than a fifth of the countries in this group are able to meet any of the infrastructure targets. At a regional level, this pattern is mirrored by sub-Saharan Africa, where only about a third of the countries are able to meet any of the targets other than that for mobile

Figure 6.1 Comparison of global access rates to targeted infrastructure in IFs Base Case and in Universal Targets Pursuit scenario: 2010 estimate and 2030 forecasts



Note: Axes range from 0 in the center to 100 percent at the vertices in 20 percent increments. All-season roads refer to the percentage of rural populations living within 2 kilometers of an all-season road; the target for this variable is to reduce by half the share of the rural population without access, up to a maximum of 90 percent; for the globe this translates into an access target of approximately 86 percent. For mobile broadband, we use 150 subscriptions per 100 persons as our measure of universal access. For both all-season roads and mobile broadband, the values in the chart have been scaled so that 100 is equivalent to the target value.

Source: IFs Version 6.61.

Even in the UTP scenario, low-income countries continue to lag behind the rest of the world, with less than a fifth able to meet the road access, electricity, and water and sanitation targets.

Table 6.3 Percent of population with access to targeted infrastructure in 2030 in the Universal Targets Pursuit scenario by income group and region (percent of countries meeting targets shown in parentheses)

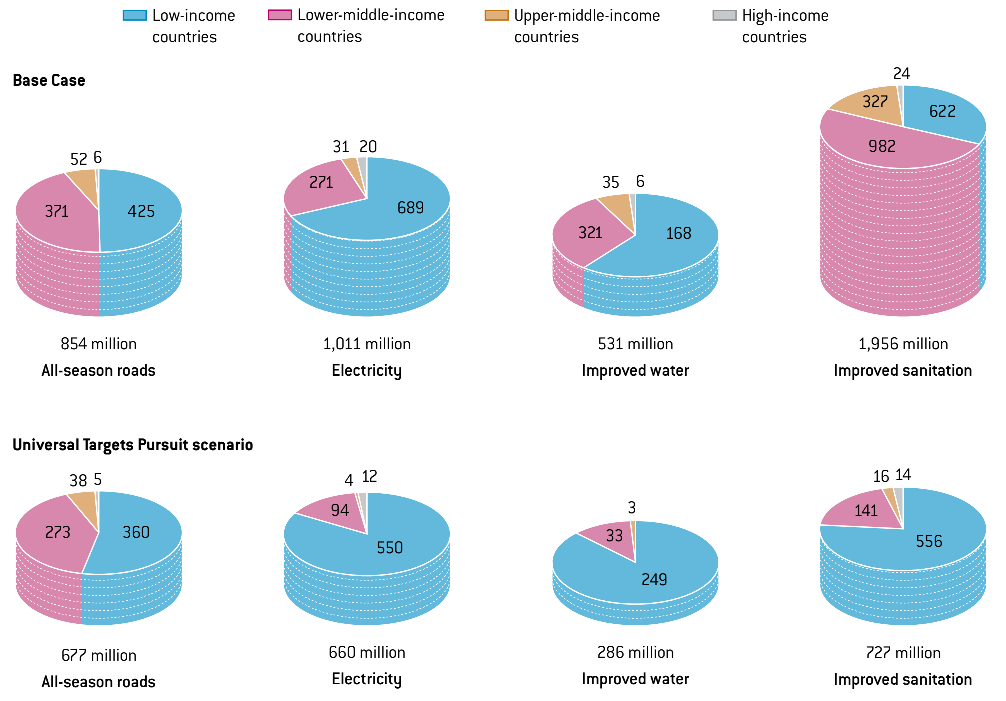
By income group	All-season roads	Electricity	Improved water	Improved sanitation	Mobile broadband
Low-income countries	55 (11) ●	56 (3) ●	80 (17) ●	55 (3) ●	100 (100) ●
Lower-middle-income countries	83 (78) ●	97 (70) ●	99 (78) ●	96 (50) ●	100 (100) ●
Upper-middle-income countries	95 (100) ●	100 (94) ●	100 (90) ●	99 (73) ●	100 (100) ●
High-income countries	97 (100) ●	99 (98) ●	100 (100) ●	99 (90) ●	100 (100) ●
By region, developing countries only					
East Asia and Pacific	95 (89) ●	98 (63) ●	100 (89) ●	99 (53) ●	100 (100) ●
Europe and Central Asia	89 (91) ●	99 (86) ●	99 (86) ●	99 (77) ●	100 (100) ●
Latin America and the Caribbean	79 (89) ●	99 (89) ●	99 (74) ●	96 (59) ●	100 (100) ●
Middle East and North Africa	79 (85) ●	97 (85) ●	97 (69) ●	96 (54) ●	100 (100) ●
South Asia	81 (50) ●	95 (38) ●	99 (75) ●	94 (25) ●	100 (100) ●
Sub-Saharan Africa	56 (33) ●	64 (27) ●	82 (38) ●	62 (20) ●	100 (100) ●
World	**80 (77)** ●	**92 (70)** ●	**97 (75)** ●	**91 (57)** ●	**100 (100)** ●

Note: The target for all-season roads is to reduce by half the share of the rural population without access up to a 90 percent access rate, so the actual target value varies by country and region. This translates into all-season road access targets of approximately 70 percent for low-income countries, 85 percent for lower-middle-income countries, and 90 percent for upper-middle and high-income countries. On a regional basis, the all-season road access targets are: 70 percent for sub-Saharan Africa; 80 percent for Latin America and the Caribbean, the Middle East and North Africa, and South Asia; 90 percent for all other developing regions; and 85 percent for the world. For mobile broadband, we use 150 subscriptions per 100 persons as our measure of universal access, so the actual values for subscriptions per 100 persons have been multiplied by two-thirds to yield values between 0 and 100 in the table.

We consider a country or a country group to have achieved a target when it is within 2.5 percent of it and to be close to a target when between 3 and 6 percent from it. A green circle indicates that we forecast the income group or region will achieve the target level by 2030; a red circle indicates that we forecast the income group or region will not achieve the target level by 2030.

Source: IFs Version 6.61.

Figure 6.2 Population (in millions), by income group, without access to selected core infrastructure forms in 2030 in the Universal Targets Pursuit scenario and the Base Case



Note: The global population in 2030 is forecast to be approximately 30 million persons larger in the Universal Targets Pursuit scenario than in the Base Case, primarily due to the health benefits of improved infrastructure. Numbers in the pie charts may not exactly add to totals due to rounding.

Source: IFs Version 6.61.

In the UTP scenario, persons without access to traditional infrastructure range from 1.8 million fewer for all-season roads to 1.2 billion fewer for improved sanitation than in the Base Case.

broadband. Meanwhile, all other regions are able to at least come close to achieving the targeted levels for all forms of infrastructure on a regional population-weighted basis. At the same time, some countries within each developing region do not reach at least one of the targets.

In 2030, the numbers of persons globally forecast to be without access to all-season roads, electricity, improved water, and improved sanitation are approximately 180, 350, 245, and 1,230 million fewer, respectively, in the Universal Targets Pursuit scenario than in the Base Case (see Figure 6.2). This is in spite of an overall increase in global population of about 30 million persons in the UTP scenario as a result of health benefits associated with the improved infrastructure; most of this population growth occurs in low- and lower-middle-income countries. All income groups see reductions in persons without access to infrastructure in the UTP scenario. However, as we see in Figure 6.2, those who remain without access in the UTP scenario are even more dramatically concentrated in the low-income economies than in the Base Case, because countries in other income groups are more frequently able to generate the resources needed to meet the targets.

Under the UTP scenario, total cumulative global spending on infrastructure is $9.6 trillion above that in the Base Case over the 2010 to 2060 period, an increase of 5.6 percent.

Changes in infrastructure spending and other government spending

Compared to the Base Case, global spending on infrastructure in the Universal Targets Pursuit scenario increases immediately, eventually growing to approximately $220 billion annually around the target year of 2030 (see Figure 6.3). This increase is followed by a short-term drop in global spending as a number of countries achieve the targets. Spending then resumes rising as other countries continue to strive to reach the targets and as all countries spend more in order to maintain the additional infrastructure they have (compared to the Base

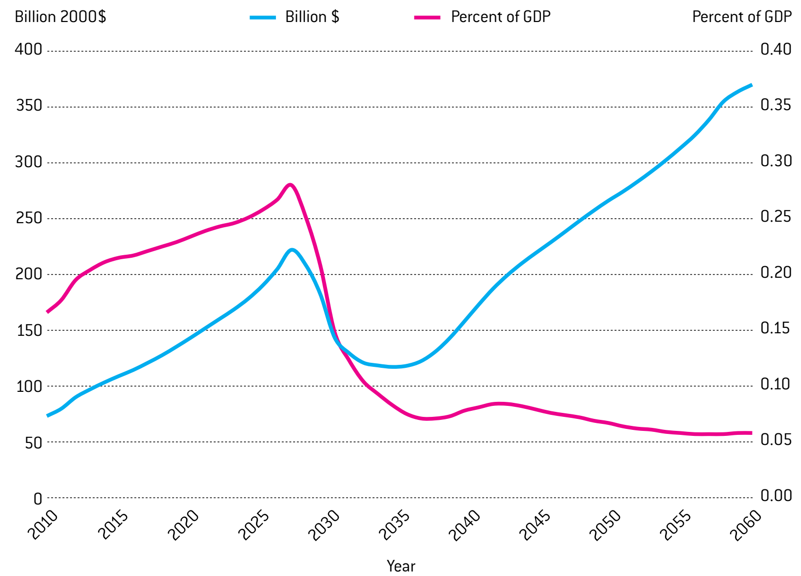
Case). The cumulative additional spending is $2.9 trillion between 2010 and 2030 and $9.6 trillion over our full forecast horizon to 2060. These amounts represent increases of 6.3 and 5.6 percent over the spending in the Base Case for these periods.

If we measure this incremental spending as a percentage of global GDP, the same pattern is followed until the 2030 target year, with a peak value of approximately 0.3 percent of GDP in 2028. Thereafter, however, the additional spending is increasingly offset by additional economic activity, so the increment as a percentage of GDP falls (also shown in Figure 6.3).

These global numbers mask significant differences across countries and regions. Figure 6.4 compares the annual additional spending on infrastructure as a percentage of GDP in the UTP scenario for four African countries: Botswana, Kenya, Mauritania, and Tanzania. All of these countries achieve the ICT target by 2030. Botswana is also able to achieve the other targets by 2030; Tanzania does so around 2040 and Kenya around 2050. Mauritania is unable to do so even by the end of our horizon. Each country rapidly increases the amount of funds allocated to infrastructure as it pursues the targets, but the level of increase differs from less than 1 percent of GDP in Botswana to as much as 9 percent in Mauritania. Botswana progresses toward and achieves the targets rather quickly, never seeing a significant increase in infrastructure spending. Tanzania maintains its additional spending until around 2040, when it achieves the targets. Kenya has to allocate even more funds in later years but sees a sharp drop in spending once it achieves the targets around 2050. Meanwhile, Mauritania generally maintains and even increases its extra spending throughout the horizon as it continues to work to meet the targets. Variations such as these in incremental spending of countries over time reflect many factors, including countries' distance from targets at the starting point, their GDP in the initial year, and their ability to mobilize revenues over time.

This additional spending on infrastructure has both public and private implications. Of the additional $2.9 trillion forecast to be spent globally between 2010 and 2030, approximately 38 percent, or more than $1.1 trillion, comes

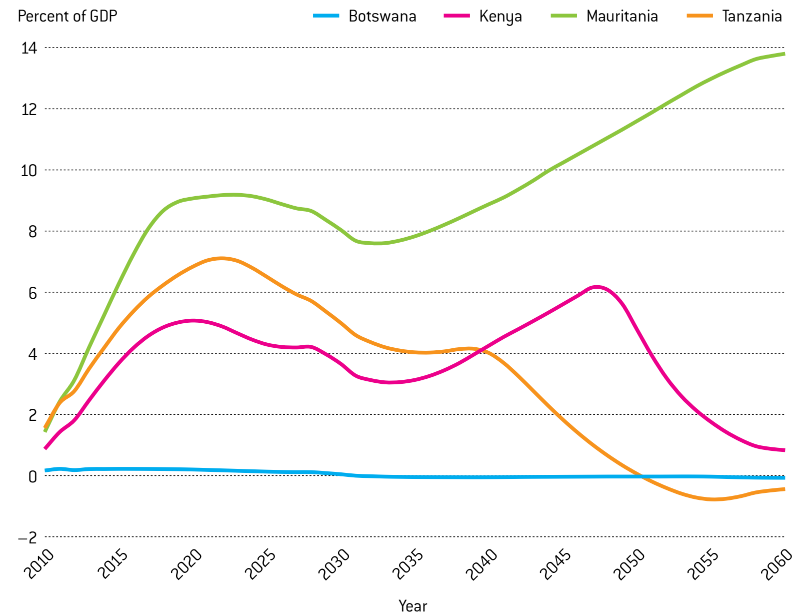
Figure 6.3 Annual additional global spending on infrastructure in billion dollars and as a percent of GDP in the Universal Targets Pursuit scenario compared to the Base Case: 2010–2060



Note: Spending includes public and private spending on core infrastructure and public spending on other infrastructure; forecast values are five-year moving averages expressed in 2000 dollars.

Source: IFs Version 6.61.

Figure 6.4 Annual additional spending on infrastructure as a percentage of GDP in the Universal Targets Pursuit scenario compared to the Base Case for selected African countries: 2010–2060



Note: Spending includes public and private spending on core infrastructure and public spending on other infrastructure; forecast values are five-year moving averages.

Source: IFs Version 6.61.

The increased infrastructure spending under the UTP scenario includes $1.8 trillion in public funds between 2010 and 2030; more than $1.1 trillion of this comes from diverting funds from other sectors.

from additional private spending on infrastructure, leveraged by additional public spending (see again Chapter 4 for a description of the relationship between public and private spending on core infrastructure in IFs). The incremental public spending required to leverage the private spending is large—nearly $1.8 trillion of additional public funds are spent on infrastructure between 2010 and 2030 in the UTP scenario compared to the Base Case.

These additional public funds must come either from diverting resources from other categories of public spending or from overall increases in total public spending. Total public resources increase by just over $700 billion between 2010 and 2030 in the Universal Targets Pursuit scenario compared to the Base Case (Table 6.4) because of faster economic growth and, therefore, additional government revenues. This leaves in excess of $1.1 trillion that must come to infrastructure from reductions in other public spending categories.

As a percentage of the spending in the Base Case, these diversions are fairly minor at the global level, ranging from 0.2 percent for education to 1.3 percent for military. However, they are significantly larger for the low- and lower-middle-income countries, which experience diversions of greater than 10 percent for most categories. At the extreme, the low-income countries sacrifice nearly a third of their spending on public health even while, as we have seen, they are unable to meet most of the infrastructure targets. While sub-Saharan Africa again stands out among the regions, others, particularly South Asia and the Middle East and North Africa, also see relatively large diversions of funds. In distinction, high-income countries as a group had already met the electricity, water, and sanitation targets by 2010. In the UTP scenario, they see enough increase in total government revenues to not only cover the extra spending needed to meet the road and mobile broadband access targets, but also to increase spending in other public funded categories.

The net benefits of pursuing universal targets

Of course, the hope is that the benefits from the increased infrastructure in the Universal Targets Pursuit scenario exceed their costs. Chapter 3 discussed a broad range of potential benefits from improved access to infrastructure, including improved health, greater educational attainment, reduced income inequality, and

Table 6.4 Changes in government spending in the Universal Targets Pursuit scenario compared to the Base Case by income group and region: 2010–2030

By income group	Additional public spending on infrastructure (billion $)	Total additional public spending (billion $)	Public spending diverted from other categories (billion $)	Diversions by category (percent reduction from Base Case spending) Military	Health	Education	Research and development	Other
Low-income countries	225	19	206	18.3	32.0	17.8	29.7	30.6
Lower-middle-income countries	842	119	723	11.5	12.6	3.8	10.5	14.8
Upper-middle-income countries	715	334	381	1.1	1.5	-0.1	0.5	3.9
High-income countries	71	235	-164	-0.1	-0.1	-0.2	-0.2	-0.1
By region, developing countries only								
East Asia and Pacific	162	162	0	0.1	0.0	-0.3	-0.4	1.5
Europe and Central Asia	159	23	136	3.6	5.2	0.7	3.3	4.2
Latin America and the Caribbean	442	149	293	3.7	3.6	0.2	4.5	5.2
Middle East and North Africa	219	6	213	12.3	8.5	3.4	8.4	8.5
South Asia	380	102	278	8.2	7.6	2.0	8.7	17.6
Sub-Saharan Africa	421	30	391	26.6	20.0	10.1	11.2	11.6
World	**1,852**	**706**	**1,146**	**1.3**	**0.6**	**0.2**	**0.5**	**1.2**

Note: Values are expressed in 2000 dollars. In the UTP scenario, increased economic growth and resulting government revenues make it possible for 81 countries (54 percent of which are high-income) to increase public expenditures in other spending categories over this period even as infrastructure spending is also increased. Net increases in expenditures in other categories by income group and developing region are indicated by a negative entry for diversion of funds.

Source: IFs Version 6.61.

improvements in overall economic productivity. A number of other factors directly and indirectly influence each of these indicators of human development, however, including (notably) direct public spending on them and on other expenditure categories—spending that we have seen is reduced in most developing countries in the UTP scenario. Therefore, any push to improve infrastructure will have a complex set of impacts, both positive and negative, that must be considered in any evaluation of the desirability of such a push.

We can compare the net benefits of pursuing the infrastructure targets in the UTP scenario vis-à-vis the Base Case using a variety of metrics. The simplest of these is GDP per capita, a common, albeit highly problematic, measure of economic welfare.[8] Going beyond economic welfare to consider a broader notion of social welfare, we can also use the United Nations Development Programme Human Development Index (HDI). The HDI is defined as the geometric mean of three dimensions—health (measured by life expectancy at birth); knowledge (measured by mean years of schooling for adults age 25 and older and expected years of schooling for elementary school entrants); and standard of living (measured by the log of gross national income per capita so as to represent the saturating contribution of income to human development).[9] The index aggregates the three dimensions and scales the results to provide a value ranging from 0 to 1.

Figure 6.5 (p. 156) shows how GDP per capita, the other components of the HDI, and the HDI as a whole, change in the UTP scenario compared to the Base Case for the low-income countries as a group. Positive (negative) values imply that the UTP scenario performs better (worse) than the Base Case in that particular year for the given indicator.

We begin our comparison with GDP per capita, which shows a small decline until the early 2020s, after which the UTP scenario outperforms the Base Case. By 2060, GDP per capita is forecast to be almost 9 percent, or approximately $470, higher in UTP. At the same time, though, a sharp decline occurs in expected years of schooling for school-age populations, as greater infrastructure spending diverts public funds from education.[10] With a lag, this causes a decline in the level of adults' educational attainment, which only begins to recover toward the end of our 2060 horizon. The percentage changes shown in Figure 6.5 translate into peak declines of just under a half a year for expected years of schooling and a third of a year for educational attainment. Meanwhile, the diversion of public funds from the health sector is more than made up for by the health benefits of the extra infrastructure, although the net effect on life expectancy is quite small—less than a half a year of additional life expectancy in any year. The health benefits include reductions in diseases associated with a lack of access to improved water and sanitation (e.g., diarrheal diseases), and the use of solid fuels in the home (e.g., pneumonia and other respiratory diseases).

Taken together, these changes in the components of the Human Development Index result in fairly minor changes in overall HDI values—never much more than 0.002 points on a scale from 0 to 1—for the low-income countries as a group. Still, the temporal pattern is interesting. After a period of net negative impacts on the HDI due to reallocation of spending from other sectors (e.g., education) in order to pursue the universal infrastructure targets, the situation turns around as benefits from the additional infrastructure accrue. Around 2050, the net reduction in HDI values that the UTP scenario causes for the low-income countries relative to the Base Case disappears. From that point on, the net advantage of pursuing the UTP scenario continues to grow. Other country groups and individual countries see similar patterns of costs and benefits, albeit with varying magnitudes of change and timing of the declines and subsequent increases in the HDI.

We define the year after which the UTP scenario consistently outperforms the Base Case as the "crossover point." The crossover point may differ for a particular country depending on the metric of performance used (for example, it may be different for GDP per capita than for the composite HDI). Whatever metric is used, though, an earlier crossover point is obviously better.

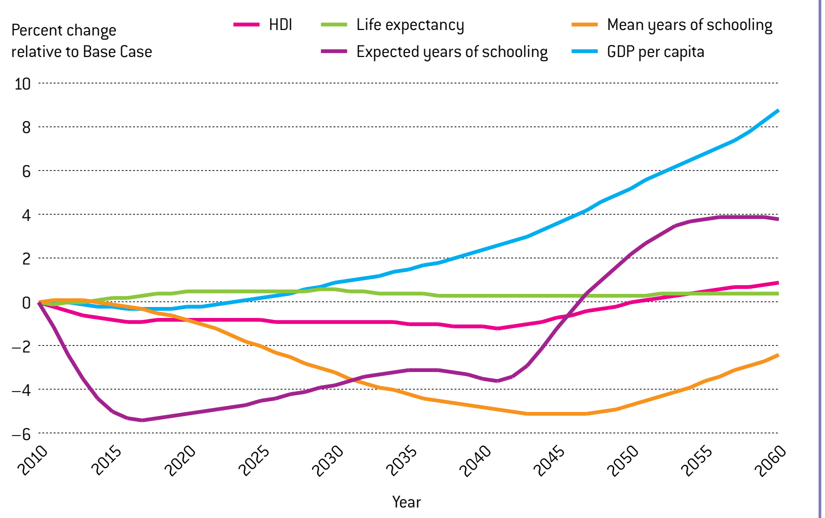
The crossover point is primarily a reflection of when targets are attained.[11] Returning to the countries we looked at in Figure 6.4—Botswana, Tanzania, Kenya, and Mauritania—recall that these countries achieved the targeted levels of infrastructure, respectively, almost immediately,

Any push to improve infrastructure will have a complex set of impacts, both positive and negative, that must be weighed against one another in any evaluation of the desirability of such a push.

By 2060, GDP per capita is forecast to be approximately 9 percent higher in low-income countries in the UTP scenario compared to the Base Case.

Despite greater positive impacts by 2040, many countries see an initial decline in average annual income and HDI values under the UTP scenario.

Figure 6.5 Differences in the HDI and its components in low-income countries in the UTP scenario compared to the Base Case: 2010–2060



Source: IFs Version 6.61.

around 2040, around 2050, and not before 2060. Not surprisingly, Botswana has the earliest crossover points, followed by Tanzania and then Kenya (see Table 6.5). Mauritania never reaches crossover. The crossover points using the HDI as the metric tend to be later than when using GDP per capita alone.

Figure 6.6 shows how the distribution of crossover points differs depending on whether we use GDP per capita or HDI values as our metric. Approximately 51 percent of the world's countries have a crossover point prior to 2020

Table 6.5 Crossover points in the scenario for selected African countries as measured by GDP per capita and the HDI

	Crossover point	
Country	**GDP per capita**	**HDI**
Botswana	2010	2010
Tanzania	2028	2042
Kenya	2051	2053
Mauritania	Not by 2100	Not by 2100

Note: The crossover point is defined as the year after which the Universal Targets Pursuit scenario consistently outperforms the Base Case with respect to annual values of GDP per capita and/or the HDI. If a country does not experience declines in any year in the Universal Targets Pursuit scenario compared to the Base Case, its crossover point is set to 2010. We ran the model to 2100 to explore whether Mauritania might achieve crossover sometime before the end of the century.

Source: IFs Version 6.61.

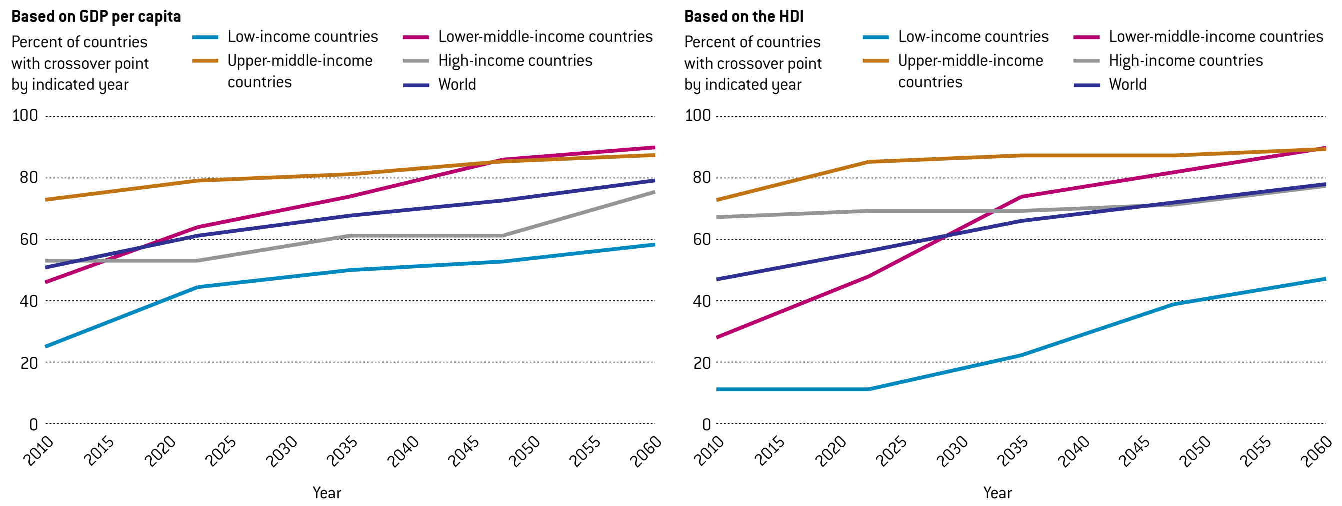
based on GDP per capita, but this falls to about 47 percent when using HDI values as the metric. By 2060, about 79 percent of countries reach the crossover point irrespective of the metric. The difference between the metrics is more striking when we look at country groupings. Using the HDI, only slightly more than 10 percent of low-income countries attain crossover prior to 2020, whereas more than twice as many do using GDP per capita. This difference narrows over time, with about half the low-income countries having a crossover point prior to 2060 using either metric. Ultimately, approximately 20 percent of all countries and 50 percent of low-income countries do not reach a point of crossover even after 50 years.

The crossover point, while of interest, does not really tell us if the Base Case or the UTP scenario performs better for a particular country or group of countries over time. That is, while it does identify when a country or group of countries begins to do better on an annual basis, it does not account for the cumulative magnitude of either the "losses" prior to that year or the "gains" in subsequent years, or how societies value such costs and benefits over time. In fact, individuals and societies tend to value the immediate more than the long term. Although this is in part psychological, it is in large part also simple financial logic—a sum of money today is worth more than the same sum 20 years from now, because today it could be invested and earn a return over time that would create a cumulative amount that is considerably larger by the time of that future year.

To account for these time differences in value and accumulation effects, we can use the concept of net present value, which is the sum of the annual values of a metric, like GDP per capita, over a particular time horizon. In calculating net present value of a longer-term investment, the annual values are normally discounted in order to give greater emphasis to the nearer-term. We use a discount rate of 3 percent for our calculations here; that is, the GDP per capita or the HDI for each year in the future is discounted or devalued by an additional 3 percent relative to the previous year.[12]

We refer to the differences over time of the net present values in two scenarios as cumulative differences in order to distinguish them from the annual differences shown in

Figure 6.6 Distribution of crossover points by income group in the Universal Targets Pursuit scenario as measured by GDP per capita and the HDI: 2020–2060



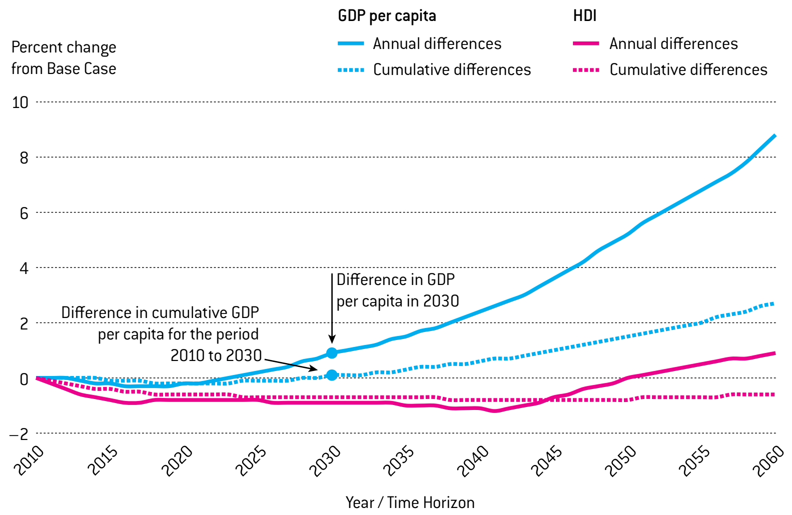
Note: The crossover point is determined as the year after which GDP per capita or the HDI in the Universal Targets Pursuit scenario remains consistently equal to or above that in the Base Case. The later crossover points for the high-income countries are somewhat misleading; in fact, they reflect small differences in GDP per capita or the HDI and a number of countries in which GDP per capita or HDI falls below the Base Case value for a single year or two later in the horizon.

Source: IFs Version 6.61.

our crossover analysis in Figure 6.5. Figure 6.7 contrasts the cumulative and annual differences for low-income countries by repeating the GDP per capita and HDI annual forecasts from Figure 6.5 and then inserting the estimates for the cumulative differences in those metrics over the forecast period. As in that earlier figure, a positive (negative) value implies that the Universal Targets Pursuit scenario performs better (worse) than the Base Case. For the cumulative differences, however, the horizontal axis refers to the time horizon over which the comparison is being made. For example, Figure 6.7 shows that the GDP per capita in 2030 is approximately 1 percent higher in the UTP scenario than in the Base Case, while the difference in cumulative discounted GDP per capita for the period 2010 to 2030 is barely above zero. The figure also shows that, while the GDP per capita in the UTP scenario exceeds that in the Base Case several years before 2025, not until several years after 2025 do the higher annual values of GDP per capita in the UTP scenario "make up for" the lower annual values experienced in previous years. Further, it appears that, as a group, low-income countries will not fully recover their "lost" HDI even over a 50-year time horizon.

As discussed previously, we defined the crossover point as the year that countries begin to see consistently higher GDP per capita or HDI values in the Universal Targets Pursuit scenario

Figure 6.7 Comparison of annual and discounted cumulative differences in GDP per capita and the HDI in the UTP scenario versus the Base Case for low-income countries: 2010–2060



Note: The calculation of the cumulative differences discounts the annual values back to the year 2010 using a discount rate of 3 percent.

Source: IFs Version 6.61.

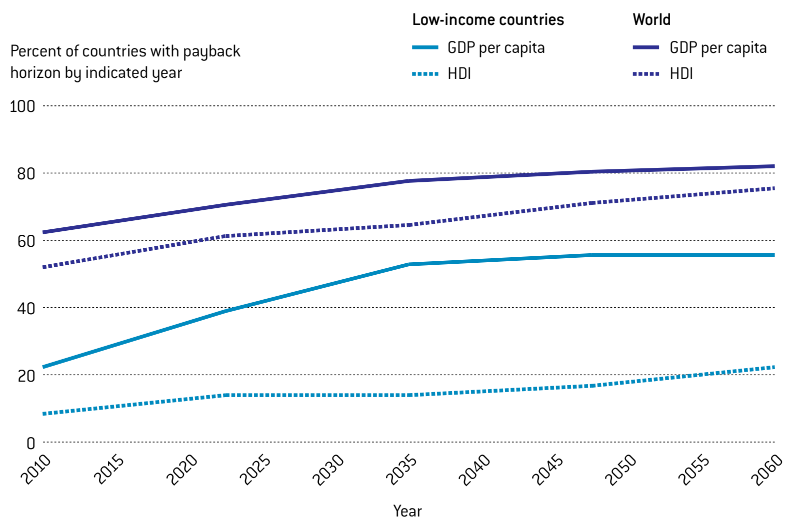
In the UTP scenario, most countries see cumulative net gains in the HDI beginning sometime between 2025 and 2030; for some low-income countries, this does not happen even as late as 2060.

than in the Base Case. Similarly, we define the year after which the discounted cumulative stream of GDP per capita or HDI values in the UTP scenario is consistently larger as the "payback horizon." If you contrast Table 6.6 to Table 6.5, you can see that the payback horizons tend to be further into the future than the crossover points.

Figure 6.8 shows the distribution of the payback horizons for the world and for low-income countries using our two metrics. These results reinforce what we saw earlier for the annual changes. Most notably, only about one fifth of low-income countries have a payback horizon of less than 50 years.

These forecast results raise obvious questions for many countries about the desirability, especially in the short-run, of pursuing a universal targets strategy if such pursuit comes at the cost of other public investments. We cannot expect a country to prioritize universal access to infrastructure if the benefits of doing so do not outweigh the costs for a long period of time (if ever). Moreover, we have found that even with a significant reallocation of resources from other public spending to infrastructure (a global total, as mentioned earlier, that we estimate to be in excess of $1.1 trillion), many countries do not reach the universal targets by 2030. In conclusion, either significant portions of the money would have to come from elsewhere, or alternative targets will need to be considered.

Figure 6.8 Distribution of payback horizons for low-income countries and the world in the UTP scenario as measured by GDP per capita and the HDI: 2010–2060



Note: The payback horizon is determined as the period after which the net present value of GDP per capita or the HDI in the Universal Targets Pursuit scenario remains consistently equal to, or above, that in the Base Case. The calculation of the net present values discounts the annual values back to 2010 using a discount rate of 3 percent.

Source: IFs Version 6.61.

Table 6.6 Payback horizons in the UTP scenario for selected African countries as measured by GDP per capita and the HDI

	Payback horizon	
Country	**GDP per capita**	**HDI**
Botswana	2010	2010
Tanzania	2035	2058
Kenya	2061	not by 2100
Mauritania	not by 2100	not by 2100

Note: The payback horizon is determined as the period after which the net present value of GDP per capita or the HDI in the Universal Targets Pursuit scenario remains consistently equal to or above that in the Base Case. The calculation of the net present values discounts annual values back to 2010 using a discount rate of 3 percent. We ran the model to 2100 to explore whether Kenya and Mauritania achieved payback before the end of the century.

Source: IFs Version 6.61.

What Might Achieving the Universal Targets Cost?

As we have indicated, the development literature and the development community have given considerable attention recently to recommendations for significant investments in infrastructure, and even for reaching universal targets. Our analysis to this point suggests that many countries, especially low-income ones, simply cannot reach universal targets by 2030 or perhaps even 2060 using only their own resources.

In fact, even with the directed effort represented by the Universal Targets Pursuit scenario, we found that the world would fall short of meeting the targets (see again Table 6.3 on the shortfall and Table 6.4 on the high costs of trying). This failure comes in spite of spending a forecasted additional $2.9 trillion on infrastructure (over $1.1 trillion diverted from badly needed spending on other public categories, an additional $1.1 trillion from private sources, and a further $0.7 trillion from increased public revenues generated by higher GDP growth) between 2010 and 2030. To analyze how far short this spending falls in terms of attaining the universal targets,

Table 6.7 Additional spending on infrastructure between 2010 and 2030 for the Universal Targets Pursuit and Universal Targets with Additional Funding scenarios compared to the Base Case (trillion dollars)

	UTP vs. Base Case	UTAF vs. Base Case
Additional spending on infrastructure	2.96	6.15
Domestic sources		
Private funds	1.11	1.63
Extra government revenue from increased GDP	0.71	0.91
Diversions from other categories of government spending	1.15	0.00
Total domestic funding	2.96	2.54
Other funds needed	0.00	3.60

Source: IFs Version 6.61.

■ We cannot expect a country to attempt to achieve universal access to infrastructure if the costs of doing so outweigh the benefits. ■

■ An additional $6.1 trillion (beyond the costs in the Base Case) would be needed between 2010 and 2030 for the world to achieve universal access targets by 2030. ■

we created a scenario variant called Universal Targets with Additional Funding (UTAF). In this scenario, the universal targets are met and no diversion is made from spending on other public categories.

In the UTAF scenario, the additional spending on infrastructure between 2010 and 2030 is $6.1 trillion above the Base Case and $3.2 trillion above the UTP scenario (see Table 6.7). Compared to the Base Case, $1.6 trillion ($0.52 trillion above UTP) would come from private sources and $0.9 trillion ($0.2 trillion above UTP) from increased public revenues generated by higher GDP growth. However, an additional $3.6 trillion would still be required for all countries to achieve the targets. That is, $3.6 trillion would need to come from international sources, or greater investment from the private sector, in order for the world as a whole to achieve a universal targets scenario that avoided the costs of internal spending diversions (costs that would be unbearable domestically for the poorest countries).

Table 6.8 breaks down the $3.6 trillion of other needed funds by income group and region. It further shows how these dollar amounts compare to the forecasted cumulative GDP in the Base Case. The $3.6 trillion is equivalent to approximately 0.3 percent of the cumulative global GDP over the period 2010–2030 in the Base Case. This may seem small, but for low-income countries as a group it is closer to 13 percent, an amount that would increase their spending on infrastructure by nearly four times what we estimate in the Universal Targets Pursuit scenario they might be able to mobilize on their own.

Some of these numbers become even more striking if we look at individual countries. For 65 of the 183 countries in IFs, the additional spending represents less than .01 percent of their GDP over this period. At the other extreme, there are 33 countries for which the additional funding is more than 10 percent of their GDP, and for eight of these countries, all in sub-Saharan Africa (Burundi, the Democratic Republic of the Congo, Eritrea, Madagascar, Mali, Mauritania, Niger, and Togo), it is more than 50 percent.

How does the $3.6 trillion compare to existing sources of external funding, such as

Table 6.8 Additional funds required to achieve infrastructure universal targets without diversion of government funds from other expenditure categories by income group and region: 2010–2030

	Additional funds	
By income group	**Billion $**	**As percent of GDP in Base Case**
Low-income countries	1,501	12.6
Lower-middle-income countries	1,525	1.6
Upper-middle-income countries	574	0.2
High-income countries	4	0.0
By region, developing countries only		
East Asia and Pacific	177	0.1
Europe and Central Asia	220	0.6
Latin America and the Caribbean	412	0.5
Middle East and North Africa	333	1.5
South Asia	868	1.4
Sub-Saharan Africa	1,590	7.5
World	**3,604**	**0.3**

Note: All values are cumulative for the years 2010–2030. Percent of GDP is calculated by dividing the additional funds by cumulative GDP in the Base Case.

Source: IFs Version 6.61 Base Case and Universal Targets with Additional Funding scenario.

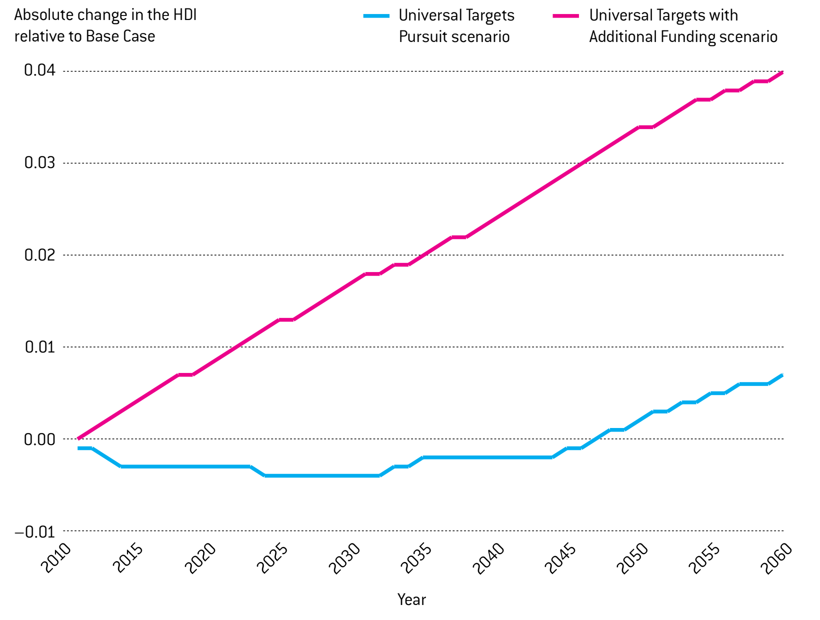
official development assistance and foreign direct investment? We forecast total ODA and FDI over the period 2010–2030 to be approximately $1.8 trillion and $27.1 trillion, respectively, in the IFs Base Case. Thus, even if all ODA were directed to infrastructure, ODA would need to more than double over this period. It is more likely that a significant share of FDI could be directed to private infrastructure spending. However, this would require a significant increase in the willingness of outside private investors to commit more money for non-ICT infrastructure[13] and in the acceptance by national governments of this increased investment.

For 65 countries, the additional spending needed from 2010 to 2030 to meet the universal targets is less than .01 percent of their GDP; for 33 countries, it is more than 10 percent.

Of course, we should consider the benefits that this additional funding might bring. For example, what would the full additional $1.8 trillion from ODA mean for sub-Saharan Africa? Figure 6.9 shows that the region would experience immediate benefits in terms of HDI values rather than a long waiting period for the annual and cumulative benefits of the additional infrastructure to outweigh its costs (the crossover point and the payback horizon). Furthermore, the magnitude of the increased HDI values compared to the Base Case would continue to far outpace those in the Universal Targets Pursuit scenario, which does not have an infusion of outside funds. Underlying these differences in HDI values are, among other benefits, a nearly 10 percent increase in average income and a nearly 25 percent reduction in the infant mortality rate in 2030 relative to the Base Case. Of course, such differences are sensitive to our parameterization of the impact of greater infrastructure; see Box 6.2 for a discussion of this sensitivity.

In spite of the human development benefits forecast from achieving universal infrastructure access—benefits that are particularly significant in poorer countries and in regions such as sub-Saharan Africa—the prospects

Figure 6.9 Absolute change in the HDI relative to the Base Case in the Universal Targets Pursuit and Universal Targets with Additional Funding scenarios for sub-Saharan Africa: 2010–2060



Source: IFs Version 6.61.

Box 6.2 The costs of infrastructure and the net effects of pursuing universal targets

In Chapter 5, we considered the sensitivity of the IFs Base Case to alternative (high and low) assumptions about the unit costs of building and maintaining infrastructure. Not surprisingly, we found that higher costs led to small, but nevertheless, significant declines in our forecasts of access to infrastructure. This impact is more noticeable in lower-middle- and low-income countries. Furthermore, these effects are magnified when we look at more aggregate measures, such as average income.

We have undertaken a similar analysis to see how the alternative cost assumptions we applied to the Base Case in Chapter 5 might affect our conclusions about pursuing the universal targets. That is, we constructed what we will call UTP-High Cost and UTP-Low Cost scenarios. Table 6.9 and Table 6.10 present some key results from this exercise. We focus on the non-ICT targets for the low-income and lower-middle-income countries because these are most affected. We also show the global results.

The first table shows that achieving the universal targets becomes more difficult as the cost of infrastructure increases. Moreover, the impact is significantly greater for the low-income countries. Ignoring electricity access, where no low-income countries meet the target in the UTP-High Cost scenario, six to seven times as many countries meet the access targets in the UTP-Low Cost scenario as in the UTP High-Cost scenario.

These results point to two main conclusions. First, as noted in Chapter 5, future work in the forecasting of infrastructure needs to include a focus on improved understanding of unit costs. Second, the ability to meet infrastructure targets, and the net benefits of trying to do so, will be strongly affected by these costs.

Table 6.9 Percentage of low- and lower-middle-income countries and all countries achieving traditional infrastructure targets in 2030 in the Universal Targets Pursuit scenario compared to its Low Cost and High Cost variants					
		All-season roads	Electricity	Improved water	Improved sanitation
Low-income countries	UTP-Low Cost	36	14	42	19
	UTP	11	3	17	3
	UTP-High Cost	6	0	8	3
Lower-middle-income countries	UTP-Low Cost	92	82	88	80
	UTP	78	70	78	50
	UTP-High Cost	54	38	64	28
All countries	UTP-Low Cost	85	76	84	74
	UTP	77	70	75	57
	UTP-High Cost	68	58	68	45

Note: See again Table 6.3 for the definition of achieved target levels.

Source: IFs Version 6.61.

Table 6.10 Cumulative public spending, GDP per capita, and HDI consequences of Low Cost and High Cost variants of the Universal Targets Pursuit scenario for low- and lower-middle-income and all countries in 2030					
		Cumulative public infrastructure spending 2010–2030 (percent of GDP)	Cumulative public non-infrastructure spending 2010–2030 (percent of GDP)	GDP per capita in 2030 (2000$)	HDI values in 2030
Low-income countries	UTP-Low Cost	6.51	6.67	1,956	0.50
	UTP	7.38	5.87	1,805	0.49
	UTP-High Cost	7.50	5.79	1,741	0.49
Lower-middle-income countries	UTP-Low Cost	4.38	8.55	6,243	0.65
	UTP	5.89	7.06	6,053	0.65
	UTP-High Cost	7.10	5.87	5,851	0.64
World	UTP-Low Cost	2.79	13.67	12,960	0.71
	UTP	3.34	13.12	12,770	0.70
	UTP-High Cost	3.85	12.63	12,600	0.70

Source: IFs Version 6.61.

that they will stimulate additional ODA or FDI at needed levels are doubtful. Therefore, in the next section we ask if the international community and individual countries should consider alternative targets.

Clearly, higher unit costs place additional strain on countries. As Table 6.10 shows, with higher costs, more public funding is devoted to infrastructure and less to other categories, even as fewer countries achieve the targets. The combined effect of less infrastructure and fewer dollars available for government spending in other categories, such as education and health, is lower levels of GDP per capita and the HDI in the UTP–High Cost scenario in the year 2030.

Alternatives to the Universal Targets Pursuit and Universal Targets with Additional Funding Scenarios

The UTP scenario shows that in pursuing the aggressive universal infrastructure-related targets being discussed, the net costs associated with a domestic funding strategy can be prohibitive in the short-term and, for some countries, even in the long-term. Furthermore, it is questionable whether the additional assistance required from other sources to allow all countries to meet these targets without diversion of domestic spending (the UTAF scenario) would be forthcoming. What might be more reasonable alternatives if countries, using their own funds, wish to

Infrastructure targets could be tailored to better suit the needs of individual countries by adjusting the target date, adjusting the targeted level of access, and/or prioritizing different categories of infrastructure.

move beyond the infrastructure development seen in the Base Case, but not necessarily aim for achieving universal access by 2030 in all forms of infrastructure?

Defining alternative targets

The international community and countries could tailor infrastructure targets in a number of ways to better suit the needs of individual countries, including countries as different as Brazil and Chad (compared at the beginning of this chapter). Any of the ways would involve one or some combination of the following:

- Adjusting the target date
- Adjusting the targeted level of access
- Prioritizing specific categories of infrastructure

With IFs, we can explore a range of scenarios built using these different possibilities. Box 6.3 describes one approach we use for adjusting the targeted level of access taking into account a country's general level of development. More generally, with 183 countries, multiple types of infrastructure, and a 50-year time horizon, we could explore an almost infinite range of scenarios. In order to simplify matters, we have chosen to focus on one type of variation at a time rather than possible interacting combinations of such adjustments, except in our final scenario, where we change both the target date and the level of access.

The key characteristics of the eight modified scenarios, plus those of the Base Case and UTP, are described in Table 6.11. The Delayed Universal Targets scenario extends the time period for achieving the universal targets to 2050; the next four scenarios focus on single categories or types of infrastructure; and the final three scenarios—Meet Expectations, High Performance, and Delayed High Performance—base the targeted levels of access on countries' general level of development (see again Box 6.3), with Delayed High Performance also extending the time period.

As with the pursuit of the full set of universal targets, these alternatives most often demand additional investment in infrastructure over that in the Base Case, and countries must balance these expenditures against other demands on the resources available to them. Thus, with these scenarios, the actual amount of infrastructure forecast in our analysis will reflect fiscal constraints. In most cases, the targets are less aspirational than those explored in the Universal Targets Pursuit scenario. This is because we define the targets in the Delayed Universal Targets and single infrastructure priority scenarios so that their values can never exceed those in the UTP scenario in the target year of 2030 or later. However, in the Meet Expectations, High Performance, and Delayed High Performance scenarios, targeted values may be greater than those in the Universal Targets Pursuit scenario for years prior to 2030. Thus, in at least five of our eight alternative goal-setting scenarios, we expect that the alternative targeting strategies will result in some dampening, if not the complete elimination, of the short-term costs we saw many countries experience in the Universal Targets Pursuit scenario. Given the dynamic and integrated nature of the interactions captured in the model, however, the behavior of forecasted costs remains an empirical question to be answered.

Box 6.3 Adjusting targeted levels of access taking into account a country's general level of development

The historical levels of infrastructure and infrastructure access in a country are highly, but not completely, correlated with other indicators of development. In Chapter 4, we described the derivation of the equations we use to forecast country-specific expected future levels of infrastructure stocks and access, highlighting the key driving variables (e.g., average income) in each case. The actual past performance of individual countries varies around the expected value for their historical levels of the driving variables, with some countries performing better and some worse than expected. One measure of this cross-country variation is the standard error of the regression line used to specify the forecasting equation (this level relative to a function is roughly comparable to one standard deviation relative to a mean).

We can interpret positive deviations—that is, cases where countries perform better than would be expected given the level of their driving variables—as indications of better-than-average practices in these countries, and vice versa for negative deviations. In our Base Case, we generally assume that these unexplained deviations gradually fade away over time.* In IFs, we can modify both the rate at which these deviations converge and the level to which they converge.

We include three such scenarios in this chapter—one in which all countries strive to have levels of infrastructure access by 2030 that are at least as high as expected given their level of development; a second in which they try to improve access to a level that is at least one standard error above the expected level by 2030; and a third with the same target level as the second but with a target date of 2050. We refer to these scenarios as Meet Expectations, High Performance, and Delayed High Performance, respectively.

* The time-horizon over which this convergence occurs varies across different parts of the model. See Chapter 4 for more details.

Table 6.11 Alternative IFs infrastructure scenarios and associated targets				
Scenario name	**Scenario code**	**Targeted core infrastructure**	**Year of target**	**Level of target**
Base Case	Base	NA	NA	NA
Universal Targets Pursuit	UTP	All	2030	100%, except for road access, where target is based on a 90% cap
Delayed Universal Targets	DUT	All	2050	100%, except for road access, where target is based on a 90% cap
Universal Target–Roads Only	UT-R	Road access	2030	Reduce lack of access by one-half up to cap of 90% access
Universal Target–Energy Only	UT-E	Electricity access	2030	100%
Universal Target–Water and Sanitation Only	UT-W	Improved water and sanitation	2030	100%
Universal Target-ICT Only	UT-I	Mobile broadband	2030	100%
Meet Expectations	ME	All	2030	Expected level given general level of development
High Performance	HP	All	2030	One standard error above expected level given general level of development
Delayed High Performance	DHP	All	2050	One standard error above expected level given general level of development

Note: For the first three scenarios, the target for roads is to reduce by one-half the share of the rural population living more than 2 kilometers from an all-season road, with a maximum target (cap) of 90 percent because of extremely high marginal costs beyond that point. Access levels for the final three scenarios are determined by cross-sectional analysis of expected levels of access at varying levels of development and by a one-standard-error increment above that level in the final two scenarios (see Box 6.3 for further explanation); access rates for roads in those scenarios are again capped at 90 percent.

Source: IFs Version 6.61.

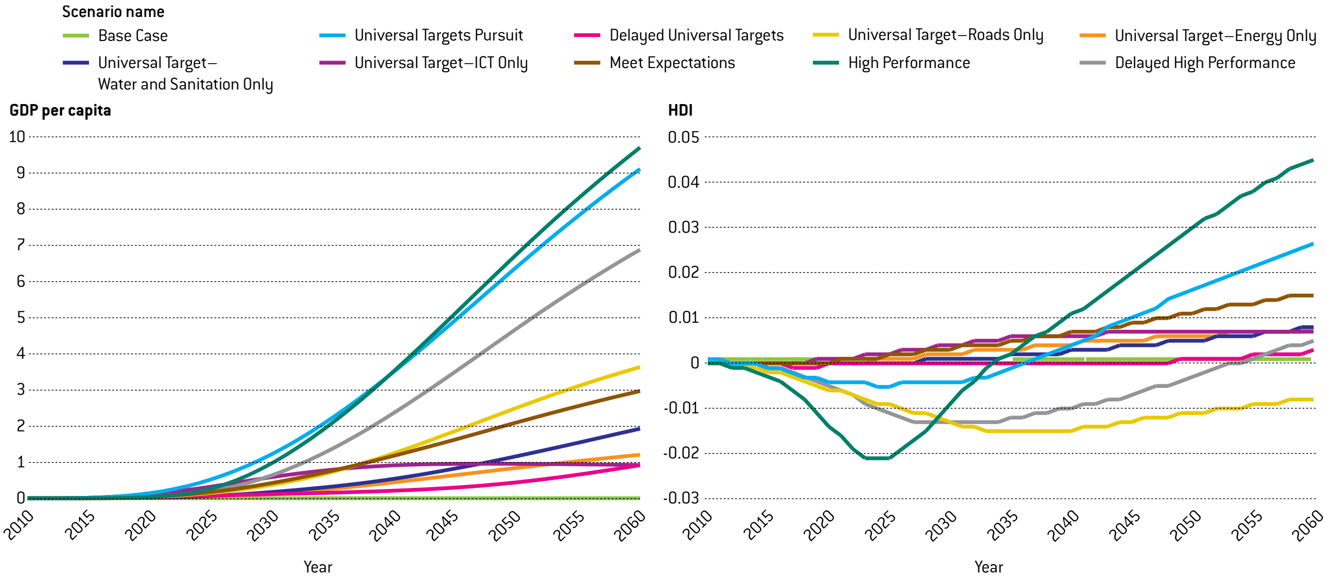
Comparing the alternatives

Earlier in this chapter, we described a number of metrics for comparing the Universal Targets Pursuit and Base Case scenarios. The two key underlying measures were average income (GDP per capita) and the UNDP's Human Development Index. From these, we introduced the concepts of crossover points and payback horizons. The former is the year after which the value of the measure in a scenario is consistently larger than in the Base Case for a given country or country grouping. The latter is the horizon beyond which the net present value of the measure, that is, the discounted cumulative stream of the measure's annual values, is consistently larger than in the Base Case.[14] For the current comparison, we will focus on the net present values and payback horizons of the different scenarios, as these are more in line with standard budgeting that looks at the desirability of investments. Using Peru as an example, Figures 6.10 and 6.11 and Table 6.10 illustrate how we can utilize these metrics to compare scenarios for an individual country; a similar analysis could be done for a group of countries.

Figure 6.10 (p. 164) presents the discounted cumulative streams of GDP per capita and the HDI for Peru for the alternative scenarios described in Table 6.9 compared to the Base Case over a time horizon from 2010 to 2060. The analysis is similar to the low-income country analysis of Figure 6.7, except that in Figure 6.10 we use two separate panels and show the absolute, instead of the percentage, differences.[15] The absolute magnitudes of the plotted values for each scenario are less important than their patterns over time and their values relative to the other scenarios, particularly the Base Case, which is shown as the horizontal green line with a value of 0 in both panels.

As the time horizon lengthens, most of the target scenarios outperform the Base Case. Only when the HDI is used as the metric for the Universal Targets–Roads Only scenario (UT-R) is the payback horizon beyond the 2060 time horizon of our study (Table 6.12, on p. 164). However, the payback horizon is almost at 2060 for the Delayed High Performance scenario and is beyond 2040 for the Delayed Universal Targets scenario using this same metric (HDI),

Figure 6.10 Cumulative net present values of GDP per capita and HDI for alternative infrastructure scenarios compared to the Base Case for Peru over the time horizon 2010–2060



Note: Values shown are absolute differences in discounted cumulated streams of GDP per capita and HDI values compared to the Base Case over the time horizon displayed on the horizontal axis; the annual discount rate used was 3 percent.

Source: IFs Version 6.61.

and we can surmise the potential concern this would raise for decision makers with shorter time horizons. Note that, as in prior analyses of the UTP scenario, using the GDP per capita measure of performance results in much shorter forecasted payback horizons for all scenarios.

Table 6.12 Payback horizons for Peru under alternative infrastructure scenarios as measured by GDP per capita and the HDI

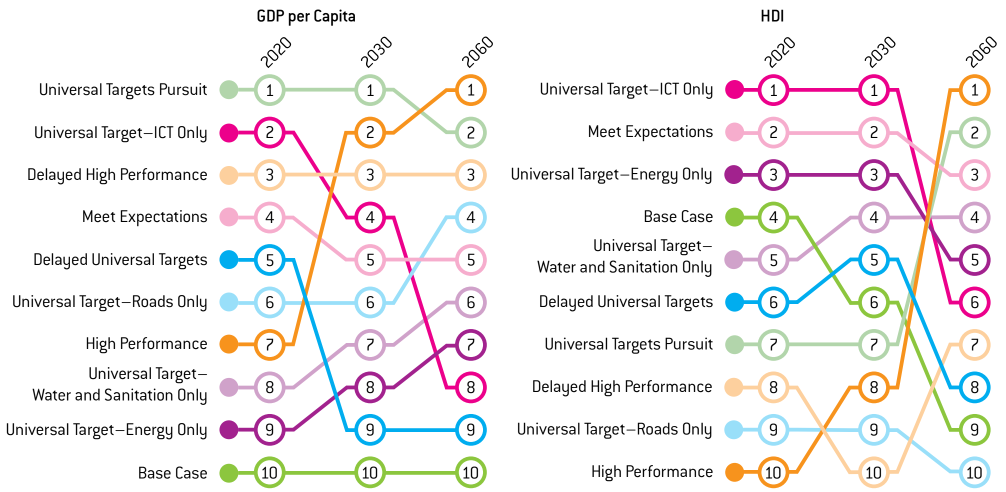
	Payback horizon	
Scenario name	**GDP per capita**	**HDI**
Base Case	NA	NA
Universal Targets Pursuit	2013	2013
Delayed Universal Targets	2013	2045
Universal Target–Roads Only	2010	Not by 2060
Universal Target–Energy Only	2014	2016
Universal Target–Water and Sanitation Only	2013	2025
Universal Target–ICT Only	2013	2014
Meet Expectations	2013	2013
High Performance	2010	2034
Delayed High Performance	2010	2054

Note: The payback horizon is defined as the year after which the scenario consistently performs better than the Base Case. If a country does not experience declines in any year in the Universal Targets scenario compared to the Base Case, the payback horizon for the Universal Targets scenario is set to 2010.

Source IFs version 6.61.

We can also rank the scenarios by payback at different time horizons (see Figure 6.11, again for Peru). We can consider the 2020, 2030, and 2060 time horizons as representing the near-, mid-, and long-term. The rankings differ depending on the metric as well as the time horizon, reflecting the results shown in Figure 6.10 and Table 6.12. One noticeable shift is that the High Performance scenario moves dramatically—from being ranked seventh in GDP per capita and last in the HDI using a time horizon of 2020 to first using a time horizon of 2060 under both metrics. The Universal Targets Pursuit scenario shows a similar but less dramatic shift using the HDI; it actually starts out with the highest rank using GDP per capita.[16] Meanwhile, the rankings of the Base Case and Universal Target–ICT Only (UT-I) scenario generally move in the opposite direction—that is, to lower rankings—as the time horizon lengthens. In the case of UT-I, the movement to a lower ranking is the flip-side of the near-term benefits of accelerating the already rapid expansion of mobile broadband. Once universal access to mobile broadband is attained in the early years of our time horizon, the benefits of the scenario do not rise as

Figure 6.11 Rank ordering of alternative infrastructure scenarios for Peru by GDP per capita and HDI outcomes at net present value: 2020, 2030, and 2060



Note: Rank orderings are based on discounted cumulated streams of annual values. The discount rate is 3 percent, and values are discounted to 2010. A value of 1 represents best performance.

Source: IFs Version 6.61.

rapidly as those of some of the other scenarios (recall, however, that our analysis does not include the possibilities of future now-unknown ICT technologies and their impacts).

We have undertaken similar analyses for other countries and country groupings. An obvious question is whether any of the scenarios consistently outperform the others. The simple answer to this question is "no." The results show that the scenario rankings depend on the country, the time horizon, and the metric used. Still, the results suggest some insights for those thinking about strategies for infrastructure development.

Figure 6.12 (p. 166) shows the relative rankings, by income group and for the world as a whole, of the different targeting strategies based on the HDI metric.[17] Except for the high-income countries (where the High Performance scenario is ranked first throughout the period), the rankings within each income group change over time. As we saw in the case of Peru, the Base Case and the Universal Target–ICT Only scenario have more appeal, with a shorter time horizon, while the more aggressive and expansive Universal Targets Pursuit and High Performance scenarios increase their desirability with longer-time horizons.

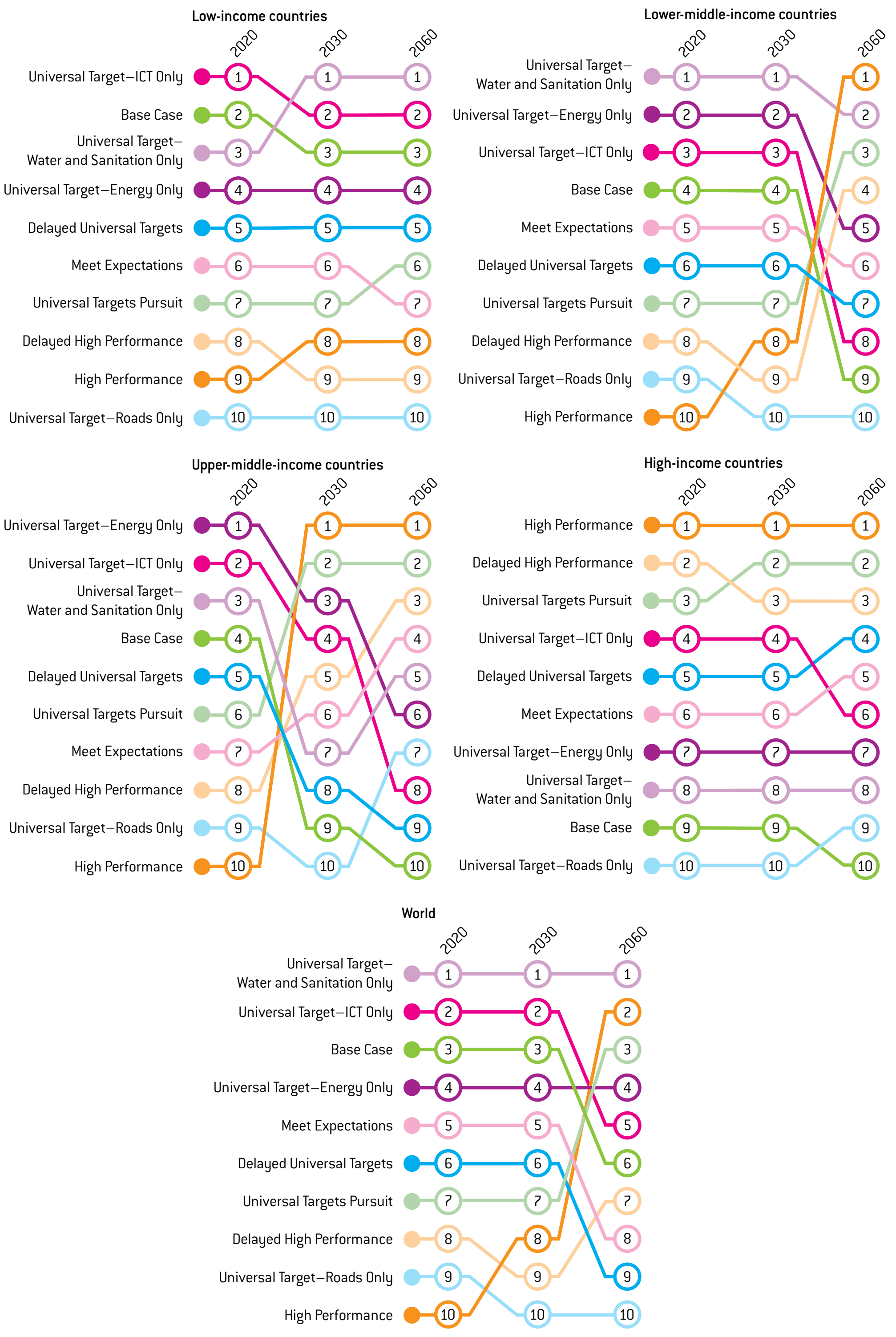
Very interesting differences arise when we look across the income groups. Both the Universal Targets Pursuit and High Performance scenarios are consistently ranked much lower for the low- and lower-middle-income countries than for upper-middle-income and high-income countries. This lower ranking reflects the significant sacrifices these countries would have to make in order to pursue a full suite of infrastructure targets without outside assistance. Instead, a focus on increasing access to improved water and sanitation, followed by electricity, appears to be their most promising strategy. At the same time, a targeted emphasis on increasing access to roads is likely to produce the least benefit for lower income countries.

Of course, these conclusions in significant part reflect our model assumptions. Our modeling includes positive benefits from all forms of infrastructure for economic productivity. However, water and sanitation and electricity also generate additional direct benefits related to health (see again Chapter 4). The fact that fewer countries might find ICT to be their main priority across longer time horizons is partly due to the quite near-term achievement by most countries of mobile broadband universality and the similarly near-term benefits it conveys. As mentioned previously, it almost certainly also reflects our inability to envision and capture potential

The desirability of more aggressive and comprehensive target sets increases with the length of the time horizon.

A focus on increasing access to improved water and sanitation appears to be the most promising strategy for most low-income countries.

Figure 6.12 Rank ordering of alternative infrastructure scenarios by income group and HDI outcome at net present value: 2020, 2030, and 2060



Note: Rank orderings are based on discounted cumulated streams of annual values of HDI. Discount rate is 3 percent and values are discounted to 2010. Values are population weighted, and a value of 1 represents best performance for each grouping.

Source: IFs Version 6.61.

future developments in ICT and the longer-term benefits of those developments in our analysis.

The lesser benefit of focusing on roads for almost all income groups and across all time horizons may be somewhat unexpected, but it is not surprising in our analysis. We have already noted the increasing marginal cost of improving road access—which in turn requires greater diversions of public resources from other expenditure categories—as countries build all-season roads in remote areas with small and widely dispersed populations. Although we tried to account for these increasing and very high marginal costs by modifying the road target with a 90 percent cap, they are still influencing the results. However, the relative benefits of roads do increase somewhat for middle-income and high-income countries relative to low-income ones.

While the results shown in Figure 6.12 illustrate general patterns across time and income groups, they should not be taken to imply that all countries within an income category will have the same priorities. Peru, for example, is an upper-middle income country, and a quick comparison of Peru's HDI values in Figures 6.11 with those of upper-middle income countries in Figure 6.12 shows that Peru exhibits an HDI profile in response to infrastructure scenarios that is very different from the general profile of upper-middle income countries. Every country is unique, and Figure 6.13 (p. 168) shows the percentage of countries in each income group for which we would assign each of the scenarios the highest ranking, again using the HDI as our metric.

Again, we see some of the same patterns across time and across the income groups. The number of countries with the highest rank associated with an ICT-focused strategy drops significantly as the time horizon lengthens, while those with the highest rank associated with the Universal Targets Pursuit strategy increases, particularly among the poorer countries. At the same time, for wealthier countries, the High Performance strategy appears most favored. Meanwhile, the expected benefits from extending the water, sanitation, and electricity infrastructures are evident in the large number of low- and lower-middle-income countries for whom the scenarios that emphasize these forms of infrastructure have the highest rankings, particularly in the short- and medium-term.

In summary, our analysis shows that there is some net benefit to trying to accelerate infrastructure development in some way for almost all countries. (Although the Base Case ranks fairly high in the low- and lower-middle-income groups as a whole, it receives the highest ranking for only three countries, and then only in 2020.) The fact that such acceleration has not been the general pattern reinforces the understanding that expenditures on public goods like infrastructure tend to be suboptimal.

Lessons for countries

Obviously, the results presented in the previous section reflect the modeling assumptions in IFs, as well as the metrics we have chosen for ranking the desirability of the alternative infrastructure scenarios. Still, our results can provide some guidance in setting priorities for infrastructure development for individual countries.

The primary message from our analysis is that no single set of targets is universally superior; the best and least-beneficial categories for investment will differ by country and time horizon. Every country differs in terms of initial levels of access, the availability of economic resources needed to pursue infrastructure development, and the other development challenges it faces. Consider the two developing countries we compared in the opening section of this chapter—Brazil and Chad. Given the dramatic differences in their current levels of development in general and their infrastructure stocks in particular, we would not expect that the optimal path of infrastructure development would be the same for both. Our analysis shows that this is indeed the case, with Chad benefitting most from an emphasis on increasing access to improved water and sanitation and Brazil from pursuing the full set of universal targets.[18]

Of course, additional analysis would be required to make specific recommendations for Chad, Brazil, Peru, or any individual country. In setting priorities, individual countries would need to refine the analytic foundation provided by this volume by adding additional information, such as country-specific costs for construction and maintenance, a broader or different range of scenarios, and perhaps, additional or different metrics for comparing scenarios. Perhaps most important, they would need to compare the net benefits of increasing investment in infrastructure, as explored in

Even within a given income category, not all countries will have the same priorities.

For almost all countries, accelerating infrastructure development in one way or another results in some net benefit.

Figure 6.13 Percent of countries, by income group, with alternative infrastructure scenarios ranked highest, based on HDI outcome: 2020, 2030, and 2060

Note: Choice of preferred scenario is based on discounted cumulated streams of annual values of the HDI. Discount rate is 3 percent and values are discounted to 2010.

Source: IFs Version 6.61.

these scenarios, vis-à-vis increasing other public investments.

Lessons for international donors
In our alternative scenarios, we have assumed that the additional resources for infrastructure arise from domestic sources. Therefore, the results provide guidance on how countries might wish to allocate their own resources. Of key concern to domestic governments is the tradeoff inherent in diverting limited public resources from other sectors in order to accelerate infrastructure development. International donors, however, have a different perspective and face further tradeoffs. For international donors, the primary question is whether investing in infrastructure represents an effective route for increasing human development in recipient countries. Chapter 3 showed that infrastructure investment can spur economic growth, lessen inequality, and improve health and education outcomes—all of which suggests that improving infrastructure can be an effective lever. However, only further analysis would determine whether and under what circumstances infrastructure investment has greater payoff than investment in other areas that support human development. In addition, the influx of potentially large sums of funding from external sources can sometimes have negative impacts, including the potential for corruption or misuse of funds and adverse effects on currency valuations, all of which are factors that donors need to consider in making decisions concerning infrastructure funding. That level of analysis goes beyond the scope of this volume, however.

Conclusion

The importance of infrastructure for economic and broader human development has received increasing attention in recent years, as has the relative lack of specific targets related to infrastructure in such efforts as the Millennium Development Goals. This absence has led a number of groups to push for a range of global and regional targets focused on various aspects of infrastructure.

We focused this chapter on exploring the potential costs and benefits of pursuing a small set of such infrastructure-related targets—those calling for improved access to all-season roads and for universal access to electricity, improved water and sanitation, and ICT (represented by mobile broadband) by the year 2030. The results show that many countries are not likely to achieve these targets using domestic resources, and that the effects of pursuing them could have net negative consequences due to the diversion of limited public resources from other important contributors to development. Furthermore, the amount of money that would be required from external sources, either via official development assistance or foreign direct investment, is large enough to raise further serious questions about whether the universal targets are reasonable.

Our exploration of alternative targets highlighted the differences across countries in terms of how they might tailor the proposed targets to best suit their own needs. One size does not fit all. While universal goals with common target dates are inspirational and help motivate a range of national and international actors to undertake important development initiatives, they can also be unrealistic for many countries (especially in South Asia and sub-Saharan Africa) and, in effect, doom them to failure. Some acceleration of infrastructure development beyond that seen in the Base Case does seem to be warranted in almost all countries, but the optimal rate and focus of this development differs across countries, due to their individual circumstances. Furthermore, the analysis of what strategies might be best will differ, depending on the time horizon and the metric of success policy makers use.

For almost all countries, accelerating infrastructure development in one way or another results in some net benefit.

No universally superior set of targets exists for all countries, time horizons, and metrics.

1 The value for Chad is an estimate based on 2004 data from Legros et al. (2009: 67) because the latest electricity access database from the International Energy Agency no longer includes Chad. Other recent estimates in our database for sub-Saharan African countries with electricity access values below 10 percent are Burundi (3 percent in 2006), Gambia (8 percent in 2002), Liberia (3 percent in 2007), Rwanda (5 percent in 2005), Sierra Leone (5 percent in 2007), and Uganda (9 percent in 2009).

2 Recall that the goal for rural access to all-season roads is to reduce by half the share of the rural population that does not live within two kilometers of an all-season road, with a maximum target level of 90 percent access.

3 Recall that the actual target for all-season roads is to reduce by half the percentage of the rural population without access, rather than to provide universal access. These target levels are 55 percent for Chad and 67 percent for Mozambique.

4 The electricity and sanitation targets are the most difficult for countries to achieve. One hundred and twelve countries missed the electricity target in our Base Case forecast, and all 139 countries that failed to meet the complete target set missed the sanitation target.

5 See Box 4.1 for a discussion of the terminological issues around demand and supply.

6 As a reviewer pointed out, historical levels can also reflect overbuilding (that is, building more than underlying demand would warrant). We assume that this effect, which would imply that our equations overestimate demand, is much smaller than the effect of a lack of funds.

7 We also calculate the expected values using the standard functions for the targeted infrastructure. If these are ahead of the target path, we use those on the assumption that countries will only adjust their demand if they are behind the target path. The core infrastructure without targets includes area equipped for irrigation, wastewater treatment, fixed-line telephones, mobile telephones, and fixed-line broadband.

8 See Stiglitz, Sen, and Fitoussi (2009) for an extensive discussion of GDP as a measure of economic welfare.

9 ul Haq (1995), with input from Amartya Sen, developed the HDI and Fukuda-Parr (2003) helped explain and extend its use. In 2010, the United Nations Development Programme Human Development Report Office revised the inputs to the HDI and moved to the geometric mean formulation currently in use (UNDP 2010: 15). In their 2009 report, Stiglitz, Sen, and Fitoussi (2009) reviewed the value of the HDI as a measure of social welfare in addition to evaluating GDP as a measure of economic welfare.

10 Because we have not included direct linkages in the model between improved infrastructure and education, we may be exaggerating the net costs of the target scenarios for education. However, Chapter 2 discussed a number of possible pathways, especially important for girls' school attendance, including better road access, electricity in homes and schools, and improved water and sanitation in homes and schools.

11 As a country nears a target, it is able to redirect some funding back to education and health. At the same time, the benefits of increased infrastructure can serve to hasten the crossover, either by providing direct benefits or by dampening the costs of redirecting funding from other sectors.

12 We also compared the results presented in this section using discount rates of 1 and 5 percent and did not find significant differences. The idea of discounting future levels of the HDI is unusual, but the logic is parallel to that of discounting GDP per capita.

13 Recall that most countries achieved the ICT goals in the Universal Targets Pursuit scenario, so almost all of the additional funding required to achieve the universal targets would be for traditional infrastructure.

14 The annual values are discounted at an annual rate of 3 percent back to the year 2010.

15 Using the percentage differences would not affect the outcomes presented in this section.

16 Peru is one of the countries for which some of the infrastructure targets in the High Performance scenario are more ambitious than those in the Universal Targets Pursuit scenario prior to 2030. Thus, it has greater short-term costs, but also greater long-term benefits as it attains higher levels of infrastructure relatively sooner.

17 For this analysis, we focus on the HDI metric rather than GDP per capita since the HDI more clearly illustrates the developmental tradeoffs of pursuing infrastructure targets.

18 These conclusions are based on the time horizon to 2030, using either cumulative discounted GDP per capita or HDI.

7

The Future of Global Infrastructure

This volume has been premised on the assumption that infrastructure plays a vital role in a country's development by underpinning economic growth and enabling human development. Thus, it was surprising to us that few efforts have sought to explore long-term futures for infrastructure in a comprehensive fashion—that is, looking at an extensive range of infrastructures across a wide variety of countries over a long time horizon—and linking infrastructure to other key human development systems.

In this volume, we make contributions on two main fronts. First, we add to the infrastructure forecasting toolkit through building and making available an empirically based, more comprehensive and accessible computer modeling system for thinking about alternative infrastructure futures. Second, we use the tool to explore where the world seems to be headed in terms of infrastructure development; how this compares to existing targets; how the pursuit of these targets might interact, positively or negatively, with broader human development; and what might be alternative targets. This chapter reflects on both of these contributions.

Expanding the Capability for Forecasting Infrastructure

Our goal for *Building Global Infrastructure* was to create a dynamic, integrated approach for forecasting infrastructure stocks, access, and spending for 183 countries around the world and for a long time horizon. Furthermore, we wanted to embed this structure into the International Futures (IFs) system, with its broad representation of multiple domains, such as economics, demographics, energy, food and agriculture, governance (including revenue generation and public spending), and the environment. This would allow us to incorporate driving variables not used in previous forecasts (e.g., those related to income inequality, geography, and governance); to take into account fiscal constraints; and to explore the wider socio-ecological impacts of different infrastructure futures.

This volume makes contributions on two fronts: (1) improving the toolkit for forecasting infrastructure, and (2) exploring the future of infrastructure and its broader implications.

In developing this infrastructure forecasting approach and embedding it into IFs, we ran into a number of related challenges. These included a lack of comprehensive and reliable historical data and somewhat limited, and at times contradictory, empirical information on the drivers of infrastructure development and the effect of infrastructure on other socio-ecological systems.

Unlike other human development issue areas, including population, education, health, agriculture, and energy, no lead international organization deals with infrastructure as a whole, nor does the field have a standard set of terms and measurements. Thus, infrastructure data have long been scattered across a number of sources, resulting in data that are difficult to obtain and reconcile across time, geography, and infrastructure types. This is true for physical data, but even more so for financial data.

IFs provides a dynamic, integrated approach to forecasting key infrastructure stocks, access to them, and the associated spending for 183 countries out to the year 2100.

These data problems exacerbated the difficulties for us, and many others, not just in forecasting infrastructure development, but also in estimating the impacts that infrastructure can have on human development. Thus, it is not surprising that most previous forecasting efforts have narrowed their focus to select countries, considered a single or small subset of infrastructure types, maintained a relatively near-term focus, and/or paid attention primarily to needed or targeted levels of infrastructure and their related funding requirements. Further, the studies that did look at costs did not explicitly address the financial and other constraints that must be considered in forecasting actual levels of infrastructure (that is, they did not consider the revenue-generating capacity of governments or the competition for funds from health, education, and other categories of public spending). Finally, previous studies very seldom considered the impacts of alternative infrastructure futures on broader human development systems (such as on economic growth and on aspects of demographics, including health), much less closed the loop by exploring how the resultant alternative futures for those other systems in turn further affect infrastructure development.

An additional challenge we faced is that infrastructure technologies continue to change (this has been seen most recently in the very rapid advances in information and communication technologies). Although our model is more structural than extrapolative, it does begin with the current state of global infrastructure; further, it links near-term development patterns to the general trends of recent years, and its structural elements have been designed, in large degree, based on historical patterns. Thus, even though we know there will continue to be new technologies and new forms of infrastructure, we are not able to forecast with any confidence what they will be, what they will cost, or what patterns of adoption will characterize them.

These challenges mean that any effort to understand the future of infrastructure, including our own, will be limited in important ways. Nonetheless, we have made what we believe is a significant contribution in enhancing the toolkit for forecasting infrastructure.

A few of the key characteristics of our infrastructure model are that it:

- provides annual forecasts for 183 countries out to the year 2100 (although the time horizon for the results presented in this volume extends only to 2060);
- includes a wider array of infrastructure forms than most previous studies, adding multiple information and communication technologies (mobile telephones, mobile broadband, and fixed broadband) as well as expanding more standard infrastructure types such as road transportation (to include unpaved roads and rural road access) and water and sanitation (to include wastewater and irrigation);
- explicitly considers financial constraints on infrastructure development through the estimation of a supply-demand balance imposed in our forecasting of actual levels of infrastructure and associated spending;
- uses infrastructure stocks and access as direct inputs into the determination of a number of economic and health outcomes;
- feeds back the direct and indirect effects of infrastructure development to affect the drivers of infrastructure development in future years;
- enables users to create their own scenarios by defining alternative targets for infrastructure attainment and changing a number of underlying parameters;

- is freely available to run or download from our website (www.ifs.du.edu); this includes access to what we believe is the most comprehensive database of infrastructure stocks and access currently available.

Chapter 4 provides greater detail on many of these aspects of the infrastructure model, as does the help system included with the IFs system.

Understanding the Future of Infrastructure

In the past, as new technologies were invented, today's high-income countries implemented—in generally sequential patterns and over relatively long periods of time—the infrastructure networks they now enjoy. Today, however, developing countries are faced with an array of existing infrastructure technologies—and populaces who desire access to all of them simultaneously.

How do people's desires for all basic infrastructures compare with the reality in today's developing countries? In 2010, the infrastructure with the widest distribution was that for providing access to safe water. In that year, 88 percent of the world's population had either household connections or access to some other improved source of water. Still, 789 million people had no such access, including 333 million in sub-Saharan Africa (66 million in Nigeria alone) and 158 million in South Asia (94 million in India alone).

Access to electricity and to mobile telephones appears to be the next most pervasive, with global access around 74 and 77 percent, respectively. For mobile phones, this might be somewhat misleading, however, as the measure, subscriptions per 100 persons, can reflect multiple subscriptions held by a single person. Still, the 2010 global figure of nearly 78 mobile phone subscriptions per 100 persons points out the rapid penetration of this technology in recent years. We are seeing a similar rapid increase in mobile broadband subscriptions which, in fact, already outpace those for fixed broadband (the greater subscription rate for mobile broadband is related to the greater physical investment required for the fixed technologies, the availability of mobile services in many areas where fixed services are unavailable, and the greater convenience of the mobile technologies even when both fixed and mobile services are available). Access to improved sanitation and rural access to all-season roads lag behind access to other forms of basic infrastructure.

The variation in current access patterns across income levels and geographic regions is often very large. This is particularly pronounced for electricity and improved sanitation, where the access rates in 2010 for sub-Saharan Africa were only 29 and 30 percent, respectively, compared to 98 percent or more in high-income countries. The pattern of access also varies for individual countries within income groups and regions, but in general, low- and lower-middle-income countries have greater access to improved water than to sanitation or electricity. There is further general consistency across countries and regions in that those that rank lower in access to one form of infrastructure also tend to rank lower in other forms. However, the spread of new technologies is facilitating more rapid advance in today's developing countries than high-income countries experienced in earlier periods. The clearest example of this is the expansion of mobile information and communication technologies, which is allowing many countries to forego altogether the widespread development of fixed telephony.

Unfortunately, for many countries progress in infrastructure development has occurred in fits and starts, reflecting inherent challenges: high upfront costs, long time-frames required for new construction, and the important roles that governments (sometimes poorly functioning or corrupt governments) need to play in infrastructure development and provision. In addition, efforts to increase private participation in infrastructure development have been uneven (as have been the results of such efforts). Further, in some countries, for example, Haiti and Iraq, natural disasters and conflict have taken a severe toll. Of course, many of these factors also affect high-income countries, but the greater challenges for these countries are related to maintaining existing infrastructure and keeping pace with new technology developments rather than building out traditional infrastructure.

Despite these problems, using our Base Case, we forecast that great progress in access rates is likely around the world by 2060 (see again

We believe we have provided some valuable insights into the possibilities and implications of alternative infrastructure futures for human well-being.

In the future, developing countries will not follow the same path of infrastructure development that today's rich countries once did.

For many countries, progress in improving access to infrastructure has occurred in fits and starts, reflecting a number of inherent challenges.

Despite the challenges, great progress in infrastructure provision is likely in most countries over the next half-century.

The pace of infrastructure development in our Base Case is not fast enough for many countries to achieve universal access to most basic infrastructure forms by 2030.

Table 5.3). Information and communication technologies (ICT), already an incredible success story, will be all but universal well before 2060. We forecast that, with the exception of sub-Saharan Africa, most developing regions will have access rates to improved water and electricity at levels that approach or exceed those in high-income countries today. Even sub-Saharan Africa will reach 81 percent access to electricity and 91 percent access to improved water. Access to improved sanitation will approach 90 percent globally. Only South Asia (87 percent) and sub-Saharan Africa (77 percent), which start from very low levels of current access, will have regional levels below the global average. Overall, road networks will grow substantially in all regions; however, although rural access to all-season roads will increase, it will not grow much beyond 80 percent in a number of regions and not beyond 60 percent in low-income countries. These rural access forecasts are related to assumptions in IFs which reflect historical data that indicate rapidly increasing marginal costs to increase rural road access above 80 percent.

Overall, therefore, the IFs Base Case projects a generally optimistic scenario that also includes positive or virtuous feedbacks across infrastructure's advance and broader human development.[1] For example, in 2060, the number of people without improved water and sanitation will be reduced by more than 50 percent compared to 2010, even as we forecast that the global population will increase by 40 percent over the same period. Still, large gaps and shortfalls will remain. Our forecasts suggest that 1.1 billion persons will not have improved sanitation in 2060, and 240 million will lack access even to an improved water source. Furthermore, those without access in 2060 are likely to be even more concentrated in sub-Saharan Africa than they are today, with the continent being home to half of those without improved sanitation and more than 85 percent of those without access to improved sources of water.

The pace of infrastructure advance in our Base Case is also not fast enough for 82 percent of countries worldwide, and 99 percent of developing countries, to meet the combined goals put forth across the separate studies that call for universal access to various forms of basic infrastructure by 2030 (see again Chapter 1 and Box 5.3). This failure is a reflection of a number of factors, including population growth, competing public priorities, and perhaps most important, poor capacity for revenue generation (particularly in the least developed countries). As a general rule, both low-income and middle-income governments spend a significantly higher percentage of their GDP on core infrastructure than do those with high incomes—in fact, approximately four times as high (about 4 percent compared to a bit less than 1 percent).[2] While low- and lower-middle-income countries, in particular, are likely to maintain or even increase that rate over the next two decades, our general expectation is for decreasing percentages to go toward core infrastructure in all countries because other categories of spending, notably education and health, tend to take higher percentages of GDP as countries' income levels rise and overall government spending as a percentage of GDP remains relatively constant or declines.

Even if we push governments to achieve universal access for core infrastructure, as we do in our Universal Targets Pursuit scenario, 78 countries (43 percent of all countries and 54 percent of developing countries) are unable to do so by the 2030 target date if they must rely only on their own resources (see again Table 6.3). By 2060, 84 percent of the world's countries, and 78 percent of developing countries, are able to do so (compared with only 32 percent of all countries and 13 percent of developing countries in the Base Case). The vast majority of countries that are not able to achieve the universal targets are low-income countries, primarily in sub-Saharan Africa. The principal reasons they are unable to meet the targets are that they have further to go and they do not have the financial resources to do so, in spite of diverting significant amounts of public funding from other important spending categories (like health and education, see again Table 6.4).

Furthermore, because most of the other public spending categories also contribute to economic and human development, the negatives caused by the diversion of funds to infrastructure may outweigh the benefits that come with the increased infrastructure. To explore this, we looked at the cumulative discounted values of

GDP per capita and the Human Development Index (HDI), and defined the concept of a payback horizon as the time horizon beyond which the cumulative discounted values of GDP per capita or HDI in the Universal Targets Pursuit scenario are consistently higher than those in the Base Case.

When using the HDI as the underlying metric of performance, we find that approximately 60 percent of all countries have a payback horizon prior to 2030 and about 75 percent have a payback horizon earlier than 2060 (see again Figure 6.8). However, for low-income countries, these percentages fall to just under 15 percent and just above 20 percent for horizons of 2030 and 2060, respectively.

When using GDP per capita as the metric of performance, however, the percentage of countries reaching payback horizons by 2030 and 2060 increases, and this is especially true for low-income countries. For the world as a whole, 70 percent of all countries have a payback horizon by 2030 and 82 percent by 2060. The corresponding values for low-income countries, again using the GDP per capita metric, are 39 percent and 56 percent, respectively.

These results imply that achieving universal infrastructure access by 2030 is probably neither politically acceptable nor economically and socially desirable for a significant number of countries in the absence substantial outside assistance. We estimate that the level of assistance required is on the order of 3.6 trillion dollars. Compared to the Base Case, where official development assistance (ODA) for all development efforts reaches 1.8 trillion dollars by 2030, ODA would need to more than double over the period 2010–2030 and be committed totally to infrastructure. Alternatively, foreign direct investment (FDI) would need to increase by more than 10 percent over the same period (see again Chapter 6).[3]

As alternatives, we explored a set of what we hope are still aggressive but more reasonable targets by: delaying the target dates; prioritizing specific types of infrastructure; and adjusting the target levels in a way that takes into account the very different starting points of countries both across and within levels of development. In all, we looked at ten different scenarios (the Base Case, the Universal Targets Pursuit scenario, and eight modified target scenarios) and their implications for human development, as measured by both cumulative discounted GDP per capita and the HDI.

Our results suggest that the most effective target set varies by country and changes depending on the length of the policy horizon (see again Chapter 6 for more details). We do find some general patterns based on a country's starting income level. Using the HDI metric, the scenario targeting only improved water and sanitation for universal access provides the greatest returns for an increasing number of low-income countries as the policy horizon increases. (When the policy horizon is set to 2060, almost three quarters of all low-income countries benefit the most from this targeted intervention.) The ICT only scenario provides the second-largest return for low-income countries when shorter policy horizons are considered. For lower-middle-income countries, the targeted Water and Sanitation Only and ICT Only scenarios provide the biggest benefit with shorter policy horizons, but are replaced by the Universal Targets Pursuit scenario as the policy horizon extends to 2060. A majority of the upper-middle- and high-income countries see the most benefit from the pursuit of a full suite of infrastructure targets, usually either the High Performance scenario (where countries attempt to achieve access rates equal to the best performing country in their income group) or the Universal Targets Pursuit scenario (see again Figure 6.13 for a fuller picture).

Based on these findings, we are confident that some acceleration of infrastructure development beyond that seen in the Base Case is warranted in almost all countries, although the optimal rate and focus of this acceleration will differ across countries.[4] We can be certain, however, that currently developing countries will not follow the same general path of infrastructure development that today's rich countries once did. On the one hand, developing countries are under pressure for rapid initial build-out of multiple traditional infrastructure forms simultaneously, a formidable task. On the other hand, new technologies—especially, but not only, mobile information and communication technologies—will allow them to leapfrog over some of the intermediate steps that have characterized the past infrastructure transitions of today's rich countries.

Pursuing universal access by 2030 in the absence of substantial international assistance is probably neither politically acceptable nor economically and socially desirable for a significant number of countries.

Some acceleration of infrastructure development beyond that seen in the Base Case is warranted in almost all countries, but the optimal rate and focus of this acceleration differs by country.

The Future of Infrastructure Forecasting

In this volume, we have painted a generally bright future for infrastructure development based on current expectations. We have also noted that it could be brighter, if supported by significant and careful policy choices, both within and across countries. Creating these brighter futures will likely require not only greater international assistance and participation of the private sector in infrastructure provision, but also wise choices by domestic governments in terms of how best to accelerate infrastructure development. Furthermore, the path to these futures will likely differ between countries.

Our conclusions are very much contingent on the tool we have developed to explore alternative infrastructure futures. From the start, we recognized that we could not create a fully comprehensive infrastructure model. Even so, we would not have undertaken such a daunting task had we not believed both that considering the long-term future of infrastructure globally is important, and that we could provide some insights into possible futures and the implications of alternative infrastructure futures for broader human well-being.

Much more can be done to further strengthen infrastructure forecasting. In particular, we would point to the need to strengthen the database of current and past stocks of, access to, and spending on infrastructure; broaden the inclusion of infrastructure types (e.g., ports and airports), as well as inter-country and global infrastructure linkages; expand the treatment of interactions across types of infrastructure (e.g., the potential impact of ICT on energy systems via smart grids); and improve the understanding and inclusion of important forward linkages from infrastructure (e.g., to education and the environment). Finally, the intersection of hard infrastructure with soft infrastructure (e.g., knowledge systems and governance) remains an important area for exploration in advancing society's understanding of infrastructure and infrastructure futures.[5] We hope that most of our insights will hold up in the face of future efforts to advance the collective enterprise of building global infrastructure.

The end tables that accompany this volume provide the Base Case results for an array of infrastructure and other human development indicators for 183 countries, as well as regional groupings of countries, for the years 2010, 2035, and 2060. Detailed results for other forecast years and the other scenarios discussed in this volume are packaged with the model itself. We encourage interested readers to learn from our endeavors, to take to heart our key messages, and to explore their own ideas using IFs, which is available at www.ifs.du.edu.

1 There are, however, a number of potential storm clouds on the global forecast horizon relating to: aging populations and the fiscal pressures associated with them; forthcoming peaking of conventional oil and gas production and the need to develop alternative, sustainable sources of energy; growing pressure on fresh water supplies; and accelerating climate change. We have therefore also developed and explored elsewhere a Global Challenges scenario that heightens all of these pressures relative to the Base Case (see B. Hughes, Irfan, et al. 2011). We have not explored the implications of such a scenario in this volume.

2 These expenditure estimates include only public spending on the forms of core infrastructure explicitly included in Ifs. The numbers presented here do not include public spending on other forms of infrastructure or private spending on any type of infrastructure.

3 These figures are based on IFs Base Case estimates of ODA, FDI, and the funds needed to achieve the universal targets while avoiding any diversion of public spending on other categories.

4 Our forecasts for individual countries or regions should not be taken as specific recommendations, but rather used to provide guidance and methodological suggestions for more detailed analysis.

5 Our first chapter noted that the knowledge systems of countries, including education systems (perhaps especially at the tertiary level) and also R&D systems and government support for them, are also a form of infrastructure, somewhat "softer" than the traditional physical forms, but also involving many physical (e.g., classrooms and research facilities) as well as institutional and cultural components. One could well argue that knowledge systems, in interaction with ICT, may be the key transformative elements of infrastructure development over the next 50 years. In fact, within IFs we have begun to develop forecasting around knowledge systems, and we wish to build and use this more fully in future analysis.

Appendix I: Countries in IFs by World Bank Developing Region and Economy Classification

East Asia and Pacific Developing Countries		
Cambodia (low-income)	Micronesia, Fed. Sts. (lower-middle-income)	Solomon Islands (lower-middle-income)
China (upper-middle-income)	Mongolia (lower-middle-income)	Thailand (upper-middle-income)
Fiji (lower-middle-income)	Myanmar (low-income)	Timor-Leste (lower-middle-income)
Indonesia (lower-middle-income)	Papua New Guinea (lower-middle-income)	Tonga (lower-middle-income)
Korea, Dem. Rep. of (low-income)	Philippines (lower-middle-income)	Vanuatu (lower-middle-income)
Lao PDR (lower-middle-income)	Samoa (lower-middle-income)	Vietnam (lower-middle-income)
Malaysia (upper-middle-income)		

Europe and Central Asia Developing Countries		
Albania (lower-middle-income)	Kyrgyz Republic (low-income)	Russian Federation (upper-middle-income)
Armenia (lower-middle-income)	Latvia (upper-middle-income)	Serbia (upper-middle-income)
Azerbaijan (upper-middle-income)	Lithuania (upper-middle-income)	Tajikistan (low-income)
Belarus (upper-middle-income)	Macedonia, TFYR (upper-middle-income)	Turkey (upper-middle-income)
Bosnia and Herzegovina (upper-middle-income)	Moldova, Rep. of (lower-middle-income)	Turkmenistan (upper-middle-income)
Bulgaria (upper-middle-income)	Montenegro (upper-middle-income)	Ukraine (lower-middle-income)
Georgia (lower-middle-income)	Romania (upper-middle-income)	Uzbekistan (lower-middle-income)
Kazakhstan (upper-middle-income)		

Latin America and the Caribbean Developing Countries		
Argentina (upper-middle-income)	Ecuador (upper-middle-income)	Nicaragua (lower-middle-income)
Belize (lower-middle-income)	El Salvador (lower-middle-income)	Panama (upper-middle-income)
Bolivia, Plurinational State of (lower-middle-income)	Grenada (upper-middle-income)	Paraguay (lower-middle-income)
Brazil (upper-middle-income)	Guatemala (lower-middle-income)	Peru (upper-middle-income)
Chile (upper-middle-income)	Guyana (lower-middle-income)	St. Lucia (upper-middle-income)
Colombia (upper-middle-income)	Haiti (low-income)	St. Vincent and the Grenadines (upper-middle-income)
Costa Rica (upper-middle-income)	Honduras (lower-middle-income)	Suriname (upper-middle-income)
Cuba (upper-middle-income)	Jamaica (upper-middle-income)	Uruguay (upper-middle-income)
Dominican Republic (upper-middle-income)	Mexico (upper-middle-income)	Venezuela, RB (upper-middle-income)

Middle East and North Africa Developing Countries		
Algeria (upper-middle-income)	Jordan (upper-middle-income)	Palestine (lower-middle-income)
Djibouti (lower-middle-income)	Lebanon (upper-middle-income)	Syrian Arab Republic (lower-middle-income)
Egypt, Arab Rep. of (lower-middle-income)	Libya (upper-middle-income)	Tunisia (upper-middle-income)
Iran, Islamic Rep. of (upper-middle-income)	Morocco (lower-middle-income)	Yemen, Rep. of (lower-middle-income)
Iraq (lower-middle-income)		

South Asia Developing Countries		
Afghanistan (low-income)	India (lower-middle-income)	Pakistan (lower-middle-income)
Bangladesh (low-income)	Maldives (upper-middle-income)	Sri Lanka (lower-middle-income)
Bhutan (lower-middle-income)	Nepal (low-income)	

Sub-Saharan Africa Developing Countries		
Angola (upper-middle-income)	Gabon (upper-middle-income)	Niger (low-income)
Benin (low-income)	Gambia (low-income)	Nigeria (lower-middle-income)
Botswana (upper-middle-income)	Ghana (lower-middle-income)	Rwanda (low-income)
Burkina Faso (low-income)	Guinea (low-income)	São Tomé and Príncipe (lower-middle-income)
Burundi (low-income)	Guinea Bissau (low-income)	Senegal (lower-middle-income)
Cameroon (lower-middle-income)	Kenya (low-income)	Sierra Leone (low-income)
Cape Verde (lower-middle-income)	Lesotho (lower-middle-income)	Somalia (low-income)
Central African Republic (low-income)	Liberia (low-income)	South Africa (upper-middle-income)
Chad (low-income)	Madagascar (low-income)	Sudan (lower-middle-income)
Comoros (low-income)	Malawi (low-income)	Swaziland (lower-middle-income)
Congo, Dem. Rep. of (low-income)	Mali (low-income)	Tanzania, United Rep. of (low-income)
Congo, Rep. of (lower-middle-income)	Mauritania (low-income)	Togo (low-income)
Côte d'Ivoire (lower-middle-income)	Mauritius (upper-middle-income)	Uganda (low-income)
Eritrea (low-income)	Mozambique (low-income)	Zambia (lower-middle-income)
Ethiopia (low-income)	Namibia (upper-middle-income)	Zimbabwe (low-income)

High Income Countries				
Australia	Czech Republic	Iceland	New Zealand	Slovenia
Austria	Denmark	Ireland	Norway	Spain
Bahamas	Equatorial Guinea	Israel	Oman	Sweden
Bahrain	Estonia	Italy	Poland	Switzerland
Barbados	Finland	Japan	Portugal	Taiwan
Belgium	France	Korea, Rep. of	Puerto Rico	Trinidad
Brunei Darussalam	Germany	Kuwait	Qatar	United Arab Emirates
Canada	Greece	Luxembourg	Saudi Arabia	United Kingdom
Croatia	Hong Kong SAR	Malta	Singapore	United States
Cyprus	Hungary	Netherlands	Slovak Republic	

Source: World Bank classification as of July 2012 of countries included in IFs. Note that IFs treats two countries differently than the World Bank: (1) the World Bank refers to West Bank and Gaza, whereas IFs uses the country name Palestine; (2) IFs includes Taiwan and the World Bank does not. The full World Bank list is available at http://data.worldbank.org/about/country-classifications/country-and-lending-groups.

Appendix II: Major Infrastructure Databases

Database name	Source	URL	Infrastructure coverage	Status of database
A Database of World Stocks of Infrastructure: Update 1950–2005	Canning, David, and Mansour Farahani. 2007. Boston: Harvard School of Public Health	http://www.hsph.harvard.edu/faculty/david-canning/data-sets/	Roads; railroads; electricity; telephones	Not updated annually; last update was in 2007
Africa Infrastructure Country Diagnostic Data	African Development Bank	http://www.infrastructureafrica.org/aicd/tools/data	Energy; electricity; ICT; irrigation; transport; water and sanitation; public sector spending by infrastructure type	Not updated annually; last update was in 2011
AQUASTAT	Food and Agriculture Organization	http://www.fao.org/nr/water/aquastat/main/index.stm	Land use and population; water resources; water use; irrigation; environment and health	Updated annually
FAOSTAT	Food and Agriculture Organization	http://faostat3.fao.org/home/index.html	Agricultural production; forestry; prices, trade and investment; food supply and balance	Updated annually
Infrastructure Investment and Maintenance Data	International Transport Forum and Organisation for Economic Co-operation and Development	http://www.internationaltransportforum.org/statistics/investment/data.html	Spending on railways; roads; inland waterways; maritime ports; airports	Updated annually
International Energy Statistics	United States Energy Information Administration	http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm;	Electricity generation by source type; energy production and consumption; emissions	Updated annually
Private Participation in Infrastructure Project Database	World Bank	http://ppi.worldbank.org/	Funding data for individual infrastructure projects covering: transport; energy; ICT; water and sanitation	Updated annually
Road Costs Knowledge System (ROCKS)	World Bank	http://go.worldbank.org/ZF1I4CJNX0	Data on individual road projects by country; physical characteristics and unit costs	Not updated annually; last update was in 2008
Rural Access Index (RAI)	World Bank	http://www.worldbank.org/transport/transportresults/headline/rural-access/rai-updated-modelbasedscores5-20070305.pdf	Percent of rural population with access to an all-season road	One-time compilation in 2007
UNSD Environmental Indicators	United Nations Statistics Division of the Department of Economic and Social Affairs	http://unstats.un.org/unsd/environment/qindicators.htm	Air and climate; biodiversity; energy and minerals; forests; governance; inland water resources; land and agriculture; marine and costal areas; natural disasters; waste	Updated biannually

Database name	Source	URL	Infrastructure coverage	Status of database
WHO/UNICEF JMP Water Supply and Sanitation Data and Estimates	World Health Organization and United Nations Children's Fund Joint Monitoring Programme	http://www.wssinfo.org/data-estimates/introduction/	Access to improved, piped, other improved, and unimproved water, and to sanitation facilities	Updated annually
World Development Indicators	World Bank	http://data.worldbank.org/data-catalog/world-development-indicators	Includes data for countries around the world across a wide range of issue areas	Updated annually
World Energy Outlook Electricity Access Database	International Energy Agency	http://www.iea.org/media/weowebsite/energydevelopment/2012updates/WEO2012Electricitydatabase_WEB.xlsx	Access to electricity; percentage of population using solid fuels	Updated biannually
World Energy Statistics	International Energy Agency	http://www.iea.org/stats/index.asp	Electricity production by source type; total electricity production; electricity access	Updated annually
World Road Statistics	International Road Federation	http://www.irfnet.org/statistics.php	Total road network length; percent of road network paved; road density	Updated annually
World Telecommunication/ ICT Indicators	International Telecommunication Union	http://www.itu.int/ITU-D/ict/statistics/	Telephone mainlines; cell phone subscriptions; mobile broadband subscriptions; computer internet users	Updated annually

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Forecast Tables: Introduction and Glossary

Forecasts (or simulation results) from International Futures (IFs) are dynamic calculations of the full modeling system, not extrapolations of series, results of isolated multiple regressions, or representations of the forecasts of others. To understand more about the forecasts of IFs and the specific formulations for the variables shown in the output tables, see the text of the volume, especially Chapter 4, and model documentation available at http://www.ifs.du.edu.

Base Case forecasts for 183 individual countries out to 2060 appear in the tables at the back of each volume in the Patterns of Potential Human Progress (PPHP) series. Such forecasts are seldom done outside the IFs project, and there are good reasons for reluctance to provide them, including:

- Data in any series are seldom available for all countries, particularly for smaller ones or those that have undergone substantial sociopolitical transitions. IFs separately represents 183 countries and uses estimation procedures to fill in data holes as necessary.
- Every country is unique. Formulating a large-scale dynamic model to behave reasonably in the face of such complexity is extremely challenging, and structures of the system will never be completely free of poor behavior for many countries, especially under extreme or new circumstances.
- Some variables, such as the future level of democracy, have especially weak bases for forecasting.

Most longer-term global forecasting reduces the severity of these problems in several ways, including by relying on regional aggregations of countries and by significantly limiting the forecast horizon. The accompanying forecast tables obviously ignore such practical approaches and simply present the numbers that the model produces. This volume has repeatedly stressed that we should never treat any model results as predictions; we should instead use them for thinking about and exploring possible futures. That is the spirit behind these tables. As the IFs team continues to develop the IFs modeling system, these results will change and presumably, on average, improve.

The forecast tables are organized by geographic, substantive, and temporal attributes. Geographically, the first of multiple sets begins with global and continental totals (Africa, the Americas, Asia with Oceania, and Europe), followed by the UN subregional divisions within each of the continents. The subsequent six pages of each set provide IFs Base Case forecasts for each of the country members of the subregional divisions within the four continents. The countries appear in subregions in descending order based on our forecasts of their population in 2060.

The multiple sets cover six substantive issue areas. The first provides a variety of population measures, land area, and an overall measure of human development. The remaining sets of forecasting variables are divided into five categories: poverty and income, health, education, infrastructure, and governance. These categories correspond to the topics that the PPHP series addresses, and forecasts in each category are therefore being developed across volumes. Each of the PPHP volumes is posted online, including the forecast tables, at http://www.ifs.du.edu.

Temporally, each series contains values for 2010, 2035, and 2060, thereby providing a forecast horizon of 50 years. In many cases, an additional column shows the cumulative percentage change forecast from 2010 through 2060. The model is currently initialized in 2010, and it computes annual results recursively from 2010 through the simulation horizon. The model uses actual GDP data through 2010 and International Monetary Fund forecasts of GDP through 2013. Otherwise, all results in years after 2010 are IFs model computations rather than actual values (even when data are available) or the forecasts of others.

To facilitate the reading and interpretation of the tables, the glossary that follows provides both the names of the variables as they appear in the tables and in IFs, along with brief definitional information and the sources of initial conditions and data. Variables are listed in the order in which they appear in the end tables. Please refer to the list of acronyms immediately following the glossary for the full names of the organizations referred to in it.

Variables	IFs Names	Sources and Notes
Population, Land Area, and Human Development Index		
Population in millions of people	POP	Total number of people within a country. Total initialized from WDI data; IFs also has cohort data on age/sex distribution, fertility, and mortality from UNPD.
Land area in 1,000 sq kilometers	LANDAREA	Total national land area in 1,000 square kilometers. Initialized with data from FAO via WDI. Constant over time.
Land area in 1,000 sq miles	No variable name in model; calculated by converting square kilometers	Total national land area in 1,000 square miles. Constant over time.
Population density per sq kilometer	No variable name in model; calculated from LANDAREA and POP	Population per land area measured in square kilometers.
Population density per sq mile	No variable name in model; calculated by converting density per square kilometer	Population per land area measured in square miles.
Urban population	No variable name in model; calculated from others	Percentage of total population living in urban areas. Initialized with WDI data. The WDI notes that countries differ in how they determine urban residence, with size of municipalities as low as 2,000 residents; Eurostat requires a density of at least 300 people per square kilometer and 5,000 minimum population.
Population growth rate	POPR	Annual percentage change in total population. See description of “Population in millions of people” entry at beginning of glossary.
Total fertility rate	TFR	The average number of children a woman is expected to bear throughout her life. Initialized from WDI data.
Population below 15 years of age	POPLE15	The total number of people in this age category, which is generally considered a period of economic dependence on others.
Population 65 years and older	POPGT65	The total number of people in this age category, which is generally considered a period of nonparticipation in the labor force.
Youth bulge	YTHBULGE	Although the youth bulge is always an indicator of the proportion of the adult or near-adult population that is young, specific definitions vary. In IFs, the definition is the population age 15–29 as a percentage of the population 15 and older. A bulge exists when this ratio is above a specified level, such as 50 percent.
Human Development Index	HDI	This corresponds very closely to the Human Development Index of the UNDP (see http://hdi.undp.org), which is an average of three components: long and healthy life; knowledge (literacy and education); and standard of living (GDP/capita). Computed in IFs population module from nearly identical drivers within IFs (see B. Hughes 2004b for specifics).

Variables	IFs Names	Sources and Notes
HDI with higher ceilings	HDI21STFIX	An IFs-specific measure. Computed in the IFs population module from driver categories within IFs corresponding to the UNDP's Human Development Index, but with maximum values raised to levels that constitute better upper limits for the 21st century (notably, life expectancy of 120 years and GDP per capita of $100,000).

Poverty and Income		
Poverty below $1.25 per day	INCOMELT1LN	Population living below $1.25 per day at 2005 international prices (purchasing power parity). Initialized from the World Bank's PovcalNet. The forecasting function is based on an assumption that income in a country is subject to log-normal distribution and is also responsive to the GINI index of distribution. The $1.25 per day threshold represents the World Bank's 2008 revision of its previous measure ($1.08 per day at 1993 international prices) based on new data and expenditure surveys.
Poverty below $2 per day	INCOMELT2LN	Population living below $2 per day at 2005 international prices (purchasing power parity). Initialized from the World Bank's PovcalNet. See immediately preceding description of "Poverty below $1.25 per day" for further information and interpretation.
Poverty below $5 per day	No variable name in model; calculated from others	Population living below $5 per day at 2005 international prices (purchasing power parity). See preceding description of "Poverty below $1.25 per day" for further information and interpretation. The forecasts of values at income poverty levels above $2 per day do not use survey data for initial conditions, but rather use $2 per day survey data and the log-normal formulation to estimate initial conditions.
Poverty below $10 per day	No variable name in model; calculated from others	Population living below $10 per day at 2005 international prices (purchasing power parity). See preceding description of "Poverty below $1.25 per day" for general interpretation and "Poverty below $5 per day" for a note on initialization.
Poverty below $20 per day	No variable name in model; calculated from others	Population living below $20 per day at 2005 international prices (purchasing power parity). See preceding description of "Poverty below $1.25 per day" for general interpretation and "Poverty below $5 per day" for a note on initialization.
Gross domestic product at MER (2000 dollars)	GDP	Gross domestic product is defined as either the sum of value added across all sectors of an economy or as the sum of goods and services delivered to meet final demand of an economy. Market exchange rates (MER) refer to the exchange rates determined by market transactions of currency traders. Initialized with WDI data in 2000 dollars.
GDP per capita at PPP (2000 dollars)	GDPPCP	Gross domestic product at purchasing power parity divided by total population. GDP is explained in the immediately preceding variable ("Gross domestic product at MER"). OECD defines purchasing power parity as "a price relative which measures the number of units of county B's currency that are needed in country B to purchase the same quantity of an individual good or service as 1 unit of country A's currency will purchase in country A" (http://stats.oecd.org/glossary/detail.asp?IF=2205). In other words, purchasing power parities eliminate price level differences between countries in order to make better comparisons of actual purchasing power. Initialized with WDI data in 2000 dollars.
Gross domestic product at PPP (2010 dollars)	GDPP	Gross domestic product in 2010 dollars was calculated from values in 2000 dollars using conversion factors based on data from WDI on GDP in local currency units, GDP deflators, and PPP conversion factors (local currency units per international dollars). (See definitions of GDP and PPP in the two immediately preceding entries.)
GDP per capita at PPP (2010 dollars)	GDPPCP	See entries immediately above for definition of GDP per capita, purchasing power parity, and the methodology used for calculation in 2010 dollars.

Health		
Life expectancy at birth	LIFEXP	The average number of years a newborn is expected to live. Initialized from WDI data.
Infant mortality rate	INFMOR	The probability an infant will die before her/his first birthday, expressed as a rate per 1,000 live births. Initialized from UNPD data.
Child mortality probability	No variable name in model; calculated using IFs population model	The probability a child will die before her/his fifth birthday, expressed as a rate per 1,000 live births. Initialized from UNPD data.
Adult mortality probability	No variable name in model; calculated using IFs population model	The probability that a 15-year-old person will die before her/his 60th birthday, expressed as a rate per 1,000 population. Initialized from UNPD data.
Calories per capita	CLPC	Estimate of available calories per day from all sources, measured in kilocalories. Initialized with data originally from the FAO.

Variables	IFs Names	Sources and Notes
Undernourished children	MALNCHP	As defined by WHO (http://apps.who.int/gho/indicatorregistry/App_Main/view_indicator.aspx?iid=27), "Percentage of children underweight is the percentage of children under five years who have a weight-for-age below minus two standard deviations of the NCHS/WHO reference median." Individual countries may look at children at ages three, four, or five. Initialized from WDI data using weight-based malnutrition measure.
Adult obesity rate	HLOBESITY	The prevalence of obesity among adults 30 years of age and older, expressed as a percentage who have a body mass index of 30 or greater. Initialized using WHO estimates (available at http://apps.whp.int/bmi/index.jsp) and forecast based on the historical relationship between obesity and available calories per capita.
Adult smoking rate	HLSMOKING	The prevalence of smoking, expressed as the percentage of the adult population (typically defined by countries as those 15 or 18 and older) who currently smoke tobacco. Initialized with data from WHO and WDI.
HIV Prevalence Rate	HIVRATE	The percentage of the total population infected with HIV. Initialized using data from UNAIDS.
Disability-adjusted life years	HLDALY: Commun, NonCom, Injuries	Total disability-adjusted life years (DALYs) across a population, expressed as years in millions. DALYs are calculated as the sum of years life lost (YLLs), which are calculated as deviation from life expectancy, and years lived with disability (YLDs). YLDs initialized from WHO Global Burden of Disease estimates; YLLs initialized from calculations inside IFs. DALYs are shown for the three major categories of disease: communicable diseases (this category includes all maternal and prenatal diseases); noncommunicable diseases; and injuries.
Years lived with disabilities	HLYLD: Commun, NonCom, Injuries	Total years lived with disability (YLDs) across a population, expressed as years in millions. Initialized from WHO Global Burden of Disease estimates. YLDs are shown for the three major categories of disease: communicable diseases (this category includes all maternal and prenatal diseases); noncommunicable diseases; and injuries.
Total annual deaths	DEATHS	Total number of annual deaths in millions. Initialized from UNPD mortality data.
Deaths from communicable diseases	DEATHCAT: AIDS, Diarrhea, Malaria, RespInfec, OthCommunDis	Total number of annual deaths from communicable diseases, expressed in thousands. Initialized using WHO Global Burden of Disease cause-specific mortality rates for communicable diseases (including also all other causes of maternal and perinatal mortality, including nutritional deficiencies). Separate forecasts are shown for AIDs; diarrheal diseases; malaria; respiratory infections; and a combined category of all other communicable, maternal, and perinatal diseases.
Deaths from noncommunicable diseases	DEATHCAT: CardioVasc, Diabetes, Digestive, MaligNeoPl, MentalHealth, Respiratory Conditions, OtherNonComm	Total number of annual deaths from noncommunicable diseases, expressed in thousands. Initialized using WHO Global Burden of Disease cause-specific mortality rates for noncommunicable diseases and conditions. Separate forecasts are shown for cardiovascular diseases, diabetes, digestive diseases, malignant neoplasms, mental health, respiratory conditions, and a combined category of all other noncommunicable diseases and conditions.
Deaths from injuries	DEATHCAT: TrafficAcc, UnintInj IntInj	Total number of annual deaths from injuries, expressed in thousands. Initialized using WHO Global Burden of Disease cause-specific mortality rates for injuries. Separate forecasts are shown for road traffic accidents, other unintentional injuries, and intentional injuries.

Education		
Literacy	LIT	The basic definition is the ability of adults to read and write, but different countries use very different standards. IFs uses 15-year-olds and older as the definition of adult for this variable. Initialized from WDI data.
Years of education, adults 25+	EDYRSAG25	Average number of years of completed education, presented separately for females and males 25 years of age and older. Initialized from the Barro and Lee data set (Barro and Lee 2001).
Primary education enrollment rate, net	EDPRIENRN	The percentage of the official primary age group enrolled at the primary level. Contrast this with gross enrollment, which includes enrolled students from all age groups but maintains the base of the official age group and can therefore exceed 100 percent. Initialized using UNESCO data.
Lower secondary enrollment rate, gross	EDSECLOWRENRG	All students of any age enrolled at the lower secondary level as a percentage of those of the official age to enroll at that level (see "Primary enrollment rate, net" immediately above for the distinction between gross and net enrollment rates). Lower secondary education for most countries is approximately grades 7–9. Initialized with UNESCO data.

Variables	IFs Names	Sources and Notes
Upper secondary enrollment rate, gross	EDSECUPPRENRG	All students of any age enrolled at the upper secondary level as a percentage of those of the official age to enroll at that level (see "Primary enrollment rate, net" above for the distinction between gross and net enrollment rates). Upper secondary education for most countries is approximately grades 10–12. Initialized with UNESCO data.
Tertiary enrollment rate, gross	EDTERENRG	All students of any age enrolled at the tertiary or post-secondary degree level as a percentage of those of the official age (frequently considered 18–21) to enroll at the tertiary level. Initialized with UNESCO data.
Knowledge Society Index	KNOWSOC	Adapted from the technological connectivity subindex of the A. T. Kearney Globalization Index (see "Globalization Index" entry below). Supplemented in IFs with ties to R&D spending and tertiary graduation rate (see B. Hughes 2005 Part 2 for specification).

Infrastructure: Roads		
Roads per capita	No variable name in model; calculated from total roads and population	Road network density measured in terms of kilometers of total road network length per million persons. Initialized with data compiled from the WDI, the International Road Federation, and authors Calderón (personal communication) and Canning (http://www.hsph.harvard.edu/faculty/david-canning/data-sets/).
Road network density	INFRAROAD	Road network density measured in terms of kilometers of total road network length per 1,000 hectares (10 square kilometers) of total land area. Initialized with data compiled from the WDI, the International Road Federation, and authors Calderón (personal communication) and Canning (http://www.hsph.harvard.edu/faculty/david-canning/data-sets/).
Population living within 2 kilometers of an all-season road	INFRAROADRAI	Percentage of population living within two kilometers of an all-season road, where an all-season road is defined as "a road that is motorable all year round by the prevailing means of rural transport. . . . Occasional interruptions of short duration during inclement weather (e.g., heavy rainfall) are accepted" (Roberts and Rastogi 2006: 2). Initialized with data from the World Bank Rural Road Access Index.
Paved roads	INFRAROADPAVEDPCNT	Percentage of total road network that has been paved. Initialized with data compiled from the WDI, the International Road Federation, and authors Calderón (personal communication) and Canning (http://www.hsph.harvard.edu/faculty/david-canning/data-sets/).
Cars, buses, and freight vehicles	VEHICLESPER1000	The number of total vehicles on a country's roads per 1,000 persons. Includes personal vehicles, public transport, and commercial vehicles. Does not include motor scooters or other two-wheeled vehicles. Initialized with data from the WDI.

Infrastructure: Energy/Electricity		
Population with access to electricity	INFRAELECACC	Percentage of population with access to electricity. Can be broken down by urban and rural population. Initialized from IEA data.
Electricity generation capacity	INFRAELECGENCAP	The total installed electricity generation capacity of all power plants measured in kilowatts. Initialized from EIA data.
Household use of modern forms of energy	No variable name in model; calculated from ENSOFUEL	Percentage of the population using modern fuels rather than solid fuels (ENSOFUEL) as their main household energy source, where modern fuels include "electricity, liquid fuels, or gaseous fuels" (Legros et al. 2009: 5–6). Initialized with data from the UN Millennium Development Goals Indicator database at http://mdgs.un.org/unsd/mdg/Data.aspx.

Infrastructure: Water and Sanitation		
Access to improved drinking water	WATSAFE	Percentage of population with access to improved water sources. Improved water sources include household piped water; public taps or standpipes; tube wells or boreholes; protected dug wells; protected springs; and rainwater collection. Initialized with data from WHO and UNICEF.
Access to improved sanitation	SANITATION	Percentage of population with access to personal (as opposed to shared or public) sanitation facilities that ensure hygienic separation of human excreta from human contact. Includes flush toilets, piped sewer systems, septic tanks, improved pit latrines, and composting toilets. Initialized with data from WHO and UNICEF.
Wastewater collection coverage	WATWASTE	Percentage of the population connected to a wastewater collection system. Initialized with data from the UN Statistics Division.
Land area equipped for irrigation	LANDIRAREAQUIP	The area of land equipped with irrigation systems measured in 1,000 square kilometers. Initialized from FAO data.

Variables	IFs Names	Sources and Notes
Infrastructure: Information and Communication Technologies		
Telephone network density	INFRATELE	Number of fixed telephone lines per 100 persons. Initialized from ITU data.
Mobile phone usage	ICTMOBIL	Number of mobile phone subscriptions per 100 persons; can exceed 100 because of multiple subscriptions per individual. Initialized from ITU data.

Infrastructure: Spending		
Spending on core infrastructure	No variable name in model; calculated from others	Total spending on core infrastructure in billions of 2000 dollars, where core infrastructure is defined as paved and unpaved roads; electricity generation capacity and urban and rural electricity connections; improved water connections and improved sanitation connections; wastewater treatment; the area equipped for irrigation; fixed telephone lines; fixed broadband subscriptions; mobile telephone subscriptions; and mobile broadband subscriptions. See "Total (core plus other) infrastructure spending" entry directly below for description of how infrastructure spending is calculated.
Total (core plus other) infrastructure spending	No variable name in model; calculated from others	Total spending on infrastructure in billions of 2000 dollars. Represents the sum of spending on new construction and maintenance by public and private sectors for each type of core infrastructure. Also includes public spending on other infrastructure types. Spending is calculated by adding the cost of maintaining existing infrastructure (determined by multiplying the amount of physical infrastructure in a given year by the unit cost of that infrastructure and by a fixed annual maintenance/renewal percentage) and adding to it the cost of new infrastructure (the expected net change in the amount of infrastructure from one year to the next multiplied by the same unit cost). Public and private shares are determined by fixed percentage contributions that differ by infrastructure type. The unit costs, maintenance percentages, and public/private shares are based on a wide range of sources.
Spending on roads	No variable name in model; calculated from others	Percent of spending on core infrastructure devoted to roads. Spending on roads includes public and private expenditures related to the construction and maintenance of paved and unpaved roads. See "Total (core plus other) infrastructure spending" for methodology.
Spending on electricity	No variable name in model; calculated from others	Percent of spending on core infrastructure devoted to electricity. Spending on electricity includes public and private expenditures related to adding new, and maintaining existing, electricity generation capacity; adding and maintaining transmission capabilities; and increasing urban and rural electricity access. See "Total (core plus other) infrastructure spending" for methodology.
Spending on water and sanitation	No variable name in model; calculated from others	Percent of spending on core infrastructure devoted to water and sanitation infrastructure. Spending on water and sanitation includes public and private expenditures related to the construction and maintenance of improved water and sanitation systems; the maintenance and expansion of irrigation networks; and the provision of wastewater services. See "Total (core plus other) infrastructure spending" for methodology.
Spending on ICT	No variable name in model; calculated from others	Percent of spending on core infrastructure devoted to ICT infrastructure. Spending on ICT includes public and private expenditures related to the construction and maintenance of fixed telephone lines and the equipment/structures needed to provide mobile phone and fixed and mobile broadband services. See "Total (core plus other) infrastructure spending" for methodology.

Governance		
Freedom House Index (inverted)	FREEDOM	This variable is based on, and initialized with data from, the annual surveys conducted by Freedom House and published in the Freedom in the World series. The surveys measure freedom—defined as the opportunity to act spontaneously in a variety of fields outside the control of the government and other centers of political domination—in terms of political rights and civil liberties. Countries are assigned a separate score in each of the two major categories; scoring runs from 1 to 7, with 1 indicating "most free" and 7 indicating "least free" (see http://www.freedomhouse.org). In IFs, the two scores are added and the valence is reversed, resulting in composite country-level freedom scores that can range from 2 to 14, with higher numbers being more free.
Polity Democracy/ Autocracy Index	DEMOCPOLITY	This variable is based on, and initialized from, Polity Project data (see http://www.systemicpeace.org/polity/polity4.htm). The index or Polity score measures a spectrum of governance structures from fully institutionalized autocracies through mixed authority regimes (anocracies) to fully institutionalized democracies. The Polity Project expresses polity scores on a 21-point scale ranging from -10 (hereditary monarch) to +10 (consolidated democracy). Adapted in IFs as the Polity measure of democracy minus the Polity measure of autocracy plus 10, so that the IFs scale runs from 0 through 20.

Variables	IFs Names	Sources and Notes
Economic Freedom Index	ECONFREE	This variable is based on an index developed by the Fraser Institute and initialized with data from its annual Economic Freedom of the World (EFW) series. The definition of economic freedom includes personal choice, voluntary exchange coordinated by markets, freedom to enter and compete in markets, and protection of persons and their property from aggression by others. The EFW index utilizes data from external sources (e.g., IMF, the World Bank, and the World Economic Forum) and includes a large number of variables across the following five components: size of government; legal structure and security of property rights; access to sound money; freedom to trade internationally; and regulation of credit, labor, and business. Each component is rated on a scale from 0 to 10 based on the underlying country-level data, with higher ratings indicating greater economic freedom. The final country-level rating also ranges from 0 to 10 and is determined by averaging its component ratings (see http://www.freetheworld.com).
Government Corruption Perceptions Index	GOVCORRUPT	This variable is based on, and initialized with, data from Transparency International's Corruption Perceptions Index (TI-CPI). Broadly speaking, corruption is defined as the misuse of public power for private benefit. The TI-CPI's purpose is the country-level assessment of the perceived extent of public and political sector corruption as indicated by the frequency and/or the size of corrupt transactions (e.g., bribes). The TI-CPI is an aggregate indicator; it draws on multiple sources (none of which cover all countries) that share this common purpose. Evaluative assessments are made by country experts (both residents and non-residents) and by business leaders. Individual ratings of ranks are combined through a standardization process into a country-level composite score that ranges from 1 to 10, with higher values representing less corruption (see http://www.transparency.com).
Economic Integration Index	ECONINTEG	The Economic Integration Index in IFs is adapted from the economic integration component of the Foreign Policy Globalization Index (developed by the international management consulting group A. T. Kearney) and is initialized with values from the broader IFs database (primarily WDI and the United Nations Conference on Trade and Development's World Investment Report). The index combines measures of a country's trade and foreign direct investment inflows and outflows in relation to its GDP (e.g., relative to its capacity to participate rather than to the absolute size of its participation). Values run from 0 to 100, with higher values representing greater economic integration. See B. Hughes 2005 for IFs specification.
Globalization Index	GLOBALIZ	The Globalization Index in IFs is adapted from the Foreign Policy Globalization Index developed by the international management consulting group A. T. Kearney. A. T. Kearney's index is a composite of four subindices: economic integration, personal contact, technological connectivity, and political engagement. In IFs, economic integration is measured by trade (exports) and foreign direct investment (inflows of capital), while personal contact is represented by telephone infrastructure and worker remittances (net) relative to GDP. Technological connectivity is represented by an electronic network infrastructure measure, and political engagement is calculated from the sum of foreign aid expenditures or receipts as a portion of GDP relative to the global average. See B. Hughes 2005 for expanded specification of the components of the Index in IFs. The Index is initialized with data from the broader IFs database.
Gender Empowerment Measure	GEM	This variable is based on and initialized from the Gender Empowerment Measure (GEM) of the UNDP. The GEM is a measure of female political participation and decision-making power, economic participation, and command over resources. The GEM includes four measures: the percentage of parliamentary seats held by men and women; the percentage shares of women and men in positions as legislators, senior officials, and managers; women's and men's percentage shares of professional and technical positions; and women's and men's estimated earned income (at purchasing power parity). The composite GEM measure is an index on which 1.0 represents gender parity, and numbers below 1.0 indicate female disadvantage.

Data Source Organization Abbreviations

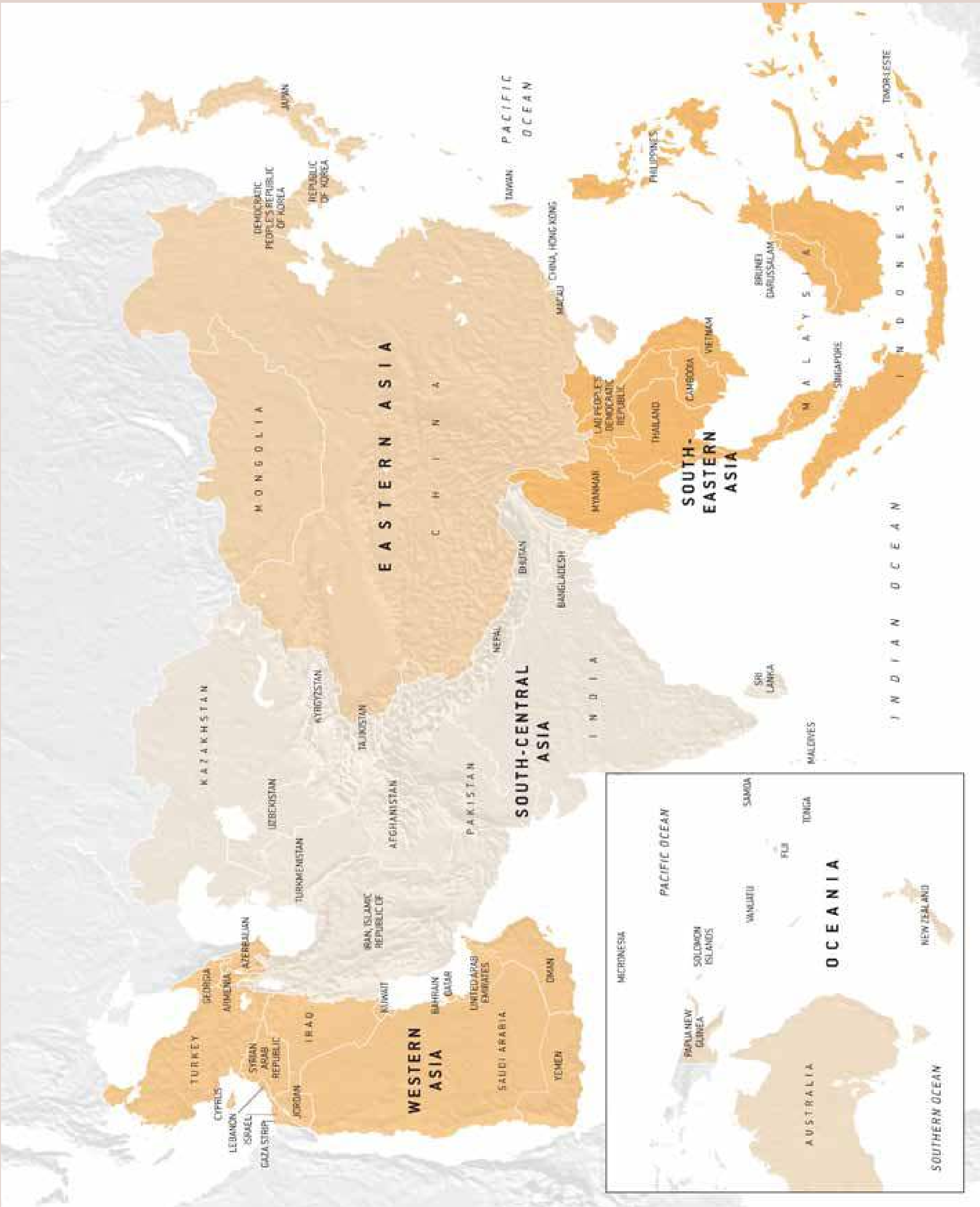
EIA	Energy Information Administration (U.S.)
FAO	Food and Agriculture Organization (UN)
IEA	International Energy Agency
IMF	International Monetary Fund
ITU	International Telecommunication Union
NCHS	National Center for Health Statistics
OECD	Organisation for Economic Co-operation and Development
UNAIDS	United Nations Program on AIDS
UNDP	United Nations Development Programme
UNESCO	United Nations Education, Scientific, and Cultural Organization
UNICEF	United Nations Children's Fund
UNPD	United Nations Population Division
WDI	World Development Indicators (World Bank)
WHO	World Health Organization

Forecast Tables: Maps of Continents and Subregions

African regions

American regions

Asian regions



European regions

Forecast Tables

Measures of Poverty and Income, Health, Education, Infrastructure, and Governance

Population, Land Area, and Human Development Index

Base Case

Source: International Futures Model Version 6.61, Jan 2013

	Population				Land Area		Population Density						Urban Population			
	Millions of People				Sq Km	Sq Mi	Persons per Sq Km			Persons per Sq Mi			Percent of Total Population			
	2010	2035	2060	% Chg	000s	000s	2010	2035	2060	2010	2035	2060	2010	2035	2060	% Chg
World	6849	8586	9614	40.4%	129368	49949	52.94	66.37	74.31	138.9	174.2	195	50.84	61.8	68.7	35.1%
Africa	1031	1731	2474	140.0%	29483	11383	34.97	58.71	83.93	91.76	154.1	220.2	39.66	51.56	60.96	53.7%
Americas	928.4	1144	1245	34.1%	38380	14819	24.19	29.8	32.43	63.47	78.2	85.1	80.6	85.76	87.68	8.8%
Asia with Oceania	4155	5008	5262	26.6%	39434	15225	105.4	127	133.4	276.5	333.2	350.1	43.07	57.35	66.15	53.6%
Europe	726.3	695.6	626.1	-13.8%	22014	8500	32.99	31.6	28.44	86.57	82.92	74.63	73.15	80.07	83.1	13.6%
World	6849	8586	9614	40.4%	129368	49949	52.94	66.37	74.31	138.9	174.2	195	50.84	61.8	68.7	35.1%
Africa-Eastern	326	590.8	875	168.4%	6157	2377	52.95	95.95	142.1	138.9	251.8	372.9	23.49	33.1	45.48	93.6%
Africa-Middle	128.9	236.4	367.8	185.3%	6497	2508	19.84	36.39	56.62	52.07	95.49	148.6	42.53	59.08	69.99	64.6%
Africa-Northern	212.6	292.4	334.6	57.4%	8114	3133	26.2	36.03	41.23	68.75	94.54	108.2	50.87	62.27	70.07	37.7%
Africa-Southern	57.33	63.86	69.24	20.8%	2652	1024	21.62	24.08	26.11	56.73	63.19	68.51	59	77.86	84.55	43.3%
Africa-Western	306.2	547.4	827.7	170.3%	6062	2341	50.5	90.3	136.5	132.5	236.9	358.3	44.26	59.43	67.64	52.8%
Africa	1031	1731	2474	140.0%	29483	11383	34.97	58.71	83.93	91.76	154.1	220.2	39.66	51.56	60.96	53.7%
America-Caribbean	40.65	48.58	50.79	24.9%	218.9	84.53	185.7	221.9	232	487.2	582.3	608.7	65.38	78.43	84.63	29.4%
America-Central	42.5	63.27	77.66	82.7%	508.3	196.3	83.6	124.5	152.8	219.4	326.6	400.9	55.89	65.34	72.26	29.3%
America-North	452.4	550.7	604.7	33.7%	20185	7793	22.41	27.28	29.96	58.81	71.6	78.61	81.81	86.6	88.64	8.3%
America-South	392.9	481.3	511.6	30.2%	17468	6744	22.49	27.55	29.29	59.02	72.29	76.86	83.45	88.24	89.2	6.9%
Americas	928.4	1144	1245	34.1%	38380	14819	24.19	29.8	32.43	63.47	78.2	85.1	80.6	85.76	87.68	8.8%
Asia-East	1571	1631	1462	-6.9%	11500	4440	136.6	141.8	127.1	358.5	372.2	333.6	48.99	70.41	81.66	66.7%
Asia-South Central	1727	2263	2562	48.3%	10327	3987	167.2	219.1	248.1	438.7	575	651	32.07	41.5	51.48	60.5%
Asia-South East	589.4	728.5	765.8	29.9%	4341	1676	135.8	167.8	176.4	356.3	440.3	462.9	48.7	69.12	78.93	62.1%
Asia-West	231.9	338.4	416.9	79.8%	4805	1855	48.26	70.42	86.76	126.6	184.8	227.7	66.3	73.28	78.05	17.7%
Oceania	35.61	46.88	55.24	55.1%	8461	3267	4.209	5.54	6.529	11.04	14.54	17.13	70.93	70.3	69.13	-2.5%
Asia with Oceania	4155	5008	5262	26.6%	39434	15225	105.4	127	133.4	276.5	333.2	350.1	43.07	57.35	66.15	53.6%
Europe-East	293.9	261.9	220.8	-24.9%	18051	6969	16.28	14.51	12.23	42.72	38.07	32.1	68.43	74.38	77.52	13.3%
Europe-North	99.17	106.1	107.8	8.7%	1640	633.4	60.45	64.71	65.7	158.6	169.8	172.4	84.52	88.35	89.15	5.5%
Europe-South	152.7	145.8	126.4	-17.2%	1294	499.7	118	112.6	97.66	309.7	295.6	256.3	67.66	78.29	82.4	21.8%
Europe-West	188.8	189.9	177.8	-5.8%	1087	419.5	173.8	174.8	163.6	455.9	458.6	429.3	77.85	83.31	85.68	10.1%
Europe	726.3	695.6	626.1	-13.8%	22014	8500	32.99	31.6	28.44	86.57	82.92	74.63	73.15	80.07	83.1	13.6%

Population, Land Area, and Human Development Index

Base Case: Countries in Descending Year 2060 Population Sequence	Population: Millions of People 2010	2035	2060	% Chg	Land Area: Sq Km 000s	Land Area: Sq Mi 000s	Population Density: Persons per Sq Km 2010	2035	2060	Persons per Sq Mi 2010	2035	2060	Urban Population: Percent of Total Population 2010	2035	2060	% Chg
AFRICA																
Ethiopia	84.99	139.8	185.4	118.1%	1104	426.4	76.96	126.6	167.9	202	332.2	440.6	17.18	26.42	40.05	133.1%
Tanzania, United Rep. of	45.03	87.92	135.6	201.1%	885.8	342	50.84	99.25	153.1	133.4	260.4	401.8	26.29	39.66	55.53	111.2%
Uganda	33.8	71.55	117	246.2%	199.8	77.15	169.2	358.1	585.7	443.9	939.6	1537	13.15	18.13	27.17	106.6%
Kenya	40.87	72.75	105	156.9%	569.1	219.7	71.8	127.8	184.5	188.4	335.4	484	22.01	31.35	44	99.9%
Madagascar	20.15	38.48	65.78	226.5%	581.5	224.5	34.65	66.16	113.1	90.93	173.6	296.8	31.04	42.24	52.6	69.5%
Mozambique	23.42	40.84	57.77	146.7%	786.4	303.6	29.78	51.93	73.46	78.14	136.3	192.8	38.36	59.34	74.74	94.8%
Malawi	15.69	32.22	53.29	239.6%	94.28	36.4	166.4	341.7	565.2	436.7	896.7	1483	18.8	28.95	43.34	130.5%
Zambia	13.26	25.2	38.56	190.8%	743.4	287	17.83	33.9	51.88	46.8	88.95	136.1	34.81	34.56	37.78	8.5%
Somalia	9.345	18.11	28.42	204.1%	627.3	242.2	14.9	28.87	45.31	39.09	75.76	118.9	37.34	43.62	51.95	39.1%
Rwanda	10.28	18.3	27.02	162.8%	24.67	9.525	416.8	741.7	1095	1094	1946	2874	19.53	31.35	46.84	139.8%
Zimbabwe	12.58	18.45	22.96	82.5%	386.9	149.4	32.53	47.69	59.36	85.35	125.2	155.8	38.26	39.79	43.74	14.3%
Burundi	8.538	14.06	20.13	135.8%	25.68	9.915	332.5	547.6	783.9	872.4	1437	2057	10.8	21.04	37.31	245.5%
Eritrea	5.223	9.301	13.31	154.8%	101	39	51.71	92.09	131.8	135.7	241.6	345.8	21.73	37.08	55.89	157.2%
Comoros	0.674	1.328	2.238	232.0%	1.86	0.718	362.4	713.9	1203	950.8	1873	3157	30.74	30.91	33.45	8.8%
Djibouti	0.879	1.149	1.278	45.4%	23.18	8.95	37.92	49.55	55.13	99.5	130	144.7	89.07	92	91.75	3.0%
Mauritius	1.281	1.334	1.197	-6.6%	2.03	0.784	631	656.9	589.7	1656	1724	1547	42.61	46.25	51.42	20.7%
Africa-Eastern	**326**	**590.8**	**875**	**168.4%**	**6157**	**2377**	**52.95**	**95.95**	**142.1**	**138.9**	**251.8**	**372.9**	**23.49**	**33.1**	**45.48**	**93.6%**
Congo, Democratic Rep. of	67.83	128.3	205.6	203.1%	2267	875.3	29.92	56.61	90.68	78.51	148.5	237.9	34.23	51.21	65.81	92.3%
Angola	18.99	34.92	51.64	171.9%	1247	481.4	15.23	28.01	41.42	39.97	73.49	108.7	58.79	83.98	91.33	55.3%
Cameroon	19.97	33.5	48.12	141.0%	472.7	182.5	42.24	70.87	101.8	110.8	186	267.1	57.33	75.02	82.76	44.4%
Chad	11.51	22.95	40.15	248.8%	1259	486.2	9.138	18.22	31.89	23.98	47.82	83.67	26.93	37.66	49.35	83.3%
Central African Rep.	4.507	7.099	10.08	123.7%	623	240.5	7.235	11.39	16.18	18.98	29.9	42.46	37.99	42.56	47.61	25.3%
Congo, Rep. of	3.752	6.012	7.663	104.2%	341.5	131.9	10.99	17.61	22.44	28.83	46.2	58.88	66.91	83.16	88.7	32.6%
Gabon	1.503	2.25	2.767	84.1%	257.7	99.49	5.833	8.732	10.74	15.31	22.91	28.17	86.14	92	92	6.8%
Equatorial Guinea	0.693	1.091	1.437	107.4%	28.05	10.83	24.71	38.89	51.23	64.83	102.1	134.4	40.12	51.9	62.78	56.5%
São Tomé and Príncipe	0.166	0.283	0.397	139.2%	0.96	0.371	172.9	294.9	413.6	453.7	773.8	1085	61.98	71.9	77.49	25.0%
Africa-Middle	**128.9**	**236.4**	**367.8**	**185.3%**	**6497**	**2508**	**19.84**	**36.39**	**56.62**	**52.07**	**95.49**	**148.6**	**42.53**	**59.08**	**69.99**	**64.6%**
Egypt, Arab Rep.	84.5	113.7	128.5	52.1%	995.4	384.3	84.88	114.3	129.1	222.7	299.8	338.7	41.09	45.61	52.03	26.6%
Sudan	43.22	70.14	89.61	107.3%	2376	917.4	18.19	29.52	37.72	47.73	77.47	98.96	45.55	71.75	84.4	85.3%
Algeria	35.42	45.92	49.4	39.5%	2382	919.6	14.87	19.28	20.74	39.03	50.59	54.42	66.58	81.57	86.8	30.4%
Morocco	32.38	40.73	43.39	34.0%	446.3	172.3	72.56	91.26	97.23	190.4	239.5	255.1	55.94	62.1	68.03	21.6%
Tunisia	10.54	12.79	13.3	26.2%	155.4	59.98	67.82	82.32	85.61	178	216	224.6	67.38	76.95	81.96	21.6%
Libya	6.549	9.033	10.37	58.3%	1760	679.4	3.722	5.133	5.894	9.767	13.47	15.46	75.59	80.29	83.45	10.4%
Africa-Northern	**212.6**	**292.4**	**334.6**	**57.4%**	**8114**	**3133**	**26.2**	**36.03**	**41.23**	**68.75**	**94.54**	**108.2**	**50.87**	**62.27**	**70.07**	**37.7%**

Population, Land Area, and Human Development Index

Base Case: Countries in Descending Year 2060 Population Sequence	Population				Land Area		Population Density						Urban Population			
	Millions of People				Sq Km	Sq Mi	Persons per Sq Km			Persons per Sq Mi			Percent of Total Population			
	2010	2035	2060	% Chg	000s	000s	2010	2035	2060	2010	2035	2060	2010	2035	2060	% Chg
AFRICA continued																
South Africa	49.85	53.99	58	16.3%	1214	468.9	41.05	44.45	47.75	107.7	116.6	125.3	61.87	81.5	87.33	41.2%
Namibia	2.213	3.218	3.869	74.8%	823.3	317.9	2.688	3.909	4.7	7.053	10.26	12.33	39.21	56.38	70.31	79.3%
Lesotho	2.085	2.55	2.74	31.4%	30.36	11.72	68.68	84	90.26	180.2	220.4	236.8	28.01	51.95	70.67	152.3%
Botswana	1.979	2.431	2.659	34.4%	566.7	218.8	3.492	4.29	4.692	9.163	11.26	12.31	61.96	83.32	89.45	44.4%
Swaziland	1.202	1.672	1.977	64.5%	17.2	6.641	69.88	97.24	115	183.4	255.1	301.7	25.16	33.41	43.63	73.4%
Africa-Southern	**57.33**	**63.86**	**69.24**	**20.8%**	**2652**	**1024**	**21.62**	**24.08**	**26.11**	**56.73**	**63.19**	**68.51**	**59**	**77.86**	**84.55**	**43.3%**
Nigeria	158.3	273.5	394.6	149.3%	910.8	351.7	173.8	300.3	433.3	456.2	787.9	1137	49.83	69.6	79.68	59.9%
Niger	15.9	36.63	74.36	367.7%	1267	489.1	12.55	28.91	58.71	32.94	75.87	154	16.29	19.03	23.24	42.7%
Côte d'Ivoire	21.57	38.69	58.62	171.8%	318	122.8	67.83	121.7	184.4	178	319.3	483.7	45.84	54.77	63.17	37.8%
Burkina Faso	16.3	31.8	51.41	215.4%	273.6	105.6	59.57	116.2	187.9	156.3	305	493.1	20.61	33.17	49.15	138.5%
Ghana	24.33	37.84	47.43	94.9%	227.5	87.85	106.9	166.3	208.4	280.6	436.4	546.9	51.62	73.81	83.89	62.5%
Mali	13.32	26.42	43.11	223.6%	1220	471.1	10.92	21.65	35.33	28.65	56.81	92.71	38.42	57.79	71.59	86.3%
Senegal	12.87	23.41	35.47	175.6%	192.5	74.34	66.83	121.6	184.2	175.4	319.1	483.4	41.46	49.05	57.39	38.4%
Guinea	10.31	18.85	31.21	202.7%	245.7	94.87	41.96	76.69	127	110.1	201.2	333.3	34.27	45.05	54.8	59.9%
Benin	9.217	18.17	29.33	218.2%	110.6	42.71	83.32	164.3	265.1	218.6	431	695.8	40.33	49.76	59.73	48.1%
Togo	6.783	11.71	17.52	158.3%	54.39	21	124.7	215.3	322.1	327.2	564.9	845.2	38.57	52.28	63.17	63.8%
Sierra Leone	5.835	10.18	14.63	150.7%	71.62	27.65	81.47	142.1	204.3	213.8	372.9	536.1	38.61	45.57	53.91	39.6%
Liberia	4.124	7.642	11.36	175.5%	96.32	37.19	42.82	79.34	117.9	112.3	208.2	309.4	59.56	87.6	92	54.5%
Mauritania	3.369	5.734	8.418	149.9%	1031	398	3.269	5.563	8.167	8.577	14.6	21.43	42.52	49.3	56.28	32.4%
Gambia	1.751	3.401	5.097	191.1%	11.3	4.363	155	301	451.1	406.6	789.8	1184	57.35	73.42	81.62	42.3%
Guinea-Bissau	1.648	2.786	4.429	168.8%	28.12	10.86	58.61	99.06	157.5	153.8	259.9	413.3	27.58	29.11	31.27	13.4%
Cape Verde	0.513	0.658	0.712	38.8%	4.03	1.556	127.3	163.3	176.7	334	428.4	463.6	59.08	71.76	78.84	33.4%
Africa-Western	**306.2**	**547.4**	**827.7**	**170.3%**	**6062**	**2341**	**50.5**	**90.3**	**136.5**	**132.5**	**236.9**	**358.3**	**44.26**	**59.43**	**67.64**	**52.8%**

Population, Land Area, and Human Development Index

Base Case: Countries in Descending Year 2060 Population Sequence	Population: Millions of People 2010	2035	2060	% Chg	Land Area: Sq Km 000s	Land Area: Sq Mi 000s	Population Density: Persons per Sq Km 2010	2035	2060	Persons per Sq Mi 2010	2035	2060	Urban Population: Percent of Total Population 2010	2035	2060	% Chg
AMERICAS																
Haiti	10.19	14.39	17.07	67.5%	27.56	10.64	369.8	522.2	619.4	970.4	1370	1625	48.63	80.17	90.05	85.2%
Dominican Rep.	10.23	13.24	14.65	43.2%	48.32	18.66	211.7	274.1	303.2	555.5	719.2	795.7	68.42	83.97	88.56	29.4%
Cuba	11.2	10.95	9.336	-16.6%	106.4	41.1	105.3	102.9	87.71	276.2	270	230.2	76.07	76.73	79.29	4.2%
Puerto Rico	3.979	4.358	4.274	7.4%	8.87	3.425	448.6	491.3	481.8	1177	1289	1264	98.79	98.79	98.75	-0.0%
Jamaica	2.713	3.136	3.156	16.3%	10.83	4.181	250.5	289.5	291.4	657.3	759.7	764.6	53.49	53.93	56.51	5.6%
Trinidad and Tobago	1.345	1.38	1.205	-10.4%	5.13	1.981	262.2	269	234.9	688	705.9	616.4	13.86	25.55	42.58	207.2%
Bahamas	0.346	0.408	0.408	17.9%	10.01	3.865	34.57	40.75	40.76	90.7	106.9	106.9	83.34	92	92	10.4%
Barbados	0.257	0.255	0.219	-14.8%	0.43	0.166	597.7	591.9	509.5	1568	1553	1337	43.39	56.74	67.18	54.8%
Saint Lucia	0.174	0.186	0.17	-2.3%	0.61	0.236	285.2	305	279.3	748.5	800.3	732.8	28	34.91	43.51	55.4%
Grenada	0.104	0.137	0.153	47.1%	0.34	0.131	305.9	401.7	451.4	802.6	1054	1184	31.14	29.33	29.33	-5.8%
Saint Vincent and the Grenadines	0.109	0.134	0.143	31.2%	0.39	0.151	279.5	344.1	365.7	733.4	902.8	959.5	47.94	47.83	50.36	5.0%
America-Caribbean	**40.65**	**48.58**	**50.79**	**24.9%**	**218.9**	**84.53**	**185.7**	**221.9**	**232**	**487.2**	**582.3**	**608.7**	**65.38**	**78.43**	**84.63**	**29.4%**
Guatemala	14.38	24.66	33.56	133.4%	107.2	41.37	134.2	230.1	313.1	352	603.9	821.7	49.54	62.05	72.22	45.8%
Honduras	7.616	11.72	14.47	90.0%	111.9	43.2	68.07	104.7	129.3	178.6	274.8	339.4	48.7	60.5	69.33	42.4%
Nicaragua	5.82	8.325	9.703	66.7%	120.3	46.46	48.36	69.18	80.63	126.9	181.5	211.6	56.99	59.86	64.98	14.0%
El Salvador	6.192	7.834	8.534	37.8%	20.72	8	298.8	378.1	411.9	784.2	992.1	1081	61.31	61.1	63.42	3.4%
Costa Rica	4.64	5.765	5.984	29.0%	51.06	19.71	90.87	112.9	117.2	238.5	296.3	307.5	64.56	80.57	86.19	33.5%
Panama	3.51	4.461	4.825	37.5%	74.34	28.7	47.22	60	64.9	123.9	157.4	170.3	74.95	92	92	22.7%
Belize	0.344	0.504	0.589	71.2%	22.81	8.807	15.08	22.09	25.82	39.57	57.96	67.75	52.81	85.01	92	74.2%
America-Central	**42.5**	**63.27**	**77.66**	**82.7%**	**508.3**	**196.3**	**83.6**	**124.5**	**152.8**	**219.4**	**326.6**	**400.9**	**55.89**	**65.34**	**72.26**	**29.3%**
United States of America	309.7	376	421.4	36.1%	9147	3532	33.85	41.1	46.07	88.83	107.9	120.9	82.14	85.52	87.66	6.7%
Mexico	108.5	133.9	138.4	27.6%	1944	750.6	55.83	68.9	71.18	146.5	180.8	186.8	81.31	89.2	90.85	11.7%
Canada	34.17	40.81	44.9	31.4%	9094	3511	3.758	4.488	4.938	9.861	11.78	12.96	80.44	87.95	90.99	13.1%
America-North	**452.4**	**550.7**	**604.7**	**33.7%**	**20185**	**7793**	**22.41**	**27.28**	**29.96**	**58.81**	**71.6**	**78.61**	**81.81**	**86.6**	**88.64**	**8.3%**
Brazil	195.5	229.8	235.2	20.3%	8459	3266	23.11	27.17	27.8	60.65	71.29	72.95	86.25	92	92	6.7%
Colombia	46.32	59.2	64.28	38.8%	1109	428.4	41.75	53.36	57.93	109.5	140	152	75.06	84.2	87.89	17.1%
Argentina	40.67	48.45	52.2	28.4%	2737	1057	14.86	17.71	19.07	39	46.46	50.05	91.81	92	92	0.2%
Peru	29.5	38.52	43.12	46.2%	1280	494.2	23.04	30.09	33.69	60.47	78.96	88.39	70.58	70.64	72.87	3.2%
Venezuela (Bolivarian Rep. of)	28.84	38	42.48	47.3%	882.1	340.6	32.7	43.08	48.16	85.8	113.1	126.4	93.98	93.98	93.92	-0.1%
Ecuador	13.77	18.29	20.55	49.2%	248.4	95.89	55.45	73.63	82.73	145.5	193.2	217.1	70.27	84.53	88.92	26.5%
Chile	17.14	19.96	20.22	18.0%	743.5	287.1	23.05	26.84	27.2	60.48	70.44	71.36	88.87	92	92	3.5%
Bolivia (Plurinational State of)	10.03	14.76	17.8	77.5%	1083	418.3	9.263	13.63	16.43	24.31	35.75	43.12	65.8	74.14	79.89	21.4%
Paraguay	6.462	9.292	10.98	69.9%	397.3	153.4	16.26	23.39	27.63	42.68	61.37	72.51	61.43	75.23	81.81	33.2%
Uruguay	3.356	3.66	3.711	10.6%	175	67.58	19.17	20.91	21.2	50.32	54.88	55.64	92.52	92.52	92.41	-0.1%
Guyana	0.761	0.768	0.645	-15.2%	196.8	76	3.866	3.901	3.275	10.14	10.24	8.593	28.26	29.94	34.15	20.8%
Suriname	0.525	0.534	0.469	-10.7%	156	60.23	3.365	3.424	3.007	8.831	8.985	7.891	75.55	90.8	91.87	21.6%
America-South	**392.9**	**481.3**	**511.6**	**30.2%**	**17468**	**6744**	**22.49**	**27.55**	**29.29**	**59.02**	**72.29**	**76.86**	**83.45**	**88.24**	**89.2**	**6.9%**

Population, Land Area, and Human Development Index

Base Case: Countries in Descending Year 2060 Population Sequence	Population				Land Area		Population Density						Urban Population			
	Millions of People				Sq Km	Sq Mi	Persons per Sq Km			Persons per Sq Mi			Percent of Total Population			
	2010	2035	2060	% Chg	000s	000s	2010	2035	2060	2010	2035	2060	2010	2035	2060	% Chg
ASIA with OCEANIA																
China	1338	1406	1269	-5.2%	9327	3601	143.5	150.7	136.1	376.5	395.4	357.1	44.9	69.09	81.65	81.8%
Japan	127.4	115.5	95.3	-25.2%	364.5	140.7	349.6	316.9	261.4	917.3	831.6	686	66.82	71.81	75.63	13.2%
Korea, Rep. of	48.89	48.85	40.1	-18.0%	97.1	37.49	503.5	503.1	413	1321	1320	1084	81.88	87.49	89.74	9.6%
Korea, Dem. People's Rep. of	23.99	26.07	25.56	6.5%	120.4	46.49	199.3	216.5	212.3	522.9	568.2	557.1	64.33	72.28	77	19.7%
Taiwan, China	23.02	23.57	19.69	-14.5%	35.98	13.89	639.8	655	547.3	1679	1719	1436	85.53	95	94.86	10.9%
Hong Kong SAR, China	7.03	8.115	7.983	13.6%	1.042	0.402	6747	7788	7661	17703	20436	20102	100	98.4	99.59	-0.4%
Mongolia	2.701	3.474	3.813	41.2%	1554	599.8	1.739	2.236	2.455	4.562	5.868	6.441	58.67	67.29	73.71	25.6%
Asia-East	**1571**	**1631**	**1462**	**-6.9%**	**11500**	**4440**	**136.6**	**141.8**	**127.1**	**358.5**	**372.2**	**333.6**	**48.99**	**70.41**	**81.66**	**66.7%**
India	1171	1495	1659	41.7%	2973	1148	393.8	502.9	557.9	1033	1320	1464	30.1	38.79	48.5	61.1%
Pakistan	173.4	264.8	335.2	93.3%	770.9	297.6	224.9	343.5	434.8	590.2	901.3	1141	37.04	47.39	58.14	57.0%
Bangladesh	164.5	208.9	222.8	35.4%	130.2	50.26	1264	1605	1712	3315	4210	4491	25.4	37.39	51.29	101.9%
Afghanistan	30.61	61.01	98.94	223.2%	652.2	251.8	46.93	93.55	151.7	123.1	245.5	398	27.86	37.55	49.74	78.5%
Iran, Islamic Rep. of	73.86	87.41	87.52	18.5%	1629	628.8	45.36	53.67	53.74	119	140.8	141	69.6	84.67	88.88	27.7%
Nepal	29.86	41.91	48.1	61.1%	143.4	55.35	208.3	292.4	335.5	546.6	767.2	880.5	18.26	35.99	57.98	217.5%
Uzbekistan	28.23	37.26	41.13	45.7%	425.4	164.2	66.36	87.58	96.68	174.1	229.8	253.7	36.81	39.69	45.09	22.5%
Sri Lanka	20.45	23.5	23.56	15.2%	62.71	24.21	326.1	374.7	375.8	855.7	983.3	986	15.4	16.22	18.41	19.5%
Kazakhstan	16.1	16.66	15.54	-3.5%	2700	1042	5.965	6.172	5.755	15.65	16.2	15.1	59.27	87.24	92	55.2%
Tajikistan	7.07	10.5	12.93	82.9%	140	54.04	50.51	74.99	92.42	132.5	196.8	242.5	25.78	25.76	28.12	9.1%
Kyrgyz Rep.	5.364	7.545	8.552	59.4%	191.8	74.05	27.97	39.34	44.59	73.38	103.2	117	36.61	34.96	36.96	1.0%
Turkmenistan	5.177	6.782	7.713	49.0%	469.9	181.4	11.02	14.43	16.41	28.91	37.87	43.07	48.21	58.09	66.08	37.1%
Bhutan	0.707	0.913	1.014	43.4%	38.39	14.82	18.42	23.79	26.41	48.32	62.44	69.3	37.79	77.58	91.06	141.0%
Maldives	0.313	0.393	0.404	29.1%	0.3	0.116	1043	1309	1346	2738	3434	3533	40.87	81.94	93.05	127.7%
Asia-South Central	**1727**	**2263**	**2562**	**48.3%**	**10327**	**3987**	**167.2**	**219.1**	**248.1**	**438.7**	**575**	**651**	**32.07**	**41.5**	**51.48**	**60.5%**
Indonesia	232.6	283.3	294.9	26.8%	1812	699.5	128.4	156.4	162.8	336.9	410.3	427.1	55.38	82.01	89.88	62.3%
Philippines	93.65	134.3	154.9	65.4%	298.2	115.1	314.1	450.5	519.6	824.1	1182	1364	66.13	81.28	86.7	31.1%
Vietnam	88.36	108	111	25.6%	310.1	119.7	285	348.4	357.9	747.8	914.3	939.2	28.34	41.87	56.28	98.6%
Thailand	68.14	69.1	61.6	-9.6%	510.9	197.3	133.4	135.2	120.6	350	354.9	316.4	34.49	47.28	58.95	70.9%
Myanmar	50.48	58.86	59.04	17.0%	653.5	252.3	77.24	90.06	90.34	202.7	236.3	237.1	32.21	49.33	64.53	100.3%
Malaysia	27.93	37.08	41.69	49.3%	328.5	126.9	85.01	112.9	126.9	223.1	296.2	333	73.42	92	92	25.3%
Cambodia	15.05	19.85	22.12	47.0%	176.5	68.15	85.27	112.5	125.3	223.8	295.1	328.8	21.42	38.88	58.73	174.2%
Lao People's Democratic Rep.	6.437	8.912	10.3	60.0%	230.8	89.11	27.89	38.62	44.62	73.18	101.3	117.1	31.98	64.62	83.22	160.2%
Singapore	5.142	6.246	6.287	22.3%	0.7	0.27	7346	8924	8981	19275	23415	23566	98.73	100	100	1.3%
Timor-Leste	1.171	2.203	3.388	189.3%	14.87	5.741	78.75	148.2	227.9	206.6	388.8	597.9	26.98	33.76	43.03	59.5%
Brunei Darussalam	0.408	0.548	0.623	52.7%	5.27	2.035	77.42	104	118.1	203.1	272.8	310	74.01	88.27	92	24.3%
Asia-South Eastern	**589.4**	**728.5**	**765.8**	**29.9%**	**4341**	**1676**	**135.8**	**167.8**	**176.4**	**356.3**	**440.3**	**462.9**	**48.7**	**69.12**	**78.93**	**62.1%**

Population, Land Area, and Human Development Index

Base Case: Countries in Descending Year 2060 Population Sequence	Population: Millions of People 2010	2035	2060	% Chg	Land Area: Sq Km 000s	Land Area: Sq Mi 000s	Population Density: Persons per Sq Km 2010	2035	2060	Persons per Sq Mi 2010	2035	2060	Urban Population: Percent of Total Population 2010	2035	2060	% Chg
ASIA with OCEANIA continued																
Turkey	75.73	91.3	94.47	24.7%	769.6	297.2	98.4	118.6	122.7	258.2	311.3	322.1	66.86	80.57	85.26	27.5%
Iraq	32.3	60.82	87.55	171.1%	434.3	167.7	74.36	140	201.6	195.1	367.4	528.9	65.85	67.29	71.99	9.3%
Yemen, Rep. of	24.26	47.73	73.24	201.9%	528	203.9	45.95	90.4	138.7	120.6	237.2	364	31.53	48.58	65.55	107.9%
Saudi Arabia	25.99	36.53	42.11	62.0%	2150	830	12.09	16.99	19.59	31.72	44.59	51.4	88.29	92	92	4.2%
Syrian Arab Rep.	21.62	32.27	39.1	80.9%	183.6	70.9	117.7	175.7	213	308.9	461.1	558.8	51.93	62.38	71.21	37.1%
Jordan	6.093	10.27	13.38	119.6%	88.78	34.28	68.63	115.7	150.7	180.1	303.7	395.6	77.91	77.45	80.32	3.1%
Israel	7.577	10.73	13.11	73.0%	21.64	8.355	350.1	495.7	606	918.8	1301	1590	92.28	92.28	92.28	0.0%
Palestine	4.152	8.149	12.54	202.0%	6.02	2.324	689.7	1354	2082	1810	3552	5464	72.1	71.96	75.3	4.4%
Azerbaijan	8.883	10.8	11.12	25.2%	82.62	31.9	107.5	130.7	134.6	282.1	343	353.2	53.17	62.13	69.57	30.8%
United Arab Emirates	4.716	5.97	5.867	24.4%	83.6	32.28	56.41	71.42	70.18	148	187.4	184.2	100	100	99.64	-0.4%
Kuwait	2.864	4.397	5.695	98.8%	17.82	6.88	160.7	246.8	319.6	421.7	647.5	838.6	94.03	92.87	93.58	-0.5%
Lebanon	4.254	4.898	4.757	11.8%	10.23	3.95	415.8	478.8	465	1091	1256	1220	86.66	88.56	89.78	3.6%
Oman	2.906	3.907	4.3	48.0%	309.5	119.5	9.389	12.62	13.89	24.64	33.12	36.45	68.65	88.33	92	34.0%
Armenia	3.089	3.232	3.011	-2.5%	28.48	11	108.5	113.5	105.7	284.6	297.7	277.5	63.76	61.86	63.18	-0.9%
Georgia	4.214	3.471	2.943	-30.2%	69.49	26.83	60.64	49.95	42.35	159.1	131.1	111.1	55.9	70.94	77.74	39.1%
Qatar	1.55	1.831	1.657	6.9%	11.59	4.475	133.7	158	143	350.9	414.6	375.2	100	100	99.57	-0.4%
Bahrain	0.806	1.108	1.189	47.5%	0.76	0.293	1061	1458	1564	2783	3825	4104	100	100	99.87	-0.1%
Cyprus	0.88	0.939	0.851	-3.3%	9.24	3.568	95.24	101.6	92.09	249.9	266.6	241.7	88.17	92	92	4.3%
Asia-West	**231.9**	**338.4**	**416.9**	**79.8%**	**4805**	**1855**	**48.26**	**70.42**	**86.76**	**126.6**	**184.8**	**227.7**	**66.3**	**73.28**	**78.05**	**17.7%**
Australia	22.33	27.87	31.91	42.9%	7682	2966	2.906	3.628	4.153	7.626	9.52	10.9	89.11	92	92	3.2%
Papua New Guinea	6.891	11.09	14.51	110.6%	452.9	174.9	15.22	24.5	32.05	39.93	64.28	84.09	12.44	12.88	15.1	21.4%
New Zealand	4.364	5.076	5.332	22.2%	263.3	101.7	16.57	19.28	20.25	43.49	50.59	53.13	86.88	92	92	5.9%
Solomon Islands	0.535	0.949	1.423	166.0%	27.99	10.81	19.11	33.91	50.83	50.16	88.99	133.4	18.71	29.45	43.75	133.8%
Fiji	0.854	0.913	0.817	-4.3%	18.27	7.054	46.74	49.95	44.71	122.7	131.1	117.3	53.81	69.95	77.97	44.9%
Vanuatu	0.246	0.411	0.561	128.0%	12.19	4.707	20.18	33.7	46	52.95	88.42	120.7	24.94	38.5	54.35	117.9%
Micronesia (Federated States of)	0.112	0.182	0.248	121.4%	0.7	0.27	160	259.8	353.7	419.8	681.8	928	22.51	20.15	20.02	-11.1%
Tonga	0.104	0.171	0.234	125.0%	0.72	0.278	144.4	236.9	325	379	621.6	852.9	25.32	24.21	24.71	-2.4%
Samoa	0.179	0.21	0.213	19.0%	2.83	1.093	63.25	74.33	75.29	166	195.1	197.6	23.93	27.69	33.02	38.0%
Oceania	**35.61**	**46.88**	**55.24**	**55.1%**	**8461**	**3267**	**4.209**	**5.54**	**6.529**	**11.04**	**14.54**	**17.13**	**70.93**	**70.3**	**69.13**	**-2.5%**

Population, Land Area, and Human Development Index

Base Case: Countries in Descending Year 2060 Population Sequence	Population				Land Area		Population Density						Urban Population			
	Millions of People				Sq Km	Sq Mi	Persons per Sq Km			Persons per Sq Mi			Percent of Total Population			
	2010	2035	2060	% Chg	000s	000s	2010	2035	2060	2010	2035	2060	2010	2035	2060	% Chg
EUROPE																
Russian Federation	141.8	127.6	108.7	-23.3%	16377	6323	8.656	7.791	6.64	22.71	20.44	17.42	72.8	78.13	80.71	10.9%
Ukraine	45.76	37.09	30.26	-33.9%	579.3	223.7	78.99	64.03	52.23	207.3	168	137.1	68.27	79	82.3	20.6%
Poland	38.17	35.56	29.95	-21.5%	304.2	117.5	125.5	116.9	98.47	329.3	306.7	258.4	61.22	64.12	67.84	10.8%
Romania	21.45	19.14	15.63	-27.1%	230.1	88.83	93.24	83.22	67.94	244.7	218.4	178.3	54.58	59.62	64.2	17.6%
Czech Rep.	10.56	10.27	9.26	-12.3%	77.25	29.83	136.6	132.9	119.9	358.6	348.7	314.6	73.28	79.28	82.32	12.3%
Belarus	9.645	8.904	7.782	-19.3%	202.8	78.31	47.55	43.9	38.37	124.8	115.2	100.7	73.11	77.08	79.49	8.7%
Hungary	10.01	8.701	7.084	-29.2%	90.53	34.95	110.5	96.11	78.25	290	252.2	205.3	68.32	78.36	81.77	19.7%
Bulgaria	7.547	6.087	4.932	-34.6%	108.6	41.92	69.52	56.07	45.43	182.4	147.1	119.2	71.67	83	86	20.0%
Slovak Rep.	5.429	5.197	4.363	-19.6%	48.09	18.57	112.9	108.1	90.73	296.2	283.6	238.1	56.85	62.8	68.02	19.6%
Moldova, Rep. of	3.575	3.344	2.795	-21.8%	32.89	12.7	108.7	101.7	84.98	285.2	266.8	223	41.05	43.32	47.51	15.7%
Europe-East	**293.9**	**261.9**	**220.8**	**-24.9%**	**18051**	**6969**	**16.28**	**14.51**	**12.23**	**42.72**	**38.07**	**32.1**	**68.43**	**74.38**	**77.52**	**13.3%**
United Kingdom	62.27	67.4	69.14	11.0%	241.9	93.41	257.4	278.6	285.8	675.4	731	749.9	90.02	92	92	2.2%
Sweden	9.385	9.933	9.984	6.4%	410.3	158.4	22.87	24.21	24.33	60.01	63.52	63.85	84.65	92	92	8.7%
Denmark	5.564	5.91	6.026	8.3%	42.43	16.38	131.1	139.3	142	344.1	365.5	372.7	86.89	92	92	5.9%
Ireland	4.474	5.409	5.935	32.7%	68.89	26.6	64.94	78.51	86.16	170.4	206	226.1	62	64.24	67.09	8.2%
Norway	4.887	5.537	5.787	18.4%	305.5	117.9	16	18.13	18.95	41.98	47.56	49.71	77.57	87.91	90.96	17.3%
Finland	5.363	5.498	5.311	-1.0%	303.9	117.3	17.65	18.09	17.48	46.31	47.47	45.86	63.91	73.4	78.26	22.5%
Lithuania	3.322	2.994	2.525	-24.0%	62.67	24.2	53.01	47.77	40.29	139.1	125.4	105.7	67.17	72.07	75.38	12.2%
Latvia	2.244	2.01	1.732	-22.8%	62.18	24.01	36.09	32.33	27.85	94.7	84.84	73.08	68.17	73.42	76.27	11.9%
Estonia	1.339	1.092	0.966	-27.9%	42.39	16.37	31.59	25.77	22.79	82.89	67.61	59.8	69.53	80.13	82.58	18.8%
Iceland	0.321	0.37	0.378	17.8%	100.2	38.71	3.202	3.693	3.775	8.402	9.69	9.904	91.26	86.2	85.91	-5.9%
Europe-North	**99.17**	**106.1**	**107.8**	**8.7%**	**1640**	**633.4**	**60.45**	**64.71**	**65.7**	**158.6**	**169.8**	**172.4**	**84.52**	**88.35**	**89.15**	**5.5%**
Italy	60.61	56.7	48.64	-19.7%	294.1	113.6	206.1	192.8	165.4	540.7	505.8	433.9	68.25	80.69	85.25	24.9%
Spain	46.36	45.78	40.38	-12.9%	498.8	192.6	92.95	91.78	80.95	243.9	240.8	212.4	76.93	86.2	88.59	15.2%
Greece	11.33	11.08	10.12	-10.7%	128.9	49.77	87.89	85.97	78.51	230.6	225.6	206	61.35	69.71	74.44	21.3%
Portugal	10.64	9.879	8.287	-22.1%	91.47	35.32	116.3	108	90.59	305.3	283.4	237.7	60.7	74.64	79.83	31.5%
Serbia	7.29	6.515	5.417	-25.7%	87.46	33.77	83.35	74.49	61.94	218.7	195.5	162.5	52.42	57.14	61.45	17.2%
Croatia	4.43	3.994	3.338	-24.7%	55.96	21.61	79.16	71.37	59.65	207.7	187.3	156.5	57.72	63.34	67.37	16.7%
Bosnia and Herzegovina	3.761	3.691	3.065	-18.5%	51	19.69	73.75	72.36	60.1	193.5	189.9	157.7	48.59	56.97	64.91	33.6%
Albania	3.167	3.18	2.878	-9.1%	27.4	10.58	115.6	116.1	105	303.3	304.5	275.6	48.57	66.63	75.44	55.3%
Macedonia, TFYR	2.043	1.991	1.711	-16.3%	25.22	9.737	81.01	78.95	67.84	212.6	207.2	178	68.48	80.03	84.35	23.2%
Slovenia	2.065	1.938	1.641	-20.5%	20.14	7.776	102.5	96.21	81.49	269	252.5	213.8	47.72	50.46	54.47	14.1%
Montenegro	0.626	0.63	0.583	-6.9%	13.45	5.193	46.54	46.81	43.35	122.1	122.8	113.7	60.02	59.67	61.41	2.3%
Malta	0.418	0.402	0.337	-19.4%	0.32	0.124	1306	1258	1054	3428	3300	2765	93.56	97.75	97.9	4.6%
Europe-South	**152.7**	**145.8**	**126.4**	**-17.2%**	**1294**	**499.7**	**118**	**112.6**	**97.66**	**309.7**	**295.6**	**256.3**	**67.66**	**78.29**	**82.4**	**21.8%**
Germany	81.65	77.71	68.82	-15.7%	348.6	134.6	234.2	222.9	197.4	614.6	584.9	518	73.85	76.18	78.62	6.5%
France	62.96	66.86	66.35	5.4%	547.7	211.5	115	122.1	121.2	301.6	320.3	317.9	80.17	86.94	89.13	11.2%
Netherlands	16.62	17.53	16.98	2.2%	33.73	13.02	492.6	519.8	503.3	1293	1364	1321	82.88	92	92	11.0%
Belgium	10.87	11.37	11.22	3.2%	30.28	11.69	359	375.3	370.6	942.1	984.9	972.5	97.47	97.47	97.47	0.0%
Switzerland	7.815	7.789	6.822	-12.7%	41.29	15.94	189.3	188.6	165.2	496.6	494.9	433.5	73.7	89.45	92	24.8%
Austria	8.391	8.019	6.802	-18.9%	82.43	31.83	101.8	97.28	82.52	267.1	255.3	216.5	67.55	76.69	81.29	20.3%
Luxembourg	0.507	0.65	0.782	54.2%	2.59	1	195.8	250.8	302	513.7	658.1	792.4	82.01	89.77	92	12.2%
Europe-West	**188.8**	**189.9**	**177.8**	**-5.8%**	**1087**	**419.5**	**173.8**	**174.8**	**163.6**	**455.9**	**458.6**	**429.3**	**77.85**	**83.31**	**85.68**	**10.1%**

Population, Land Area, and Human Development Index

Base Case

Source: International Futures Model Version 6.61, Jan 2013

	Population Growth Rate			Total Fertility Rate				Population Below 15 Years of Age				Population 65 Years and Older			
	Annual Percent			Births per Woman				Number in Millions				Number in Millions			
	2010	2035	2060	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	1.151	0.654	0.24	2.487	2.189	1.994	-19.8%	1835	1897	1855	1.1%	521.6	1153	1834	251.6%
Africa	2.207	1.799	1.042	4.572	3.324	2.332	-49.0%	415.3	591.7	651.7	56.9%	36.3	85.44	213	486.8%
Americas	1.172	0.555	0.156	2.18	1.905	1.882	-13.7%	230.9	220.3	208.8	-9.6%	85.49	191.8	288.2	237.1%
Asia with Oceania	1.069	0.416	-0.027	2.2	1.937	1.892	-14.0%	1076	988	906.5	-15.8%	280.9	698.3	1140	305.8%
Europe	0.107	-0.306	-0.512	1.577	1.649	1.741	10.4%	112.2	95.66	87.18	-22.3%	117.8	176.1	191.2	62.3%
World	1.151	0.654	0.24	2.487	2.189	1.994	-19.8%	1835	1897	1855	1.1%	521.6	1153	1834	251.6%
Africa-Eastern	2.477	2.037	1.089	4.941	3.494	2.228	-54.9%	141.2	215.6	233.3	65.2%	10.03	23.1	65.36	551.6%
Africa-Middle	2.461	2.186	1.361	5.464	3.99	2.712	-50.4%	57.78	91.8	112.1	94.0%	3.719	8.103	20.93	462.8%
Africa-Northern	1.696	0.827	0.221	2.868	2.085	1.9	-33.8%	67.09	69.05	62.33	-7.1%	10.21	26.67	57.38	462.0%
Africa-Southern	0.755	0.329	0.242	2.529	1.94	1.9	-24.9%	17.71	15.13	13.41	-24.3%	2.601	5.99	11	322.9%
Africa-Western	2.439	2.065	1.248	5.369	3.676	2.484	-53.7%	131.5	200.2	230.6	75.4%	9.73	21.58	58.3	499.2%
Africa	2.207	1.799	1.042	4.572	3.324	2.332	-49.0%	415.3	591.7	651.7	56.9%	36.3	85.44	213	486.8%
America-Caribbean	0.916	0.387	-0.084	2.286	2.021	1.885	-17.5%	10.9	10.26	8.954	-17.9%	3.375	7.196	10.8	220.0%
America-Central	1.916	1.179	0.454	2.971	2.297	1.895	-36.2%	15.04	16.78	15.35	2.1%	2.197	5.549	12.75	480.3%
America-North	1.182	0.551	0.268	2.194	1.891	1.894	-13.7%	99.36	99.42	100.6	1.2%	52.15	109	143.9	175.9%
America-South	1.106	0.494	0.002	2.069	1.857	1.865	-9.9%	105.6	93.81	83.97	-20.5%	27.77	69.96	120.7	334.6%
Americas	1.172	0.555	0.156	2.18	1.905	1.882	-13.7%	230.9	220.3	208.8	-9.6%	85.49	191.8	288.2	237.1%
Asia-East	0.511	-0.221	-0.636	1.58	1.663	1.744	10.4%	296.2	230	198.2	-33.1%	149.8	351.2	446.2	197.9%
Asia-South Central	1.424	0.733	0.229	2.652	2.061	1.959	-26.1%	536.3	512	480.1	-10.5%	83.17	214.9	454.2	446.1%
Asia-South East	1.179	0.476	-0.047	2.189	1.936	1.884	-13.9%	160.9	149.9	132.1	-17.9%	32.94	92.93	161.7	390.9%
Asia-West	1.872	1.171	0.506	3.021	2.403	2.01	-33.5%	73.73	86.21	85.79	16.4%	11.1	31.27	66.72	501.1%
Oceania	1.444	0.86	0.484	2.502	2.177	1.923	-23.1%	8.527	9.95	10.29	20.7%	3.847	7.982	11.17	190.4%
Asia with Oceania	1.069	0.416	-0.027	2.2	1.937	1.892	-14.0%	1076	988	906.5	-15.8%	280.9	698.3	1140	305.8%
Europe-East	-0.192	-0.571	-0.806	1.448	1.565	1.679	16.0%	43.69	34.54	29.53	-32.4%	40.51	58.91	69.26	71.0%
Europe-North	0.538	0.129	-0.002	1.995	1.884	1.891	-5.2%	17.19	17.29	17.29	0.6%	16.32	25.27	28.72	76.0%
Europe-South	0.163	-0.372	-0.76	1.422	1.548	1.667	17.2%	22.78	17.77	15.76	-30.8%	27.57	40.53	42.49	54.1%
Europe-West	0.302	-0.145	-0.298	1.669	1.703	1.776	6.4%	29.86	27.17	25.45	-14.8%	34.51	53.13	52.86	53.2%
Europe	0.107	-0.306	-0.512	1.577	1.649	1.741	10.4%	112.2	95.66	87.18	-22.3%	117.8	176.1	191.2	62.3%

Population, Land Area, and Human Development Index

Base Case: Countries in Descending Year 2060 Population Sequence	Population Growth Rate Annual Percent			Total Fertility Rate Births per Woman				Population Below 15 Years of Age Number in Millions				Population 65 Years and Older Number in Millions			
	2010	2035	2060	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA															
Ethiopia	1.949	1.579	0.726	4.105	2.84	1.9	-53.7%	35.25	45.87	41.55	17.9%	2.829	6.378	17.53	519.7%
Tanzania, United Rep. of	2.928	2.313	1.072	5.548	3.72	1.907	-65.6%	20.14	33.73	35.61	76.8%	1.412	3.304	9.651	583.5%
Uganda	3.208	2.574	1.349	6.217	4.078	2.301	-63.0%	16.37	29.47	34.1	108.3%	0.847	1.961	6.522	670.0%
Kenya	2.569	1.964	0.942	4.738	3.456	2.165	-54.3%	17.35	25.78	27.34	57.6%	1.084	2.98	8.665	699.4%
Madagascar	2.607	2.405	1.922	4.59	3.914	3.424	-25.4%	8.685	14.4	21.82	151.2%	0.633	1.682	4.234	568.9%
Mozambique	2.159	1.858	0.857	4.919	3.236	1.941	-60.5%	10.32	14.97	14.65	42.0%	0.774	1.575	3.925	407.1%
Malawi	3.165	2.526	1.489	5.972	4.019	2.549	-57.3%	7.191	12.84	15.78	119.4%	0.484	1.085	3.263	574.2%
Zambia	2.714	2.184	1.219	6.225	3.719	2.396	-61.5%	6.148	9.789	10.91	77.5%	0.404	0.75	2.343	480.0%
Somalia	2.786	2.31	1.34	6.361	4.113	2.56	-59.8%	4.199	7.165	8.466	101.6%	0.254	0.647	1.348	430.7%
Rwanda	2.598	2.009	1.039	5.32	3.857	2.331	-56.2%	4.385	6.672	7.502	71.1%	0.273	0.633	1.819	566.3%
Zimbabwe	1.592	1.199	0.438	3.334	2.539	1.905	-42.9%	4.891	5.582	4.969	1.6%	0.529	0.829	2.981	463.5%
Burundi	1.999	1.772	1.127	4.287	4.086	2.744	-36.0%	3.234	5.014	5.841	80.6%	0.244	0.628	1.603	557.0%
Eritrea	2.79	1.912	0.924	4.43	3.281	2.27	-48.8%	2.172	3.189	3.586	65.1%	0.13	0.276	0.849	553.1%
Comoros	3.156	2.505	1.707	4.997	4.152	3.02	-39.6%	0.287	0.492	0.695	142.2%	0.018	0.065	0.164	811.1%
Djibouti	1.09	0.764	-0.04	3.671	3.181	2.108	-42.6%	0.315	0.356	0.302	-4.1%	0.029	0.067	0.145	400.0%
Mauritius	0.334	-0.199	-0.612	1.492	1.598	1.7	13.9%	0.28	0.215	0.171	-38.9%	0.088	0.236	0.311	253.4%
Africa-Eastern	**2.477**	**2.037**	**1.089**	**4.941**	**3.494**	**2.228**	**-54.9%**	**141.2**	**215.6**	**233.3**	**65.2%**	**10.03**	**23.1**	**65.36**	**551.6%**
Congo, Democratic Rep. of	2.597	2.331	1.448	5.796	4.297	2.841	-51.0%	31.39	51.97	66.25	111.1%	1.807	3.752	9.121	404.8%
Angola	2.285	2.084	1.106	5.444	3.376	2.196	-59.7%	8.843	13.27	13.58	53.6%	0.471	1.232	3.709	687.5%
Cameroon	2.247	1.793	1.067	4.563	3.522	2.485	-45.5%	8.103	11.76	13.23	63.3%	0.701	1.514	3.951	463.6%
Chad	2.812	2.599	1.899	6.065	4.575	3.253	-46.4%	5.228	9.364	13.55	159.2%	0.331	0.726	2.004	505.4%
Central African Rep.	1.594	1.69	1.07	4.647	3.656	2.596	-44.1%	1.82	2.522	2.863	57.3%	0.179	0.307	0.734	310.1%
Congo, Rep. of	2.228	1.423	0.602	4.546	2.638	1.9	-58.2%	1.523	1.886	1.629	7.0%	0.138	0.307	0.812	488.4%
Gabon	1.958	1.167	0.551	3.124	2.235	1.9	-39.2%	0.533	0.594	0.527	-1.1%	0.065	0.17	0.424	552.3%
Equatorial Guinea	2.233	1.478	0.652	5.224	3.108	2.145	-58.9%	0.272	0.352	0.349	28.3%	0.02	0.081	0.134	570.0%
São Tomé and Príncipe	2.37	1.731	0.936	3.613	2.932	2.249	-37.8%	0.067	0.09	0.097	44.8%	0.006	0.014	0.044	633.3%
Africa-Middle	**2.461**	**2.186**	**1.361**	**5.464**	**3.99**	**2.712**	**-50.4%**	**57.78**	**91.8**	**112.1**	**94.0%**	**3.719**	**8.103**	**20.93**	**462.8%**
Egypt, Arab Rep.	1.666	0.728	0.173	2.695	1.9	1.9	-29.5%	26.65	25.54	23.34	-12.4%	4.251	10.47	22.02	418.0%
Sudan	2.284	1.43	0.661	4.36	2.67	1.9	-56.4%	17.32	21.98	18.89	9.1%	1.541	3.67	9.69	528.8%
Algeria	1.529	0.57	-0.096	2.301	1.9	1.9	-17.4%	9.581	9.011	8.468	-11.6%	1.627	5.118	11.21	589.0%
Morocco	1.301	0.502	-0.041	2.263	1.9	1.9	-16.0%	9.071	8.294	7.558	-16.7%	1.779	4.71	9.02	407.0%
Tunisia	1.141	0.369	-0.169	2.064	1.9	1.9	-7.9%	2.472	2.384	2.223	-10.1%	0.733	1.807	3.345	356.3%
Libya	1.961	0.81	0.122	2.605	1.9	1.9	-27.1%	1.992	1.838	1.847	-7.3%	0.282	0.897	2.094	642.6%
Africa-Northern	**1.696**	**0.827**	**0.221**	**2.868**	**2.085**	**1.9**	**-33.8%**	**67.09**	**69.05**	**62.33**	**-7.1%**	**10.21**	**26.67**	**57.38**	**462.0%**

Population, Land Area, and Human Development Index

Base Case: Countries in Descending Year 2060 Population Sequence	Population Growth Rate: Annual Percent 2010	2035	2060	Total Fertility Rate: Births per Woman 2010	2035	2060	% Chg	Population Below 15 Years of Age: Number in Millions 2010	2035	2060	% Chg	Population 65 Years and Older: Number in Millions 2010	2035	2060	% Chg
AFRICA continued															
South Africa	0.682	0.251	0.251	2.447	1.9	1.9	-22.4%	15.02	12.49	11.18	-25.6%	2.311	5.342	9.303	302.6%
Namibia	1.808	1.024	0.464	3.189	2.066	1.9	-40.4%	0.806	0.843	0.752	-6.7%	0.081	0.235	0.589	627.2%
Lesotho	0.744	0.511	-0.112	3.131	2.269	1.9	-39.3%	0.78	0.727	0.572	-26.7%	0.089	0.122	0.355	298.9%
Botswana	1.055	0.526	0.069	2.719	1.9	1.9	-30.1%	0.644	0.559	0.49	-23.9%	0.079	0.206	0.499	531.6%
Swaziland	1.349	0.969	0.277	3.357	2.532	1.9	-43.4%	0.462	0.504	0.418	-9.5%	0.04	0.084	0.253	532.5%
Africa-Southern	**0.755**	**0.329**	**0.242**	**2.529**	**1.94**	**1.9**	**-24.9%**	**17.71**	**15.13**	**13.41**	**-24.3%**	**2.601**	**5.99**	**11**	**322.9%**
Nigeria	2.309	1.929	1.006	5.523	3.503	2.149	-61.1%	67.79	98.26	101.4	49.6%	5.379	10.76	29.63	450.8%
Niger	3.432	3.165	2.469	7.088	5.318	3.886	-45.2%	7.786	16.33	28.21	262.3%	0.349	0.97	2.514	620.3%
Côte d'Ivoire	2.493	2.022	1.251	4.473	3.464	2.378	-46.8%	8.83	13.69	15.83	79.3%	0.817	1.969	5.219	538.8%
Burkina Faso	2.891	2.367	1.452	5.841	4.199	2.768	-52.6%	7.389	12.36	15.67	112.1%	0.361	1	2.99	728.3%
Ghana	2.072	1.343	0.597	4.225	2.706	1.9	-55.0%	9.389	11.54	9.996	6.5%	0.928	2.057	5.013	440.2%
Mali	2.702	2.443	1.45	6.338	4.181	2.791	-56.0%	6.282	10.71	13.6	116.5%	0.293	0.663	2.009	585.7%
Senegal	2.608	2.08	1.239	4.847	3.775	2.688	-44.5%	5.62	8.683	10.52	87.2%	0.31	0.656	1.932	523.2%
Guinea	1.752	2.356	1.702	5.268	3.827	2.993	-43.2%	4.424	7.072	9.654	118.2%	0.343	0.88	2.179	535.3%
Benin	3.038	2.36	1.477	5.321	3.895	2.679	-49.7%	4.027	6.826	8.577	113.0%	0.28	0.851	2.239	699.6%
Togo	2.375	1.906	1.344	4.037	3.515	2.898	-28.2%	2.689	3.899	4.881	81.5%	0.231	0.669	1.789	674.5%
Sierra Leone	2.368	1.928	0.965	5.04	3.47	2.141	-57.5%	2.509	3.766	3.962	57.9%	0.11	0.272	0.659	499.1%
Liberia	2.975	2.079	1.089	5.278	3.412	2.25	-57.4%	1.794	2.715	3.045	69.7%	0.115	0.302	0.727	532.2%
Mauritania	2.364	1.851	1.249	4.535	3.571	2.78	-38.7%	1.344	1.947	2.376	76.8%	0.091	0.253	0.631	593.4%
Gambia	3.186	2.148	1.073	4.914	3.439	2.185	-55.5%	0.77	1.215	1.34	74.0%	0.038	0.104	0.326	757.9%
Guinea-Bissau	2.077	2.008	1.699	5.07	4.22	3.565	-29.7%	0.681	1.036	1.463	114.8%	0.055	0.109	0.294	434.5%
Cape Verde	1.12	0.654	-0.044	2.24	1.9	1.9	-15.2%	0.163	0.143	0.123	-24.5%	0.03	0.06	0.148	393.3%
Africa-Western	**2.439**	**2.065**	**1.248**	**5.369**	**3.676**	**2.484**	**-53.7%**	**131.5**	**200.2**	**230.6**	**75.4%**	**9.73**	**21.58**	**58.3**	**499.2%**

Population, Land Area, and Human Development Index

Base Case: Countries in Descending Year 2060 Population Sequence	Population Growth Rate			Total Fertility Rate				Population Below 15 Years of Age				Population 65 Years and Older			
	Annual Percent			Births per Woman				Number in Millions				Number in Millions			
	2010	2035	2060	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS															
Haiti	1.501	0.997	0.276	3.289	2.66	2.03	-38.3%	3.663	4.177	3.768	2.9%	0.448	0.86	2.007	348.0%
Dominican Rep.	1.47	0.65	0.108	2.596	1.9	1.9	-26.8%	3.174	2.872	2.533	-20.2%	0.642	1.624	3.13	387.5%
Cuba	0.149	-0.467	-0.82	1.459	1.574	1.684	15.4%	1.94	1.445	1.163	-40.1%	1.388	2.911	3.131	125.6%
Puerto Rico	0.569	0.105	-0.233	1.542	1.635	1.724	11.8%	0.837	0.676	0.585	-30.1%	0.51	0.922	1.257	146.5%
Jamaica	0.59	0.24	-0.243	2.331	1.9	1.9	-18.5%	0.788	0.668	0.554	-29.7%	0.213	0.449	0.653	206.6%
Trinidad and Tobago	0.449	-0.29	-0.743	1.64	1.708	1.773	8.1%	0.277	0.221	0.177	-36.1%	0.094	0.237	0.347	269.1%
Bahamas	0.976	0.243	-0.183	1.847	1.86	1.874	1.5%	0.078	0.074	0.067	-14.1%	0.024	0.07	0.101	320.8%
Barbados	0.225	-0.433	-0.711	1.519	1.618	1.713	12.8%	0.045	0.035	0.029	-35.6%	0.029	0.063	0.07	141.4%
Saint Lucia	0.546	-0.192	-0.413	1.982	1.9	1.9	-4.1%	0.045	0.036	0.028	-37.8%	0.012	0.027	0.046	283.3%
Grenada	1.352	0.706	0.153	2.209	1.9	1.9	-14.0%	0.029	0.028	0.026	-10.3%	0.007	0.015	0.034	385.7%
Saint Vincent and the Grenadines	0.999	0.495	0.034	2.047	1.9	1.9	-7.2%	0.029	0.027	0.024	-17.2%	0.007	0.018	0.03	328.6%
America-Caribbean	**0.916**	**0.387**	**-0.084**	**2.286**	**2.021**	**1.885**	**-17.5%**	**10.9**	**10.26**	**8.954**	**-17.9%**	**3.375**	**7.196**	**10.8**	**220.0%**
Guatemala	2.494	1.703	0.759	3.939	2.731	1.9	-51.8%	5.965	7.858	7.457	25.0%	0.621	1.484	4.045	551.4%
Honduras	2.078	1.248	0.491	3.077	2.304	1.9	-38.3%	2.8	3.157	2.796	-0.1%	0.328	0.887	2.317	606.4%
Nicaragua	1.814	0.922	0.28	2.587	1.949	1.9	-26.6%	2.006	1.985	1.77	-11.8%	0.269	0.717	1.754	552.0%
El Salvador	1.181	0.59	0.051	2.149	1.9	1.9	-11.6%	1.98	1.72	1.501	-24.2%	0.432	0.836	1.82	321.3%
Costa Rica	1.345	0.437	-0.129	1.761	1.797	1.832	4.0%	1.155	1.03	0.906	-21.6%	0.303	0.944	1.634	439.3%
Panama	1.422	0.604	0.043	2.496	1.9	1.9	-23.9%	1.016	0.901	0.812	-20.1%	0.231	0.632	1.065	361.0%
Belize	1.843	0.96	0.259	2.716	2.026	1.9	-30.0%	0.121	0.126	0.107	-11.6%	0.014	0.048	0.115	721.4%
America-Central	**1.916**	**1.179**	**0.454**	**2.971**	**2.297**	**1.895**	**-36.2%**	**15.04**	**16.78**	**15.35**	**2.1%**	**2.197**	**5.549**	**12.75**	**480.3%**
United States of America	1.177	0.599	0.411	2.187	1.9	1.9	-13.1%	62.17	65.69	70.36	13.2%	40.44	80.8	100.4	148.3%
Mexico	1.258	0.431	-0.2	2.353	1.9	1.9	-19.3%	31.58	27.35	23.14	-26.7%	6.89	18.2	31.63	359.1%
Canada	0.984	0.5	0.371	1.744	1.785	1.824	4.6%	5.611	6.373	7.078	26.1%	4.824	10.05	11.85	145.6%
America-North	**1.182**	**0.551**	**0.268**	**2.194**	**1.891**	**1.894**	**-13.7%**	**99.36**	**99.42**	**100.6**	**1.2%**	**52.15**	**109**	**143.9**	**175.9%**
Brazil	0.864	0.339	-0.151	1.752	1.79	1.827	4.3%	49.76	41.93	36.39	-26.9%	13.69	36.28	61.18	346.9%
Colombia	1.458	0.618	0.072	2.384	1.9	1.9	-20.3%	13.31	11.99	11.07	-16.8%	2.602	8.073	13.86	432.7%
Argentina	1.041	0.492	0.104	2.179	1.9	1.9	-12.8%	10.11	9.36	8.703	-13.9%	4.304	7.317	12.16	182.5%
Peru	1.471	0.725	0.163	2.488	1.9	1.9	-23.6%	8.839	7.971	7.356	-16.8%	1.795	4.626	9.318	419.1%
Venezuela (Bolivarian Rep. of)	1.577	0.702	0.186	2.472	1.9	1.9	-23.1%	8.495	7.983	7.404	-12.8%	1.615	4.759	8.864	448.9%
Ecuador	1.554	0.742	0.177	2.452	1.9	1.9	-22.5%	4.177	3.856	3.542	-15.2%	0.86	2.255	4.387	410.1%
Chile	0.821	0.28	-0.157	1.838	1.854	1.87	1.7%	3.79	3.543	3.199	-15.6%	1.586	3.886	5.41	241.1%
Bolivia (Plurinational State of)	1.77	1.098	0.467	3.292	2.136	1.9	-42.3%	3.823	3.925	3.46	-9.5%	0.455	1.075	2.508	451.2%
Paraguay	1.836	0.975	0.392	2.887	2.086	1.9	-34.2%	2.167	2.296	2.054	-5.2%	0.33	0.857	1.895	474.2%
Uruguay	0.46	0.198	-0.09	1.942	1.9	1.9	-2.2%	0.756	0.679	0.606	-19.8%	0.462	0.666	0.917	98.5%
Guyana	0.227	-0.505	-0.985	2.283	1.9	1.9	-16.8%	0.256	0.166	0.107	-58.2%	0.033	0.093	0.134	306.1%
Suriname	0.33	-0.328	-0.661	2.308	1.9	1.9	-17.7%	0.15	0.109	0.079	-47.3%	0.034	0.076	0.104	205.9%
America-South	**1.106**	**0.494**	**0.002**	**2.069**	**1.857**	**1.865**	**-9.9%**	**105.6**	**93.81**	**83.97**	**-20.5%**	**27.77**	**69.96**	**120.7**	**334.6%**

Population, Land Area, and Human Development Index

Base Case: Countries in Descending Year 2060 Population Sequence	Population Growth Rate (Annual Percent)			Total Fertility Rate (Births per Woman)				Population Below 15 Years of Age (Number in Millions)				Population 65 Years and Older (Number in Millions)			
	2010	2035	2060	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA															
China	0.556	-0.182	-0.619	1.606	1.682	1.756	9.3%	260.4	201.4	173.9	-33.2%	109.6	287.4	380.8	247.4%
Japan	0.035	-0.671	-0.826	1.352	1.494	1.631	20.6%	17.02	12.86	10.67	-37.3%	28.91	37.76	36.66	26.8%
Korea, Rep. of	0.372	-0.456	-1.053	1.298	1.455	1.605	23.7%	8.033	5.918	4.634	-42.3%	5.448	13.38	14.52	166.5%
Korea, Dem. People's Rep. of	0.486	0.063	-0.147	2.027	1.9	1.9	-6.3%	5.49	5.08	4.628	-15.7%	2.281	3.845	4.72	106.9%
Taiwan, China	0.554	-0.418	-0.916	1.502	1.605	1.705	13.5%	3.783	3.161	2.672	-29.4%	2.565	6.117	6.191	141.4%
Hong Kong SAR, China	1.101	0.2	-0.163	1.075	1.289	1.496	39.2%	0.809	0.869	0.957	18.3%	0.896	2.362	2.614	191.7%
Mongolia	1.513	0.626	0.068	2.58	1.9	1.9	-26.4%	0.746	0.714	0.696	-6.7%	0.11	0.335	0.706	541.8%
Asia-East	**0.511**	**-0.221**	**-0.636**	**1.58**	**1.663**	**1.744**	**10.4%**	**296.2**	**230**	**198.2**	**-33.1%**	**149.8**	**351.2**	**446.2**	**197.9%**
India	1.37	0.635	0.168	2.593	1.9	1.9	-26.7%	358.2	321.1	294.1	-17.9%	57.64	150.6	309.5	437.0%
Pakistan	1.892	1.267	0.556	3.361	2.695	2.045	-39.2%	61.32	75.03	72.84	18.8%	7.461	18.55	45.98	516.3%
Bangladesh	1.257	0.557	-0.002	2.139	1.9	1.9	-11.2%	51.48	44	39.17	-23.9%	7.543	18.49	40.18	432.7%
Afghanistan	3.552	2.272	1.593	6.252	4.424	3.061	-51.0%	14.22	24.71	32.29	127.1%	0.685	1.546	4.398	542.0%
Iran, Islamic Rep. of	0.821	0.33	-0.439	1.617	1.69	1.761	8.9%	16.95	14.5	12.57	-25.8%	3.864	10.91	25.63	563.3%
Nepal	1.58	0.891	0.203	2.576	2.101	1.9	-26.2%	10.81	10.65	9.186	-15.0%	1.246	2.897	6.83	448.2%
Uzbekistan	1.63	0.643	0.06	2.568	1.9	1.9	-26.0%	8.289	7.805	7.251	-12.5%	1.229	3.643	8.193	566.6%
Sri Lanka	1.095	0.227	-0.234	2.412	1.9	1.9	-21.2%	5.087	4.443	4.002	-21.3%	1.67	3.81	5.264	215.2%
Kazakhstan	0.431	-0.074	-0.65	2.8	1.9	1.9	-32.1%	3.944	3.234	2.75	-30.3%	1.092	2.275	3.22	194.9%
Tajikistan	1.205	1.19	0.38	3.255	2.553	1.902	-41.6%	2.615	3.005	2.735	4.6%	0.246	0.687	1.699	590.7%
Kyrgyz Rep.	1.991	0.852	0.191	2.98	2.157	1.9	-36.2%	1.612	1.834	1.652	2.5%	0.238	0.657	1.32	454.6%
Turkmenistan	1.44	0.814	0.171	2.392	1.9	1.9	-20.6%	1.513	1.411	1.323	-12.6%	0.213	0.713	1.698	697.2%
Bhutan	1.268	0.683	0.105	2.258	1.9	1.9	-15.9%	0.208	0.19	0.172	-17.3%	0.034	0.087	0.225	561.8%
Maldives	1.011	0.476	-0.293	1.571	1.657	1.739	10.7%	0.083	0.073	0.061	-26.5%	0.016	0.037	0.1	525.0%
Asia-South Central	**1.424**	**0.733**	**0.229**	**2.652**	**2.061**	**1.959**	**-26.1%**	**536.3**	**512**	**480.1**	**-10.5%**	**83.17**	**214.9**	**454.2**	**446.1%**
Indonesia	1.185	0.454	-0.107	2.104	1.9	1.9	-9.7%	62.89	55.89	49.68	-21.0%	12.92	37.34	66.21	412.5%
Philippines	1.834	0.925	0.264	3.094	2.233	1.9	-38.6%	33.19	35.26	29.61	-10.8%	3.404	11.56	24.73	626.5%
Vietnam	1.182	0.396	-0.181	1.854	1.866	1.877	1.2%	20.85	19.62	17.88	-14.2%	5.305	15.67	28.14	430.4%
Thailand	0.236	-0.246	-0.592	1.597	1.675	1.751	9.6%	13.99	11.15	9.263	-33.8%	6.056	12.96	15.45	155.1%
Myanmar	0.831	0.25	-0.143	1.956	1.9	1.9	-2.9%	12.94	11.77	10.56	-18.4%	2.588	6.812	11.08	328.1%
Malaysia	1.546	0.712	0.231	2.602	1.9	1.9	-27.0%	8.473	7.914	7.361	-13.1%	1.332	4.547	8.05	504.4%
Cambodia	1.361	0.636	0.158	2.457	1.9	1.9	-22.7%	4.801	4.52	4.087	-14.9%	0.573	1.652	3.819	566.5%
Lao People's Democratic Rep.	1.499	0.84	0.272	2.605	1.9	1.9	-27.1%	2.221	2.089	1.893	-14.8%	0.249	0.649	1.777	613.7%
Singapore	1.685	0.298	-0.106	1.242	1.413	1.578	27.1%	0.895	0.812	0.763	-14.7%	0.463	1.588	2.055	343.8%
Timor-Leste	2.201	2.223	1.254	4.898	3.518	2.381	-51.4%	0.541	0.81	0.909	68.0%	0.034	0.089	0.249	632.4%
Brunei Darussalam	1.811	0.862	0.238	2.015	1.9	1.9	-5.7%	0.107	0.101	0.102	-4.7%	0.015	0.076	0.149	893.3%
Asia-South Eastern	**1.179**	**0.476**	**-0.047**	**2.189**	**1.936**	**1.884**	**-13.9%**	**160.9**	**149.9**	**132.1**	**-17.9%**	**32.94**	**92.93**	**161.7**	**390.9%**

Population, Land Area, and Human Development Index

Base Case: Countries in Descending Year 2060 Population Sequence	Population Growth Rate			Total Fertility Rate				Population Below 15 Years of Age				Population 65 Years and Older			
	Annual Percent			Births per Woman				Number in Millions				Number in Millions			
	2010	2035	2060	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA continued															
Turkey	1.117	0.413	-0.124	2.071	1.9	1.9	-8.3%	19.97	17.71	15.76	-21.1%	4.526	11.91	20.96	363.1%
Iraq	3.086	2.013	0.919	4.731	3.112	1.989	-58.0%	13.94	20.86	21.08	51.2%	1.056	2.777	8.064	663.6%
Yemen, Rep. of	3.065	2.188	1.226	5.141	3.446	2.39	-53.5%	10.73	17.21	19.78	84.3%	0.619	1.627	5.689	819.1%
Saudi Arabia	1.803	0.925	0.246	2.697	1.9	1.9	-29.6%	7.888	7.669	7.408	-6.1%	0.769	3.713	8.444	998.0%
Syrian Arab Rep.	1.864	1.14	0.494	2.923	2.107	1.9	-35.0%	7.977	8.172	7.244	-9.2%	0.852	2.663	6.391	650.1%
Jordan	2.66	1.516	0.652	3.874	2.643	1.9	-51.0%	2.286	3.023	2.721	19.0%	0.238	0.57	1.824	666.4%
Israel	2.249	1.016	0.607	2.906	1.979	1.9	-34.6%	2.064	2.246	2.313	12.1%	0.789	1.585	2.65	235.9%
Palestine	3.058	2.197	1.242	4.403	3.26	2.269	-48.5%	1.764	2.795	3.223	82.7%	0.114	0.398	1.185	939.5%
Azerbaijan	1.65	0.402	-0.148	2.6	1.9	1.9	-26.9%	1.856	1.872	1.815	-2.2%	0.582	1.648	2.64	353.6%
United Arab Emirates	1.688	0.455	-0.624	1.602	1.679	1.754	9.5%	0.803	0.746	0.718	-10.6%	0.02	0.796	2.292	11360.0%
Kuwait	2.497	1.517	0.715	2.2	1.9	1.9	-13.6%	0.765	0.785	0.925	20.9%	0.072	0.517	1.346	1769.4%
Lebanon	0.984	0.16	-0.4	1.685	1.741	1.795	6.5%	1.054	0.889	0.73	-30.7%	0.31	0.692	1.195	285.5%
Oman	1.466	0.835	-0.104	2.135	1.9	1.9	-11.0%	0.789	0.737	0.695	-11.9%	0.074	0.346	1.105	1393.2%
Armenia	0.619	-0.069	-0.41	1.754	1.792	1.829	4.3%	0.623	0.519	0.443	-28.9%	0.344	0.591	0.823	139.2%
Georgia	-0.516	-0.556	-0.731	1.562	1.65	1.734	11.0%	0.698	0.467	0.401	-42.6%	0.604	0.797	0.891	47.5%
Qatar	1.217	0.299	-1.038	2.17	1.9	1.9	-12.4%	0.209	0.198	0.212	1.4%	0.016	0.296	0.654	3987.5%
Bahrain	2.298	0.697	-0.124	2.586	1.9	1.9	-26.5%	0.161	0.18	0.2	24.2%	0.017	0.147	0.287	1588.2%
Cyprus	0.717	-0.154	-0.687	1.437	1.557	1.673	16.4%	0.156	0.13	0.109	-30.1%	0.102	0.195	0.282	176.5%
Asia-West	**1.872**	**1.171**	**0.506**	**3.021**	**2.403**	**2.01**	**-33.5%**	**73.73**	**86.21**	**85.79**	**16.4%**	**11.1**	**31.27**	**66.72**	**501.1%**
Australia	1.275	0.684	0.46	2.018	1.9	1.9	-5.8%	4.239	4.745	5.248	23.8%	3.002	6.089	8.085	169.3%
Papua New Guinea	2.245	1.49	0.652	3.96	2.841	1.9	-52.0%	2.691	3.504	3.341	24.2%	0.192	0.54	1.302	578.1%
New Zealand	1.009	0.347	0.095	2.242	1.9	1.9	-15.3%	0.894	0.877	0.868	-2.9%	0.568	1.129	1.353	138.2%
Solomon Islands	2.658	1.978	1.291	4.288	3.41	2.669	-37.8%	0.213	0.319	0.394	85.0%	0.017	0.048	0.124	629.4%
Fiji	0.725	-0.277	-0.623	2.638	1.983	1.9	-28.0%	0.248	0.204	0.147	-40.7%	0.041	0.108	0.157	282.9%
Vanuatu	2.398	1.655	0.792	3.85	2.973	2.077	-46.1%	0.094	0.127	0.131	39.4%	0.008	0.027	0.065	712.5%
Micronesia (Federated States of)	1.854	1.543	0.889	3.394	3.003	2.216	-34.7%	0.041	0.057	0.06	46.3%	0.004	0.011	0.029	625.0%
Tonga	2.192	1.708	0.811	3.962	3.043	1.985	-49.9%	0.039	0.053	0.053	35.9%	0.006	0.012	0.027	350.0%
Samoa	0.145	0.451	-0.4	3.803	2.775	1.9	-50.0%	0.068	0.064	0.044	-35.3%	0.009	0.019	0.028	211.1%
Oceania	**1.444**	**0.86**	**0.484**	**2.502**	**2.177**	**1.923**	**-23.1%**	**8.527**	**9.95**	**10.29**	**20.7%**	**3.847**	**7.982**	**11.17**	**190.4%**

Population, Land Area, and Human Development Index

Base Case: Countries in Descending Year 2060 Population Sequence	Population Growth Rate: Annual Percent			Total Fertility Rate: Births per Woman				Population Below 15 Years of Age: Number in Millions				Population 65 Years and Older: Number in Millions			
	2010	2035	2060	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
EUROPE															
Russian Federation	-0.169	-0.515	-0.773	1.476	1.586	1.692	14.6%	21.32	17.32	14.99	-29.7%	18.14	27.96	33.08	82.4%
Ukraine	-0.545	-0.756	-0.861	1.492	1.598	1.7	13.9%	6.497	4.855	4.127	-36.5%	7.072	8.494	9.34	32.1%
Poland	0.044	-0.558	-0.838	1.346	1.49	1.629	21.0%	5.644	4.376	3.663	-35.1%	5.198	8.564	10.51	102.2%
Romania	-0.19	-0.638	-0.996	1.33	1.478	1.621	21.9%	3.259	2.351	1.879	-42.3%	3.199	4.335	5.203	62.6%
Czech Rep.	0.315	-0.38	-0.539	1.602	1.679	1.754	9.5%	1.48	1.377	1.319	-10.9%	1.566	2.371	2.818	79.9%
Belarus	-0.114	-0.441	-0.624	1.46	1.574	1.684	15.3%	1.447	1.217	1.082	-25.2%	1.308	1.887	2.263	73.0%
Hungary	-0.34	-0.736	-0.92	1.332	1.48	1.622	21.8%	1.472	1.105	0.898	-39.0%	1.653	2.032	2.259	36.7%
Bulgaria	-0.557	-0.797	-0.865	1.546	1.638	1.727	11.7%	1.035	0.759	0.652	-37.0%	1.323	1.552	1.574	19.0%
Slovak Rep.	0.147	-0.513	-0.904	1.286	1.446	1.599	24.3%	0.821	0.636	0.524	-36.2%	0.656	1.164	1.497	128.2%
Moldova, Rep. of	-0.151	-0.619	-0.919	1.474	1.585	1.691	14.7%	0.716	0.539	0.403	-43.7%	0.395	0.547	0.714	80.8%
Europe-East	**-0.192**	**-0.571**	**-0.806**	**1.448**	**1.565**	**1.679**	**16.0%**	**43.69**	**34.54**	**29.53**	**-32.4%**	**40.51**	**58.91**	**69.26**	**71.0%**
United Kingdom	0.6	0.173	0.027	2.056	1.9	1.9	-7.6%	10.81	11.05	11.17	3.3%	10.33	16.02	18.3	77.2%
Sweden	0.459	0.055	-0.034	2.018	1.9	1.9	-5.8%	1.552	1.603	1.588	2.3%	1.711	2.484	2.79	63.1%
Denmark	0.412	0.117	0.104	1.912	1.9	1.9	-0.6%	1.002	1.01	0.995	-0.7%	0.916	1.403	1.476	61.1%
Ireland	1.229	0.595	0.2	2.034	1.9	1.9	-6.6%	0.948	0.918	0.959	1.2%	0.522	1.062	1.474	182.4%
Norway	0.709	0.325	0.118	1.99	1.9	1.9	-4.5%	0.915	0.935	0.94	2.7%	0.718	1.306	1.489	107.4%
Finland	0.36	-0.129	-0.104	1.896	1.897	1.898	0.1%	0.887	0.883	0.853	-3.8%	0.924	1.458	1.448	56.7%
Lithuania	-0.202	-0.618	-0.786	1.416	1.542	1.663	17.4%	0.494	0.405	0.339	-31.4%	0.533	0.706	0.808	51.6%
Latvia	-0.152	-0.579	-0.695	1.518	1.617	1.713	12.8%	0.311	0.271	0.239	-23.2%	0.399	0.473	0.549	37.6%
Estonia	-0.583	-0.536	-0.528	1.786	1.816	1.844	3.2%	0.205	0.153	0.149	-27.3%	0.23	0.278	0.287	24.8%
Iceland	0.962	0.303	-0.078	2.186	1.9	1.9	-13.1%	0.067	0.063	0.06	-10.4%	0.039	0.081	0.103	164.1%
Europe-North	**0.538**	**0.129**	**-0.002**	**1.995**	**1.884**	**1.891**	**-5.2%**	**17.19**	**17.29**	**17.29**	**0.6%**	**16.32**	**25.27**	**28.72**	**76.0%**
Italy	0.063	-0.425	-0.764	1.43	1.552	1.67	16.8%	8.524	6.798	6.047	-29.1%	12.33	17.19	16.49	33.7%
Spain	0.378	-0.251	-0.784	1.484	1.592	1.696	14.3%	6.937	5.516	5.126	-26.1%	7.868	12.54	13.76	74.9%
Greece	0.241	-0.2	-0.497	1.494	1.6	1.701	13.9%	1.65	1.402	1.336	-19.0%	2.102	2.937	3.207	52.6%
Portugal	-0.002	-0.476	-0.87	1.246	1.416	1.58	26.8%	1.609	1.147	0.943	-41.4%	1.909	2.714	2.883	51.0%
Serbia	-0.396	-0.604	-0.866	1.266	1.431	1.589	25.5%	1.283	0.839	0.636	-50.4%	1.046	1.425	1.723	64.7%
Croatia	-0.135	-0.629	-0.785	1.436	1.557	1.673	16.5%	0.664	0.523	0.433	-34.8%	0.762	1.021	1.055	38.5%
Bosnia and Herzegovina	0.92	-0.529	-0.929	1.097	1.306	1.507	37.4%	0.566	0.411	0.32	-43.5%	0.528	0.903	1.106	109.5%
Albania	0.011	-0.372	-0.562	1.392	1.524	1.651	18.6%	0.718	0.471	0.356	-50.4%	0.306	0.617	0.921	201.0%
Macedonia, TFYR	0.171	-0.424	-0.791	1.388	1.521	1.649	18.8%	0.36	0.271	0.217	-39.7%	0.241	0.408	0.525	117.8%
Slovenia	0.164	-0.527	-0.783	1.482	1.591	1.695	14.4%	0.287	0.238	0.214	-25.4%	0.34	0.538	0.543	59.7%
Montenegro	0.279	-0.206	-0.401	1.646	1.712	1.776	7.9%	0.12	0.1	0.087	-27.5%	0.078	0.123	0.151	93.6%
Malta	0.194	-0.588	-0.824	1.322	1.472	1.617	22.3%	0.063	0.05	0.04	-36.5%	0.059	0.106	0.12	103.4%
Europe-South	**0.163**	**-0.372**	**-0.76**	**1.422**	**1.548**	**1.667**	**17.2%**	**22.78**	**17.77**	**15.76**	**-30.8%**	**27.57**	**40.53**	**42.49**	**54.1%**
Germany	0.077	-0.38	-0.509	1.388	1.521	1.649	18.8%	11	9.631	8.816	-19.9%	16.64	23.89	22.35	34.3%
France	0.556	0.1	-0.083	2.04	1.9	1.9	-6.9%	11.56	10.91	10.47	-9.4%	10.57	16.91	18.05	70.8%
Netherlands	0.447	0.017	-0.116	1.714	1.762	1.809	5.5%	2.941	2.728	2.56	-13.0%	2.544	4.549	4.521	77.7%
Belgium	0.448	0.051	-0.083	1.916	1.9	1.9	-0.8%	1.834	1.811	1.788	-2.5%	1.895	2.941	3.035	60.2%
Switzerland	0.283	-0.316	-0.691	1.502	1.605	1.705	13.5%	1.191	1.005	0.872	-26.8%	1.305	2.326	2.335	78.9%
Austria	0.072	-0.454	-0.804	1.374	1.511	1.642	19.5%	1.236	0.986	0.825	-33.3%	1.477	2.37	2.378	61.0%
Luxembourg	1.333	0.919	0.733	1.598	1.677	1.752	9.6%	0.09	0.101	0.121	34.4%	0.071	0.144	0.189	166.2%
Europe-West	**0.302**	**-0.145**	**-0.298**	**1.669**	**1.703**	**1.776**	**6.4%**	**29.86**	**27.17**	**25.45**	**-14.8%**	**34.51**	**53.13**	**52.86**	**53.2%**

Base Case

Source: International Futures Model Version 6.61, Jan 2013

Population, Land Area, and Human Development Index

	Youth Bulge				Human Development Index				HDI with Higher Ceilings			
	Ratio Persons 15–29 to Total Population				Index Range: 0–1				Index Range: 0–1			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	0.361	0.288	0.248	-31.3%	0.741	0.843	0.906	22.3%	0.62	0.707	0.761	22.7%
Africa	0.477	0.418	0.344	-27.9%	0.537	0.71	0.817	52.1%	0.452	0.6	0.689	52.4%
Americas	0.329	0.252	0.213	-35.3%	0.877	0.93	0.963	9.8%	0.735	0.777	0.809	10.1%
Asia with Oceania	0.361	0.265	0.219	-39.3%	0.732	0.854	0.925	26.4%	0.611	0.715	0.775	26.8%
Europe	0.236	0.192	0.178	-24.6%	0.908	0.953	0.976	7.5%	0.764	0.798	0.823	7.7%
World	0.361	0.288	0.248	-31.3%	0.741	0.843	0.906	22.3%	0.62	0.707	0.761	22.7%
Africa-Eastern	0.504	0.44	0.355	-29.6%	0.498	0.692	0.817	64.1%	0.419	0.584	0.689	64.4%
Africa-Middle	0.504	0.452	0.389	-22.8%	0.468	0.633	0.741	58.3%	0.402	0.542	0.632	57.2%
Africa-Northern	0.423	0.32	0.24	-43.3%	0.682	0.815	0.895	31.2%	0.563	0.682	0.75	33.2%
Africa-Southern	0.433	0.337	0.249	-42.5%	0.694	0.795	0.907	30.7%	0.604	0.683	0.766	26.8%
Africa-Western	0.484	0.442	0.362	-25.2%	0.478	0.697	0.81	69.5%	0.402	0.59	0.683	69.9%
Africa	0.477	0.418	0.344	-27.9%	0.537	0.71	0.817	52.1%	0.452	0.6	0.689	52.4%
America-Caribbean	0.357	0.273	0.225	-37.0%	0.732	0.819	0.888	21.3%	0.609	0.683	0.741	21.7%
America-Central	0.447	0.338	0.26	-41.8%	0.755	0.832	0.898	18.9%	0.627	0.693	0.749	19.5%
America-North	0.288	0.239	0.21	-27.1%	0.944	0.974	0.988	4.7%	0.791	0.814	0.837	5.8%
America-South	0.36	0.253	0.207	-42.5%	0.828	0.904	0.95	14.7%	0.694	0.756	0.793	14.3%
Americas	0.329	0.252	0.213	-35.3%	0.877	0.93	0.963	9.8%	0.735	0.777	0.809	10.1%
Asia-East	0.29	0.195	0.169	-41.7%	0.832	0.919	0.981	17.9%	0.698	0.77	0.822	17.8%
Asia-South Central	0.414	0.306	0.239	-42.3%	0.621	0.806	0.903	45.4%	0.513	0.675	0.756	47.4%
Asia-South East	0.378	0.268	0.22	-41.8%	0.764	0.849	0.902	18.1%	0.642	0.712	0.754	17.4%
Asia-West	0.415	0.327	0.267	-35.7%	0.789	0.86	0.91	15.3%	0.66	0.72	0.764	15.8%
Oceania	0.309	0.27	0.239	-22.7%	0.875	0.921	0.947	8.2%	0.731	0.772	0.806	10.3%
Asia with Oceania	0.361	0.265	0.219	-39.3%	0.732	0.854	0.925	26.4%	0.611	0.715	0.775	26.8%
Europe-East	0.264	0.199	0.175	-33.7%	0.848	0.909	0.939	10.7%	0.72	0.766	0.787	9.3%
Europe-North	0.24	0.214	0.199	-17.1%	0.951	0.985	0.998	4.9%	0.797	0.824	0.85	6.6%
Europe-South	0.206	0.174	0.162	-21.4%	0.929	0.962	0.989	6.5%	0.777	0.802	0.825	6.2%
Europe-West	0.214	0.185	0.181	-15.4%	0.961	0.986	1	4.1%	0.804	0.822	0.849	5.6%
Europe	0.236	0.192	0.178	-24.6%	0.908	0.953	0.976	7.5%	0.764	0.798	0.823	7.7%

Poverty and Income

	Poverty below $1.25 per Day					
	Millions of People			Percent of Population		
	2010	2035	2060	2010	2035	2060
World	1222	509.9	345.3	17.8%	5.9%	3.6%
Africa	392.1	284.8	227.3	38.0%	16.5%	9.2%
Americas	36.41	24.41	31.72	3.9%	2.1%	2.5%
Asia with Oceania	792.6	200.3	85.97	19.1%	4.0%	1.6%
Europe	1.256	0.511	0.413	0.2%	0.1%	0.1%
World	1222	509.9	345.3	17.8%	5.9%	3.6%
Africa-Eastern	150.3	143.5	104.6	46.1%	24.3%	12.0%
Africa-Middle	60.22	42.06	27.58	46.7%	17.8%	7.5%
Africa-Northern	16.4	4.404	0.982	7.7%	1.5%	0.3%
Africa-Southern	10.79	7.179	4.564	18.8%	11.2%	6.6%
Africa-Western	154.4	87.61	89.66	50.4%	16.0%	10.8%
Africa	392.1	284.8	227.3	38.0%	16.5%	9.2%
America-Caribbean	10.03	7.638	8.106	24.7%	15.7%	16.0%
America-Central	5.334	8.658	10.39	12.6%	13.7%	13.4%
America-North	4.366	3.856	5.092	1.0%	0.7%	0.8%
America-South	16.68	4.259	8.134	4.2%	0.9%	1.6%
Americas	36.41	24.41	31.72	3.9%	2.1%	2.5%
Asia-East	106.5	6.153	1.01	6.8%	0.4%	0.1%
Asia-South Central	569.4	163.2	57.85	33.0%	7.2%	2.3%
Asia-South East	105.8	17.91	14.45	18.0%	2.5%	1.9%
Asia-West	7.761	11.68	10.85	3.3%	3.5%	2.6%
Oceania	3.132	1.312	1.797	8.8%	2.8%	3.3%
Asia with Oceania	792.6	200.3	85.97	19.1%	4.0%	1.6%
Europe-East	0.62	0.372	0.232	0.2%	0.1%	0.1%
Europe-North	0.003	0	0.001	0.0%	0.0%	0.0%
Europe-South	0.094	0.086	0.075	0.1%	0.1%	0.1%
Europe-West	0	0	0	0.0%	0.0%	0.0%
Europe	1.256	0.511	0.413	0.2%	0.1%	0.1%

Population, Land Area, and Human Development Index

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Youth Bulge: Ratio Persons 15–29 to Total Population				Human Development Index: Index Range: 0–1				HDI with Higher Ceilings: Index Range: 0–1				Poverty below $1.25 per Day: Millions of People			Poverty below $1.25 per Day: Percent of Population		
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	2010	2035	2060
AFRICA																		
Ethiopia	0.493	0.391	0.308	-37.5%	0.393	0.713	0.851	116.5%	0.312	0.6	0.717	129.8%	28.03	8.175	0.062	33.0%	5.8%	0.0%
Tanzania, United Rep. of	0.499	0.468	0.366	-26.7%	0.563	0.722	0.891	58.3%	0.477	0.609	0.747	56.6%	29.72	23.92	1.187	66.0%	27.2%	0.9%
Uganda	0.534	0.492	0.391	-26.8%	0.533	0.684	0.824	54.6%	0.454	0.576	0.694	52.9%	9.962	3.756	1.739	29.5%	5.2%	1.5%
Kenya	0.515	0.435	0.35	-32.0%	0.61	0.713	0.803	31.6%	0.526	0.607	0.68	29.3%	7.408	12.95	5.327	18.1%	17.8%	5.1%
Madagascar	0.472	0.422	0.384	-18.6%	0.536	0.633	0.701	30.8%	0.444	0.527	0.587	32.2%	13.73	29.81	44.67	68.1%	77.5%	67.9%
Mozambique	0.488	0.45	0.351	-28.1%	0.427	0.673	0.821	92.3%	0.363	0.566	0.693	90.9%	13.86	3.777	0.924	59.2%	9.2%	1.6%
Malawi	0.512	0.481	0.384	-25.0%	0.521	0.686	0.794	52.4%	0.444	0.578	0.667	50.2%	11.16	17.88	13.9	71.1%	55.5%	26.1%
Zambia	0.517	0.485	0.372	-28.0%	0.509	0.722	0.813	59.7%	0.441	0.618	0.691	56.7%	8.083	4.747	8.23	61.0%	18.8%	21.3%
Somalia	0.461	0.461	0.389	-15.6%	0.411	0.637	0.774	88.3%	0.346	0.536	0.657	89.9%	5.542	6.846	3.134	59.3%	37.8%	11.0%
Rwanda	0.516	0.45	0.368	-28.7%	0.509	0.641	0.791	55.4%	0.438	0.543	0.668	52.5%	7.542	11.09	6.775	73.4%	60.6%	25.1%
Zimbabwe	0.566	0.394	0.293	-48.2%	0.6	0.715	0.776	29.3%	0.528	0.611	0.658	24.6%	4.753	7.819	8.147	37.8%	42.4%	35.5%
Burundi	0.517	0.398	0.369	-28.6%	0.439	0.518	0.672	53.1%	0.374	0.435	0.568	51.9%	6.883	8.823	7.899	80.6%	62.8%	39.2%
Eritrea	0.498	0.435	0.357	-28.3%	0.51	0.634	0.757	48.4%	0.424	0.531	0.641	51.2%	3.107	2.887	1.562	59.5%	31.0%	11.7%
Comoros	0.471	0.43	0.38	-19.3%	0.608	0.672	0.773	27.1%	0.505	0.558	0.645	27.7%	0.312	0.82	0.901	46.3%	61.7%	40.3%
Djibouti	0.471	0.369	0.318	-32.5%	0.521	0.692	0.802	53.9%	0.433	0.587	0.678	56.6%	0.131	0.193	0.078	14.9%	16.8%	6.1%
Mauritius	0.307	0.205	0.182	-40.7%	0.816	0.878	0.932	14.2%	0.685	0.736	0.781	14.0%	0.055	0.021	0.022	4.3%	1.6%	1.8%
Africa-Eastern	**0.504**	**0.44**	**0.355**	**-29.6%**	**0.498**	**0.692**	**0.817**	**64.1%**	**0.419**	**0.584**	**0.689**	**64.4%**	**150.3**	**143.5**	**104.6**	**46.1%**	**24.3%**	**12.0%**
Congo, Democratic Rep. of	0.513	0.464	0.411	-19.9%	0.413	0.565	0.687	66.3%	0.356	0.485	0.587	64.9%	38.4	33.13	18.69	56.6%	25.8%	9.1%
Angola	0.508	0.451	0.35	-31.1%	0.577	0.807	0.895	55.1%	0.5	0.688	0.76	52.0%	8.203	0.052	0.338	43.2%	0.1%	0.7%
Cameroon	0.49	0.422	0.351	-28.4%	0.548	0.673	0.775	41.4%	0.47	0.574	0.658	40.0%	1.992	1.985	2.385	10.0%	5.9%	5.0%
Chad	0.5	0.463	0.41	-18.0%	0.378	0.63	0.746	97.4%	0.31	0.536	0.632	103.9%	6.735	3.289	2.219	58.5%	14.3%	5.5%
Central African Rep.	0.486	0.418	0.362	-25.5%	0.414	0.579	0.72	73.9%	0.353	0.493	0.612	73.4%	2.853	3.492	3.774	63.3%	49.2%	37.4%
Congo, Rep. of	0.464	0.409	0.294	-36.6%	0.646	0.799	0.871	34.8%	0.56	0.68	0.737	31.6%	1.944	0.034	0.119	51.8%	0.6%	1.6%
Gabon	0.458	0.341	0.251	-45.2%	0.768	0.858	0.92	19.8%	0.656	0.725	0.775	18.1%	0.057	0.008	0.004	3.8%	0.4%	0.1%
Equatorial Guinea	0.432	0.411	0.324	-25.0%	0.77	0.876	0.893	16.0%	0.673	0.753	0.765	13.7%	0	0	0	0.0%	0.0%	0.0%
São Tomé and Príncipe	0.514	0.381	0.31	-39.7%	0.679	0.745	0.811	19.4%	0.574	0.627	0.682	18.8%	0.035	0.072	0.052	21.1%	25.4%	13.1%
Africa-Middle	**0.504**	**0.452**	**0.389**	**-22.8%**	**0.468**	**0.633**	**0.741**	**58.3%**	**0.402**	**0.542**	**0.632**	**57.2%**	**60.22**	**42.06**	**27.58**	**46.7%**	**17.8%**	**7.5%**
Egypt, Arab Rep.	0.421	0.315	0.23	-45.4%	0.692	0.826	0.895	29.3%	0.569	0.692	0.75	31.8%	0.168	0.135	0.009	0.2%	0.1%	0.0%
Sudan	0.462	0.393	0.288	-37.7%	0.589	0.758	0.883	49.9%	0.497	0.637	0.743	49.5%	15.34	4.146	0.648	35.5%	5.9%	0.7%
Algeria	0.422	0.279	0.21	-50.2%	0.745	0.849	0.901	20.9%	0.615	0.708	0.754	22.6%	0.583	0	0.091	1.6%	0.0%	0.2%
Morocco	0.4	0.276	0.217	-45.8%	0.652	0.808	0.889	36.3%	0.528	0.672	0.742	40.5%	0.261	0.117	0.225	0.8%	0.3%	0.5%
Tunisia	0.373	0.253	0.2	-46.4%	0.771	0.87	0.942	22.2%	0.637	0.724	0.785	23.2%	0.027	0.007	0.009	0.3%	0.1%	0.1%
Libya	0.41	0.308	0.219	-46.6%	0.848	0.919	0.944	11.3%	0.709	0.767	0.788	11.1%	0.026	0	0	0.4%	0.0%	0.0%
Africa-Northern	**0.423**	**0.32**	**0.24**	**-43.3%**	**0.682**	**0.815**	**0.895**	**31.2%**	**0.563**	**0.682**	**0.75**	**33.2%**	**16.4**	**4.404**	**0.982**	**7.7%**	**1.5%**	**0.3%**

Population, Land Area, and Human Development Index

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Youth Bulge: Ratio Persons 15–29 to Total Population				Human Development Index: Index Range: 0–1				HDI with Higher Ceilings: Index Range: 0–1				Poverty below $1.25 per Day: Millions of People			Poverty below $1.25 per Day: Percent of Population		
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	2010	2035	2060
AFRICA continued																		
South Africa	0.422	0.332	0.247	-41.5%	0.698	0.794	0.914	30.9%	0.608	0.683	0.772	27.0%	7.928	4.024	1.648	15.9%	7.5%	2.8%
Namibia	0.466	0.351	0.248	-46.8%	0.723	0.855	0.909	25.7%	0.617	0.724	0.764	23.8%	0.939	0.881	0.916	42.4%	27.4%	23.7%
Lesotho	0.531	0.386	0.28	-47.3%	0.564	0.708	0.787	39.5%	0.5	0.611	0.671	34.2%	0.816	0.98	0.705	39.1%	38.4%	25.7%
Botswana	0.48	0.334	0.235	-51.0%	0.719	0.868	0.929	29.2%	0.621	0.738	0.785	26.4%	0.381	0.24	0.317	19.3%	9.9%	11.9%
Swaziland	0.551	0.393	0.286	-48.1%	0.628	0.748	0.83	32.2%	0.552	0.642	0.705	27.7%	0.726	1.055	0.978	60.4%	63.1%	49.5%
Africa-Southern	**0.433**	**0.337**	**0.249**	**-42.5%**	**0.694**	**0.795**	**0.907**	**30.7%**	**0.604**	**0.683**	**0.766**	**26.8%**	**10.79**	**7.179**	**4.564**	**18.8%**	**11.2%**	**6.6%**
Nigeria	0.481	0.443	0.349	-27.4%	0.499	0.733	0.855	71.3%	0.428	0.624	0.723	68.9%	96	1.495	2.842	60.6%	0.5%	0.7%
Niger	0.481	0.502	0.443	-7.9%	0.32	0.565	0.69	115.6%	0.248	0.469	0.579	133.5%	6.692	15.57	25.55	42.1%	42.5%	34.4%
Côte d'Ivoire	0.479	0.412	0.344	-28.2%	0.522	0.693	0.813	55.7%	0.432	0.58	0.681	57.6%	5.086	4.209	1.243	23.6%	10.9%	2.1%
Burkina Faso	0.513	0.452	0.384	-25.1%	0.387	0.657	0.774	100.0%	0.31	0.555	0.654	111.0%	8.908	16.91	12.39	54.7%	53.2%	24.1%
Ghana	0.459	0.396	0.296	-35.5%	0.549	0.734	0.852	55.2%	0.462	0.623	0.719	55.6%	6.552	6.069	1.225	26.9%	16.0%	2.6%
Mali	0.519	0.479	0.399	-23.1%	0.347	0.636	0.762	119.6%	0.279	0.532	0.643	130.5%	6.972	9.721	9.26	52.3%	36.8%	21.5%
Senegal	0.511	0.441	0.377	-26.2%	0.496	0.664	0.752	51.6%	0.41	0.565	0.639	55.9%	4.167	8.826	8.501	32.4%	37.7%	24.0%
Guinea	0.482	0.442	0.373	-22.6%	0.443	0.675	0.766	72.9%	0.355	0.562	0.641	80.6%	4.557	3.022	7.587	44.2%	16.0%	24.3%
Benin	0.486	0.441	0.368	-24.3%	0.486	0.689	0.799	64.4%	0.39	0.572	0.667	71.0%	4.419	8.034	7.687	47.9%	44.2%	26.2%
Togo	0.484	0.384	0.334	-31.0%	0.514	0.648	0.717	39.5%	0.42	0.543	0.6	42.9%	2.635	6.116	6.616	38.8%	52.2%	37.8%
Sierra Leone	0.48	0.453	0.371	-22.7%	0.376	0.623	0.774	105.9%	0.312	0.53	0.659	111.2%	2.895	1.388	0.534	49.6%	13.6%	3.7%
Liberia	0.487	0.45	0.36	-26.1%	0.458	0.656	0.773	68.8%	0.377	0.549	0.652	72.9%	3.412	2.362	2.303	82.7%	30.9%	20.3%
Mauritania	0.469	0.401	0.349	-25.6%	0.53	0.669	0.753	42.1%	0.441	0.566	0.637	44.4%	0.64	1.536	1.475	19.0%	26.8%	17.5%
Gambia	0.516	0.433	0.35	-32.2%	0.467	0.671	0.783	67.7%	0.383	0.565	0.663	73.1%	0.566	0.977	0.389	32.3%	28.7%	7.6%
Guinea-Bissau	0.478	0.425	0.384	-19.7%	0.433	0.599	0.69	59.4%	0.366	0.512	0.586	60.1%	0.802	1.334	2.016	48.7%	47.9%	45.5%
Cape Verde	0.469	0.282	0.218	-53.5%	0.736	0.835	0.906	23.1%	0.614	0.698	0.757	23.3%	0.073	0.049	0.035	14.2%	7.4%	4.9%
Africa-Western	**0.484**	**0.442**	**0.362**	**-25.2%**	**0.478**	**0.697**	**0.81**	**69.5%**	**0.402**	**0.59**	**0.683**	**69.9%**	**154.4**	**87.61**	**89.66**	**50.4%**	**16.0%**	**10.8%**

Population, Land Area, and Human Development Index

Base Case: Countries in Descending Year 2060 Population Sequence	Youth Bulge: Ratio Persons 15–29 to Total Population 2010	2035	2060	% Chg	Human Development Index: Index Range: 0–1 2010	2035	2060	% Chg	HDI with Higher Ceilings: Index Range: 0–1 2010	2035	2060	% Chg
AMERICAS												
Haiti	0.473	0.357	0.289	-38.9%	0.486	0.631	0.74	52.3%	0.395	0.524	0.62	57.0%
Dominican Rep.	0.392	0.299	0.218	-44.4%	0.802	0.909	0.974	21.4%	0.672	0.759	0.811	20.7%
Cuba	0.248	0.168	0.156	-37.1%	0.806	0.883	0.959	19.0%	0.672	0.736	0.797	18.6%
Puerto Rico	0.287	0.203	0.173	-39.7%	0.858	0.923	0.988	15.2%	0.712	0.766	0.821	15.3%
Jamaica	0.355	0.276	0.218	-38.6%	0.782	0.843	0.895	14.5%	0.654	0.707	0.749	14.5%
Trinidad and Tobago	0.355	0.224	0.186	-47.6%	0.878	0.942	0.958	9.1%	0.746	0.794	0.805	7.9%
Bahamas	0.338	0.231	0.201	-40.5%	0.904	0.934	0.961	6.3%	0.76	0.783	0.804	5.8%
Barbados	0.265	0.177	0.165	-37.7%	0.909	0.935	0.969	6.6%	0.763	0.782	0.807	5.8%
Saint Lucia	0.389	0.253	0.201	-48.3%	0.815	0.877	0.929	14.0%	0.681	0.732	0.775	13.8%
Grenada	0.444	0.278	0.211	-52.5%	0.807	0.864	0.92	14.0%	0.671	0.72	0.767	14.3%
Saint Vincent and the Grenadines	0.369	0.253	0.214	-42.0%	0.795	0.854	0.917	15.3%	0.666	0.714	0.767	15.2%
America-Caribbean	**0.357**	**0.273**	**0.225**	**-37.0%**	**0.732**	**0.819**	**0.888**	**21.3%**	**0.609**	**0.683**	**0.741**	**21.7%**
Guatemala	0.48	0.397	0.3	-37.5%	0.709	0.811	0.896	26.4%	0.587	0.673	0.747	27.3%
Honduras	0.472	0.341	0.256	-45.8%	0.738	0.82	0.876	18.7%	0.614	0.684	0.73	18.9%
Nicaragua	0.463	0.32	0.23	-50.3%	0.711	0.781	0.843	18.6%	0.587	0.648	0.702	19.6%
El Salvador	0.435	0.285	0.219	-49.7%	0.775	0.839	0.903	16.5%	0.647	0.701	0.756	16.8%
Costa Rica	0.371	0.227	0.188	-49.3%	0.874	0.927	0.964	10.3%	0.729	0.772	0.802	10.0%
Panama	0.356	0.275	0.214	-39.9%	0.861	0.939	0.989	14.9%	0.721	0.784	0.825	14.4%
Belize	0.463	0.32	0.226	-51.2%	0.771	0.884	0.945	22.6%	0.634	0.734	0.785	23.8%
America-Central	**0.447**	**0.338**	**0.26**	**-41.8%**	**0.755**	**0.832**	**0.898**	**18.9%**	**0.627**	**0.693**	**0.749**	**19.5%**
United States of America	0.264	0.231	0.212	-19.7%	0.969	0.995	1	3.2%	0.812	0.831	0.851	4.8%
Mexico	0.37	0.275	0.211	-43.0%	0.866	0.912	0.949	9.6%	0.724	0.761	0.791	9.3%
Canada	0.244	0.202	0.195	-20.1%	0.966	0.995	1	3.5%	0.808	0.83	0.847	4.8%
America-North	**0.288**	**0.239**	**0.21**	**-27.1%**	**0.944**	**0.974**	**0.988**	**4.7%**	**0.791**	**0.814**	**0.837**	**5.8%**
Brazil	0.352	0.23	0.194	-44.9%	0.82	0.903	0.953	16.2%	0.687	0.755	0.796	15.9%
Colombia	0.373	0.275	0.219	-41.3%	0.824	0.891	0.928	12.6%	0.691	0.747	0.776	12.3%
Argentina	0.327	0.253	0.211	-35.5%	0.881	0.947	0.984	11.7%	0.74	0.792	0.82	10.8%
Peru	0.392	0.28	0.216	-44.9%	0.812	0.902	0.953	17.4%	0.68	0.753	0.794	16.8%
Venezuela (Bolivarian Rep. of)	0.384	0.287	0.219	-43.0%	0.847	0.915	0.965	13.9%	0.712	0.767	0.806	13.2%
Ecuador	0.392	0.284	0.217	-44.6%	0.796	0.871	0.914	14.8%	0.661	0.725	0.762	15.3%
Chile	0.32	0.222	0.195	-39.1%	0.897	0.948	0.969	8.0%	0.751	0.791	0.806	7.3%
Bolivia (Plurinational State of)	0.439	0.348	0.25	-43.1%	0.735	0.824	0.895	21.8%	0.622	0.693	0.751	20.7%
Paraguay	0.438	0.321	0.237	-45.9%	0.787	0.849	0.896	13.9%	0.662	0.712	0.749	13.1%
Uruguay	0.286	0.23	0.203	-29.0%	0.882	0.942	0.986	11.8%	0.74	0.788	0.822	11.1%
Guyana	0.388	0.254	0.205	-47.2%	0.752	0.82	0.877	16.6%	0.638	0.691	0.734	15.0%
Suriname	0.357	0.268	0.216	-39.5%	0.798	0.876	0.934	17.0%	0.675	0.738	0.783	16.0%
America-South	**0.36**	**0.253**	**0.207**	**-42.5%**	**0.828**	**0.904**	**0.95**	**14.7%**	**0.694**	**0.756**	**0.793**	**14.3%**

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Poverty below $1.25 per Day: Millions of People 2010	2035	2060	Percent of Population 2010	2035	2060
AMERICAS						
Haiti	5.902	7.353	7.969	57.9%	51.1%	46.7%
Dominican Rep.	0.165	0.034	0.039	1.6%	0.3%	0.3%
Cuba	3.626	0.106	0	32.4%	1.0%	0.0%
Puerto Rico	0.256	0.061	0.041	6.4%	1.4%	1.0%
Jamaica	0.016	0.01	0.027	0.6%	0.3%	0.9%
Trinidad and Tobago	0.006	0	0	0.4%	0.0%	0.0%
Bahamas	0	0	0	0.0%	0.0%	0.0%
Barbados	0.001	0	0.001	0.4%	0.0%	0.5%
Saint Lucia	0.033	0.027	0.012	19.0%	14.5%	7.1%
Grenada	0.013	0.027	0.007	12.5%	19.7%	4.6%
Saint Vincent and the Grenadines	0.012	0.021	0.008	11.0%	15.7%	5.6%
America-Caribbean	**10.03**	**7.638**	**8.106**	**24.7%**	**15.7%**	**16.0%**
Guatemala	2.27	3.821	4.34	15.8%	15.5%	12.9%
Honduras	1.779	3.197	4.165	23.4%	27.3%	28.8%
Nicaragua	0.895	1.249	1.423	15.4%	15.0%	14.7%
El Salvador	0.175	0.346	0.456	2.8%	4.4%	5.3%
Costa Rica	0.015	0.003	0.005	0.3%	0.1%	0.1%
Panama	0.17	0.022	0.002	4.8%	0.5%	0.0%
Belize	0.031	0.02	0.003	9.0%	4.0%	0.5%
America-Central	**5.334**	**8.658**	**10.39**	**12.6%**	**13.7%**	**13.4%**
United States of America	0	0	0	0.0%	0.0%	0.0%
Mexico	4.366	3.856	5.092	4.0%	2.9%	3.7%
Canada	0	0	0	0.0%	0.0%	0.0%
America-North	**4.366**	**3.856**	**5.092**	**1.0%**	**0.7%**	**0.8%**
Brazil	5.264	0.858	1.522	2.7%	0.4%	0.6%
Colombia	6.668	2.737	5.18	14.4%	4.6%	8.1%
Argentina	0.035	0.001	0.004	0.1%	0.0%	0.0%
Peru	1.355	0.249	0.676	4.6%	0.6%	1.6%
Venezuela (Bolivarian Rep. of)	0.949	0.029	0	3.3%	0.1%	0.0%
Ecuador	0.736	0.044	0.284	5.3%	0.2%	1.4%
Chile	0.014	0.001	0.013	0.1%	0.0%	0.1%
Bolivia (Plurinational State of)	1.314	0.116	0.342	13.1%	0.8%	1.9%
Paraguay	0.267	0.203	0.109	4.1%	2.2%	1.0%
Uruguay	0	0	0	0.0%	0.0%	0.0%
Guyana	0.025	0.016	0.003	3.3%	2.1%	0.5%
Suriname	0.048	0.005	0.001	9.1%	0.9%	0.2%
America-South	**16.68**	**4.259**	**8.134**	**4.2%**	**0.9%**	**1.6%**

Population, Land Area, and Human Development Index

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Youth Bulge: Ratio Persons 15–29 to Total Population				Human Development Index: Index Range: 0–1				HDI with Higher Ceilings: Index Range: 0–1				Poverty below $1.25 per Day: Millions of People			Poverty below $1.25 per Day: Percent of Population		
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	2010	2035	2060
ASIA with OCEANIA																		
China	0.302	0.199	0.171	-43.4%	0.814	0.912	0.982	20.6%	0.683	0.764	0.821	20.2%	94.46	2.117	0.432	7.1%	0.2%	0.0%
Japan	0.183	0.151	0.145	-20.8%	0.972	1	1	2.9%	0.81	0.836	0.862	6.4%	0	0	0	0.0%	0.0%	0.0%
Korea, Rep. of	0.252	0.158	0.143	-43.3%	0.943	0.985	1	6.0%	0.79	0.823	0.846	7.1%	0	0	0	0.0%	0.0%	0.0%
Korea, Dem. People's Rep. of	0.306	0.236	0.221	-27.8%	0.696	0.772	0.823	18.2%	0.591	0.65	0.69	16.8%	11.51	4.033	0.578	48.0%	15.5%	2.3%
Taiwan, China	0.252	0.172	0.164	-34.9%	0.952	0.975	0.99	4.0%	0.798	0.816	0.827	3.6%	0	0	0	0.0%	0.0%	0.0%
Hong Kong SAR, China	0.225	0.153	0.153	-32.0%	0.985	1	1	1.5%	0.822	0.846	0.849	3.3%	0	0	0	0.0%	0.0%	0.0%
Mongolia	0.429	0.32	0.238	-44.5%	0.752	0.834	0.893	18.8%	0.639	0.705	0.75	17.4%	0.497	0.003	0	18.4%	0.1%	0.0%
Asia-East	**0.29**	**0.195**	**0.169**	**-41.7%**	**0.832**	**0.919**	**0.981**	**17.9%**	**0.698**	**0.77**	**0.822**	**17.8%**	**106.5**	**6.153**	**1.01**	**6.8%**	**0.4%**	**0.1%**
India	0.399	0.299	0.226	-43.4%	0.62	0.826	0.932	50.3%	0.513	0.692	0.78	52.0%	416	66.4	12.43	35.5%	4.4%	0.7%
Pakistan	0.464	0.346	0.278	-40.1%	0.594	0.747	0.839	41.2%	0.484	0.624	0.702	45.0%	35.93	56.19	22.33	20.7%	21.2%	6.7%
Bangladesh	0.431	0.277	0.224	-48.0%	0.562	0.75	0.862	53.4%	0.456	0.629	0.723	58.6%	74.99	17.17	1.068	45.6%	8.2%	0.5%
Afghanistan	0.514	0.458	0.403	-21.6%	0.342	0.63	0.752	119.9%	0.282	0.541	0.644	128.4%	13.49	2.925	3.989	44.1%	4.8%	4.0%
Iran, Islamic Rep. of	0.441	0.241	0.18	-59.2%	0.799	0.89	0.934	16.9%	0.668	0.745	0.782	17.1%	0.107	0	0	0.1%	0.0%	0.0%
Nepal	0.456	0.323	0.249	-45.4%	0.562	0.705	0.791	40.7%	0.457	0.587	0.662	44.9%	15.78	18.91	16.06	52.8%	45.1%	33.4%
Uzbekistan	0.445	0.304	0.225	-49.4%	0.753	0.84	0.892	18.5%	0.64	0.707	0.747	16.7%	10.84	0.083	0.191	38.4%	0.2%	0.5%
Sri Lanka	0.321	0.272	0.22	-31.5%	0.787	0.864	0.923	17.3%	0.657	0.723	0.772	17.5%	0.879	0.178	0.154	4.3%	0.8%	0.7%
Kazakhstan	0.36	0.326	0.237	-34.2%	0.816	0.893	0.915	12.1%	0.698	0.756	0.772	10.6%	0.003	0	0	0.0%	0.0%	0.0%
Tajikistan	0.501	0.36	0.277	-44.7%	0.727	0.773	0.823	13.2%	0.618	0.654	0.691	11.8%	1.155	1.207	1.574	16.3%	11.5%	12.2%
Kyrgyz Rep.	0.448	0.346	0.257	-42.6%	0.737	0.774	0.819	11.1%	0.626	0.654	0.689	10.1%	0.032	0.123	0.045	0.6%	1.6%	0.5%
Turkmenistan	0.435	0.288	0.219	-49.7%	0.791	0.954	0.976	23.4%	0.676	0.801	0.816	20.7%	0.128	0	0	2.5%	0.0%	0.0%
Bhutan	0.454	0.274	0.213	-53.1%	0.624	0.843	0.933	49.5%	0.509	0.705	0.781	53.4%	0.13	0.021	0.011	18.4%	2.3%	1.1%
Maldives	0.477	0.238	0.187	-60.8%	0.811	0.853	0.883	8.9%	0.683	0.717	0.739	8.2%	0	0	0	0.0%	0.0%	0.0%
Asia-South Central	**0.414**	**0.306**	**0.239**	**-42.3%**	**0.621**	**0.806**	**0.903**	**45.4%**	**0.513**	**0.675**	**0.756**	**47.4%**	**569.4**	**163.2**	**57.85**	**33.0%**	**7.2%**	**2.3%**
Indonesia	0.37	0.257	0.214	-42.2%	0.771	0.866	0.908	17.8%	0.647	0.725	0.759	17.3%	39.81	0.438	3.38	17.1%	0.2%	1.1%
Philippines	0.437	0.334	0.251	-42.6%	0.774	0.84	0.901	16.4%	0.65	0.704	0.753	15.8%	19.33	11.26	8.255	20.6%	8.4%	5.3%
Vietnam	0.39	0.247	0.202	-48.2%	0.768	0.839	0.889	15.8%	0.641	0.702	0.741	15.6%	10.19	1.751	0.197	11.5%	1.6%	0.2%
Thailand	0.288	0.209	0.192	-33.3%	0.798	0.872	0.913	14.4%	0.675	0.736	0.767	13.6%	6.538	2.143	2.118	9.6%	3.1%	3.4%
Myanmar	0.369	0.253	0.226	-38.8%	0.655	0.759	0.843	28.7%	0.557	0.643	0.71	27.5%	23.28	0.559	0.05	46.1%	0.9%	0.1%
Malaysia	0.376	0.284	0.221	-41.2%	0.853	0.92	0.971	13.8%	0.715	0.77	0.811	13.4%	0.015	0.001	0.003	0.1%	0.0%	0.0%
Cambodia	0.482	0.302	0.229	-52.5%	0.625	0.762	0.86	37.6%	0.527	0.641	0.722	37.0%	4.119	1.415	0.392	27.4%	7.1%	1.8%
Lao People's Democratic Rep.	0.48	0.305	0.228	-52.5%	0.636	0.799	0.9	41.5%	0.529	0.668	0.754	42.5%	2.064	0.186	0.054	32.1%	2.1%	0.5%
Singapore	0.253	0.161	0.155	-38.7%	0.968	1	1	3.3%	0.808	0.862	0.882	9.2%	0	0	0	0.0%	0.0%	0.0%
Timor-Leste	0.514	0.411	0.348	-32.3%	0.483	0.704	0.805	66.7%	0.391	0.584	0.674	72.4%	0.428	0.157	0.004	36.5%	7.1%	0.1%
Brunei Darussalam	0.349	0.254	0.213	-39.0%	0.947	0.998	1	5.6%	0.794	0.835	0.843	6.2%	0	0	0	0.0%	0.0%	0.0%
Asia-South Eastern	**0.378**	**0.268**	**0.22**	**-41.8%**	**0.764**	**0.849**	**0.902**	**18.1%**	**0.642**	**0.712**	**0.754**	**17.4%**	**105.8**	**17.91**	**14.45**	**18.0%**	**2.5%**	**1.9%**

Population, Land Area, and Human Development Index

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Youth Bulge				Human Development Index				HDI with Higher Ceilings				Poverty below $1.25 per Day					
	Ratio Persons 15–29 to Total Population				Index Range: 0–1				Index Range: 0–1				Millions of People			Percent of Population		
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	2010	2035	2060
ASIA with OCEANIA continued																		
Turkey	0.364	0.255	0.212	-41.8%	0.829	0.893	0.946	14.1%	0.697	0.749	0.793	13.8%	0.514	0.134	0.319	0.7%	0.1%	0.3%
Iraq	0.481	0.422	0.326	-32.2%	0.695	0.808	0.888	27.8%	0.578	0.676	0.746	29.1%	1.064	0.011	0.001	3.3%	0.0%	0.0%
Yemen, Rep. of	0.548	0.44	0.346	-36.9%	0.599	0.735	0.819	36.7%	0.495	0.612	0.688	39.0%	3.959	6.549	5.884	16.3%	13.7%	8.0%
Saudi Arabia	0.387	0.291	0.223	-42.4%	0.851	0.932	0.971	14.1%	0.712	0.781	0.812	14.0%	0	0	0	0.0%	0.0%	0.0%
Syrian Arab Rep.	0.452	0.319	0.238	-47.3%	0.762	0.851	0.913	19.8%	0.632	0.711	0.761	20.4%	0.037	0.048	0.014	0.2%	0.1%	0.0%
Jordan	0.49	0.375	0.277	-43.5%	0.786	0.852	0.918	16.8%	0.659	0.714	0.767	16.4%	0.002	0.001	0	0.0%	0.0%	0.0%
Israel	0.311	0.289	0.223	-28.3%	0.935	0.991	1	7.0%	0.779	0.825	0.86	10.4%	0	0	0	0.0%	0.0%	0.0%
Palestine	0.503	0.403	0.329	-34.6%	0.769	0.808	0.843	9.6%	0.644	0.676	0.705	9.5%	1.241	4.561	4.298	29.9%	56.0%	34.3%
Azerbaijan	0.379	0.292	0.22	-42.0%	0.833	0.896	0.926	11.2%	0.705	0.753	0.775	9.9%	0.009	0	0	0.1%	0.0%	0.0%
United Arab Emirates	0.393	0.167	0.15	-61.8%	0.932	1	1	7.3%	0.778	0.838	0.875	12.5%	0	0	0	0.0%	0.0%	0.0%
Kuwait	0.38	0.249	0.216	-43.2%	0.939	1	1	6.5%	0.786	0.861	0.869	10.6%	0	0	0	0.0%	0.0%	0.0%
Lebanon	0.356	0.227	0.191	-46.3%	0.823	0.893	0.944	14.7%	0.69	0.748	0.79	14.5%	0.218	0.081	0.127	5.1%	1.7%	2.7%
Oman	0.496	0.253	0.204	-58.9%	0.874	0.953	0.975	11.6%	0.728	0.797	0.815	12.0%	0	0	0	0.0%	0.0%	0.0%
Armenia	0.339	0.238	0.194	-42.8%	0.818	0.858	0.906	10.8%	0.688	0.72	0.757	10.0%	0.111	0.113	0.057	3.6%	3.5%	1.9%
Georgia	0.283	0.202	0.176	-37.8%	0.804	0.851	0.891	10.8%	0.679	0.715	0.745	9.7%	0.605	0.181	0.154	14.4%	5.2%	5.2%
Qatar	0.362	0.155	0.165	-54.4%	0.965	1	1	3.6%	0.812	0.889	0.899	10.7%	0	0	0	0.0%	0.0%	0.0%
Bahrain	0.37	0.24	0.209	-43.5%	0.902	0.95	0.977	8.3%	0.756	0.795	0.818	8.2%	0	0	0	0.0%	0.0%	0.0%
Cyprus	0.309	0.189	0.158	-48.9%	0.936	0.964	0.979	4.6%	0.783	0.805	0.815	4.1%	0	0	0	0.0%	0.0%	0.0%
Asia-West	**0.415**	**0.327**	**0.267**	**-35.7%**	**0.789**	**0.86**	**0.91**	**15.3%**	**0.66**	**0.72**	**0.764**	**15.8%**	**7.761**	**11.68**	**10.85**	**3.3%**	**3.5%**	**2.6%**
Australia	0.265	0.221	0.205	-22.6%	0.969	1	1	3.2%	0.81	0.838	0.857	5.8%	0	0	0	0.0%	0.0%	0.0%
Papua New Guinea	0.446	0.392	0.314	-29.6%	0.572	0.733	0.835	46.0%	0.474	0.617	0.704	48.5%	2.581	0.84	1.308	37.5%	7.6%	9.0%
New Zealand	0.266	0.23	0.204	-23.3%	0.944	0.972	1	5.9%	0.789	0.81	0.842	6.7%	0	0	0	0.0%	0.0%	0.0%
Solomon Islands	0.46	0.398	0.342	-25.7%	0.652	0.749	0.809	24.1%	0.541	0.627	0.679	25.5%	0.174	0.123	0.31	32.5%	13.0%	21.8%
Fiji	0.384	0.31	0.23	-40.1%	0.751	0.804	0.87	15.8%	0.634	0.677	0.73	15.1%	0.217	0.131	0.016	25.4%	14.3%	2.0%
Vanuatu	0.461	0.376	0.306	-33.6%	0.732	0.793	0.865	18.2%	0.61	0.662	0.723	18.5%	0.057	0.103	0.082	23.2%	25.1%	14.6%
Micronesia (Federated States of)	0.499	0.349	0.302	-39.5%	0.674	0.759	0.828	22.8%	0.559	0.635	0.694	24.2%	0.036	0.021	0.033	32.1%	11.5%	13.3%
Tonga	0.416	0.369	0.307	-26.2%	0.794	0.829	0.882	11.1%	0.67	0.696	0.737	10.0%	0.024	0.063	0.031	23.1%	36.8%	13.2%
Samoa	0.402	0.351	0.29	-27.9%	0.793	0.845	0.903	13.9%	0.669	0.708	0.753	12.6%	0.043	0.031	0.018	24.0%	14.8%	8.5%
Oceania	**0.309**	**0.27**	**0.239**	**-22.7%**	**0.875**	**0.921**	**0.947**	**8.2%**	**0.731**	**0.772**	**0.806**	**10.3%**	**3.132**	**1.312**	**1.797**	**8.8%**	**2.8%**	**3.3%**

Population, Land Area, and Human Development Index

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Youth Bulge: Ratio Persons 15–29 to Total Population				Human Development Index: Index Range: 0–1				HDI with Higher Ceilings: Index Range: 0–1				Poverty below $1.25 per Day: Millions of People			Poverty below $1.25 per Day: Percent of Population		
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	2010	2035	2060
EUROPE																		
Russian Federation	0.272	0.208	0.182	-33.1%	0.842	0.913	0.937	11.3%	0.717	0.771	0.788	9.9%	0.023	0	0	0.0%	0.0%	0.0%
Ukraine	0.259	0.202	0.181	-30.1%	0.801	0.861	0.9	12.4%	0.68	0.727	0.755	11.0%	0.005	0	0	0.0%	0.0%	0.0%
Poland	0.269	0.182	0.153	-43.1%	0.898	0.948	0.979	9.0%	0.755	0.794	0.816	8.1%	0.004	0	0.002	0.0%	0.0%	0.0%
Romania	0.245	0.178	0.157	-35.9%	0.85	0.893	0.93	9.4%	0.716	0.75	0.778	8.7%	0.486	0.238	0.174	2.3%	1.2%	1.1%
Czech Rep.	0.234	0.199	0.179	-23.5%	0.919	0.945	0.968	5.3%	0.773	0.791	0.809	4.7%	0	0	0	0.0%	0.0%	0.0%
Belarus	0.268	0.205	0.183	-31.7%	0.85	0.908	0.945	11.2%	0.722	0.765	0.793	9.8%	0.003	0	0	0.0%	0.0%	0.0%
Hungary	0.227	0.181	0.164	-27.8%	0.886	0.925	0.955	7.8%	0.747	0.777	0.8	7.1%	0	0	0	0.0%	0.0%	0.0%
Bulgaria	0.221	0.184	0.173	-21.7%	0.86	0.901	0.939	9.2%	0.725	0.757	0.785	8.3%	0.033	0.005	0.007	0.4%	0.1%	0.1%
Slovak Rep.	0.272	0.178	0.153	-43.8%	0.902	0.944	0.97	7.5%	0.76	0.792	0.811	6.7%	0.001	0	0.005	0.0%	0.0%	0.1%
Moldova, Rep. of	0.336	0.215	0.181	-46.1%	0.754	0.789	0.839	11.3%	0.639	0.667	0.706	10.5%	0.066	0.128	0.044	1.8%	3.8%	1.6%
Europe-East	**0.264**	**0.199**	**0.175**	**-33.7%**	**0.848**	**0.909**	**0.939**	**10.7%**	**0.72**	**0.766**	**0.787**	**9.3%**	**0.62**	**0.372**	**0.232**	**0.2%**	**0.1%**	**0.1%**
United Kingdom	0.241	0.216	0.201	-16.6%	0.954	0.987	1	4.8%	0.8	0.824	0.85	6.2%	0	0	0	0.0%	0.0%	0.0%
Sweden	0.233	0.209	0.195	-16.3%	0.965	1	1	3.6%	0.807	0.837	0.864	7.1%	0	0	0	0.0%	0.0%	0.0%
Denmark	0.219	0.208	0.206	-5.9%	0.95	0.984	1	5.3%	0.797	0.823	0.85	6.6%	0	0	0	0.0%	0.0%	0.0%
Ireland	0.267	0.238	0.21	-21.3%	0.962	1	1	4.0%	0.806	0.836	0.852	5.7%	0	0	0	0.0%	0.0%	0.0%
Norway	0.238	0.209	0.202	-15.1%	0.982	1	1	1.8%	0.822	0.849	0.854	3.9%	0	0	0	0.0%	0.0%	0.0%
Finland	0.224	0.202	0.197	-12.1%	0.954	0.99	1	4.8%	0.799	0.826	0.853	6.8%	0	0	0	0.0%	0.0%	0.0%
Lithuania	0.266	0.193	0.168	-36.8%	0.872	0.909	0.949	8.8%	0.738	0.765	0.795	7.7%	0.001	0	0	0.0%	0.0%	0.0%
Latvia	0.254	0.201	0.175	-31.1%	0.869	0.913	0.957	10.1%	0.734	0.768	0.8	9.0%	0.001	0	0	0.0%	0.0%	0.0%
Estonia	0.251	0.216	0.191	-23.9%	0.886	0.935	0.982	10.8%	0.747	0.785	0.821	9.9%	0.001	0	0	0.1%	0.0%	0.0%
Iceland	0.282	0.227	0.197	-30.1%	0.967	1	1	3.4%	0.808	0.84	0.862	6.7%	0	0	0	0.0%	0.0%	0.0%
Europe-North	**0.24**	**0.214**	**0.199**	**-17.1%**	**0.951**	**0.985**	**0.998**	**4.9%**	**0.797**	**0.824**	**0.85**	**6.6%**	**0.003**	**0**	**0.001**	**0.0%**	**0.0%**	**0.0%**
Italy	0.183	0.166	0.162	-11.5%	0.949	0.976	1	5.4%	0.792	0.813	0.834	5.3%	0	0	0	0.0%	0.0%	0.0%
Spain	0.206	0.182	0.164	-20.4%	0.945	0.976	1	5.8%	0.789	0.813	0.836	6.0%	0	0	0	0.0%	0.0%	0.0%
Greece	0.204	0.182	0.171	-16.2%	0.931	0.957	0.985	5.8%	0.778	0.798	0.819	5.3%	0	0	0	0.0%	0.0%	0.0%
Portugal	0.209	0.162	0.152	-27.3%	0.911	0.944	0.98	7.6%	0.761	0.788	0.816	7.2%	0	0	0	0.0%	0.0%	0.0%
Serbia	0.259	0.18	0.156	-39.8%	0.83	0.894	0.94	13.3%	0.694	0.749	0.785	13.1%	0.022	0	0	0.3%	0.0%	0.0%
Croatia	0.225	0.177	0.164	-27.1%	0.895	0.928	0.958	7.0%	0.752	0.776	0.799	6.3%	0	0	0	0.0%	0.0%	0.0%
Bosnia and Herzegovina	0.253	0.156	0.136	-46.2%	0.841	0.904	0.939	11.7%	0.706	0.756	0.782	10.8%	0	0	0	0.0%	0.0%	0.0%
Albania	0.354	0.192	0.154	-56.5%	0.845	0.905	0.943	11.6%	0.707	0.755	0.785	11.0%	0.002	0.001	0.004	0.1%	0.0%	0.1%
Macedonia, TFYR	0.282	0.186	0.161	-42.9%	0.841	0.878	0.912	8.4%	0.707	0.736	0.762	7.8%	0.024	0.026	0.026	1.2%	1.3%	1.5%
Slovenia	0.216	0.179	0.166	-23.1%	0.931	0.96	0.985	5.8%	0.781	0.803	0.821	5.1%	0	0	0	0.0%	0.0%	0.0%
Montenegro	0.276	0.213	0.19	-31.2%	0.832	0.869	0.911	9.5%	0.696	0.726	0.761	9.3%	0.047	0.06	0.045	7.5%	9.5%	7.7%
Malta	0.256	0.166	0.146	-43.0%	0.906	0.955	0.987	8.9%	0.754	0.795	0.821	8.9%	0	0	0	0.0%	0.0%	0.0%
Europe-South	**0.206**	**0.174**	**0.162**	**-21.4%**	**0.929**	**0.962**	**0.989**	**6.5%**	**0.777**	**0.802**	**0.825**	**6.2%**	**0.094**	**0.086**	**0.075**	**0.1%**	**0.1%**	**0.1%**
Germany	0.199	0.164	0.162	-18.6%	0.959	0.985	1	4.3%	0.803	0.822	0.848	5.6%	0	0	0	0.0%	0.0%	0.0%
France	0.23	0.211	0.2	-13.0%	0.96	0.985	1	4.2%	0.802	0.82	0.85	6.0%	0	0	0	0.0%	0.0%	0.0%
Netherlands	0.219	0.191	0.193	-11.9%	0.964	0.987	1	3.7%	0.808	0.824	0.845	4.6%	0	0	0	0.0%	0.0%	0.0%
Belgium	0.216	0.204	0.199	-7.9%	0.96	0.985	1	4.2%	0.803	0.822	0.847	5.5%	0	0	0	0.0%	0.0%	0.0%
Switzerland	0.216	0.169	0.16	-25.9%	0.976	1	1	2.5%	0.816	0.834	0.856	4.9%	0	0	0	0.0%	0.0%	0.0%
Austria	0.221	0.162	0.153	-30.8%	0.963	0.99	1	3.8%	0.806	0.826	0.849	5.3%	0	0	0	0.0%	0.0%	0.0%
Luxembourg	0.229	0.203	0.201	-12.2%	0.999	1	1	0.1%	0.839	0.862	0.875	4.3%	0	0	0	0.0%	0.0%	0.0%
Europe-West	**0.214**	**0.185**	**0.181**	**-15.4%**	**0.961**	**0.986**	**1**	**4.1%**	**0.804**	**0.822**	**0.849**	**5.6%**	**0**	**0**	**0**	**0.0%**	**0.0%**	**0.0%**

Poverty and Income

Base Case

Source: International Futures Model Version 6.61, Jan 2013

	Poverty below $2 per Day						Poverty below $5 per Day						Poverty below $10 per Day					
	Millions of People			Percent of Population			Millions of People			Percent of Population			Millions of People			Percent of Population		
	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060
World	2393	1231	797	34.9%	14.3%	8.3%	4215	3332	2538	61.5%	38.8%	26.4%	5095	4953	4485	74.4%	57.7%	46.7%
Africa	600.9	521.7	431.3	58.3%	30.1%	17.4%	893.2	1056	1031	86.6%	61.0%	41.7%	988.5	1386	1642	95.9%	80.1%	66.4%
Americas	75.54	47.9	59.51	8.1%	4.2%	4.8%	217.8	155.6	172.2	23.5%	13.6%	13.8%	363.1	306.7	322.5	39.1%	26.8%	25.9%
Asia with Oceania	1713	659.9	305.2	41.2%	13.2%	5.8%	3058	2106	1326	73.6%	42.1%	25.2%	3597	3218	2487	86.6%	64.3%	47.3%
Europe	4.959	1.565	1.152	0.7%	0.2%	0.2%	45.66	13.61	9.002	6.3%	2.0%	1.4%	143.6	39.39	31	19.8%	5.7%	5.0%
World	2393	1231	797	34.9%	14.3%	8.3%	4215	3332	2538	61.5%	38.8%	26.4%	5095	4953	4485	74.4%	57.7%	46.7%
Africa-Eastern	230.4	250.1	175.7	70.7%	42.3%	20.1%	307.9	466.7	376.5	94.4%	79.0%	43.0%	320.5	555.3	595.2	98.3%	94.0%	68.0%
Africa-Middle	83.76	78.65	63.08	65.0%	33.3%	17.2%	116	153.8	179.4	90.0%	65.1%	48.8%	124.9	189.2	270.5	96.9%	80.0%	73.5%
Africa-Northern	46.04	22.12	7.248	21.7%	7.6%	2.2%	139.3	111.1	58.25	65.5%	38.0%	17.4%	192.2	192.9	152	90.4%	66.0%	45.4%
Africa-Southern	20.74	15.16	9.39	36.2%	23.7%	13.6%	38.15	33.56	23.45	66.5%	52.6%	33.9%	48.54	47.77	38.17	84.7%	74.8%	55.1%
Africa-Western	219.9	155.7	175.9	71.8%	28.4%	21.3%	291.9	291.3	393	95.3%	53.2%	47.5%	302.4	401.2	586.6	98.8%	73.3%	70.9%
Africa	600.9	521.7	431.3	58.3%	30.1%	17.4%	893.2	1056	1031	86.6%	61.0%	41.7%	988.5	1386	1642	95.9%	80.1%	66.4%
America-Caribbean	15.5	11.26	11.59	38.1%	23.2%	22.8%	27.13	21.96	18.57	66.7%	45.2%	36.6%	33.93	33.22	27.07	83.5%	68.4%	53.3%
America-Central	10.02	15.24	17.08	23.6%	24.1%	22.0%	23.8	33.92	36.2	56.0%	53.6%	46.6%	33.5	47.26	51.52	78.8%	74.7%	66.3%
America-North	9.683	9.122	10.57	2.1%	1.7%	1.7%	36.75	39.08	38.1	8.1%	7.1%	6.3%	70.21	79.2	75.36	15.5%	14.4%	12.5%
America-South	40.34	12.27	20.27	10.3%	2.5%	4.0%	130.1	60.62	79.32	33.1%	12.6%	15.5%	225.4	147	168.5	57.4%	30.5%	32.9%
Americas	75.54	47.9	59.51	8.1%	4.2%	4.8%	217.8	155.6	172.2	23.5%	13.6%	13.8%	363.1	306.7	322.5	39.1%	26.8%	25.9%
Asia-East	339.5	29.48	6.25	21.6%	1.8%	0.4%	866.5	192.7	53.47	55.2%	11.8%	3.7%	1188	515.6	172.2	75.6%	31.6%	11.8%
Asia-South Central	1087	533	210.7	62.9%	23.6%	8.2%	1601	1527	910.3	92.7%	67.5%	35.5%	1681	2002	1650	97.3%	88.5%	64.4%
Asia-South East	250.2	62.14	55.91	42.4%	8.5%	7.3%	472.9	275.4	257.3	80.2%	37.8%	33.6%	543.2	510.5	479.2	92.2%	70.1%	62.6%
Asia-West	31.59	32.37	28.46	13.6%	9.6%	6.8%	109.9	103.2	94.94	47.4%	30.5%	22.8%	174.7	177.6	170.6	75.3%	52.5%	40.9%
Oceania	5.008	2.979	3.934	14.1%	6.4%	7.1%	7.854	7.893	9.954	22.1%	16.8%	18.0%	9.506	11.49	14.56	26.7%	24.5%	26.4%
Asia with Oceania	1713	659.9	305.2	41.2%	13.2%	5.8%	3058	2106	1326	73.6%	42.1%	25.2%	3597	3218	2487	86.6%	64.3%	47.3%
Europe-East	3.55	1.333	0.683	1.2%	0.5%	0.3%	39.24	11.28	6.225	13.4%	4.3%	2.8%	124	28.73	19.05	42.2%	11.0%	8.6%
Europe-North	0.136	0.031	0.029	0.1%	0.0%	0.0%	1.348	0.586	0.438	1.4%	0.6%	0.4%	4.72	2.534	2.112	4.8%	2.4%	2.0%
Europe-South	0.374	0.302	0.269	0.2%	0.2%	0.2%	4.701	2.217	2.377	3.1%	1.5%	1.9%	16.66	10.21	10.48	10.9%	7.0%	8.3%
Europe-West	0	0	0	0.0%	0.0%	0.0%	0.046	0.025	0.066	0.0%	0.0%	0.0%	1.773	1.115	1.343	0.9%	0.6%	0.8%
Europe	4.959	1.565	1.152	0.7%	0.2%	0.2%	45.66	13.61	9.002	6.3%	2.0%	1.4%	143.6	39.39	31	19.8%	5.7%	5.0%

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Poverty below $2 per Day						Poverty below $5 per Day						Poverty below $10 per Day					
	Millions of People			Percent of Population			Millions of People			Percent of Population			Millions of People			Percent of Population		
	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060
AFRICA																		
Ethiopia	58.75	31.66	0.821	69.1%	22.6%	0.4%	83.75	106.5	20.68	98.5%	76.2%	11.2%	84.14	135	80.95	99.0%	96.6%	43.7%
Tanzania, United Rep. of	38.4	43	4.768	85.3%	48.9%	3.5%	44.58	77.42	35.79	99.0%	88.1%	26.4%	44.58	86.31	81.73	99.0%	98.2%	60.3%
Uganda	19.08	11.81	7.042	56.4%	16.5%	6.0%	30.32	37.02	32.96	89.7%	51.7%	28.2%	33.19	56.66	65.94	98.2%	79.2%	56.4%
Kenya	15.41	26.94	13.46	37.7%	37.0%	12.8%	32.7	57.64	45.76	80.0%	79.2%	43.6%	39.11	69.38	75.31	95.7%	95.4%	71.7%
Madagascar	18.14	36.36	57.91	90.0%	94.5%	88.0%	19.94	38.09	64.52	99.0%	99.0%	98.1%	19.95	38.09	65.13	99.0%	99.0%	99.0%
Mozambique	18.85	9.627	3.637	80.5%	23.6%	6.3%	22.78	25.43	18.17	97.3%	62.3%	31.5%	23.18	35.24	35.89	99.0%	86.3%	62.1%
Malawi	13.6	24.29	23.29	86.7%	75.4%	43.7%	15.54	31.39	44.18	99.0%	97.4%	82.9%	15.54	31.9	51.33	99.0%	99.0%	96.3%
Zambia	10.19	8.419	14	76.8%	33.4%	36.3%	12.64	17.52	27.55	95.3%	69.5%	71.4%	13.13	22.41	34.56	99.0%	88.9%	89.6%
Somalia	8.327	13.45	9.857	89.1%	74.3%	34.7%	9.225	17.15	19.03	98.7%	94.7%	67.0%	9.252	17.93	24.37	99.0%	99.0%	85.7%
Rwanda	8.72	13.59	10.12	84.8%	74.3%	37.5%	10	17.07	18.3	97.3%	93.3%	67.7%	10.18	18	23.05	99.0%	98.4%	85.3%
Zimbabwe	7.439	11.78	12.49	59.1%	63.8%	54.4%	10.75	16.28	18.39	85.5%	88.2%	80.1%	12	17.81	21.11	95.4%	96.5%	91.9%
Burundi	7.896	11.33	11.67	92.5%	80.6%	58.0%	8.453	13.9	18.64	99.0%	98.9%	92.6%	8.453	13.92	19.93	99.0%	99.0%	99.0%
Eritrea	4.668	6.274	5.056	89.4%	67.5%	38.0%	5.162	8.566	9.605	98.8%	92.1%	72.2%	5.171	9.15	11.94	99.0%	98.4%	89.7%
Comoros	0.439	1.028	1.235	65.1%	77.4%	55.2%	0.633	1.285	1.902	93.9%	96.8%	85.0%	0.667	1.315	2.142	99.0%	99.0%	95.7%
Djibouti	0.314	0.448	0.212	35.7%	39.0%	16.6%	0.67	0.909	0.613	76.2%	79.1%	48.0%	0.823	1.09	0.946	93.6%	94.9%	74.0%
Mauritius	0.16	0.076	0.067	12.5%	5.7%	5.6%	0.745	0.565	0.423	58.2%	42.4%	35.3%	1.141	1.072	0.844	89.1%	80.4%	70.5%
Africa-Eastern	**230.4**	**250.1**	**175.7**	**70.7%**	**42.3%**	**20.1%**	**307.9**	**466.7**	**376.5**	**94.4%**	**79.0%**	**43.0%**	**320.5**	**555.3**	**595.2**	**98.3%**	**94.0%**	**68.0%**
Congo, Democratic Rep. of	51.49	59.01	42.02	75.9%	46.0%	20.4%	65.41	108.6	120.4	96.4%	84.6%	58.6%	67.15	124.4	173.2	99.0%	97.0%	84.2%
Angola	10.39	0.131	0.761	54.7%	0.4%	1.5%	16.25	1.511	6.052	85.6%	4.3%	11.7%	18.27	5.643	17	96.2%	16.2%	32.9%
Cameroon	6.178	7.096	8.031	30.9%	21.2%	16.7%	14.48	20.21	23.79	72.5%	60.3%	49.4%	18.43	28.69	36.58	92.3%	85.6%	76.0%
Chad	9.036	7.127	5.965	78.5%	31.1%	14.9%	11.05	15.62	18.32	96.0%	68.1%	45.6%	11.39	20.3	29.09	99.0%	88.5%	72.5%
Central African Rep.	3.64	4.932	5.761	80.8%	69.5%	57.2%	4.269	6.361	8.196	94.7%	89.6%	81.3%	4.442	6.858	9.304	98.6%	96.6%	92.3%
Congo, Rep. of	2.672	0.131	0.377	71.2%	2.2%	4.9%	3.52	0.9	1.867	93.8%	15.0%	24.4%	3.709	2.31	3.923	98.9%	38.4%	51.2%
Gabon	0.272	0.073	0.041	18.1%	3.2%	1.5%	0.637	0.288	0.185	42.4%	12.8%	6.7%	0.959	0.617	0.447	63.8%	27.4%	16.2%
Equatorial Guinea	0	0	0	0.0%	0.0%	0.0%	0.231	0.023	0.288	33.3%	2.1%	20.0%	0.424	0.105	0.627	61.2%	9.6%	43.6%
São Tomé and Príncipe	0.078	0.151	0.129	47.0%	53.4%	32.5%	0.139	0.248	0.279	83.7%	87.6%	70.3%	0.16	0.276	0.357	96.4%	97.5%	89.9%
Africa-Middle	**83.76**	**78.65**	**63.08**	**65.0%**	**33.3%**	**17.2%**	**116**	**153.8**	**179.4**	**90.0%**	**65.1%**	**48.8%**	**124.9**	**189.2**	**270.5**	**96.9%**	**80.0%**	**73.5%**
Egypt, Arab Rep.	11.37	10.13	1.402	13.5%	8.9%	1.1%	53.79	58.73	18.78	63.7%	51.7%	14.6%	78.28	98.08	58.38	92.6%	86.3%	45.4%
Sudan	24.17	9.519	1.851	55.9%	13.6%	2.1%	39.92	36.09	13.26	92.4%	51.5%	14.8%	42.78	57.15	34.51	99.0%	81.5%	38.5%
Algeria	5.826	0.005	1.56	16.4%	0.0%	3.2%	23.72	0.381	13.93	67.0%	0.8%	28.2%	33.1	3.701	32.24	93.5%	8.1%	65.3%
Morocco	3.761	2.296	2.284	11.6%	5.6%	5.3%	16.34	13.83	10.77	50.5%	34.0%	24.8%	26.63	27.77	22.22	82.2%	68.2%	51.2%
Tunisia	0.45	0.174	0.15	4.3%	1.4%	1.1%	3.332	2.086	1.494	31.6%	16.3%	11.2%	7.142	6.123	4.544	67.8%	47.9%	34.2%
Libya	0.462	0	0	7.1%	0.0%	0.0%	2.216	0.007	0.01	33.8%	0.1%	0.1%	4.246	0.091	0.113	64.8%	1.0%	1.1%
Africa-Northern	**46.04**	**22.12**	**7.248**	**21.7%**	**7.6%**	**2.2%**	**139.3**	**111.1**	**58.25**	**65.5%**	**38.0%**	**17.4%**	**192.2**	**192.9**	**152**	**90.4%**	**66.0%**	**45.4%**

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Poverty below $2 per Day						Poverty below $5 per Day						Poverty below $10 per Day					
	Millions of People			Percent of Population			Millions of People			Percent of Population			Millions of People			Percent of Population		
	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060
AFRICA continued																		
South Africa	16.81	10.79	5.174	33.7%	20.0%	8.9%	32.44	26.91	16.58	65.1%	49.8%	28.6%	41.92	39.72	29.57	84.1%	73.6%	51.0%
Namibia	1.171	1.187	1.263	52.9%	36.9%	32.6%	1.67	1.977	2.204	75.5%	61.4%	57.0%	1.938	2.502	2.87	87.6%	77.8%	74.2%
Lesotho	1.174	1.386	1.073	56.3%	54.4%	39.2%	1.689	1.993	1.745	81.0%	78.2%	63.7%	1.924	2.296	2.178	92.3%	90.0%	79.5%
Botswana	0.648	0.469	0.552	32.7%	19.3%	20.8%	1.204	1.079	1.13	60.8%	44.4%	42.5%	1.572	1.6	1.626	79.4%	65.8%	61.2%
Swaziland	0.933	1.329	1.327	77.6%	79.5%	67.1%	1.15	1.607	1.792	95.7%	96.1%	90.6%	1.19	1.656	1.93	99.0%	99.0%	97.6%
Africa-Southern	**20.74**	**15.16**	**9.39**	**36.2%**	**23.7%**	**13.6%**	**38.15**	**33.56**	**23.45**	**66.5%**	**52.6%**	**33.9%**	**48.54**	**47.77**	**38.17**	**84.7%**	**74.8%**	**55.1%**
Nigeria	124.5	6.091	10.95	78.6%	2.2%	2.8%	153.9	52.95	86.08	97.2%	19.4%	21.8%	156.7	136.8	210.1	99.0%	50.0%	53.2%
Niger	11.85	27.58	47.2	74.5%	75.3%	63.5%	15.64	36.09	70.47	98.4%	98.5%	94.8%	15.74	36.26	73.62	99.0%	99.0%	99.0%
Côte d'Ivoire	9.944	10.26	4.226	46.1%	26.5%	7.2%	18.59	27.14	20.74	86.2%	70.1%	35.4%	21.06	35.58	39.4	97.6%	92.0%	67.2%
Burkina Faso	12.81	24.71	23.46	78.6%	77.7%	45.6%	15.96	31.13	43.13	97.9%	97.9%	83.9%	16.14	31.48	49.65	99.0%	99.0%	96.6%
Ghana	12.01	12.48	3.37	49.4%	33.0%	7.1%	21.19	27.69	13.79	87.1%	73.2%	29.1%	23.78	34.89	26.4	97.7%	92.2%	55.7%
Mali	10.44	16.71	18.28	78.4%	63.2%	42.4%	13.06	24.73	34.65	98.0%	93.6%	80.4%	13.19	26.15	40.96	99.0%	99.0%	95.0%
Senegal	7.566	15.02	15.65	58.8%	64.2%	44.1%	11.86	21.99	28.31	92.2%	93.9%	79.8%	12.74	23.18	33.44	99.0%	99.0%	94.3%
Guinea	7.298	7.388	15.11	70.8%	39.2%	48.4%	9.945	15.99	27.31	96.5%	84.8%	87.5%	10.21	18.43	30.58	99.0%	97.8%	98.0%
Benin	7.021	12.83	13.92	76.2%	70.6%	47.5%	9.043	17.48	24.4	98.1%	96.2%	83.2%	9.125	17.99	28.13	99.0%	99.0%	95.9%
Togo	4.717	9.227	11.04	69.5%	78.8%	63.0%	6.615	11.53	16.37	97.5%	98.5%	93.4%	6.715	11.59	17.34	99.0%	99.0%	99.0%
Sierra Leone	4.134	2.745	1.314	70.8%	27.0%	9.0%	5.619	6.876	5.346	96.3%	67.5%	36.5%	5.777	9.129	9.647	99.0%	89.7%	65.9%
Liberia	3.858	3.818	4.172	93.5%	50.0%	36.7%	4.083	6.645	8.872	99.0%	87.0%	78.1%	4.083	7.458	10.76	99.0%	97.6%	94.7%
Mauritania	1.385	2.959	3.083	41.1%	51.6%	36.6%	2.87	5.201	6.655	85.2%	90.7%	79.1%	3.293	5.671	8.026	97.7%	98.9%	95.3%
Gambia	0.944	1.677	0.904	53.9%	49.3%	17.7%	1.521	2.848	2.554	86.9%	83.7%	50.1%	1.7	3.262	3.871	97.1%	95.9%	75.9%
Guinea-Bissau	1.28	2.1	3.128	77.7%	75.4%	70.6%	1.588	2.647	4.067	96.4%	95.0%	91.8%	1.632	2.758	4.337	99.0%	99.0%	97.9%
Cape Verde	0.162	0.122	0.086	31.6%	18.5%	12.1%	0.349	0.33	0.249	68.0%	50.2%	35.0%	0.452	0.495	0.415	88.1%	75.2%	58.3%
Africa-Western	**219.9**	**155.7**	**175.9**	**71.8%**	**28.4%**	**21.3%**	**291.9**	**291.3**	**393**	**95.3%**	**53.2%**	**47.5%**	**302.4**	**401.2**	**586.6**	**98.8%**	**73.3%**	**70.9%**

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Poverty below $2 per Day						Poverty below $5 per Day						Poverty below $10 per Day					
	Millions of People			Percent of Population			Millions of People			Percent of Population			Millions of People			Percent of Population		
	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060
AMERICAS																		
Haiti	7.781	10.02	10.85	76.4%	69.6%	63.6%	9.511	12.87	14.34	93.3%	89.4%	84.0%	10.01	13.88	15.9	98.2%	96.5%	93.1%
Dominican Rep.	1.013	0.331	0.334	9.9%	2.5%	2.3%	3.945	2.176	2.042	38.6%	16.4%	13.9%	6.939	5.399	5.104	67.8%	40.8%	34.8%
Cuba	5.779	0.415	0.003	51.6%	3.8%	0.0%	10.32	4.521	0.261	92.1%	41.3%	2.8%	11.09	9.096	1.968	99.0%	83.1%	21.1%
Puerto Rico	0.616	0.211	0.134	15.5%	4.8%	3.1%	1.87	1.126	0.717	47.0%	25.8%	16.8%	2.935	2.381	1.659	73.8%	54.6%	38.8%
Jamaica	0.172	0.132	0.202	6.3%	4.2%	6.4%	0.878	0.813	0.877	32.4%	25.9%	27.8%	1.73	1.784	1.723	63.8%	56.9%	54.6%
Trinidad and Tobago	0.018	0	0.001	1.3%	0.0%	0.1%	0.218	0	0.028	16.2%	0.0%	2.3%	0.641	0.006	0.161	47.7%	0.4%	13.4%
Bahamas	0	0	0	0.0%	0.0%	0.0%	0.001	0.002	0.003	0.3%	0.5%	0.7%	0.009	0.027	0.027	2.6%	6.6%	6.6%
Barbados	0.007	0.005	0.005	2.7%	2.0%	2.3%	0.101	0.095	0.059	39.3%	37.3%	26.9%	0.215	0.213	0.148	83.7%	83.5%	67.6%
Saint Lucia	0.065	0.058	0.031	37.4%	31.2%	18.2%	0.139	0.139	0.1	79.9%	74.7%	58.8%	0.166	0.175	0.146	95.4%	94.1%	85.9%
Grenada	0.025	0.047	0.016	24.0%	34.3%	10.5%	0.074	0.11	0.074	71.2%	80.3%	48.4%	0.097	0.132	0.123	93.3%	96.4%	80.4%
Saint Vincent and the Grenadines	0.024	0.038	0.017	22.0%	28.4%	11.9%	0.074	0.101	0.068	67.9%	75.4%	47.6%	0.1	0.127	0.111	91.7%	94.8%	77.6%
America-Caribbean	**15.5**	**11.26**	**11.59**	**38.1%**	**23.2%**	**22.8%**	**27.13**	**21.96**	**18.57**	**66.7%**	**45.2%**	**36.6%**	**33.93**	**33.22**	**27.07**	**83.5%**	**68.4%**	**53.3%**
Guatemala	4.052	6.674	7.369	28.2%	27.1%	22.0%	8.915	14.56	16.31	62.0%	59.0%	48.6%	12	19.88	23.48	83.4%	80.6%	70.0%
Honduras	2.705	4.616	5.666	35.5%	39.4%	39.2%	5.098	8.074	9.333	66.9%	68.9%	64.5%	6.498	10.05	11.66	85.3%	85.8%	80.6%
Nicaragua	1.819	2.524	2.619	31.3%	30.3%	27.0%	4.317	6.039	6.082	74.2%	72.5%	62.7%	5.438	7.704	8.237	93.4%	92.5%	84.9%
El Salvador	0.745	1.221	1.309	12.0%	15.6%	15.3%	2.751	3.798	3.624	44.4%	48.5%	42.5%	4.579	5.935	5.715	74.0%	75.8%	67.0%
Costa Rica	0.23	0.082	0.101	5.0%	1.4%	1.7%	1.129	0.654	0.653	24.3%	11.3%	10.9%	2.368	1.849	1.728	51.0%	32.1%	28.9%
Panama	0.4	0.078	0.008	11.4%	1.7%	0.2%	1.347	0.531	0.102	38.4%	11.9%	2.1%	2.292	1.413	0.433	65.3%	31.7%	9.0%
Belize	0.067	0.05	0.008	19.5%	9.9%	1.4%	0.247	0.269	0.094	71.8%	53.4%	16.0%	0.327	0.438	0.276	95.1%	86.9%	46.9%
America-Central	**10.02**	**15.24**	**17.08**	**23.6%**	**24.1%**	**22.0%**	**23.8**	**33.92**	**36.2**	**56.0%**	**53.6%**	**46.6%**	**33.5**	**47.26**	**51.52**	**78.8%**	**74.7%**	**66.3%**
United States of America	0	0	0	0.0%	0.0%	0.0%	0.251	0.208	0.418	0.1%	0.1%	0.1%	3.905	3.823	5.024	1.3%	1.0%	1.2%
Mexico	9.683	9.122	10.57	8.9%	6.8%	7.6%	36.49	38.87	37.67	33.6%	29.0%	27.2%	66.03	75.29	70.14	60.9%	56.2%	50.7%
Canada	0	0	0	0.0%	0.0%	0.0%	0.006	0.001	0.007	0.0%	0.0%	0.0%	0.279	0.089	0.198	0.8%	0.2%	0.4%
America-North	**9.683**	**9.122**	**10.57**	**2.1%**	**1.7%**	**1.7%**	**36.75**	**39.08**	**38.1**	**8.1%**	**7.1%**	**6.3%**	**70.21**	**79.2**	**75.36**	**15.5%**	**14.4%**	**12.5%**
Brazil	16.28	4.01	6.091	8.3%	1.7%	2.6%	60.01	26.6	33.32	30.7%	11.6%	14.2%	110.2	70.42	79.91	56.4%	30.6%	34.0%
Colombia	11.87	5.84	9.767	25.6%	9.9%	15.2%	25.74	17.79	24.53	55.6%	30.1%	38.2%	35.71	30.94	38.46	77.1%	52.3%	59.8%
Argentina	0.13	0.007	0.018	0.3%	0.0%	0.0%	1.961	0.301	0.479	4.8%	0.6%	0.9%	7.949	2.4	3.011	19.5%	5.0%	5.8%
Peru	3.794	0.985	2.139	12.9%	2.6%	5.0%	13.28	6.359	10.05	45.0%	16.5%	23.3%	21.77	15.68	20.99	73.8%	40.7%	48.7%
Venezuela (Bolivarian Rep. of)	2.854	0.178	0.004	9.9%	0.5%	0.0%	12.57	2.839	0.233	43.6%	7.5%	0.5%	21.77	10.85	2.038	75.5%	28.6%	4.8%
Ecuador	1.879	0.198	0.879	13.6%	1.1%	4.3%	6.269	1.781	4.36	45.5%	9.7%	21.2%	10.14	5.384	9.435	73.6%	29.4%	45.9%
Chile	0.226	0.022	0.195	1.3%	0.1%	1.0%	1.643	0.331	1.413	9.6%	1.7%	7.0%	4.63	1.537	4.149	27.0%	7.7%	20.5%
Bolivia (Plurinational State of)	2.361	0.319	0.803	23.5%	2.2%	4.5%	5.396	1.657	3.15	53.8%	11.2%	17.7%	7.645	4.026	6.485	76.2%	27.3%	36.4%
Paraguay	0.767	0.64	0.36	11.9%	6.9%	3.3%	2.561	2.542	1.658	39.6%	27.4%	15.1%	4.311	4.888	3.703	66.7%	52.6%	33.7%
Uruguay	0.001	0	0	0.0%	0.0%	0.0%	0.031	0.002	0.002	0.9%	0.1%	0.1%	0.233	0.035	0.024	6.9%	1.0%	0.6%
Guyana	0.081	0.059	0.013	10.6%	7.7%	2.0%	0.336	0.29	0.085	44.2%	37.8%	13.2%	0.572	0.539	0.22	75.2%	70.2%	34.1%
Suriname	0.096	0.015	0.002	18.3%	2.8%	0.4%	0.318	0.13	0.033	60.6%	24.3%	7.0%	0.46	0.313	0.124	87.6%	58.6%	26.4%
America-South	**40.34**	**12.27**	**20.27**	**10.3%**	**2.5%**	**4.0%**	**130.1**	**60.62**	**79.32**	**33.1%**	**12.6%**	**15.5%**	**225.4**	**147**	**168.5**	**57.4%**	**30.5%**	**32.9%**

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Poverty below $2 per Day						Poverty below $5 per Day						Poverty below $10 per Day					
	Millions of People			Percent of Population			Millions of People			Percent of Population			Millions of People			Percent of Population		
	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060
ASIA with OCEANIA																		
China	320.7	19.31	3.853	24.0%	1.4%	0.3%	840.6	169	39.97	62.8%	12.0%	3.1%	1159	487.6	148.5	86.6%	34.7%	11.7%
Japan	0	0	0	0.0%	0.0%	0.0%	0	0	0	0.0%	0.0%	0.0%	0.151	0.005	0.008	0.1%	0.0%	0.0%
Korea, Rep. of	0	0	0	0.0%	0.0%	0.0%	0.053	0.002	0.012	0.1%	0.0%	0.0%	1.521	0.173	0.305	3.1%	0.4%	0.8%
Korea, Dem. People's Rep. of	17.6	10.14	2.392	73.4%	38.9%	9.4%	23.41	23.01	13.29	97.6%	88.3%	52.0%	23.75	25.79	22.02	99.0%	98.9%	86.2%
Taiwan, China	0	0	0	0.0%	0.0%	0.0%	0.009	0	0.009	0.0%	0.0%	0.0%	0.398	0.04	0.223	1.7%	0.2%	1.1%
Hong Kong SAR, China	0	0	0	0.0%	0.0%	0.0%	0.034	0	0.025	0.5%	0.0%	0.3%	0.292	0.011	0.236	4.2%	0.1%	3.0%
Mongolia	1.175	0.035	0.005	43.5%	1.0%	0.1%	2.391	0.637	0.162	88.5%	18.3%	4.2%	2.666	1.977	0.891	98.7%	56.9%	23.4%
Asia-East	**339.5**	**29.48**	**6.25**	**21.6%**	**1.8%**	**0.4%**	**866.5**	**192.7**	**53.47**	**55.2%**	**11.8%**	**3.7%**	**1188**	**515.6**	**172.2**	**75.6%**	**31.6%**	**11.8%**
India	785.7	270.1	66	67.1%	18.1%	4.0%	1128	978.9	442	96.3%	65.5%	26.6%	1159	1372	980.9	99.0%	91.8%	59.1%
Pakistan	100.1	159.5	93.56	57.7%	60.2%	27.9%	166.1	256.6	264.6	95.8%	96.9%	78.9%	171.6	262.1	324.5	99.0%	99.0%	96.8%
Bangladesh	124.5	56.8	6.366	75.7%	27.2%	2.9%	162.2	168.1	60.03	98.6%	80.5%	26.9%	162.8	203.7	142.7	99.0%	97.5%	64.0%
Afghanistan	20.78	10.05	13.11	67.9%	16.5%	13.3%	30.16	50.64	73.6	98.5%	83.0%	74.4%	30.3	60.4	96.66	99.0%	99.0%	97.7%
Iran, Islamic Rep. of	4.046	0	0	5.5%	0.0%	0.0%	28.04	0.085	0.003	38.0%	0.1%	0.0%	55.34	1.703	0.142	74.9%	1.9%	0.2%
Nepal	22.21	27.89	24.41	74.4%	66.5%	50.7%	28.48	38.49	38	95.4%	91.8%	79.0%	29.56	41.21	44.24	99.0%	98.3%	92.0%
Uzbekistan	18.54	0.674	1.194	65.7%	1.8%	2.9%	27.12	9.661	12.31	96.1%	25.9%	29.9%	27.95	25.11	28.56	99.0%	67.4%	69.4%
Sri Lanka	5.176	1.825	1.241	25.3%	7.8%	5.3%	14.58	9.476	6.358	71.3%	40.3%	27.0%	19.06	17.4	13.17	93.2%	74.0%	55.9%
Kazakhstan	0.024	0	0	0.1%	0.0%	0.0%	1.449	0	0	9.0%	0.0%	0.0%	7.367	0.089	0.007	45.8%	0.5%	0.0%
Tajikistan	3.09	3.207	3.575	43.7%	30.5%	27.6%	6.425	8.106	8.696	90.9%	77.2%	67.3%	6.999	10.02	11.53	99.0%	95.4%	89.2%
Kyrgyz Rep.	1.48	2.806	1.178	27.6%	37.2%	13.8%	4.383	6.504	4.474	81.7%	86.2%	52.3%	5.253	7.429	7.039	97.9%	98.5%	82.3%
Turkmenistan	0.784	0	0	15.1%	0.0%	0.0%	2.955	0	0	57.1%	0.0%	0.0%	4.467	0.004	0	86.3%	0.1%	0.0%
Bhutan	0.273	0.073	0.036	38.6%	8.0%	3.6%	0.568	0.345	0.189	80.3%	37.8%	18.6%	0.677	0.638	0.429	95.8%	69.9%	42.3%
Maldives	0.021	0.016	0.004	6.7%	4.1%	1.0%	0.158	0.165	0.065	50.5%	42.0%	16.1%	0.274	0.328	0.209	87.5%	83.5%	51.7%
Asia-South Central	**1087**	**533**	**210.7**	**62.9%**	**23.6%**	**8.2%**	**1601**	**1527**	**910.3**	**92.7%**	**67.5%**	**35.5%**	**1681**	**2002**	**1650**	**97.3%**	**88.5%**	**64.4%**
Indonesia	112.4	6.138	22.88	48.3%	2.2%	7.8%	210.6	75.83	130.1	90.5%	26.8%	44.1%	230.3	189.8	233.8	99.0%	67.0%	79.3%
Philippines	39.6	29.51	22.35	42.3%	22.0%	14.4%	76.81	83.31	72.61	82.0%	62.0%	46.9%	89.95	116.8	115.7	96.0%	87.0%	74.7%
Vietnam	32.09	9.957	1.643	36.3%	9.2%	1.5%	73.75	51.35	17.03	83.5%	47.5%	15.3%	86.22	88.02	48.91	97.6%	81.5%	44.1%
Thailand	16.88	7.731	6.596	24.8%	11.2%	10.7%	39.57	26.56	20.73	58.1%	38.4%	33.7%	55.12	45.39	35.65	80.9%	65.7%	57.9%
Myanmar	35.7	2.635	0.35	70.7%	4.5%	0.6%	48.48	18.56	5.21	96.0%	31.5%	8.8%	49.98	39.43	18.84	99.0%	67.0%	31.9%
Malaysia	0.304	0.037	0.072	1.1%	0.1%	0.2%	2.99	0.804	1.033	10.7%	2.2%	2.5%	9.148	4.182	4.508	32.8%	11.3%	10.8%
Cambodia	8.309	4.45	1.657	55.2%	22.4%	7.5%	13.41	12.31	7.272	89.1%	62.0%	32.9%	14.76	17.21	13.76	98.1%	86.7%	62.2%
Lao People's Democratic Rep.	4.086	0.932	0.302	63.5%	10.5%	2.9%	6.15	4.632	2.267	95.5%	52.0%	22.0%	6.373	7.577	5.458	99.0%	85.0%	53.0%
Singapore	0	0	0	0.0%	0.0%	0.0%	0.023	0	0.001	0.4%	0.0%	0.0%	0.211	0.011	0.018	4.1%	0.2%	0.3%
Timor-Leste	0.838	0.746	0.059	71.6%	33.9%	1.7%	1.152	2.023	1.017	98.4%	91.8%	30.0%	1.159	2.181	2.54	99.0%	99.0%	75.0%
Brunei Darussalam	0	0	0	0.0%	0.0%	0.0%	0	0	0	0.0%	0.0%	0.0%	0.014	0	0	3.4%	0.0%	0.0%
Asia-South Eastern	**250.2**	**62.14**	**55.91**	**42.4%**	**8.5%**	**7.3%**	**472.9**	**275.4**	**257.3**	**80.2%**	**37.8%**	**33.6%**	**543.2**	**510.5**	**479.2**	**92.2%**	**70.1%**	**62.6%**

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Poverty below $2 per Day						Poverty below $5 per Day						Poverty below $10 per Day					
	Millions of People			Percent of Population			Millions of People			Percent of Population			Millions of People			Percent of Population		
	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060
ASIA with OCEANIA continued																		
Turkey	4.701	2.046	2.84	6.2%	2.2%	3.0%	29.13	21.75	20.78	38.5%	23.8%	22.0%	56.16	55.27	49.72	74.2%	60.5%	52.6%
Iraq	7.848	0.54	0.059	24.3%	0.9%	0.1%	21.59	7.058	1.59	66.8%	11.6%	1.8%	29.12	23.1	9.226	90.2%	38.0%	10.5%
Yemen, Rep. of	10.9	18.31	17.13	44.9%	38.4%	23.4%	21.42	39.38	45.77	88.3%	82.5%	62.5%	23.91	46.25	63.45	98.6%	96.9%	86.6%
Saudi Arabia	0	0	0	0.0%	0.0%	0.0%	5.607	0.003	0.001	21.6%	0.0%	0.0%	16.02	0.148	0.058	61.6%	0.4%	0.1%
Syrian Arab Rep.	3.117	4.162	1.553	14.4%	12.9%	4.0%	13.27	18.73	10.99	61.4%	58.0%	28.1%	19.57	28.63	24.29	90.5%	88.7%	62.1%
Jordan	0.151	0.082	0.023	2.5%	0.8%	0.2%	1.577	1.513	0.602	25.9%	14.7%	4.5%	3.878	5.056	2.971	63.6%	49.2%	22.2%
Israel	0	0	0	0.0%	0.0%	0.0%	0.064	0.007	0.008	0.8%	0.1%	0.1%	0.576	0.148	0.118	7.6%	1.4%	0.9%
Palestine	1.998	5.865	5.908	48.1%	72.0%	47.1%	3.86	7.939	10.48	93.0%	97.4%	83.6%	4.11	8.068	12.06	99.0%	99.0%	96.2%
Azerbaijan	0.462	0	0	5.2%	0.0%	0.0%	3.951	0.017	0.005	44.5%	0.2%	0.0%	7.442	0.289	0.088	83.8%	2.7%	0.8%
United Arab Emirates	0	0	0	0.0%	0.0%	0.0%	0	0	0	0.0%	0.0%	0.0%	0.012	0	0	0.3%	0.0%	0.0%
Kuwait	0	0	0	0.0%	0.0%	0.0%	0.077	0	0	2.7%	0.0%	0.0%	0.581	0	0	20.3%	0.0%	0.0%
Lebanon	0.58	0.254	0.321	13.6%	5.2%	6.7%	2.857	2.095	1.924	67.2%	42.8%	40.4%	4.026	4.009	3.614	94.6%	81.8%	76.0%
Oman	0	0	0	0.0%	0.0%	0.0%	0.985	0.029	0.034	33.9%	0.7%	0.8%	1.997	0.252	0.264	68.7%	6.4%	6.1%
Armenia	0.484	0.51	0.21	15.7%	15.8%	7.0%	2.266	2.415	1.227	73.4%	74.7%	40.8%	2.992	3.145	2.289	96.9%	97.3%	76.0%
Georgia	1.351	0.6	0.42	32.1%	17.3%	14.3%	3.228	2.291	1.513	76.6%	66.0%	51.4%	3.995	3.21	2.377	94.8%	92.5%	80.8%
Qatar	0	0	0	0.0%	0.0%	0.0%	0.039	0	0	2.5%	0.0%	0.0%	0.226	0	0	14.6%	0.0%	0.0%
Bahrain	0	0	0	0.0%	0.0%	0.0%	0.004	0	0	0.5%	0.0%	0.0%	0.072	0.007	0.004	8.9%	0.6%	0.3%
Cyprus	0	0	0	0.0%	0.0%	0.0%	0	0.001	0.002	0.0%	0.1%	0.2%	0.017	0.02	0.035	1.9%	2.1%	4.1%
Asia-West	**31.59**	**32.37**	**28.46**	**13.6%**	**9.6%**	**6.8%**	**109.9**	**103.2**	**94.94**	**47.4%**	**30.5%**	**22.8%**	**174.7**	**177.6**	**170.6**	**75.3%**	**52.5%**	**40.9%**
Australia	0	0	0	0.0%	0.0%	0.0%	0.027	0.002	0.005	0.1%	0.0%	0.0%	0.557	0.079	0.129	2.5%	0.3%	0.4%
Papua New Guinea	4.114	2.115	3.069	59.7%	19.1%	21.2%	6.079	5.788	7.805	88.2%	52.2%	53.8%	6.692	8.606	11.32	97.1%	77.6%	78.0%
New Zealand	0	0	0	0.0%	0.0%	0.0%	0.023	0.013	0.009	0.5%	0.3%	0.2%	0.285	0.19	0.11	6.5%	3.7%	2.1%
Solomon Islands	0.277	0.248	0.536	51.8%	26.1%	37.7%	0.453	0.594	1.032	84.7%	62.6%	72.5%	0.514	0.809	1.282	96.1%	85.2%	90.1%
Fiji	0.358	0.266	0.047	41.9%	29.1%	5.8%	0.732	0.742	0.326	85.7%	81.3%	39.9%	0.836	0.891	0.63	97.9%	97.6%	77.1%
Vanuatu	0.096	0.164	0.144	39.0%	39.9%	25.7%	0.196	0.321	0.352	79.7%	78.1%	62.7%	0.234	0.386	0.481	95.1%	93.9%	85.7%
Micronesia (Federated States of)	0.052	0.037	0.054	46.4%	20.3%	21.8%	0.094	0.112	0.147	83.9%	61.5%	59.3%	0.108	0.159	0.209	96.4%	87.4%	84.3%
Tonga	0.041	0.092	0.053	39.4%	53.8%	22.6%	0.094	0.161	0.165	90.4%	94.2%	70.5%	0.103	0.169	0.219	99.0%	98.8%	93.6%
Samoa	0.071	0.057	0.032	39.7%	27.1%	15.0%	0.156	0.162	0.112	87.2%	77.1%	52.6%	0.176	0.202	0.173	98.3%	96.2%	81.2%
Oceania	**5.008**	**2.979**	**3.934**	**14.1%**	**6.4%**	**7.1%**	**7.854**	**7.893**	**9.954**	**22.1%**	**16.8%**	**18.0%**	**9.506**	**11.49**	**14.56**	**26.7%**	**24.5%**	**26.4%**

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Poverty below $2 per Day						Poverty below $5 per Day						Poverty below $10 per Day					
	Millions of People			Percent of Population			Millions of People			Percent of Population			Millions of People			Percent of Population		
	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060	2010	2035	2060
EUROPE																		
Russian Federation	1.622	0	0	1.1%	0.0%	0.0%	18.84	0.007	0	13.3%	0.0%	0.0%	57.79	0.242	0.015	40.8%	0.2%	0.0%
Ukraine	0.022	0	0	0.0%	0.0%	0.0%	3.296	0	0	7.2%	0.0%	0.0%	21.64	0.003	0.003	47.3%	0.0%	0.0%
Poland	0.01	0	0.004	0.0%	0.0%	0.0%	0.833	0.077	0.272	2.2%	0.2%	0.9%	6.918	1.711	2.484	18.1%	4.8%	8.3%
Romania	0.947	0.498	0.318	4.4%	2.6%	2.0%	9.972	7.22	3.519	46.5%	37.7%	22.5%	18.7	15.72	9.19	87.2%	82.1%	58.8%
Czech Rep.	0	0	0	0.0%	0.0%	0.0%	0.002	0.001	0.008	0.0%	0.0%	0.1%	0.204	0.208	0.232	1.9%	2.0%	2.5%
Belarus	0.005	0	0	0.1%	0.0%	0.0%	0.73	0.046	0.044	7.6%	0.5%	0.6%	4.721	1.011	0.519	48.9%	11.4%	6.7%
Hungary	0.002	0	0.001	0.0%	0.0%	0.0%	0.254	0.053	0.067	2.5%	0.6%	0.9%	2.323	0.941	0.689	23.2%	10.8%	9.7%
Bulgaria	0.49	0.134	0.112	6.5%	2.2%	2.3%	2.492	1.121	0.74	33.0%	18.4%	15.0%	4.874	2.903	1.872	64.6%	47.7%	38.0%
Slovak Rep.	0.007	0.001	0.016	0.1%	0.0%	0.4%	0.823	0.407	0.524	15.2%	7.8%	12.0%	3.675	2.853	2.117	67.7%	54.9%	48.5%
Moldova, Rep. of	0.445	0.698	0.232	12.4%	20.9%	8.3%	2.004	2.35	1.051	56.1%	70.3%	37.6%	3.121	3.141	1.925	87.3%	93.9%	68.9%
Europe-East	**3.55**	**1.333**	**0.683**	**1.2%**	**0.5%**	**0.3%**	**39.24**	**11.28**	**6.225**	**13.4%**	**4.3%**	**2.8%**	**124**	**28.73**	**19.05**	**42.2%**	**11.0%**	**8.6%**
United Kingdom	0	0	0	0.0%	0.0%	0.0%	0.046	0.014	0.037	0.1%	0.0%	0.1%	1.034	0.479	0.686	1.7%	0.7%	1.0%
Sweden	0	0	0	0.0%	0.0%	0.0%	0	0	0	0.0%	0.0%	0.0%	0.022	0	0	0.2%	0.0%	0.0%
Denmark	0	0	0	0.0%	0.0%	0.0%	0	0	0	0.0%	0.0%	0.0%	0.025	0.003	0.002	0.4%	0.1%	0.0%
Ireland	0	0	0	0.0%	0.0%	0.0%	0.012	0	0.001	0.3%	0.0%	0.0%	0.213	0.007	0.036	4.8%	0.1%	0.6%
Norway	0	0	0	0.0%	0.0%	0.0%	0	0	0	0.0%	0.0%	0.0%	0.025	0	0	0.5%	0.0%	0.0%
Finland	0	0	0	0.0%	0.0%	0.0%	0	0	0	0.0%	0.0%	0.0%	0.019	0.003	0.006	0.4%	0.1%	0.1%
Lithuania	0.132	0.03	0.028	4.0%	1.0%	1.1%	1.107	0.533	0.359	33.3%	17.8%	14.2%	2.378	1.657	1.111	71.6%	55.3%	44.0%
Latvia	0.002	0	0.001	0.1%	0.0%	0.1%	0.104	0.027	0.026	4.6%	1.3%	1.5%	0.597	0.258	0.176	26.6%	12.8%	10.2%
Estonia	0.002	0	0	0.1%	0.0%	0.0%	0.077	0.013	0.015	5.8%	1.2%	1.6%	0.4	0.128	0.096	29.9%	11.7%	9.9%
Iceland	0	0	0	0.0%	0.0%	0.0%	0	0	0	0.0%	0.0%	0.0%	0.006	0	0	1.9%	0.0%	0.0%
Europe-North	**0.136**	**0.031**	**0.029**	**0.1%**	**0.0%**	**0.0%**	**1.348**	**0.586**	**0.438**	**1.4%**	**0.6%**	**0.4%**	**4.72**	**2.534**	**2.112**	**4.8%**	**2.4%**	**2.0%**
Italy	0	0	0	0.0%	0.0%	0.0%	0.161	0.078	0.375	0.3%	0.1%	0.8%	2.48	1.561	3.036	4.1%	2.8%	6.2%
Spain	0	0	0	0.0%	0.0%	0.0%	0.1	0.07	0.181	0.2%	0.2%	0.4%	1.812	1.407	1.811	3.9%	3.1%	4.5%
Greece	0	0	0	0.0%	0.0%	0.0%	0.012	0.014	0.075	0.1%	0.1%	0.7%	0.277	0.327	0.675	2.4%	3.0%	6.7%
Portugal	0	0	0	0.0%	0.0%	0.0%	0.093	0.119	0.188	0.9%	1.2%	2.3%	0.853	1.056	1.006	8.0%	10.7%	12.1%
Serbia	0.064	0	0	0.9%	0.0%	0.0%	2.051	0.055	0.011	28.1%	0.8%	0.2%	5.704	1.377	0.332	78.2%	21.1%	6.1%
Croatia	0.001	0	0.001	0.0%	0.0%	0.0%	0.074	0.03	0.045	1.7%	0.8%	1.3%	0.703	0.44	0.358	15.9%	11.0%	10.7%
Bosnia and Herzegovina	0.001	0	0.001	0.0%	0.0%	0.0%	0.055	0.022	0.033	1.5%	0.6%	1.1%	0.482	0.23	0.213	12.8%	6.2%	6.9%
Albania	0.092	0.032	0.073	2.9%	1.0%	2.5%	1.037	0.545	0.568	32.7%	17.1%	19.7%	2.35	1.706	1.422	74.2%	53.6%	49.4%
Macedonia, TFYR	0.112	0.129	0.1	5.5%	6.5%	5.8%	0.634	0.731	0.481	31.0%	36.7%	28.1%	1.295	1.411	0.97	63.4%	70.9%	56.7%
Slovenia	0	0	0	0.0%	0.0%	0.0%	0.003	0.002	0.011	0.1%	0.1%	0.7%	0.081	0.069	0.098	3.9%	3.6%	6.0%
Montenegro	0.106	0.14	0.094	16.9%	22.2%	16.1%	0.479	0.551	0.409	76.5%	87.5%	70.2%	0.612	0.623	0.556	97.8%	98.9%	95.4%
Malta	0	0	0	0.0%	0.0%	0.0%	0	0	0	0.0%	0.0%	0.0%	0.012	0.004	0.005	2.9%	1.0%	1.5%
Europe-South	**0.374**	**0.302**	**0.269**	**0.2%**	**0.2%**	**0.2%**	**4.701**	**2.217**	**2.377**	**3.1%**	**1.5%**	**1.9%**	**16.66**	**10.21**	**10.48**	**10.9%**	**7.0%**	**8.3%**
Germany	0	0	0	0.0%	0.0%	0.0%	0.001	0	0.002	0.0%	0.0%	0.0%	0.224	0.068	0.139	0.3%	0.1%	0.2%
France	0	0	0	0.0%	0.0%	0.0%	0.035	0.021	0.048	0.1%	0.0%	0.1%	1.118	0.836	0.873	1.8%	1.3%	1.3%
Netherlands	0	0	0	0.0%	0.0%	0.0%	0.003	0.001	0.007	0.0%	0.0%	0.0%	0.17	0.074	0.161	1.0%	0.4%	0.9%
Belgium	0	0	0	0.0%	0.0%	0.0%	0.005	0.003	0.007	0.0%	0.0%	0.1%	0.171	0.119	0.146	1.6%	1.0%	1.3%
Switzerland	0	0	0	0.0%	0.0%	0.0%	0.001	0	0	0.0%	0.0%	0.0%	0.059	0.009	0.009	0.8%	0.1%	0.1%
Austria	0	0	0	0.0%	0.0%	0.0%	0	0	0	0.0%	0.0%	0.0%	0.03	0.008	0.016	0.4%	0.1%	0.2%
Luxembourg	0	0	0	0.0%	0.0%	0.0%	0	0	0	0.0%	0.0%	0.0%	0	0	0	0.0%	0.0%	0.0%
Europe-West	**0**	**0**	**0**	**0.0%**	**0.0%**	**0.0%**	**0.046**	**0.025**	**0.066**	**0.0%**	**0.0%**	**0.0%**	**1.773**	**1.115**	**1.343**	**0.9%**	**0.6%**	**0.8%**

Poverty and Income

Base Case	Poverty below $20 per Day						GDP at MER				GDP per Capita at PPP				GDP at PPP			
Source: International Futures	Millions of People			Percent of Population			Billions in 2000 Dollars				Thousands in 2000 Dollars				Billions in 2010 dollars			
Model Version 6.61, Jan 2013	2010	2035	2060	2010	2035	2060	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	5689	6219	6288	83.1%	72.4%	65.4%	41239	87851	170946	314.5%	8.746	13.97	21.28	143.3%	76640.697	152626.357	258479.008	237.3%
Africa	1016	1581	2149	98.5%	91.3%	86.9%	926.9	3526	12624	1262.0%	2.36	4.131	7.814	231.1%	3038.178	8929.135	24141.535	694.6%
Americas	510.3	506.4	523.8	55.0%	44.3%	42.1%	15494	26125	39033	151.9%	19.31	25.66	33.69	74.5%	22760.244	37244.364	53166.446	133.6%
Asia with Oceania	3847	4003	3516	92.6%	79.9%	66.8%	14097	42600	97969	595.0%	5.894	12.69	22.59	283.3%	30431.695	79110.276	148129.641	386.8%
Europe	308.2	122.2	95.42	42.4%	17.6%	15.2%	10664	15501	21188	98.7%	20.55	28.45	38.81	88.9%	20410.580	27342.583	33041.386	61.9%
World	5689	6219	6288	83.1%	72.4%	65.4%	41239	87851	170946	314.5%	8.746	13.97	21.28	143.3%	76640.697	152626.357	258479.008	237.3%
Africa-Eastern	322.7	580.3	778.4	99.0%	98.2%	89.0%	113.1	698.5	4180	3595.8%	0.97	2.452	6.968	618.4%	395.087	1808.935	7613.340	1827.0%
Africa-Middle	127.2	208.4	328.8	98.7%	88.2%	89.4%	66.52	429.5	1337	1909.9%	1.538	3.585	5.678	269.2%	247.555	1058.437	2607.280	953.2%
Africa-Northern	208.3	243.1	250.8	98.0%	83.1%	75.0%	404.5	1127	2758	581.8%	4.666	7.495	12.49	167.7%	1238.988	2736.561	5216.546	321.0%
Africa-Southern	54.3	57.43	52.23	94.7%	89.9%	75.4%	204.6	511.5	1270	520.7%	8.307	13.79	23.46	182.4%	594.704	1099.603	2028.709	241.1%
Africa-Western	303.1	491.5	738.3	99.0%	89.8%	89.2%	138.3	759	3079	2126.3%	1.47	3.257	6.459	339.4%	561.844	2225.599	6675.659	1088.2%
Africa	1016	1581	2149	98.5%	91.3%	86.9%	926.9	3526	12624	1262.0%	2.36	4.131	7.814	231.1%	3038.178	8929.135	24141.535	694.6%
America-Caribbean	38.06	41.28	38.08	93.6%	85.0%	75.0%	200.8	478.2	901.7	349.1%	5.102	9.837	16.52	223.8%	259.084	596.980	1048.077	304.5%
America-Central	39.32	56.25	63.66	92.5%	88.9%	82.0%	105	294.4	666.4	534.7%	5.029	7.613	11.83	135.2%	266.892	601.392	1146.784	329.7%
America-North	123	141.5	137	27.2%	25.7%	22.7%	13250	19876	28028	111.5%	30.96	37.67	47.69	54.0%	17859.181	26504.497	36801.253	106.1%
America-South	309.9	267.4	285	78.9%	55.6%	55.7%	1938	5476	9438	387.0%	8.915	15.87	22.17	148.7%	4375.086	9541.495	14170.332	223.9%
Americas	510.3	506.4	523.8	55.0%	44.3%	42.1%	15494	26125	39033	151.9%	19.31	25.66	33.69	74.5%	22760.244	37244.364	53166.446	133.6%
Asia-East	1352	948.9	417	86.1%	58.2%	28.5%	9735	25735	52101	435.2%	8.704	20.08	38.92	347.2%	16899.265	40634.225	70747.564	318.6%
Asia-South Central	1704	2143	2190	98.7%	94.7%	85.5%	1469	8856	31380	2036.1%	2.929	7.885	16.35	458.2%	6315.869	22280.089	52322.956	728.4%
Asia-South East	565.8	656.3	642.8	96.0%	90.1%	83.9%	989	3182	6276	534.6%	4.258	8.252	12.52	194.0%	3134.026	7506.121	11971.190	282.0%
Asia-West	210.6	239.6	246.9	90.8%	70.8%	59.2%	1268	3562	6260	393.7%	10.55	16.25	20.01	89.7%	3089.327	6901.501	10426.979	237.5%
Oceania	14.41	15.43	18.88	40.5%	32.9%	34.2%	636.2	1264	1952	206.8%	22.34	30.58	38.59	72.7%	993.209	1788.338	2660.953	167.9%
Asia with Oceania	3847	4003	3516	92.6%	79.9%	66.8%	14097	42600	97969	595.0%	5.894	12.69	22.59	283.3%	30431.695	79110.276	148129.641	386.8%
Europe-East	224.1	60.43	41.8	76.3%	23.1%	18.9%	997.1	2323	3115	212.4%	11.79	20.53	24.58	108.5%	5381.202	8463.417	8459.575	57.2%
Europe-North	18.6	10.46	9.266	18.8%	9.9%	8.6%	2700	4072	5795	114.6%	28.47	39.03	54.13	90.1%	3509.082	5158.229	7227.762	106.0%
Europe-South	49.73	41.79	36.4	32.6%	28.7%	28.8%	2213	2865	3720	68.1%	21.3	25.41	33.25	56.1%	4305.903	4909.007	5573.621	29.4%
Europe-West	22.71	16.1	12.54	12.0%	8.5%	7.1%	4811	6341	8690	80.6%	29.2	35.45	50.66	73.5%	7214.393	8811.930	11780.429	63.3%
Europe	308.2	122.2	95.42	42.4%	17.6%	15.2%	10664	15501	21188	98.7%	20.55	28.45	38.81	88.9%	20410.580	27342.583	33041.386	61.9%

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Poverty below $20 per Day: Millions of People			Poverty below $20 per Day: Percent of Population			GDP at MER: Billions in 2000 Dollars				GDP per Capita at PPP: Thousands in 2000 Dollars				GDP at PPP: Billions in 2010 dollars			
	2010	2035	2060	2010	2035	2060	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA																		
Ethiopia	84.14	138.4	151.2	99.0%	99.0%	81.6%	17.95	172.6	1069	5855.4%	0.792	2.841	8.689	997.1%	84.022	496.092	2011.590	2294.1%
Tanzania, United Rep. of	44.58	87.04	118.7	99.0%	99.0%	87.5%	19.86	142.6	1415	7024.9%	1.135	3.116	13.3	1071.8%	63.794	342.133	2252.582	3431.0%
Uganda	33.46	67.49	95.41	99.0%	94.3%	81.5%	12.59	104.3	584.8	4545.0%	0.936	2.758	7.238	673.3%	39.520	246.360	1057.739	2576.5%
Kenya	40.46	72.02	95.03	99.0%	99.0%	90.5%	18.88	59.38	226.7	1100.7%	1.3	2.099	4.404	238.8%	66.316	190.670	577.380	770.6%
Madagascar	19.95	38.09	65.13	99.0%	99.0%	99.0%	4.898	8.561	16.27	232.2%	0.769	0.82	0.981	27.6%	19.342	39.420	80.551	316.5%
Mozambique	23.18	39.6	49.94	99.0%	97.0%	86.4%	9.083	93.43	424.5	4573.6%	0.717	3.141	8.517	1087.9%	20.965	160.203	614.340	2830.3%
Malawi	15.54	31.9	52.76	99.0%	99.0%	99.0%	2.731	12.79	56.57	1971.4%	0.629	1.234	2.653	321.8%	12.319	49.634	176.560	1333.2%
Zambia	13.13	24.53	37.59	99.0%	97.3%	97.5%	5.587	42.31	139.8	2402.2%	1.174	3.33	6.153	424.1%	19.442	104.787	296.307	1424.1%
Somalia	9.252	17.93	27.15	99.0%	99.0%	95.5%	4.746	13.91	79.21	1569.0%	0.474	1.121	3.82	705.9%	5.531	25.388	135.75	2354.2%
Rwanda	10.18	18.11	25.65	99.0%	99.0%	94.9%	3.56	18.15	96.69	2616.0%	0.927	2.178	5.862	532.4%	11.908	49.747	197.788	1560.9%
Zimbabwe	12.45	18.27	22.38	99.0%	99.0%	97.5%	3.934	9.612	21.41	444.2%	1.608	2.187	3.121	94.1%	25.288	50.425	89.575	254.2%
Burundi	8.453	13.92	19.93	99.0%	99.0%	99.0%	0.966	2.023	6.854	609.5%	0.32	0.491	1.075	235.9%	3.414	8.613	27.021	691.5%
Eritrea	5.171	9.208	12.96	99.0%	99.0%	97.4%	0.69	3.142	16.97	2359.4%	0.469	1.032	2.883	514.7%	3.055	11.982	47.911	1468.0%
Comoros	0.667	1.315	2.215	99.0%	99.0%	99.0%	0.247	0.477	1.597	546.6%	0.973	1.104	1.976	103.1%	0.819	1.831	5.522	574.1%
Djibouti	0.87	1.137	1.163	99.0%	99.0%	91.0%	0.816	1.438	3.373	313.4%	1.952	2.684	4.914	151.7%	2.145	3.854	7.849	265.9%
Mauritius	1.266	1.296	1.11	98.8%	97.2%	92.7%	6.524	13.82	21.62	231.4%	10.76	16.7	23.33	116.8%	17.207	27.795	34.875	102.7%
Africa-Eastern	**322.7**	**580.3**	**778.4**	**99.0%**	**98.2%**	**89.0%**	**113.1**	**698.5**	**4180**	**3595.8%**	**0.97**	**2.452**	**6.968**	**618.4%**	**395.087**	**1808.935**	**7613.340**	**1827.0%**
Congo, Democratic Rep. of	67.15	127	198.1	99.0%	99.0%	96.4%	6.842	24.56	131.8	1826.3%	0.279	0.576	1.62	480.6%	23.650	92.251	415.804	1658.2%
Angola	18.8	13.85	32.01	99.0%	39.7%	62.0%	24.69	273.3	904.2	3562.2%	4.28	14.04	22.88	434.6%	101.479	612.218	1474.667	1353.2%
Cameroon	19.73	32.47	44.43	98.8%	96.9%	92.3%	13.96	41.05	103.6	642.1%	1.728	2.772	4.404	154.9%	43.091	115.938	264.591	514.0%
Chad	11.39	22.33	36.28	99.0%	97.3%	90.4%	3.12	13.24	46.1	1377.6%	0.985	1.757	2.975	202.0%	14.147	50.346	149.215	954.7%
Central African Rep.	4.462	7.028	9.829	99.0%	99.0%	97.5%	1.063	2.828	9.211	766.5%	0.591	1.045	2.175	268.0%	3.324	9.264	27.371	723.4%
Congo, Rep. of	3.714	4.047	5.937	99.0%	67.3%	77.5%	5.089	31.16	70.75	1290.3%	3.532	8.866	13.27	275.7%	16.545	66.566	126.989	667.5%
Gabon	1.225	1.067	0.877	81.5%	47.4%	31.7%	6.318	19.34	38.36	507.2%	12.27	18.11	22.62	84.4%	23.038	50.870	78.141	239.2%
Equatorial Guinea	0.583	0.31	1.005	84.1%	28.4%	69.9%	5.374	23.86	32.46	504.0%	25.38	44.21	38.35	51.1%	21.964	60.235	68.801	213.2%
São Tomé and Príncipe	0.164	0.28	0.389	98.8%	98.9%	98.0%	0.073	0.191	0.522	615.1%	1.532	2.116	3.431	124.0%	0.318	0.749	1.703	436.2%
Africa-Middle	**127.2**	**208.4**	**328.8**	**98.7%**	**88.2%**	**89.4%**	**66.52**	**429.5**	**1337**	**1909.9%**	**1.538**	**3.585**	**5.678**	**269.2%**	**247.555**	**1058.437**	**2607.280**	**953.2%**
Egypt, Arab Rep.	83.65	111.9	102.1	99.0%	98.4%	79.5%	160.2	400.3	926.6	478.4%	4.696	7.122	11.55	146.0%	495.468	1011.539	1853.011	274.0%
Sudan	42.78	67.36	60.71	99.0%	96.0%	67.7%	23.83	175.1	908.6	3712.8%	1.831	5.223	13.82	654.8%	98.781	457.509	1547.089	1466.2%
Algeria	35.07	15.72	45.12	99.0%	34.2%	91.3%	78.96	188.7	297.4	276.6%	6.687	9.492	11.61	73.6%	295.807	544.291	716.356	142.2%
Morocco	31.31	37.19	33.44	96.7%	91.3%	77.1%	59.71	143.4	298.2	399.4%	3.686	6.068	10.08	173.5%	149.090	308.669	546.288	266.4%
Tunisia	9.688	10.35	8.708	91.9%	80.9%	65.5%	30.35	81.75	173.6	472.0%	6.842	11.44	18.09	164.4%	90.016	182.679	300.427	233.7%
Libya	5.768	0.62	0.692	88.1%	6.9%	6.7%	51.44	137.9	153.8	199.0%	13.42	20.54	19.55	45.7%	109.825	231.875	253.375	130.7%
Africa-Northern	**208.3**	**243.1**	**250.8**	**98.0%**	**83.1%**	**75.0%**	**404.5**	**1127**	**2758**	**581.8%**	**4.666**	**7.495**	**12.49**	**167.7%**	**1238.988**	**2736.561**	**5216.546**	**321.0%**

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Poverty below $20 per Day						GDP at MER				GDP per Capita at PPP				GDP at PPP			
	Millions of People			Percent of Population			Billions in 2000 Dollars				Thousands in 2000 Dollars				Billions in 2010 dollars			
	2010	2035	2060	2010	2035	2060	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA continued																		
South Africa	47.17	48.42	42.38	94.6%	89.7%	73.1%	187	449.3	1145	512.3%	8.643	14.26	24.95	188.7%	538.047	961.593	1806.810	235.8%
Namibia	2.097	2.87	3.362	94.8%	89.2%	86.9%	6.058	23.61	50.86	739.6%	5.388	10.8	16.44	205.1%	14.884	43.391	79.452	433.8%
Lesotho	2.034	2.456	2.473	97.6%	96.3%	90.3%	0.997	2.988	6.699	571.9%	1.338	2.691	4.802	258.9%	3.484	8.568	16.432	371.7%
Botswana	1.81	2.019	2.062	91.5%	83.1%	77.5%	8.64	31.08	58.57	577.9%	13	24.31	31.54	142.6%	32.128	73.796	104.700	225.9%
Swaziland	1.19	1.656	1.958	99.0%	99.0%	99.0%	1.877	4.436	9.295	395.2%	4.105	5.869	8.635	110.4%	6.161	12.256	21.315	246.0%
Africa-Southern	**54.3**	**57.43**	**52.23**	**94.7%**	**89.9%**	**75.4%**	**204.6**	**511.5**	**1270**	**520.7%**	**8.307**	**13.79**	**23.46**	**182.4%**	**594.704**	**1099.603**	**2028.709**	**241.1%**
Nigeria	156.7	220.7	326.2	99.0%	80.7%	82.7%	84.91	569.9	2380	2703.0%	1.854	4.714	9.874	432.6%	366.482	1609.522	4864.777	1227.4%
Niger	15.74	36.26	73.62	99.0%	99.0%	99.0%	2.84	9.147	23.58	730.3%	0.575	0.841	1.125	95.7%	11.411	38.471	104.438	815.2%
Côte d'Ivoire	21.35	38.25	52.61	99.0%	98.9%	89.7%	11.59	34.59	109.3	843.1%	1.367	2.157	3.906	185.7%	36.810	104.201	285.943	676.8%
Burkina Faso	16.14	31.48	50.9	99.0%	99.0%	99.0%	4.405	15.19	56.47	1182.0%	0.986	1.55	2.892	193.3%	20.078	61.559	185.676	824.8%
Ghana	24.09	37.34	37.87	99.0%	98.7%	79.8%	8.65	45.21	240.1	2675.7%	1.311	3.089	8.496	548.1%	39.832	145.968	503.085	1163.0%
Mali	13.19	26.15	42.68	99.0%	99.0%	99.0%	4.135	17.52	53.97	1205.2%	0.853	1.651	2.869	236.3%	14.185	54.454	154.459	988.9%
Senegal	12.74	23.18	35.11	99.0%	99.0%	99.0%	6.975	19.01	46.63	568.5%	1.525	2.167	3.217	111.0%	24.499	63.332	142.472	481.5%
Guinea	10.21	18.66	30.9	99.0%	99.0%	99.0%	4.108	11.84	25.46	519.8%	0.804	1.384	1.984	146.8%	10.356	32.578	77.329	646.7%
Benin	9.125	17.99	29.04	99.0%	99.0%	99.0%	3.319	10.58	41.63	1154.3%	1.13	1.703	3.355	196.9%	12.999	38.634	122.868	845.2%
Togo	6.715	11.59	17.34	99.0%	99.0%	99.0%	1.69	2.423	4.297	154.3%	0.687	0.719	0.929	35.2%	5.821	10.519	20.328	249.2%
Sierra Leone	5.777	9.984	12.85	99.0%	98.1%	87.8%	1.587	8.623	50.16	3060.7%	0.671	1.774	5.376	701.2%	4.890	22.551	98.232	1908.9%
Liberia	4.083	7.566	11.24	99.0%	99.0%	98.9%	0.617	4.891	22.06	3475.4%	0.327	1.229	3.325	916.8%	1.684	11.724	47.149	2699.1%
Mauritania	3.335	5.677	8.334	99.0%	99.0%	99.0%	1.592	3.802	7.408	365.3%	1.578	2.064	2.592	64.3%	6.637	14.772	27.246	310.5%
Gambia	1.733	3.367	4.691	99.0%	99.0%	92.0%	0.689	2.594	9.345	1256.3%	1.071	1.894	3.811	255.8%	2.341	8.045	24.249	935.7%
Guinea-Bissau	1.632	2.758	4.385	99.0%	99.0%	99.0%	0.238	0.59	1.158	386.6%	0.893	1.131	1.276	42.9%	1.837	3.932	7.056	284.2%
Cape Verde	0.498	0.601	0.562	97.1%	91.3%	78.9%	0.94	3.044	6.725	615.4%	3.093	6.499	11.64	276.3%	1.982	5.339	10.351	422.4%
Africa-Western	**303.1**	**491.5**	**738.3**	**99.0%**	**89.8%**	**89.2%**	**138.3**	**759**	**3079**	**2126.3%**	**1.47**	**3.257**	**6.459**	**339.4%**	**561.844**	**2225.599**	**6675.659**	**1088.2%**

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Poverty below $20 per Day						GDP at MER				GDP per Capita at PPP				GDP at PPP			
	Millions of People			Percent of Population			Billions in 2000 Dollars				Thousands in 2000 Dollars				Billions in 2010 dollars			
	2010	2035	2060	2010	2035	2060	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS																		
Haiti	10.09	14.25	16.66	99.0%	99.0%	97.6%	3.712	8.787	17.95	383.6%	0.826	1.43	2.426	193.7%	10.514	25.710	51.694	391.7%
Dominican Rep.	9.085	9.203	9.072	88.8%	69.5%	61.9%	40.2	164.1	363.3	803.7%	7.465	16.37	27	261.7%	95.348	270.834	494.095	418.2%
Cuba	11.09	10.77	5.785	99.0%	98.4%	62.0%	48.96	118.1	268.6	448.6%	2.185	6.911	18.8	760.4%	30.6	94.6	219.375	616.9%
Puerto Rico	3.626	3.534	2.795	91.1%	81.1%	65.4%	73.78	125.4	175.7	138.1%	9.519	17.12	29.76	212.6%	47.35	93.238	159	235.8%
Jamaica	2.38	2.633	2.506	87.7%	84.0%	79.4%	9.851	14.61	22.67	130.1%	6.077	7.551	10.58	74.1%	20.613	29.588	41.738	102.5%
Trinidad and Tobago	1.086	0.063	0.493	80.7%	4.6%	40.9%	14.12	33.49	34.58	144.9%	20.6	33.83	34.88	69.3%	34.600	58.312	52.481	51.7%
Bahamas	0.063	0.128	0.113	18.2%	31.4%	27.7%	5.762	7.386	9.345	62.2%	26.34	26.21	28.85	9.5%	11.382	13.348	14.697	29.1%
Barbados	0.254	0.252	0.205	98.8%	98.8%	93.6%	2.646	3.295	4.623	74.7%	16.01	18.28	24.98	56.0%	5.143	5.815	6.843	33.1%
Saint Lucia	0.172	0.184	0.166	98.9%	98.9%	97.6%	0.823	1.42	2.033	147.0%	7.799	11.09	15.4	97.5%	1.694	2.576	3.276	93.4%
Grenada	0.103	0.135	0.147	99.0%	98.5%	96.1%	0.455	0.758	1.432	214.7%	6.639	8.281	12.42	87.1%	0.862	1.412	2.380	176.2%
Saint Vincent and the Grenadines	0.108	0.133	0.135	99.1%	99.3%	94.4%	0.461	0.785	1.486	222.3%	7.205	9.236	14.03	94.7%	0.980	1.547	2.499	154.9%
America-Caribbean	**38.06**	**41.28**	**38.08**	**93.6%**	**85.0%**	**75.0%**	**200.8**	**478.2**	**901.7**	**349.1%**	**5.102**	**9.837**	**16.52**	**223.8%**	**259.084**	**596.980**	**1048.077**	**304.5%**
Guatemala	13.65	23.01	28.87	94.9%	93.3%	86.0%	26.74	79.15	251.9	842.0%	3.792	5.789	10.81	185.1%	68.064	178.309	452.764	565.2%
Honduras	7.249	11.13	13.19	95.2%	95.0%	91.2%	10.59	25.44	49.94	371.6%	3.137	4.468	6.409	104.3%	29.830	65.355	115.826	288.3%
Nicaragua	5.762	8.232	9.306	99.0%	98.9%	95.9%	5.222	11.2	20	283.0%	2.111	3.017	4.333	105.3%	15.346	31.366	52.494	242.1%
El Salvador	5.713	7.242	7.316	92.3%	92.4%	85.7%	15.93	33.19	68.22	328.2%	6.332	8.654	12.98	105.0%	48.960	84.659	138.227	182.3%
Costa Rica	3.585	3.511	3.272	77.3%	60.9%	54.7%	24.05	61.07	106.7	343.7%	9.114	14.82	21.14	132.0%	52.806	106.673	157.955	199.1%
Panama	3.02	2.63	1.235	86.0%	59.0%	25.6%	21.28	81.45	162.5	663.6%	11.3	23.32	36.32	221.4%	49.547	129.861	218.890	341.8%
Belize	0.341	0.496	0.471	99.1%	98.4%	80.0%	1.212	2.917	7.107	486.4%	5.444	8.217	14.45	165.4%	2.339	5.169	10.629	354.5%
America-Central	**39.32**	**56.25**	**63.66**	**92.5%**	**88.9%**	**82.0%**	**105**	**294.4**	**666.4**	**534.7%**	**5.029**	**7.613**	**11.83**	**135.2%**	**266.892**	**601.392**	**1146.784**	**329.7%**
United States of America	28.73	31.62	32.38	9.3%	8.4%	7.7%	11686	17129	24015	105.5%	37.74	45.56	56.98	51.0%	14591.834	21388.287	29986.555	105.5%
Mexico	90.6	108	102.3	83.5%	80.7%	73.9%	691.4	1297	2000	189.3%	11.53	14.97	19.23	66.8%	1916.201	3071.130	4074.417	112.6%
Canada	3.709	1.851	2.364	10.9%	4.5%	5.3%	872.8	1451	2013	130.6%	31.22	39.56	48.18	54.3%	1351.146	2045.080	2740.281	102.8%
America-North	**123**	**141.5**	**137**	**27.2%**	**25.7%**	**22.7%**	**13250**	**19876**	**28028**	**111.5%**	**30.96**	**37.67**	**47.69**	**54.0%**	**17859.181**	**26504.497**	**36801.253**	**106.1%**
Brazil	155.5	131.7	140.5	79.5%	57.3%	59.7%	916.1	2656	4384	378.6%	8.89	16.23	22.25	150.3%	2170.170	4658.748	6534.235	201.1%
Colombia	42.17	43.68	50.64	91.0%	73.8%	78.8%	147.8	437.5	762.3	415.8%	7.459	12.79	17.1	129.3%	431.412	945.235	1372.277	218.1%
Argentina	19.47	10.28	11.2	47.9%	21.2%	21.5%	434.4	1085	1721	296.2%	12.72	23.58	33.46	163.1%	645.807	1427.218	2181.408	237.8%
Peru	27.12	26.68	32.18	91.9%	69.3%	74.6%	92.43	351.4	661.3	615.5%	7.483	14.92	20.52	174.2%	275.579	717.480	1104.814	300.9%
Venezuela (Bolivarian Rep. of)	27.06	23.6	9.174	93.8%	62.1%	21.6%	157	439.2	1075	584.7%	9.599	15.94	28.22	194.0%	345.629	756.313	1497.143	333.2%
Ecuador	12.61	10.7	14.87	91.6%	58.5%	72.4%	24.9	64.48	107.2	330.5%	6.58	9.475	11.32	72.0%	113.154	216.393	290.313	156.6%
Chile	9.12	4.702	8.747	53.2%	23.6%	43.3%	108.7	289.3	392	260.6%	12.12	20.49	24.05	98.4%	261.195	514.215	611.425	134.1%
Bolivia (Plurinational State of)	9.114	7.414	10.54	90.9%	50.2%	59.2%	12.25	47.88	137.1	1019.2%	3.53	6.778	12.15	244.2%	44.228	124.866	270.085	510.7%
Paraguay	5.622	7.138	6.325	87.0%	76.8%	57.6%	10.48	29.08	63.53	506.2%	4.069	6.398	9.772	140.2%	32.827	74.220	133.981	308.1%
Uruguay	0.915	0.276	0.175	27.3%	7.5%	4.7%	31.27	70.94	122.6	292.1%	11.52	20.66	33.64	192.0%	48.273	94.436	155.833	222.8%
Guyana	0.711	0.703	0.399	93.4%	91.5%	61.9%	0.907	1.738	3.301	263.9%	2.704	4.454	8.209	203.6%	2.570	4.270	6.608	157.1%
Suriname	0.514	0.465	0.276	97.9%	87.1%	58.8%	1.454	3.849	7.708	430.1%	6.461	12.12	20.81	222.1%	4.244	8.101	12.212	187.8%
America-South	**309.9**	**267.4**	**285**	**78.9%**	**55.6%**	**55.7%**	**1938**	**5476**	**9438**	**387.0%**	**8.915**	**15.87**	**22.17**	**148.7%**	**4375.086**	**9541.495**	**14170.332**	**223.9%**

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Poverty below $20 per Day						GDP at MER				GDP per Capita at PPP				GDP at PPP			
	Millions of People			Percent of Population			Billions in 2000 Dollars				Thousands in 2000 Dollars				Billions in 2010 dollars			
	2010	2035	2060	2010	2035	2060	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA																		
China	1299	914.1	382.3	97.1%	65.0%	30.1%	3240	17293	42740	1219.1%	6.034	17.85	37.88	527.8%	10084.173	31331.361	60043.035	495.4%
Japan	8.599	1.249	0.722	6.7%	1.1%	0.8%	5062	5728	6238	23.2%	27.41	38.21	55.52	102.6%	4269.750	5395.555	6467.577	51.5%
Korea, Rep. of	12.44	3.281	3.155	25.4%	6.7%	7.9%	798.8	1642	1931	141.7%	23.89	38.43	52.72	120.7%	1369.777	2201.260	2479.203	81.0%
Korea, Dem. People's Rep. of	23.75	25.81	25.13	99.0%	99.0%	98.3%	32.19	50.14	69.79	116.8%	0.9	2.063	3.756	317.3%	27	67.25	120.038	344.6%
Taiwan, China	4.393	1.187	2.097	19.1%	5.0%	10.7%	349.8	591.8	675.5	93.1%	28.23	36.24	42.39	50.2%	812.375	1067.5	1043.375	28.4%
Hong Kong SAR, China	1.334	0.161	1.196	19.0%	2.0%	15.0%	250.2	419.8	419.4	67.6%	37.18	53.44	53.69	44.4%	326.400	541.544	535.175	64.0%
Mongolia	2.674	3.107	2.311	99.0%	89.4%	60.6%	2.029	9.83	27.44	1252.4%	2.903	6.858	12.42	327.8%	9.791	29.756	59.161	504.3%
Asia-East	**1352**	**948.9**	**417**	**86.1%**	**58.2%**	**28.5%**	**9735**	**25735**	**52101**	**435.2%**	**8.704**	**20.08**	**38.92**	**347.2%**	**16899.265**	**40634.225**	**70747.564**	**318.6%**
India	1159	1480	1428	99.0%	99.0%	86.1%	977.2	7063	27256	2689.2%	2.886	9.147	20.87	623.1%	4219.220	17079.163	43227.339	924.5%
Pakistan	171.6	262.1	331.8	99.0%	99.0%	99.0%	116.8	308.9	811.7	594.9%	2.154	3.183	5.314	146.7%	466.249	1052.370	2223.862	377.0%
Bangladesh	162.8	206.8	202.5	99.0%	99.0%	90.9%	82.94	341	1233	1386.6%	1.193	3.05	7.863	559.1%	244.987	795.521	2187.651	793.0%
Afghanistan	30.3	60.4	97.95	99.0%	99.0%	99.0%	13.68	69.39	231	1588.6%	1.124	2.411	4.423	293.5%	43	183.875	547.125	1172.4%
Iran, Islamic Rep. of	70.22	13.25	2.472	95.1%	15.2%	2.8%	159.7	533.8	811.2	408.0%	9.165	16.36	18.97	107.0%	846.25	1787.5	2075	145.2%
Nepal	29.56	41.49	47	99.0%	99.0%	97.7%	7.995	22.01	55.25	591.1%	0.955	1.624	2.948	208.7%	35.612	84.971	177.060	397.2%
Uzbekistan	27.95	34.99	38.6	99.0%	93.9%	93.8%	26.9	122	269.2	900.7%	2.467	5.965	9.951	303.4%	86.957	277.452	510.951	487.6%
Sri Lanka	20.25	22.03	19.28	99.0%	93.7%	81.8%	27.31	95.18	246.9	804.1%	4.153	8.536	15.76	279.5%	106.049	250.481	463.627	337.2%
Kazakhstan	14.01	2.439	0.465	87.0%	14.6%	3.0%	40.4	144.3	191.2	373.3%	9.674	19.94	22.33	130.8%	194.541	414.805	433.285	122.7%
Tajikistan	6.999	10.39	12.65	99.0%	99.0%	97.8%	1.844	6.097	15.95	765.0%	1.669	2.668	4.116	146.6%	14.734	34.962	66.479	351.2%
Kyrgyz Rep.	5.31	7.469	8.242	99.0%	99.0%	96.4%	2.02	4.798	12.43	515.3%	1.814	2.492	4.202	131.6%	12.148	23.475	44.877	269.4%
Turkmenistan	5.061	0.126	0.004	97.8%	1.9%	0.1%	10.2	138.9	230.4	2158.8%	6.247	33.14	34.99	460.1%	40.382	280.699	337.013	734.6%
Bhutan	0.7	0.832	0.702	99.0%	91.1%	69.2%	0.958	4.511	13.71	1331.1%	4.394	10.12	19.2	337.0%	3.880	11.539	24.299	526.3%
Maldives	0.31	0.386	0.347	99.0%	98.2%	85.9%	1.098	1.907	2.491	126.9%	4.761	6.682	8.699	82.7%	1.861	3.276	4.388	135.8%
Asia-South Central	**1704**	**2143**	**2190**	**98.7%**	**94.7%**	**85.5%**	**1469**	**8856**	**31380**	**2036.1%**	**2.929**	**7.885**	**16.35**	**458.2%**	**6315.869**	**22280.089**	**52322.956**	**728.4%**
Indonesia	230.3	264.3	283.8	99.0%	93.3%	96.2%	274.3	1141	1994	626.9%	3.706	8.316	11.54	211.4%	1076.594	2941.842	4249.188	294.7%
Philippines	92.71	130.8	142.6	99.0%	97.4%	92.1%	119.9	407.2	1129	841.6%	3.003	5.645	10.68	255.6%	351.123	946.858	2066.531	488.5%
Vietnam	87.48	104.6	84.93	99.0%	96.9%	76.5%	62.83	209.7	435.5	593.1%	2.494	4.872	7.771	211.6%	275.080	657.169	1076.844	291.5%
Thailand	63.96	59.75	48.89	93.9%	86.5%	79.4%	187.5	443.9	751.8	301.0%	6.91	11.84	17.62	155.0%	587.994	1021.403	1354.795	130.4%
Myanmar	49.98	53.74	38.93	99.0%	91.3%	65.9%	14.8	50.42	221.7	1398.0%	1.002	2.215	6.53	551.7%	63.2	163	482	662.7%
Malaysia	17.78	12.72	12.73	63.7%	34.3%	30.5%	146.9	485.1	1054	617.5%	11.84	20.7	30.5	157.6%	412.932	958.596	1588.295	284.6%
Cambodia	14.9	19.3	18.95	99.0%	97.2%	85.7%	7.739	38.2	116.7	1407.9%	1.602	4.12	8.547	433.5%	30.118	102.140	235.997	683.6%
Lao People's Democratic Rep.	6.373	8.721	8.462	99.0%	97.9%	82.2%	3.376	23.73	89.96	2564.7%	1.926	5.804	13.01	575.5%	15.483	64.593	167.320	980.6%
Singapore	0.994	0.147	0.169	19.3%	2.4%	2.7%	164.2	364	453.9	176.4%	46.67	78.16	88.51	89.7%	299.678	609.596	694.754	131.8%
Timor-Leste	1.159	2.181	3.285	99.0%	99.0%	97.0%	0.39	1.743	6.795	1642.3%	0.63	1.508	3.51	457.1%	0.922	4.151	14.847	1511.1%
Brunei Darussalam	0.158	0	0	38.7%	0.0%	0.0%	7.004	17.05	21.96	213.5%	41.04	53.74	52.24	27.3%	20.903	36.773	40.619	94.3%
Asia-South Eastern	**565.8**	**656.3**	**642.8**	**96.0%**	**90.1%**	**83.9%**	**989**	**3182**	**6276**	**534.6%**	**4.258**	**8.252**	**12.52**	**194.0%**	**3134.026**	**7506.121**	**11971.190**	**282.0%**

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Poverty below $20 per Day						GDP at MER				GDP per Capita at PPP				GDP at PPP			
	Millions of People			Percent of Population			Billions in 2000 Dollars				Thousands in 2000 Dollars				Billions in 2010 dollars			
	2010	2035	2060	2010	2035	2060	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA continued																		
Turkey	71.49	81.6	77.18	94.4%	89.4%	81.7%	386.8	933.1	1772	358.1%	10.93	16.72	24.12	120.7%	1106.524	2041.395	3046.719	175.3%
Iraq	31.78	43.8	29.86	98.4%	72.0%	34.1%	23.58	154.8	558.1	2266.8%	2.744	6.205	11.23	309.3%	110.656	471.119	1227.182	1009.0%
Yemen, Rep. of	24.02	47.25	71.13	99.0%	99.0%	97.1%	14.38	60.96	163	1033.5%	2.084	3.521	5.149	147.1%	63.145	209.775	470.869	645.7%
Saudi Arabia	23.81	2.329	1.062	91.6%	6.4%	2.5%	259.8	790.8	1164	348.0%	19.28	30.36	33.37	73.1%	625.703	1384.763	1754.366	180.4%
Syrian Arab Rep.	21.4	31.84	34.58	99.0%	98.7%	88.4%	29.39	84.03	267.2	809.2%	3.827	5.899	11.25	194.0%	103.302	237.745	549.410	431.9%
Jordan	5.549	8.667	7.568	91.1%	84.4%	56.6%	15.32	47.77	154.2	906.5%	4.218	6.954	13.85	228.4%	32.091	89.217	231.377	621.0%
Israel	2.401	1.264	0.89	31.7%	11.8%	6.8%	169.7	421	804.8	374.2%	23.63	39.84	61.63	160.8%	180.757	431.353	815.675	351.3%
Palestine	4.11	8.068	12.41	99.0%	99.0%	99.0%	3.776	8.057	22.72	501.7%	2.516	2.75	4.273	69.8%	13.05	28.013	66.95	413.0%
Azerbaijan	8.728	1.986	0.705	98.3%	18.4%	6.3%	21.23	65.68	104.1	390.3%	7.968	13.76	16.84	111.3%	88.380	185.551	233.874	164.6%
United Arab Emirates	0.24	0.003	0	5.1%	0.1%	0.0%	121.6	310.5	389.9	220.6%	45.33	77.55	88.06	94.3%	266.963	578.129	645.182	141.7%
Kuwait	1.734	0.01	0.002	60.5%	0.2%	0.0%	62.35	241.1	341.7	448.0%	37.79	77.32	76.29	101.9%	135.105	424.544	542.543	301.6%
Lebanon	4.211	4.787	4.523	99.0%	97.7%	95.1%	28.79	73.26	102.6	256.4%	10.26	17.89	23.41	128.2%	54.504	109.395	138.976	155.0%
Oman	2.667	1.078	1.078	91.8%	27.6%	25.1%	31.63	91.47	114.6	262.3%	21.34	33.12	33.37	56.4%	77.429	161.577	179.183	131.4%
Armenia	3.058	3.199	2.861	99.0%	99.0%	95.0%	4.108	8.337	18.45	349.1%	4.361	6.545	11.26	158.2%	16.819	26.409	42.355	151.8%
Georgia	4.172	3.436	2.813	99.0%	99.0%	95.6%	5.595	9.241	14.03	150.8%	4.09	6.369	9.198	124.9%	21.514	27.608	33.801	57.1%
Qatar	0.684	0	0	44.1%	0.0%	0.0%	63.04	212.2	210.8	234.4%	70.46	178.7	172.9	145.4%	136.354	408.561	357.741	162.4%
Bahrain	0.367	0.112	0.069	45.5%	10.1%	5.8%	14.12	31.79	38.84	175.1%	27.78	36.32	37.85	36.2%	27.957	50.246	56.177	100.9%
Cyprus	0.171	0.205	0.211	19.4%	21.8%	24.8%	12.3	17.92	19.37	57.5%	23.08	26.87	28.41	23.1%	29.073	36.102	34.599	19.0%
Asia-West	**210.6**	**239.6**	**246.9**	**90.8%**	**70.8%**	**59.2%**	**1268**	**3562**	**6260**	**393.7%**	**10.55**	**16.25**	**20.01**	**89.7%**	**3089.327**	**6901.501**	**10426.979**	**237.5%**
Australia	4.183	1.222	1.386	18.7%	4.4%	4.3%	563.2	1123	1656	194.0%	30.52	44.36	55.36	81.4%	847.278	1536.888	2195.909	159.2%
Papua New Guinea	6.822	10.3	13.45	99.0%	92.9%	92.7%	5.01	23.41	63.62	1169.9%	1.909	4.208	7.346	284.8%	16.420	58.287	133.107	710.6%
New Zealand	1.394	1.133	0.664	31.9%	22.3%	12.5%	64.46	111.2	219.7	240.8%	21.74	27.35	44.49	104.6%	121.875	178.456	304.751	150.1%
Solomon Islands	0.53	0.913	1.389	99.1%	96.2%	97.6%	0.601	1.754	3.075	411.6%	2.165	3.435	4.25	96.3%	1.446	4.072	7.551	422.2%
Fiji	0.845	0.904	0.784	98.9%	99.0%	96.0%	1.865	2.515	4.708	152.4%	3.243	4.37	8.11	150.1%	3.459	4.980	8.271	139.1%
Vanuatu	0.244	0.407	0.541	99.2%	99.0%	96.4%	0.383	0.93	2.057	437.1%	3.654	4.851	6.913	89.2%	1.123	2.489	4.841	331.3%
Micronesia (Federated States of)	0.111	0.178	0.238	99.1%	97.8%	96.0%	0.221	0.451	0.788	256.6%	2.487	3.602	5.062	103.5%	0.348	0.818	1.565	349.1%
Tonga	0.103	0.169	0.232	99.0%	98.8%	99.1%	0.21	0.428	1.222	481.9%	3.608	4.559	8.083	124.0%	0.468	0.971	2.362	404.5%
Samoa	0.177	0.208	0.204	98.9%	99.0%	95.8%	0.325	0.614	1.42	336.9%	3.547	5.244	9.757	175.1%	0.793	1.377	2.596	227.4%
Oceania	**14.41**	**15.43**	**18.88**	**40.5%**	**32.9%**	**34.2%**	**636.2**	**1264**	**1952**	**206.8%**	**22.34**	**30.58**	**38.59**	**72.7%**	**993.209**	**1788.338**	**2660.953**	**167.9%**

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	Poverty below $20 per Day: Millions of People			Percent of Population			GDP at MER: Billions in 2000 Dollars				GDP per Capita at PPP: Thousands in 2000 Dollars				GDP at PPP: Billions in 2010 dollars			
	2010	2035	2060	2010	2035	2060	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
EUROPE																		
Russian Federation	105	3.613	0.391	74.0%	2.8%	0.4%	413.7	1189	1492	260.6%	12.54	23.92	26.58	112.0%	3144.006	5399.835	5113.212	62.6%
Ukraine	41.52	0.805	0.423	90.7%	2.2%	1.4%	47.31	115.7	171.1	261.7%	5.313	9.995	13.2	148.4%	303.549	463.003	498.839	64.3%
Poland	22.05	11.3	10.23	57.8%	31.8%	34.2%	250.7	533.6	740.3	195.3%	15.34	24.75	31.77	107.1%	755.920	1136.074	1228.240	62.5%
Romania	21.24	18.84	13.83	99.0%	98.4%	88.5%	55.29	86.33	135.8	145.6%	9.451	12.39	17.2	82.0%	325.620	381.041	431.803	32.6%
Czech Rep.	3.058	3.388	2.027	29.0%	33.0%	21.9%	77.55	118.4	166.4	114.6%	20.05	24.18	28.68	43.0%	253.453	297.152	317.984	25.5%
Belarus	8.839	4.977	2.478	91.6%	55.9%	31.8%	26.57	65.54	116.2	337.3%	11.54	19.63	27.28	136.4%	138.976	218.266	265.090	90.7%
Hungary	6.882	4.474	2.849	68.8%	51.4%	40.2%	59.17	97.28	134.8	127.8%	15.16	21.24	27.51	81.5%	213.445	260.017	274.228	28.5%
Bulgaria	6.66	4.77	3.274	88.2%	78.4%	66.4%	19.31	28.83	45.96	138.0%	10.31	13.82	19.09	85.2%	107.329	116.075	129.896	21.0%
Slovak Rep.	5.289	4.947	3.772	97.4%	95.2%	86.5%	45.32	84.91	105.9	133.7%	17.71	25.8	31.02	75.2%	127.936	178.394	179.991	40.7%
Moldova, Rep. of	3.515	3.311	2.525	98.3%	99.0%	90.3%	2.11	3.148	6.565	211.1%	2.457	3.248	5.814	136.6%	10.968	13.560	20.291	85.0%
Europe-East	**224.1**	**60.43**	**41.8**	**76.3%**	**23.1%**	**18.9%**	**997.1**	**2323**	**3115**	**212.4%**	**11.79**	**20.53**	**24.58**	**108.5%**	**5381.202**	**8463.417**	**8459.575**	**57.2%**
United Kingdom	8.701	5.679	5.682	14.0%	8.4%	8.2%	1707	2498	3674	115.2%	28.68	37.54	53.39	86.2%	2149.007	3044.226	4441.201	106.7%
Sweden	0.93	0.088	0.039	9.9%	0.9%	0.4%	303.3	472.4	681.5	124.7%	29.92	44.95	65.77	119.8%	336.761	535.484	787.576	133.9%
Denmark	0.812	0.225	0.078	14.6%	3.8%	1.3%	172.4	245.5	358.8	108.1%	29.19	39.76	57.86	98.2%	223.600	323.560	480.108	114.7%
Ireland	1.282	0.179	0.399	28.7%	3.3%	6.7%	125.5	239.7	318.4	153.7%	31.84	47.69	56.36	77.0%	186.935	338.558	439.114	134.9%
Norway	0.689	0	0.01	14.1%	0.0%	0.2%	198.5	320.4	328.2	65.3%	41.6	58.9	57.39	38.0%	300.557	482.103	490.974	63.4%
Finland	0.558	0.181	0.15	10.4%	3.3%	2.8%	145.9	213.2	301.8	106.9%	27.63	38.94	56.9	105.9%	181.586	262.332	370.279	103.9%
Lithuania	3.129	2.645	1.967	94.2%	88.3%	77.9%	17.44	27.65	45.52	161.0%	13.49	18.1	26	92.7%	57.753	69.842	84.613	46.5%
Latvia	1.496	0.962	0.615	66.7%	47.9%	35.5%	11.18	20.06	33.14	196.4%	11.87	17.78	25.8	117.4%	34.790	46.705	58.358	67.7%
Estonia	0.935	0.5	0.327	69.8%	45.8%	33.9%	8.448	15.81	28.95	242.7%	14.75	23.89	36.78	149.4%	27.616	36.482	49.681	79.9%
Iceland	0.063	0.001	0	19.6%	0.3%	0.0%	10.84	18.81	24.73	128.1%	29.09	45.59	60.92	109.4%	10.474	18.936	25.858	146.9%
Europe-North	**18.6**	**10.46**	**9.266**	**18.8%**	**9.9%**	**8.6%**	**2700**	**4072**	**5795**	**114.6%**	**28.47**	**39.03**	**54.13**	**90.1%**	**3509.082**	**5158.229**	**7227.762**	**106.0%**
Italy	14.8	11.31	12.59	24.4%	19.9%	25.9%	1127	1382	1684	49.4%	23.8	27.95	36.25	52.3%	1840.014	2022.485	2249.615	22.3%
Spain	11.66	9.973	8.78	25.2%	21.8%	21.7%	712.8	997.8	1381	93.7%	23.87	28.66	38.25	60.2%	1531.809	1817.118	2138.438	39.6%
Greece	2.196	2.479	2.896	19.4%	22.4%	28.6%	159.9	188.2	244.5	52.9%	22.42	24.09	29.12	29.9%	324.557	341.040	376.563	16.0%
Portugal	3.553	4.038	3.057	33.4%	40.9%	36.9%	124.9	148.9	199.8	60.0%	19.04	21.55	28.32	48.7%	283.707	298.131	328.658	15.8%
Serbia	7.172	5.114	2.238	98.4%	78.5%	41.3%	9.158	19.74	35.23	284.7%	8.994	13.74	18.88	109.9%	87.959	120.073	137.230	56.0%
Croatia	2.439	1.961	1.309	55.1%	49.1%	39.2%	28.04	38.44	52.78	88.2%	14.29	17.66	22.93	60.5%	84.358	93.980	102.003	20.9%
Bosnia and Herzegovina	1.74	1.07	0.778	46.3%	29.0%	25.4%	8.209	21.35	29.36	257.7%	6.495	11.87	15.77	142.8%	31.860	57.148	63.030	97.8%
Albania	3.039	2.771	2.286	96.0%	87.1%	79.4%	6.084	15.92	25.68	322.1%	6.837	12.01	16.18	136.7%	27.497	48.505	59.135	115.1%
Macedonia, TFYR	1.799	1.842	1.403	88.1%	92.5%	82.0%	4.439	6.368	9.75	119.6%	7.434	8.851	11.98	61.2%	22.783	26.428	30.732	34.9%
Slovenia	0.615	0.537	0.438	29.8%	27.7%	26.7%	26.01	37.49	46.87	80.2%	21.2	26.77	32.96	55.5%	52.158	61.796	64.453	23.6%
Montenegro	0.62	0.623	0.577	99.0%	98.9%	99.0%	1.385	1.85	2.851	105.8%	8.984	9.685	12.04	34.0%	8.100	8.782	10.112	24.8%
Malta	0.106	0.069	0.049	25.4%	17.2%	14.5%	4.599	6.901	8.447	83.7%	20.21	25.56	30.83	52.5%	11.100	13.521	13.652	23.0%
Europe-South	**49.73**	**41.79**	**36.4**	**32.6%**	**28.7%**	**28.8%**	**2213**	**2865**	**3720**	**68.1%**	**21.3**	**25.41**	**33.25**	**56.1%**	**4305.903**	**4909.007**	**5573.621**	**29.4%**
Germany	6.294	2.994	2.585	7.7%	3.9%	3.8%	2069	2624	3346	61.7%	29.75	36.38	51.1	71.8%	3205.099	3730.265	4640.730	44.8%
France	10.91	9.614	6.878	17.3%	14.4%	10.4%	1495	2067	3235	116.4%	26.45	32.02	49.38	86.7%	2168.694	2788.694	4267.053	96.8%
Netherlands	2.312	1.4	1.455	13.9%	8.0%	8.6%	438.9	602	793	80.7%	32.61	38.83	50.76	55.7%	700.628	880.375	1114.435	59.1%
Belgium	1.725	1.518	1.201	15.9%	13.4%	10.7%	266	371	527.6	98.3%	29.29	35.38	49.63	69.4%	402.900	508.653	704.474	74.9%
Switzerland	0.75	0.24	0.152	9.6%	3.1%	2.2%	293.6	347	392.9	33.8%	33.61	41.07	54.62	62.5%	361.177	439.987	512.470	41.9%
Austria	0.711	0.328	0.268	8.5%	4.1%	3.9%	222.6	283.8	331.4	48.9%	31.35	38.75	51.78	65.2%	330.907	390.775	442.970	33.9%
Luxembourg	0.01	0.001	0.002	2.0%	0.2%	0.3%	26.97	45.74	64.07	137.6%	63.13	80.16	89.42	41.6%	44.988	73.181	98.297	118.5%
Europe-West	**22.71**	**16.1**	**12.54**	**12.0%**	**8.5%**	**7.1%**	**4811**	**6341**	**8690**	**80.6%**	**29.2**	**35.45**	**50.66**	**73.5%**	**7214.393**	**8811.930**	**11780.429**	**63.3%**

Poverty and Income / Health

Base Case	GDP per Capita at PPP				Life Expectancy at Birth				Infant Mortality Rate				Child Mortality Probability			
Source: International Futures	Thousands in 2010 dollars				Years				Deaths per 1,000 Infants before 1 Year of Age				Deaths per 1,000 Children before Age 5			
Model Version 6.61, Jan 2013	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	11.19	17.78	26.89	140.3%	70.09	75.2	78.89	12.6%	34.37	15.49	7.327	-78.7%	63.21	31.02	13.97	-77.9%
Africa	2.95	5.16	9.76	231.1%	56.98	66.53	72.69	27.6%	72.04	33.18	13.89	-80.7%	119.6	57.29	24.93	-79.2%
Americas	24.52	32.56	42.70	74.2%	76.67	80.53	83.36	8.7%	15.04	6.716	3.574	-76.2%	20.4	9.052	4.593	-77.5%
Asia with Oceania	7.32	15.80	28.15	284.4%	70.69	76.22	80.18	13.4%	34.17	12.98	5.672	-83.4%	50.87	20.4	8.862	-82.6%
Europe	28.10	39.31	52.77	87.8%	76.78	80.66	83.69	9.0%	7.19	4.104	2.802	-61.0%	9.52	5.25	3.574	-62.5%
World	11.19	17.78	26.89	140.3%	70.09	75.2	78.89	12.6%	34.37	15.49	7.327	-78.7%	63.21	31.02	13.97	-77.9%
Africa-Eastern	1.21	3.06	8.70	617.9%	55.91	66.58	73.18	30.9%	70.8	31.28	12.01	-83.0%	106.8	49.14	19.8	-81.5%
Africa-Middle	1.92	4.48	7.09	269.1%	49.95	60.06	66.23	32.6%	106.1	54.3	25.63	-75.8%	172.3	92.89	44.95	-73.9%
Africa-Northern	5.83	9.36	15.59	167.5%	69.75	74.76	78.4	12.4%	35.84	15.15	7.605	-78.8%	50.92	19.33	8.745	-82.8%
Africa-Southern	10.37	17.22	29.30	182.5%	52.94	61.88	74.03	39.8%	50.93	38.61	16.74	-67.1%	71.83	54.22	24.14	-66.4%
Africa-Western	1.83	4.07	8.07	339.6%	52.96	65.43	72.62	37.1%	88.08	35.12	12.97	-85.3%	142.6	59.96	23.93	-83.2%
Africa	2.95	5.16	9.76	231.1%	56.98	66.53	72.69	27.6%	72.04	33.18	13.89	-80.7%	119.6	57.29	24.93	-79.2%
America-Caribbean	6.37	12.29	20.64	223.8%	72.68	76.46	80.03	10.1%	27.53	17.32	9.88	-64.1%	42.91	28.91	15.44	-64.0%
America-Central	6.28	9.51	14.77	135.1%	73.72	78.28	81.28	10.3%	23.31	9.563	4.627	-80.2%	31.45	12.5	5.934	-81.1%
America-North	39.48	48.13	60.86	54.2%	79.42	82.31	84.85	6.8%	8.337	4.605	2.66	-68.1%	10.59	5.581	3.119	-70.5%
America-South	11.14	19.82	27.70	148.7%	74.25	79.2	82.24	10.8%	20.57	7.687	3.869	-81.2%	26.29	9.971	4.978	-81.1%
Americas	24.52	32.56	42.70	74.2%	76.67	80.53	83.36	8.7%	15.04	6.716	3.574	-76.2%	20.4	9.052	4.593	-77.5%
Asia-East	10.76	24.91	48.39	349.9%	75.03	79.29	82.76	10.3%	20.04	8.071	4.332	-78.4%	24.58	9.855	5.228	-78.7%
Asia-South Central	3.66	9.85	20.42	458.4%	65.98	73.72	78.78	19.4%	52.32	17.58	6.191	-88.2%	72.27	27.83	10.81	-85.0%
Asia-South East	5.32	10.30	15.63	194.0%	71.82	76.67	80.11	11.5%	23.11	10.17	5.78	-75.0%	29.23	13.14	7.477	-74.4%
Asia-West	13.32	20.39	25.01	87.7%	72.51	76.66	79.53	9.7%	25.93	12.5	7.177	-72.3%	33.86	15.27	8.453	-75.0%
Oceania	27.89	38.15	48.17	72.7%	77.52	80.2	82.86	6.9%	14.63	8.542	4.243	-71.0%	27.15	15.25	6.41	-76.4%
Asia with Oceania	7.32	15.80	28.15	284.4%	70.69	76.22	80.18	13.4%	34.17	12.98	5.672	-83.4%	50.87	20.4	8.862	-82.6%
Europe-East	18.31	32.32	38.31	109.3%	70.96	75.96	79.29	11.7%	11.16	6.97	5.439	-51.3%	15.41	9.602	7.539	-51.1%
Europe-North	35.38	48.62	67.05	89.5%	79.83	83.05	85.76	7.4%	4.498	2.238	1.24	-72.4%	5.386	2.659	1.474	-72.6%
Europe-South	28.20	33.67	44.10	56.4%	80.56	83.2	85.76	6.5%	4.994	2.868	1.833	-63.3%	5.953	3.415	2.15	-63.9%
Europe-West	38.21	46.40	66.26	73.4%	81.1	83.72	86.32	6.4%	3.739	2.038	1.12	-70.0%	4.56	2.489	1.37	-70.0%
Europe	28.10	39.31	52.77	87.8%	76.78	80.66	83.69	9.0%	7.19	4.104	2.802	-61.0%	9.52	5.25	3.574	-62.5%

Poverty and Income / Health

Base Case: Countries in Descending Year 2060 Population Sequence	GDP per Capita at PPP: Thousands in 2010 dollars				Life Expectancy at Birth: Years				Infant Mortality Rate: Deaths per 1,000 Infants before 1 Year of Age				Child Mortality Probability: Deaths per 1,000 Children before Age 5			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA																
Ethiopia	0.99	3.55	10.85	997.5%	57.16	68.24	74.14	29.7%	74.22	22.53	5.397	-92.7%	111.6	35.45	8.596	-92.3%
Tanzania, United Rep. of	1.42	3.89	16.61	1072.6%	58.25	67.89	77.55	33.1%	56.83	29.97	5.541	-90.2%	86.93	46.99	8.671	-90.0%
Uganda	1.17	3.44	9.04	673.2%	55.5	65.58	73.03	31.6%	69.11	33.36	10.43	-84.9%	107.4	53.62	17.01	-84.2%
Kenya	1.62	2.62	5.50	238.9%	56.9	65.54	71.71	26.0%	59.37	37.69	17.53	-70.5%	90.39	58.71	27.84	-69.2%
Madagascar	0.96	1.02	1.22	27.6%	62.31	69.32	72.17	15.8%	55.97	32.25	24.58	-56.1%	77.58	45.71	35.09	-54.8%
Mozambique	0.90	3.92	10.63	1088.0%	49.11	64.49	71.52	45.6%	87.66	25	7.926	-91.0%	135.2	39.85	12.49	-90.8%
Malawi	0.79	1.54	3.31	322.0%	56.2	68.83	75.07	33.6%	78.21	37.03	19.44	-75.1%	108	52.66	28.06	-74.0%
Zambia	1.47	4.16	7.68	424.1%	49.35	63.23	70.17	42.2%	86.21	34.63	16.85	-80.5%	136.8	56.55	28.15	-79.4%
Somalia	0.59	1.40	4.78	707.0%	51.51	65.55	69.11	34.2%	103.8	27.08	9.873	-90.5%	162.9	45.58	16.91	-89.6%
Rwanda	1.16	2.72	7.32	531.9%	51.99	61.76	70.02	34.7%	112.1	58.95	20.62	-81.6%	135.8	74.01	26.72	-80.3%
Zimbabwe	2.01	2.73	3.90	94.1%	50.1	64.89	70.15	40.0%	49.83	30.73	21.79	-56.3%	77.78	49.62	35.75	-54.0%
Burundi	0.40	0.61	1.34	235.7%	52.38	59.94	67.64	29.1%	88.54	57.33	21.61	-75.6%	139.4	93.29	36.47	-73.8%
Eritrea	0.59	1.29	3.60	515.3%	61.33	66.92	69.51	13.3%	52.39	18.86	7.178	-86.3%	67.34	25.09	9.641	-85.7%
Comoros	1.22	1.38	2.47	103.0%	67.18	71.94	76.81	14.3%	49.14	36.55	14.35	-70.8%	67.07	50.47	20.24	-69.8%
Djibouti	2.44	3.35	6.14	151.7%	57.15	64.21	71.37	24.9%	81.48	50.09	20.65	-74.7%	109.9	69.28	29.31	-73.3%
Mauritius	13.43	20.84	29.14	116.9%	72.25	76.01	79.17	9.6%	14.57	9.15	6.143	-57.8%	17.33	10.99	7.389	-57.4%
Africa-Eastern	**1.21**	**3.06**	**8.70**	**617.9%**	**55.91**	**66.58**	**73.18**	**30.9%**	**70.8**	**31.28**	**12.01**	**-83.0%**	**106.8**	**49.14**	**19.8**	**-81.5%**
Congo, Democratic Rep. of	0.35	0.72	2.02	480.0%	48.81	57.75	63.41	29.9%	111.8	58.36	25.5	-77.2%	184.3	100.7	45.56	-75.3%
Angola	5.34	17.53	28.56	434.4%	49.32	65.3	71.76	45.5%	108.6	33.14	18.38	-83.1%	169.2	54.85	30.99	-81.7%
Cameroon	2.16	3.46	5.50	154.8%	52.7	61.14	68.66	30.3%	84.86	56.79	30.82	-63.7%	133.1	91.6	51.09	-61.6%
Chad	1.23	2.19	3.72	202.4%	50.01	60.76	68.61	37.2%	127.4	68.29	31.39	-75.4%	192.6	108.8	51.85	-73.1%
Central African Rep.	0.74	1.30	2.72	268.2%	48.62	58.28	66.35	36.5%	95.41	57.81	24.78	-74.0%	150.8	94.79	42.03	-72.1%
Congo, Rep. of	4.41	11.07	16.57	275.8%	54.5	67.07	72.89	33.7%	78.84	29.64	15.37	-80.5%	119	46.49	24.52	-79.4%
Gabon	15.33	22.61	28.24	84.2%	62.5	71	76.39	22.2%	48.45	29.78	18.19	-62.5%	70.84	44.31	27.47	-61.2%
Equatorial Guinea	31.69	55.21	47.88	51.1%	52.07	62.92	66.18	27.1%	96.39	53.83	48.48	-49.7%	151.7	86.57	79.44	-47.6%
São Tomé and Príncipe	1.91	2.65	4.29	124.2%	66.62	71.33	75.64	13.5%	45.29	29.84	15.71	-65.3%	65.49	43.85	23.41	-64.3%
Africa-Middle	**1.92**	**4.48**	**7.09**	**269.1%**	**49.95**	**60.06**	**66.23**	**32.6%**	**106.1**	**54.3**	**25.63**	**-75.8%**	**172.3**	**92.89**	**44.95**	**-73.9%**
Egypt, Arab Rep.	5.86	8.90	14.42	145.9%	71.14	75.2	78.5	10.3%	30.24	16.66	10.02	-66.9%	34.06	19.01	11.5	-66.2%
Sudan	2.29	6.52	17.26	655.4%	59.84	69.88	75.63	26.4%	66.48	14.06	1.997	-97.0%	99.39	21.88	3.066	-96.9%
Algeria	8.35	11.85	14.50	73.6%	73.44	77.23	79.94	8.9%	23.79	15.86	12.01	-49.5%	29.9	20.09	15.26	-49.0%
Morocco	4.60	7.58	12.59	173.4%	72.54	76.67	79.91	10.2%	32.02	14.71	7.383	-76.9%	34.78	16.25	8.211	-76.4%
Tunisia	8.54	14.28	22.59	164.5%	74.85	79.17	82.54	10.3%	20.49	11.29	6.769	-67.0%	24.3	13.53	8.146	-66.5%
Libya	16.77	25.67	24.43	45.7%	75.26	79.76	82.02	9.0%	14.62	8.421	7.161	-51.0%	16.22	9.41	8.011	-50.6%
Africa-Northern	**5.83**	**9.36**	**15.59**	**167.5%**	**69.75**	**74.76**	**78.4**	**12.4%**	**35.84**	**15.15**	**7.605**	**-78.8%**	**50.92**	**19.33**	**8.745**	**-82.8%**

Poverty and Income / Health

Base Case: Countries in Descending Year 2060 Population Sequence	GDP per Capita at PPP (Thousands in 2010 dollars)				Life Expectancy at Birth (Years)				Infant Mortality Rate (Deaths per 1,000 Infants before 1 Year of Age)				Child Mortality Probability (Deaths per 1,000 Children before Age 5)			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA continued																
South Africa	10.79	17.81	31.15	188.6%	52.81	61.01	74.21	40.5%	50.8	40.9	17.18	-66.2%	71.16	57.14	24.57	-65.5%
Namibia	6.73	13.48	20.54	205.3%	62.05	72.32	77.53	24.9%	35.32	13.85	7.755	-78.0%	48.35	19.28	10.88	-77.5%
Lesotho	1.67	3.36	6.00	258.9%	46.75	60.69	67.93	45.3%	73.18	37.9	19.49	-73.4%	105.6	56.15	29.61	-72.0%
Botswana	16.23	30.36	39.38	142.5%	55.31	68.48	74.69	35.0%	35.87	18.88	11.95	-66.7%	50.37	26.86	17.2	-65.9%
Swaziland	5.13	7.33	10.78	110.3%	48.63	62.17	69.69	43.3%	71.04	42.06	24.05	-66.1%	103.1	62.42	36.49	-64.6%
Africa-Southern	**10.37**	**17.22**	**29.30**	**182.5%**	**52.94**	**61.88**	**74.03**	**39.8%**	**50.93**	**38.61**	**16.74**	**-67.1%**	**71.83**	**54.22**	**24.14**	**-66.4%**
Nigeria	2.32	5.88	12.33	432.5%	49.14	64.41	72.89	48.3%	102.3	34.37	9.553	-90.7%	159	56.61	16.05	-89.9%
Niger	0.72	1.05	1.40	95.7%	53.84	64.13	70.57	31.1%	94.9	46.4	20.68	-78.2%	157	80.35	36.82	-76.5%
Côte d'Ivoire	1.71	2.69	4.88	185.8%	59.68	69.17	76.53	28.2%	57.71	33.83	12.43	-78.5%	89.79	54.1	20.3	-77.4%
Burkina Faso	1.23	1.94	3.61	193.2%	54.51	64.83	71.47	31.1%	78.43	37.46	14.71	-81.2%	160.7	80.93	32.75	-79.6%
Ghana	1.64	3.86	10.61	547.9%	58.03	66.97	73.9	27.3%	64.38	29.47	9.278	-85.6%	92.33	43.55	13.97	-84.9%
Mali	1.06	2.06	3.58	236.4%	50.2	65.92	70.82	41.1%	103.2	28.91	11.54	-88.8%	188.8	57.23	23.34	-87.6%
Senegal	1.90	2.71	4.02	111.0%	57.16	62.23	67.5	18.1%	59.79	41.08	22.45	-62.5%	100.3	70.21	39.18	-60.9%
Guinea	1.00	1.73	2.48	146.7%	60.13	70.44	74.96	24.7%	67.34	28.42	15.48	-77.0%	106.8	46.79	25.88	-75.8%
Benin	1.41	2.13	4.19	197.0%	63.27	71.79	76.93	21.6%	57.55	29.66	13.67	-76.2%	90.57	48	22.49	-75.2%
Togo	0.86	0.90	1.16	35.2%	64.02	69.1	74.22	15.9%	50.46	47.27	31.59	-37.4%	78.01	73.77	50.15	-35.7%
Sierra Leone	0.84	2.22	6.71	701.2%	48.98	60.12	66.75	36.3%	101.7	39.6	12.12	-88.1%	149.3	61.07	19.12	-87.2%
Liberia	0.41	1.53	4.15	916.2%	60.09	67.79	71.71	19.3%	68.54	23.89	10.97	-84.0%	95.01	34.38	15.97	-83.2%
Mauritania	1.97	2.58	3.24	64.3%	58.24	64.64	69.98	20.2%	76.53	45.93	26.23	-65.7%	113.6	70.03	40.78	-64.1%
Gambia	1.34	2.37	4.76	255.8%	57.47	66.29	70.64	22.9%	75.54	30.65	13.38	-82.3%	102.7	43.27	19.21	-81.3%
Guinea-Bissau	1.11	1.41	1.59	42.9%	49.66	58.97	66.54	34.0%	108.2	70.32	40.26	-62.8%	173.4	116.9	69.07	-60.2%
Cape Verde	3.86	8.11	14.54	276.4%	72.28	77.04	80.46	11.3%	23.02	10.08	5.62	-75.6%	26.65	11.87	6.649	-75.1%
Africa-Western	**1.83**	**4.07**	**8.07**	**339.6%**	**52.96**	**65.43**	**72.62**	**37.1%**	**88.08**	**35.12**	**12.97**	**-85.3%**	**142.6**	**59.96**	**23.93**	**-83.2%**

Poverty and Income

Base Case: Countries in Descending Year 2060 Population Sequence	GDP per Capita at PPP (Thousands in 2010 dollars) 2010	2035	2060	% Chg
AMERICAS				
Haiti	1.03	1.79	3.03	193.5%
Dominican Rep.	9.32	20.46	33.73	261.9%
Cuba	2.73	8.64	23.50	760.0%
Puerto Rico	11.90	21.39	37.20	212.6%
Jamaica	7.60	9.43	13.22	74.1%
Trinidad and Tobago	25.73	42.26	43.55	69.3%
Bahamas	32.89	32.72	36.02	9.5%
Barbados	20.01	22.80	31.24	56.1%
Saint Lucia	9.74	13.85	19.27	97.9%
Grenada	8.28	10.31	15.56	87.8%
Saint Vincent and the Grenadines	8.99	11.55	17.47	94.3%
America-Caribbean	**6.37**	**12.29**	**20.64**	**223.8%**
Guatemala	4.73	7.23	13.49	185.0%
Honduras	3.92	5.58	8.00	104.4%
Nicaragua	2.64	3.77	5.41	105.2%
El Salvador	7.91	10.81	16.20	104.8%
Costa Rica	11.38	18.50	26.40	131.9%
Panama	14.12	29.11	45.37	221.4%
Belize	6.80	10.26	18.05	165.4%
America-Central	**6.28**	**9.51**	**14.77**	**135.1%**
United States of America	47.12	56.88	71.16	51.0%
Mexico	17.66	22.94	29.44	66.7%
Canada	39.54	50.11	61.03	54.3%
America-North	**39.48**	**48.13**	**60.86**	**54.2%**
Brazil	11.10	20.27	27.78	150.3%
Colombia	9.31	15.97	21.35	129.2%
Argentina	15.88	29.46	41.79	163.2%
Peru	9.34	18.63	25.62	174.3%
Venezuela (Bolivarian Rep. of)	11.98	19.90	35.24	194.1%
Ecuador	8.22	11.83	14.13	71.9%
Chile	15.24	25.76	30.24	98.4%
Bolivia (Plurinational State of)	4.41	8.46	15.17	244.1%
Paraguay	5.08	7.99	12.20	140.2%
Uruguay	14.38	25.80	41.99	191.9%
Guyana	3.38	5.56	10.24	203.4%
Suriname	8.08	15.17	26.04	222.1%
America-South	**11.14**	**19.82**	**27.70**	**148.7%**

Health

Base Case: Countries in Descending Year 2060 Population Sequence	Life Expectancy at Birth (Years) 2010	2035	2060	% Chg	Infant Mortality Rate (Deaths per 1,000 Infants before 1 Year of Age) 2010	2035	2060	% Chg	Child Mortality Probability (Deaths per 1,000 Children before Age 5) 2010	2035	2060	% Chg
AMERICAS												
Haiti	62.16	67.27	72.29	16.3%	60.42	42.84	23.49	-61.1%	77.02	55.37	30.86	-59.9%
Dominican Rep.	73.29	79.97	84.17	14.8%	29.08	8.787	3.422	-88.2%	31.83	9.909	3.87	-87.8%
Cuba	79.24	81.58	85.22	7.5%	4.983	2.371	0.997	-80.0%	6.831	3.264	1.375	-79.9%
Puerto Rico	79.45	83	85.74	7.9%	8.009	3.231	1.553	-80.6%	9.436	3.832	1.844	-80.5%
Jamaica	72.9	76.05	79.39	8.9%	24.89	13.73	6.58	-73.6%	28.85	16.18	7.779	-73.0%
Trinidad and Tobago	70.51	76.16	78.79	11.7%	26.49	11.58	6.916	-73.9%	32.59	14.49	8.657	-73.4%
Bahamas	75.26	78.54	81.24	7.9%	15.86	10.27	6.959	-56.1%	19.3	12.59	8.56	-55.6%
Barbados	77.97	81.1	84.07	7.8%	12.35	6.652	3.437	-72.2%	14.22	7.72	3.999	-71.9%
Saint Lucia	74.8	78.71	81.7	9.2%	12.5	4.898	2.352	-81.2%	16.28	6.446	3.106	-80.9%
Grenada	76.1	79.32	82.26	8.1%	14.19	7.88	4.871	-65.7%	16.37	9.154	5.675	-65.3%
Saint Vincent and the Grenadines	72.53	77.33	80.63	11.2%	22.8	11.31	6.103	-73.2%	26.59	13.35	7.247	-72.7%
America-Caribbean	**72.68**	**76.46**	**80.03**	**10.1%**	**27.53**	**17.32**	**9.88**	**-64.1%**	**42.91**	**28.91**	**15.44**	**-64.0%**
Guatemala	71.54	77.76	81.2	13.5%	29.19	9.004	3.623	-87.6%	37.43	11.85	4.792	-87.2%
Honduras	73.15	77.97	80.94	10.6%	26.87	11.05	5.138	-80.9%	37.23	15.58	7.29	-80.4%
Nicaragua	74.68	77.65	80.13	7.3%	20.1	13.08	8.632	-57.1%	23.66	15.54	10.29	-56.5%
El Salvador	72.49	76.25	79.11	9.1%	22.15	10.93	5.521	-75.1%	25.91	13.06	6.593	-74.6%
Costa Rica	79.51	82.49	84.92	6.8%	9.775	4.604	2.574	-73.7%	11.17	5.298	2.968	-73.4%
Panama	76.43	80.8	83.98	9.9%	17.62	6.477	3.159	-82.1%	22.9	8.531	4.174	-81.8%
Belize	77.53	82.06	85.25	10.0%	15.05	6.893	3.209	-78.7%	18.75	8.7	4.065	-78.3%
America-Central	**73.72**	**78.28**	**81.28**	**10.3%**	**23.31**	**9.563**	**4.627**	**-80.2%**	**31.45**	**12.5**	**5.934**	**-81.1%**
United States of America	79.93	82.73	85.27	6.7%	6.073	3.551	2.168	-64.3%	6.971	4.093	2.502	-64.1%
Mexico	77.33	80.55	83.09	7.4%	15.83	8.127	4.48	-71.7%	18.97	9.831	5.435	-71.3%
Canada	81.42	84.21	86.38	6.1%	5.04	2.763	1.662	-67.0%	5.719	3.147	1.895	-66.9%
America-North	**79.42**	**82.31**	**84.85**	**6.8%**	**8.337**	**4.605**	**2.66**	**-68.1%**	**10.59**	**5.581**	**3.119**	**-70.5%**
Brazil	73.61	79.24	82.42	12.0%	22.7	8.008	4.104	-81.9%	27.67	9.923	5.105	-81.6%
Colombia	74.11	78.05	80.47	8.6%	18.68	7.69	4.01	-78.5%	25.16	10.51	5.5	-78.1%
Argentina	76.33	80.66	83.85	9.9%	13.55	5.634	3.014	-77.8%	15.43	6.492	3.481	-77.4%
Peru	74.24	79.71	83.14	12.0%	20.49	7.353	3.775	-81.6%	31.05	11.3	5.833	-81.2%
Venezuela (Bolivarian Rep. of)	74.74	78.98	82.17	9.9%	16.67	6.165	2.549	-84.7%	21.07	7.892	3.275	-84.5%
Ecuador	75.89	79.82	82.24	8.4%	20.69	8.814	4.96	-76.0%	24.76	10.7	6.04	-75.6%
Chile	79.28	82.37	84.43	6.5%	7.279	3.496	2.236	-69.3%	8.784	4.249	2.721	-69.0%
Bolivia (Plurinational State of)	67.21	73.77	78.05	16.1%	44.42	15.14	5.696	-87.2%	56.7	19.85	7.537	-86.7%
Paraguay	72.78	77.04	80.38	10.4%	30.55	12.9	5.655	-81.5%	35.69	15.35	6.773	-81.0%
Uruguay	77.32	81.14	84.31	9.0%	13.21	5.649	2.797	-78.8%	16.17	6.984	3.465	-78.6%
Guyana	69.04	74.66	78.66	13.9%	42.59	18.5	8.532	-80.0%	52.79	23.46	10.92	-79.3%
Suriname	70.09	75.24	79.73	13.8%	22.31	7.845	3.161	-85.8%	30.39	10.83	4.388	-85.6%
America-South	**74.25**	**79.2**	**82.24**	**10.8%**	**20.57**	**7.687**	**3.869**	**-81.2%**	**26.29**	**9.971**	**4.978**	**-81.1%**

Base Case: Countries in Descending Year 2060 Population Sequence	Poverty and Income: GDP per Capita at PPP (Thousands in 2010 dollars)				Health: Life Expectancy at Birth (Years)				Infant Mortality Rate (Deaths per 1,000 Infants before 1 Year of Age)				Child Mortality Probability (Deaths per 1,000 Children before Age 5)			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA																
China	7.54	22.28	47.32	527.8%	74.03	78.65	82.37	11.3%	22.15	8.888	4.789	-78.4%	26.04	10.55	5.701	-78.1%
Japan	33.51	46.71	67.87	102.5%	83.74	86.36	88.63	5.8%	2.632	1.513	0.923	-64.9%	3.506	2.021	1.234	-64.8%
Korea, Rep. of	28.02	45.06	61.83	120.7%	79.91	82.77	84.85	6.2%	4.178	1.978	1.11	-73.4%	5.307	2.512	1.411	-73.4%
Korea, Dem. People's Rep. of	1.13	2.58	4.70	317.3%	68.19	73.72	76.9	12.8%	45.59	10.58	2.268	-95.0%	57.74	13.82	2.986	-94.8%
Taiwan, China	35.29	45.29	52.99	50.2%	79.91	81.43	82.53	3.3%	4.178	2.659	1.884	-54.9%	5.306	3.374	2.392	-54.9%
Hong Kong SAR, China	46.43	66.73	67.04	44.4%	82.95	84.64	85.42	3.0%	1.98	1.201	0.88	-55.6%	2.723	1.652	1.211	-55.5%
Mongolia	3.62	8.57	15.52	328.0%	68.19	72.82	77.4	13.5%	36.69	15.27	4.813	-86.9%	44.01	18.71	5.958	-86.5%
Asia-East	**10.76**	**24.91**	**48.39**	**349.9%**	**75.03**	**79.29**	**82.76**	**10.3%**	**20.04**	**8.071**	**4.332**	**-78.4%**	**24.58**	**9.855**	**5.228**	**-78.7%**
India	3.60	11.42	26.06	623.2%	65.25	74.55	80.09	22.7%	52.18	11.4	1.813	-96.5%	70.02	15.87	2.548	-96.4%
Pakistan	2.69	3.97	6.63	146.7%	67.94	72.51	77.67	14.3%	59.33	37.49	16.37	-72.4%	76.51	49.21	21.89	-71.4%
Bangladesh	1.49	3.81	9.82	559.3%	67.73	72.1	77.3	14.1%	50.13	23.33	7.393	-85.3%	61.41	29.25	9.407	-84.7%
Afghanistan	1.40	3.01	5.53	293.6%	45.5	57.12	63.96	40.6%	151.2	70.12	34.78	-77.0%	211.3	104.8	53.68	-74.6%
Iran, Islamic Rep. of	11.46	20.45	23.71	106.9%	72.58	77.61	80.65	11.1%	26.8	12.55	8.659	-67.7%	35.65	16.94	11.73	-67.1%
Nepal	1.19	2.03	3.68	208.7%	68.11	72.55	75.9	11.4%	38.08	18.96	9.184	-75.9%	47.02	23.83	11.64	-75.2%
Uzbekistan	3.08	7.45	12.42	303.3%	68.87	75.23	79.55	15.5%	47.44	16.37	6.977	-85.3%	55.28	19.61	8.434	-84.7%
Sri Lanka	5.19	10.66	19.68	279.5%	75	77.94	80.48	7.3%	12.76	7.386	4.723	-63.0%	14.58	8.516	5.459	-62.6%
Kazakhstan	12.08	24.90	27.88	130.7%	66.34	72.71	75.61	14.0%	30.16	15.85	12.78	-57.6%	35.52	18.93	15.32	-56.9%
Tajikistan	2.08	3.33	5.14	146.7%	67.79	71.26	75.93	12.0%	56.15	42.71	22.5	-59.9%	70.02	53.86	28.88	-58.8%
Kyrgyz Rep.	2.26	3.11	5.25	131.7%	69.15	72.06	75.02	8.5%	33.74	24.43	15.55	-53.9%	41.16	30.1	19.31	-53.1%
Turkmenistan	7.80	41.39	43.69	460.2%	66.26	78.56	82.07	23.9%	49.5	8.973	6.418	-87.0%	60.93	11.48	8.231	-86.5%
Bhutan	5.49	12.64	23.96	336.7%	67.74	75.49	80.43	18.7%	40.43	16.07	7.941	-80.4%	56.51	23.02	11.47	-79.7%
Maldives	5.94	8.34	10.86	82.7%	73.19	76.42	79.27	8.3%	12.44	9.025	5.859	-52.9%	18.48	13.46	8.773	-52.5%
Asia-South Central	**3.66**	**9.85**	**20.42**	**458.4%**	**65.98**	**73.72**	**78.78**	**19.4%**	**52.32**	**17.58**	**6.191**	**-88.2%**	**72.27**	**27.83**	**10.81**	**-85.0%**
Indonesia	4.63	10.38	14.41	211.3%	72.26	77.79	80.92	12.0%	21.65	7.191	4.773	-78.0%	26.88	9.079	6.035	-77.5%
Philippines	3.75	7.05	13.34	255.8%	72.94	76.85	80.47	10.3%	16.57	9.388	5.457	-67.1%	21.48	12.27	7.162	-66.7%
Vietnam	3.11	6.08	9.70	211.6%	75.37	78.25	81.34	7.9%	19.5	10.09	5.484	-71.9%	23.93	12.55	6.831	-71.5%
Thailand	8.63	14.78	21.99	154.9%	70	74.41	77.56	10.8%	17.1	9.672	6.586	-61.5%	19.02	10.84	7.397	-61.1%
Myanmar	1.25	2.77	8.16	552.1%	64.53	70.67	74.94	16.1%	53.6	26.1	12.72	-76.3%	69.26	34.59	17.07	-75.4%
Malaysia	14.78	25.85	38.10	157.7%	75.22	79.09	82.46	9.6%	6.864	4.623	3.288	-52.1%	8.966	6.06	4.312	-51.9%
Cambodia	2.00	5.15	10.67	433.1%	63.24	70.65	75.99	20.2%	57.94	25.77	9.726	-83.2%	76.39	34.94	13.39	-82.5%
Lao People's Democratic Rep.	2.41	7.25	16.24	575.4%	66.85	74.48	79.01	18.2%	45.89	11.16	2.92	-93.6%	59.42	14.92	3.938	-93.4%
Singapore	58.28	97.60	110.51	89.6%	80.93	85.25	88.08	8.8%	1.965	0.879	0.546	-72.2%	2.404	1.079	0.669	-72.2%
Timor-Leste	0.79	1.88	4.38	456.9%	63.18	73.58	75.92	20.2%	59.8	12.36	6.242	-89.6%	80.23	17.3	8.793	-89.0%
Brunei Darussalam	51.23	67.10	65.20	27.3%	77.97	81.97	84.08	7.8%	4.684	2.387	1.626	-65.3%	6.31	3.226	2.2	-65.1%
Asia-South Eastern	**5.32**	**10.30**	**15.63**	**194.0%**	**71.82**	**76.67**	**80.11**	**11.5%**	**23.11**	**10.17**	**5.78**	**-75.0%**	**29.23**	**13.14**	**7.477**	**-74.4%**

Poverty and Income

Health

Base Case: Countries in Descending Year 2060 Population Sequence	GDP per Capita at PPP (Thousands in 2010 dollars)				Life Expectancy at Birth (Years)				Infant Mortality Rate (Deaths per 1,000 Infants before 1 Year of Age)				Child Mortality Probability (Deaths per 1,000 Children before Age 5)			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA continued																
Turkey	14.61	22.36	32.25	120.7%	72.76	76.9	80.42	10.5%	25.99	16.08	11.13	-57.2%	29.23	18.27	12.71	-56.5%
Iraq	3.43	7.75	14.02	309.1%	70.14	74.53	77.62	10.7%	30.71	11.28	4.084	-86.7%	36.92	13.8	5.032	-86.4%
Yemen, Rep. of	2.60	4.40	6.43	147.0%	64.94	71.81	75.11	15.7%	51.53	15.75	7.547	-85.4%	66.38	20.95	10.12	-84.8%
Saudi Arabia	24.07	37.91	41.66	73.1%	73.86	78.59	81.52	10.4%	17.96	11.02	9.466	-47.3%	20.48	12.67	10.9	-46.8%
Syrian Arab Rep.	4.78	7.37	14.05	194.1%	75.08	78.77	81.97	9.2%	15.9	7.337	3.509	-77.9%	17.96	8.364	4.016	-77.6%
Jordan	5.27	8.69	17.29	228.3%	73.69	77.08	80.87	9.7%	20.18	12.08	6.671	-66.9%	23.53	14.21	7.887	-66.5%
Israel	23.86	40.20	62.22	160.8%	81.43	84.38	86.65	6.4%	3.765	1.798	1.003	-73.4%	4.697	2.25	1.256	-73.3%
Palestine	3.14	3.44	5.34	69.9%	74.37	77.17	79.2	6.5%	19.26	12.24	7.859	-59.2%	21.98	14.07	9.072	-58.7%
Azerbaijan	9.95	17.18	21.03	111.4%	71.32	76.9	80.29	12.6%	40.47	18.21	12.28	-69.7%	45.87	20.96	14.21	-69.0%
United Arab Emirates	56.61	96.84	109.97	94.3%	77.97	82.96	86.18	10.5%	5.671	2.715	1.723	-69.6%	6.763	3.25	2.064	-69.5%
Kuwait	47.17	96.55	95.27	101.9%	78.23	83.86	86.48	10.5%	5.458	2.042	1.287	-76.4%	7.004	2.633	1.661	-76.3%
Lebanon	12.81	22.33	29.22	128.0%	72.95	77.11	80.25	10.0%	21.8	12.63	8.925	-59.1%	25.4	14.87	10.54	-58.5%
Oman	26.64	41.36	41.67	56.4%	76.56	80.29	82.27	7.5%	6.648	4.098	3.485	-47.6%	8.047	4.985	4.24	-47.3%
Armenia	5.44	8.17	14.07	158.3%	74.72	77.61	80.85	8.2%	26.39	19.41	12.41	-53.0%	28.82	21.2	13.64	-52.7%
Georgia	5.11	7.95	11.49	125.0%	72.7	76.64	80.02	10.1%	33.3	18.86	12.47	-62.6%	34.09	19.49	12.95	-62.0%
Qatar	87.97	223.14	215.90	145.4%	76.14	81.68	83.82	10.1%	9.627	3.244	2.198	-77.2%	12.08	4.101	2.78	-77.0%
Bahrain	34.69	45.35	47.25	36.2%	76.24	79.28	81.48	6.9%	6.335	3.588	2.386	-62.3%	7.958	4.526	3.013	-62.1%
Cyprus	33.04	38.45	40.66	23.1%	80.2	82.71	84.63	5.5%	4.252	2.55	1.726	-59.4%	4.794	2.878	1.95	-59.3%
Asia-West	**13.32**	**20.39**	**25.01**	**87.7%**	**72.51**	**76.66**	**79.53**	**9.7%**	**25.93**	**12.5**	**7.177**	**-72.3%**	**33.86**	**15.27**	**8.453**	**-75.0%**
Australia	37.94	55.14	68.82	81.4%	82.21	85.14	87.24	6.1%	4.574	2.215	1.322	-71.1%	5.34	2.595	1.55	-71.0%
Papua New Guinea	2.38	5.26	9.17	285.0%	62.4	67.9	73.4	17.6%	50.02	24.26	9.424	-81.2%	63.86	31.66	12.47	-80.5%
New Zealand	27.93	35.16	57.16	104.7%	80.98	83.71	86.22	6.5%	4.853	2.818	1.504	-69.0%	5.964	3.473	1.857	-68.9%
Solomon Islands	2.70	4.29	5.31	96.3%	67.91	71.74	74.97	10.4%	39.69	25.6	17.87	-55.0%	49.37	32.21	22.64	-54.1%
Fiji	4.05	5.45	10.12	150.0%	69.65	73.63	77.65	11.5%	17.9	14.01	8.856	-50.5%	22.21	17.44	11.08	-50.1%
Vanuatu	4.56	6.05	8.63	89.1%	71.56	75.3	79.17	10.6%	26.28	19.88	12.2	-53.6%	31.16	23.71	14.65	-53.0%
Micronesia (Federated States of)	3.11	4.49	6.31	102.8%	69.43	72.76	76.37	10.0%	33.22	21.05	12.8	-61.5%	40.52	25.94	15.89	-60.8%
Tonga	4.50	5.68	10.10	124.2%	72.55	75.91	79.72	9.9%	22.79	19.45	13.25	-41.9%	26.77	22.91	15.69	-41.4%
Samoa	4.43	6.56	12.19	175.1%	72.8	77.36	81.69	12.2%	22.36	13.78	7.9	-64.7%	26.32	16.33	9.42	-64.2%
Oceania	**27.89**	**38.15**	**48.17**	**72.7%**	**77.52**	**80.2**	**82.86**	**6.9%**	**14.63**	**8.542**	**4.243**	**-71.0%**	**27.15**	**15.25**	**6.41**	**-76.4%**

Base Case: Countries in Descending Year 2060 Population Sequence	Poverty and Income: GDP per Capita at PPP (Thousands in 2010 dollars)				Health: Life Expectancy at Birth (Years)				Infant Mortality Rate (Deaths per 1,000 Infants before 1 Year of Age)				Child Mortality Probability (Deaths per 1,000 Children before Age 5)			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
EUROPE																
Russian Federation	22.17	42.32	47.04	112.2%	68.46	74.55	77.79	13.6%	12.69	7.41	5.941	-53.2%	18.97	11.13	8.978	-52.7%
Ukraine	6.63	12.48	16.49	148.5%	69.51	73.96	78.02	12.2%	13.05	8.29	6.399	-51.0%	15.57	9.962	7.692	-50.6%
Poland	19.80	31.95	41.01	107.1%	76.49	80.39	83.47	9.1%	6.316	4.087	3.213	-49.1%	7.489	4.864	3.828	-48.9%
Romania	15.18	19.91	27.63	82.0%	73.85	77.4	80.93	9.6%	14.51	11.01	8.036	-44.6%	17.23	13.13	9.611	-44.2%
Czech Rep.	24.00	28.93	34.34	43.1%	77.36	80.1	82.66	6.9%	3.314	2.775	2.374	-28.4%	4.129	3.466	2.967	-28.1%
Belarus	14.41	24.51	34.06	136.4%	70.65	75.52	79	11.8%	7.482	4.499	3.36	-55.1%	10.08	6.089	4.554	-54.8%
Hungary	21.32	29.88	38.71	81.5%	74.55	77.77	80.68	8.2%	6.098	4.584	3.728	-38.9%	7.548	5.691	4.632	-38.6%
Bulgaria	14.22	19.07	26.34	85.2%	74.41	77.83	81.41	9.4%	9.846	7.361	5.512	-44.0%	11.74	8.807	6.608	-43.7%
Slovak Rep.	23.57	34.33	41.25	75.1%	75.65	79.31	82.18	8.6%	6.511	4.581	3.839	-41.0%	7.883	5.569	4.67	-40.8%
Moldova, Rep. of	3.07	4.06	7.26	136.6%	69.51	72.24	75.38	8.4%	15.12	11.65	7.513	-50.3%	18.75	14.5	9.384	-50.0%
Europe-East	**18.31**	**32.32**	**38.31**	**109.3%**	**70.96**	**75.96**	**79.29**	**11.7%**	**11.16**	**6.97**	**5.439**	**-51.3%**	**15.41**	**9.602**	**7.539**	**-51.1%**
United Kingdom	34.51	45.17	64.23	86.1%	80.09	83.26	86.01	7.4%	4.914	2.293	1.19	-75.8%	5.764	2.702	1.404	-75.6%
Sweden	35.88	53.91	78.88	119.8%	81.61	84.58	86.96	6.6%	2.538	1.312	0.743	-70.7%	3.167	1.641	0.93	-70.6%
Denmark	40.19	54.75	79.67	98.3%	79.07	82.12	84.77	7.2%	3.913	1.838	0.965	-75.3%	4.659	2.196	1.154	-75.2%
Ireland	41.78	62.59	73.99	77.1%	80.5	83.53	85.74	6.5%	3.948	2.048	1.324	-66.5%	4.558	2.37	1.534	-66.3%
Norway	61.50	87.07	84.84	37.9%	81.3	84.24	85.91	5.7%	2.901	1.464	1.005	-65.4%	3.462	1.753	1.205	-65.2%
Finland	33.86	47.71	69.72	105.9%	80.46	83.4	85.78	6.6%	2.764	1.378	0.759	-72.5%	3.428	1.716	0.946	-72.4%
Lithuania	17.39	23.33	33.51	92.8%	73.05	76.51	80.05	9.6%	6.819	5.496	4.138	-39.3%	9.797	7.945	5.992	-38.8%
Latvia	15.50	23.24	33.69	117.3%	73.78	77.51	81.57	10.6%	7.85	5.674	4.097	-47.8%	9.458	6.874	4.972	-47.4%
Estonia	20.62	33.41	51.43	149.4%	74.51	78.49	82.6	10.9%	5.203	3.826	2.767	-46.8%	8.367	6.163	4.475	-46.5%
Iceland	32.63	51.18	68.41	109.6%	82.34	85.33	87.53	6.3%	1.87	0.887	0.505	-73.0%	2.513	1.194	0.679	-73.0%
Europe-North	**35.38**	**48.62**	**67.05**	**89.5%**	**79.83**	**83.05**	**85.76**	**7.4%**	**4.498**	**2.238**	**1.24**	**-72.4%**	**5.386**	**2.659**	**1.474**	**-72.6%**
Italy	30.36	35.67	46.25	52.3%	81.67	84.21	86.63	6.1%	3.721	1.874	1.054	-71.7%	4.406	2.214	1.247	-71.7%
Spain	33.04	39.69	52.96	60.3%	81.69	84.06	86.39	5.8%	3.66	1.937	1.098	-70.0%	4.447	2.361	1.339	-69.9%
Greece	28.65	30.78	37.21	29.9%	80.13	82.71	85.46	6.7%	4.669	2.714	1.645	-64.8%	5.39	3.141	1.906	-64.6%
Portugal	26.66	30.18	39.66	48.7%	79.45	82.13	84.93	6.9%	4.542	2.446	1.359	-70.1%	5.876	3.175	1.766	-69.9%
Serbia	12.07	18.43	25.33	110.0%	74.82	78.33	81.65	9.1%	11.59	7.781	5.767	-50.2%	13.56	9.133	6.783	-50.0%
Croatia	19.04	23.53	30.56	60.5%	77.22	80.14	82.98	7.5%	6.128	4.626	3.547	-42.1%	7.217	5.463	4.193	-41.9%
Bosnia and Herzegovina	8.47	15.48	20.56	142.8%	75.95	79.87	83.28	9.7%	13.18	7.996	6.026	-54.3%	15.79	9.629	7.27	-54.0%
Albania	8.68	15.25	20.55	136.7%	77.3	80.84	83.74	8.3%	18.79	12.58	9.772	-48.0%	21.23	14.27	11.12	-47.6%
Macedonia, TFYR	11.15	13.27	17.96	61.1%	74.95	78.15	81.31	8.5%	14.92	10.57	7.582	-49.2%	16.93	12.03	8.655	-48.9%
Slovenia	25.26	31.89	39.28	55.5%	79.08	81.86	84.31	6.6%	3.75	1.965	1.118	-70.2%	4.628	2.434	1.386	-70.1%
Montenegro	12.94	13.94	17.34	34.0%	75.29	78.11	81.09	7.7%	8.393	6.021	4.341	-48.3%	9.448	6.792	4.907	-48.1%
Malta	26.56	33.63	40.51	52.5%	80.21	82.9	85.25	6.3%	5.155	3.997	3.274	-36.5%	7.038	5.469	4.483	-36.3%
Europe-South	**28.20**	**33.67**	**44.10**	**56.4%**	**80.56**	**83.2**	**85.76**	**6.5%**	**4.994**	**2.868**	**1.833**	**-63.3%**	**5.953**	**3.415**	**2.15**	**-63.9%**
Germany	39.25	48.00	67.43	71.8%	80.5	83.21	86.02	6.9%	3.728	2.108	1.177	-68.4%	4.514	2.563	1.432	-68.3%
France	34.45	41.71	64.31	86.7%	81.94	84.44	86.89	6.0%	3.522	1.85	0.978	-72.2%	4.286	2.26	1.196	-72.1%
Netherlands	42.16	50.22	65.63	55.7%	80.57	82.94	85.22	5.8%	4.496	2.563	1.487	-66.9%	5.465	3.125	1.815	-66.8%
Belgium	37.07	44.74	62.79	69.4%	80.86	83.55	86.01	6.4%	3.73	2.005	1.135	-69.6%	4.646	2.507	1.421	-69.4%
Switzerland	46.22	56.49	75.12	62.5%	82.49	84.94	87.29	5.8%	3.756	1.856	0.985	-73.8%	5.391	2.673	1.42	-73.7%
Austria	39.44	48.73	65.12	65.1%	80.76	83.47	86.1	6.6%	4.059	2.079	1.164	-71.3%	4.934	2.536	1.421	-71.2%
Luxembourg	88.73	112.59	125.70	41.7%	80.31	83.59	86.02	7.1%	2.262	1.152	0.704	-68.9%	2.998	1.531	0.937	-68.7%
Europe-West	**38.21**	**46.40**	**66.26**	**73.4%**	**81.1**	**83.72**	**86.32**	**6.4%**	**3.739**	**2.038**	**1.12**	**-70.0%**	**4.56**	**2.489**	**1.37**	**-70.0%**

Health

Base Case	Adult Mortality Probability				Calories per Capita				Undernourished Children				Adult Obesity Rate			
Source: International Futures	Deaths per 1,000 Adults before Age 60				Available per Person per Day				Percent of All Children				Percent of Adults 30 Years or Older			
Model Version 6.61, Jan 2013	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	165.6	128.8	105.2	-36.5%	2791	2922	3049	9.2%	16.72	8.925	5.477	-67.2%	13.05	13.69	14.61	12.0%
Africa	325.2	212.4	153	-53.0%	2452	2571	2761	12.6%	22.37	12.99	7.153	-68.0%	10.14	9.463	10.05	-0.9%
Americas	119.1	97.39	82.96	-30.3%	3208	3233	3269	1.9%	3.993	3.405	2.994	-25.0%	38.93	39.49	40.66	4.4%
Asia with Oceania	146.9	112.7	89.59	-39.0%	2672	2907	3094	15.8%	20.86	9.885	5.816	-72.1%	6.085	7.889	9.565	57.2%
Europe	140.7	105.3	83.78	-40.5%	3415	3391	3371	-1.3%	1.444	1.015	0.96	-33.5%	23.81	23.45	23.14	-2.8%
World	165.6	128.8	105.2	-36.5%	2791	2922	3049	9.2%	16.72	8.925	5.477	-67.2%	13.05	13.69	14.61	12.0%
Africa-Eastern	360.5	221.1	150.1	-58.4%	2055	2349	2699	31.3%	24.68	13.76	6.917	-72.0%	2.069	3.05	5.196	151.1%
Africa-Middle	371.7	279.4	229.2	-38.3%	1861	2113	2426	30.4%	28.49	17.26	8.86	-68.9%	4.657	5.802	7.614	63.5%
Africa-Northern	144.9	108.7	89.69	-38.1%	3013	3012	3097	2.8%	13.37	6.709	4.345	-67.5%	25.57	24.5	25.14	-1.7%
Africa-Southern	508.5	351.6	169.9	-66.6%	2916	3051	3239	11.1%	12.22	7.779	4.767	-61.0%	27.8	29.7	33.41	20.2%
Africa-Western	360.8	221.6	149.7	-58.5%	2648	2717	2801	5.8%	25.49	14.29	7.979	-68.7%	7.019	7.573	8.198	16.8%
Africa	325.2	212.4	153	-53.0%	2452	2571	2761	12.6%	22.37	12.99	7.153	-68.0%	10.14	9.463	10.05	-0.9%
America-Caribbean	151.2	122.3	95.77	-36.7%	2592	2752	2924	12.8%	7.077	6.513	5.364	-24.2%	26.58	30.01	33.85	27.4%
America-Central	143.7	119	105.3	-26.7%	2444	2603	2840	16.2%	13.33	8.824	5.734	-57.0%	28.3	32.53	39.12	38.2%
America-North	93.84	79.26	67.51	-28.1%	3616	3509	3453	-4.5%	1.566	1.887	2.127	35.8%	48.85	46.18	44.78	-8.3%
America-South	144.6	111	95.86	-33.7%	2884	3049	3152	9.3%	5.457	4.115	3.368	-38.3%	29.93	33.71	36.69	22.6%
Americas	119.1	97.39	82.96	-30.3%	3208	3233	3269	1.9%	3.993	3.405	2.994	-25.0%	38.93	39.49	40.66	4.4%
Asia-East	103.9	79.98	61.3	-41.0%	2964	3232	3382	14.1%	7.615	3.97	3.246	-57.4%	5.466	7.966	9.545	74.6%
Asia-South Central	195.7	138.4	104.4	-46.7%	2381	2692	2976	25.0%	34.27	14.26	7.153	-79.1%	4.072	5.562	7.399	81.7%
Asia-South East	159.7	116.5	92.89	-41.8%	2592	2794	2955	14.0%	21.48	11.27	7.124	-66.8%	4.515	5.48	6.662	47.6%
Asia-West	122.4	92.67	82.14	-32.9%	3020	3005	3046	0.9%	11.37	6.945	4.662	-59.0%	25.71	25.26	25.5	-0.8%
Oceania	101.2	93.42	82.94	-18.0%	2986	3082	3184	6.6%	6.519	3.96	2.407	-63.1%	29.19	29.59	30.48	4.4%
Asia with Oceania	146.9	112.7	89.59	-39.0%	2672	2907	3094	15.8%	20.86	9.885	5.816	-72.1%	6.085	7.889	9.565	57.2%
Europe-East	222.9	166.1	142.7	-36.0%	3323	3365	3293	-0.9%	3.439	2.512	2.473	-28.1%	23.32	24.13	23.25	-0.3%
Europe-North	84.12	64.61	51.32	-39.0%	3401	3408	3436	1.0%	0.121	0.195	0.235	94.2%	27.53	27.55	28.04	1.9%
Europe-South	73.18	59.07	47.52	-35.1%	3422	3326	3311	-3.2%	0.478	0.447	0.44	-7.9%	24.05	22.82	22.78	-5.3%
Europe-West	75.42	62.36	51.68	-31.5%	3536	3448	3460	-2.1%	0	0	0		22.47	20.84	20.52	-8.7%
Europe	140.7	105.3	83.78	-40.5%	3415	3391	3371	-1.3%	1.444	1.015	0.96	-33.5%	23.81	23.45	23.14	-2.8%

Health

Base Case: Countries in Descending Year 2060 Population Sequence	Adult Mortality Probability: Deaths per 1,000 Adults before Age 60				Calories per Capita: Available per Person per Day				Undernourished Children: Percent of All Children				Adult Obesity Rate: Percent of Adults 30 Years or Older			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA																
Ethiopia	304.6	191.2	130.4	-57.2%	1980	2409	2845	43.7%	33.05	14.64	5.444	-83.5%	0.149	1.235	3.135	2004.0%
Tanzania, United Rep. of	351.1	209.3	113.9	-67.6%	2032	2383	2957	45.5%	14.63	9.602	3.669	-74.9%	3.052	5.241	10.8	253.9%
Uganda	375	233.9	158.6	-57.7%	2211	2517	2818	27.5%	22.9	12.85	5.817	-74.6%	1.251	2.072	3.47	177.4%
Kenya	375.2	233.9	171.1	-54.4%	2089	2260	2571	23.1%	18.47	12.61	6.104	-67.0%	1.652	2.11	3.479	110.6%
Madagascar	237.2	163.9	136.9	-42.3%	2160	2104	2138	-1.0%	36.03	28.04	23.21	-35.6%	3.103	2.876	2.998	-3.4%
Mozambique	468.2	271.8	177.5	-62.1%	2067	2532	2871	38.9%	21.51	9.802	4.081	-81.0%	2.662	4.909	7.521	182.5%
Malawi	383	177.1	90.64	-76.3%	2172	2305	2502	15.2%	15.88	9.199	6.537	-58.8%	2.149	2.748	3.887	80.9%
Zambia	474	280.5	193	-59.3%	1873	2283	2616	39.7%	25.38	10.42	5.871	-76.9%	1.198	2.609	4.611	284.9%
Somalia	336.3	222	186.2	-44.6%	2120	2349	2723	28.4%	25.8	12.58	4.336	-83.2%	2.867	3.724	5.923	106.6%
Rwanda	370.5	265.5	185.3	-50.0%	2085	2336	2678	28.4%	14.47	8.799	4.161	-71.2%	0.915	1.418	2.757	201.3%
Zimbabwe	585	289.6	218.1	-62.7%	2238	2330	2481	10.9%	15.3	11.67	8.541	-44.2%	12.2	12.65	13.96	14.4%
Burundi	379.9	286.4	220.5	-42.0%	1685	1822	2115	25.5%	45.1	32.14	13.57	-69.9%	1.777	2.217	3.677	106.9%
Eritrea	304.3	252.2	217.7	-28.5%	1605	1920	2367	47.5%	39.6	25.62	10.33	-73.9%	0.101	0.162	1.107	996.0%
Comoros	189.2	141.9	109.1	-42.3%	1884	1500	2261	20.0%	25.4	24.46	10.6	-58.3%	7.166	5.121	10.23	42.8%
Djibouti	312.5	224.1	158.1	-49.4%	2291	2382	2619	14.3%	26.8	17.64	8.906	-66.8%	6.498	7.04	8.86	36.3%
Mauritius	168.3	132.4	107.3	-36.2%	2965	3070	3186	7.5%	14.9	10.73	7.564	-49.2%	18.86	20.31	21.94	16.3%
Africa-Eastern	**360.5**	**221.1**	**150.1**	**-58.4%**	**2055**	**2349**	**2699**	**31.3%**	**24.68**	**13.76**	**6.917**	**-72.0%**	**2.069**	**3.05**	**5.196**	**151.1%**
Congo, Democratic Rep. of	367.8	310.2	273.4	-25.7%	1605	1853	2239	39.5%	31	19.42	8.932	-71.2%	0.904	1.41	3.075	240.2%
Angola	383.2	231.9	170.2	-55.6%	1973	2502	2873	45.6%	30.5	11.13	6.225	-79.6%	7.791	12.75	17.58	125.6%
Cameroon	380.9	263.5	189.6	-50.2%	2269	2397	2576	13.5%	21.58	15.11	9.746	-54.8%	15.75	17.29	19.69	25.0%
Chad	341.7	231.6	164.1	-52.0%	2056	2247	2460	19.6%	33.96	22.29	12.12	-64.3%	2.258	2.912	3.954	75.1%
Central African Rep.	460	325.7	243	-47.2%	1986	2153	2400	20.8%	24.3	18.31	10.16	-58.2%	1.115	1.509	2.447	119.5%
Congo, Rep. of	358.4	214.8	159.4	-55.5%	2512	2820	2990	19.0%	7.056	3.446	2.532	-64.1%	2.798	4.292	5.389	92.6%
Gabon	272.1	162.5	116.6	-57.1%	2755	2915	3043	10.5%	11.9	7.528	4.517	-62.0%	14.82	16.38	17.85	20.4%
Equatorial Guinea	348	249	208.5	-40.1%	2435	2826	3002	23.3%	18.6	9.95	6.484	-65.1%	17.24	22.83	25.75	49.4%
São Tomé and Príncipe	189.1	147.2	115.5	-38.9%	2684	2616	2661	-0.9%	12.9	9.953	5.511	-57.3%	4.98	4.62	4.809	-3.4%
Africa-Middle	**371.7**	**279.4**	**229.2**	**-38.3%**	**1861**	**2113**	**2426**	**30.4%**	**28.49**	**17.26**	**8.86**	**-68.9%**	**4.657**	**5.802**	**7.614**	**63.5%**
Egypt, Arab Rep.	130.9	97.32	77.74	-40.6%	3195	3113	3130	-2.0%	4.617	4.396	3.944	-14.6%	42.98	41.08	41.51	-3.4%
Sudan	254	175.2	127.3	-49.9%	2282	2640	3034	33.0%	40.7	11.52	4.652	-88.6%	5.673	8.106	11.85	108.9%
Algeria	112.8	88.34	77.27	-31.5%	3153	3094	3046	-3.4%	10.4	7.57	5.804	-44.2%	15.04	14.42	13.98	-7.0%
Morocco	114.4	87.13	69.94	-38.9%	3236	3160	3138	-3.0%	8.728	6.202	4.283	-50.9%	17.84	16.99	16.68	-6.5%
Tunisia	93.46	62.92	47.28	-49.4%	3326	3276	3264	-1.9%	4	3.485	3.025	-24.4%	27.8	27.09	26.93	-3.1%
Libya	110.8	77.88	67.06	-39.5%	3143	3179	3098	-1.4%	0	0.906	1.662		23.95	24.52	23.43	-2.2%
Africa-Northern	**144.9**	**108.7**	**89.69**	**-38.1%**	**3013**	**3012**	**3097**	**2.8%**	**13.37**	**6.709**	**4.345**	**-67.5%**	**25.57**	**24.5**	**25.14**	**-1.7%**

Health

Base Case: Countries in Descending Year 2060 Population Sequence	Adult Mortality Probability: Deaths per 1,000 Adults before Age 60				Calories per Capita: Available per Person per Day				Undernourished Children: Percent of All Children				Adult Obesity Rate: Percent of Adults 30 Years or Older			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA continued																
South Africa	511	366.1	167.4	-67.2%	2999	3126	3307	10.3%	11.5	7.66	4.72	-59.0%	29.78	32.05	36.07	21.1%
Namibia	331.6	187.3	133	-59.9%	2383	2713	2970	24.6%	24	9.199	4.905	-79.6%	4.376	6.201	8.181	87.0%
Lesotho	600.1	332.9	231.4	-61.4%	2476	2620	2756	11.3%	16.68	9.637	6.224	-62.7%	23.29	24.46	26.24	12.7%
Botswana	488.6	258.3	180.2	-63.1%	2264	2682	3020	33.4%	12.5	6.574	4.048	-67.6%	16.39	22.46	28.57	74.3%
Swaziland	552.5	298.7	203.3	-63.2%	2292	2487	2737	19.4%	12.08	7.823	4.829	-60.0%	15.31	17.58	21.28	39.0%
Africa-Southern	**508.5**	**351.6**	**169.9**	**-66.6%**	**2916**	**3051**	**3239**	**11.1%**	**12.22**	**7.779**	**4.767**	**-61.0%**	**27.8**	**29.7**	**33.41**	**20.2%**
Nigeria	414.2	246.8	160.7	-61.2%	2741	2899	3030	10.5%	24.14	10.39	4.915	-79.6%	7.608	8.776	9.9	30.1%
Niger	297.3	194.2	133.2	-55.2%	2376	2346	2308	-2.9%	38.97	28.69	19.52	-49.9%	2.989	2.857	2.716	-9.1%
Côte d'Ivoire	315.7	183.1	117.7	-62.7%	2528	2545	2663	5.3%	22.54	15.77	7.869	-65.1%	4.275	4.376	4.983	16.6%
Burkina Faso	278.2	180.1	129.8	-53.3%	2677	2632	2687	0.4%	40.52	24.74	10.73	-73.5%	1.556	1.446	1.561	0.3%
Ghana	315.8	214.7	149.3	-52.7%	2907	2963	3095	6.5%	20.18	11.31	6.009	-70.2%	6.988	7.392	8.433	20.7%
Mali	338.1	189.5	144.4	-57.3%	2614	2653	2668	2.1%	33.2	17.72	8.441	-74.6%	6.104	6.198	6.246	2.3%
Senegal	290.1	228.6	173	-40.4%	2348	2409	2531	7.8%	16.33	11.85	7.182	-56.0%	9.855	10.2	11.15	13.1%
Guinea	260.1	168.6	129.6	-50.2%	2568	2561	2518	-1.9%	24.25	16.42	11.92	-50.8%	5.658	5.598	5.382	-4.9%
Benin	224.6	148.3	111.2	-50.5%	2533	2512	2633	3.9%	22.9	16.09	8.022	-65.0%	9.248	8.93	9.741	5.3%
Togo	241.3	159.5	115.5	-52.1%	2161	1500	1689	-21.8%	25.1	29.23	21.21	-15.5%	5.889	3.907	4.058	-31.1%
Sierra Leone	433.8	304.6	218.3	-49.7%	2170	2435	2781	28.2%	27.2	14.77	5.714	-79.0%	13.18	15.8	20.22	53.4%
Liberia	288.7	213.2	163.5	-43.4%	2204	2559	2753	24.9%	24.04	8.044	4.34	-81.9%	12.32	16.26	18.87	53.2%
Mauritania	255.9	195	144.6	-43.5%	2841	2723	2627	-7.5%	31.8	19.18	10.22	-67.9%	21.58	20.06	18.97	-12.1%
Gambia	282.3	188.3	144.2	-48.9%	2385	2476	2654	11.3%	17.2	10.22	7.284	-57.7%	2.723	2.991	3.698	35.8%
Guinea-Bissau	364.9	264.1	198.8	-45.5%	2306	2283	2265	-1.8%	23.84	20.38	13.29	-44.3%	3.17	3.069	3.002	-5.3%
Cape Verde	130.5	91.76	71.41	-45.3%	2572	2792	2985	16.1%	13.5	7.29	4.354	-67.7%	14.16	16.56	19.08	34.7%
Africa-Western	**360.8**	**221.6**	**149.7**	**-58.5%**	**2648**	**2717**	**2801**	**5.8%**	**25.49**	**14.29**	**7.979**	**-68.7%**	**7.019**	**7.573**	**8.198**	**16.8%**

Health

Base Case: Countries in Descending Year 2060 Population Sequence	Adult Mortality Probability: Deaths per 1,000 Adults before Age 60				Calories per Capita: Available per Person per Day				Undernourished Children: Percent of All Children				Adult Obesity Rate: Percent of Adults 30 Years or Older			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS																
Haiti	252.7	180	128.2	-49.3%	1870	2086	2338	25.0%	14.88	13.73	10.08	-32.3%	14.05	16.3	19.55	39.1%
Dominican Rep.	164.6	111.2	86.59	-47.4%	2295	2716	3066	33.6%	5.3	3.708	3.029	-42.8%	31.14	40.22	49.14	57.8%
Cuba	89.27	74.18	54.54	-38.9%	3274	3420	3491	6.6%	3.9	3.032	2.747	-29.6%	32.16	34.92	36.39	13.2%
Puerto Rico	91.83	71.14	58.69	-36.1%	3012	3200	3434	14.0%	2.837	2.551	2.208	-22.2%	21.34	23.98	27.59	29.3%
Jamaica	158.4	141.4	121.1	-23.5%	2852	2857	2949	3.4%	3.6	3.658	3.435	-4.6%	31.59	31.67	33.48	6.0%
Trinidad and Tobago	181.1	127.7	112	-38.2%	2725	3004	3130	14.9%	5.9	4.331	3.626	-38.5%	41.7	48.65	52.16	25.1%
Bahamas	113	81.49	64.88	-42.6%	2713	2864	3027	11.6%	11.15	8.52	5.955	-46.6%	28.96	31.71	34.93	20.6%
Barbados	79.63	59.42	44.28	-44.4%	3056	3066	3167	3.6%	1.684	2.1	2.334	38.6%	45.98	46.15	48.83	6.2%
Saint Lucia	133.1	106.8	93.11	-30.0%	2738	2876	3017	10.2%	10.42	6.795	4.564	-56.2%	31.66	33.95	36.72	16.0%
Grenada	91.28	70.95	56	-38.7%	2454	2647	2897	18.1%	19.1	12.61	8.064	-57.8%	22.55	25.62	30.27	34.2%
Saint Vincent and the Grenadines	129.2	80.72	65.07	-49.6%	2821	2865	2997	6.2%	9.459	7.255	5.071	-46.4%	20.38	21.03	23.07	13.2%
America-Caribbean	**151.2**	**122.3**	**95.77**	**-36.7%**	**2592**	**2752**	**2924**	**12.8%**	**7.077**	**6.513**	**5.364**	**-24.2%**	**26.58**	**30.01**	**33.85**	**27.4%**
Guatemala	166.7	130.3	111.4	-33.2%	2159	2417	2791	29.3%	22.7	12.57	7.194	-68.3%	36.57	42.56	52.71	44.1%
Honduras	138.6	105.4	92.92	-33.0%	2623	2688	2796	6.6%	10.17	7.322	5.126	-49.6%	15.45	16.22	17.65	14.2%
Nicaragua	145.7	121.2	106.1	-27.2%	2403	2487	2624	9.2%	9.6	7.366	5.093	-46.9%	36.11	37.87	41.07	13.7%
El Salvador	190.4	167.8	156.3	-17.9%	2590	2718	2929	13.1%	8.036	6.259	4.521	-43.7%	19.35	21.13	24.43	26.3%
Costa Rica	82.31	67.75	58.26	-29.2%	2840	3012	3163	11.4%	5.1	4.13	3.484	-31.7%	32.07	35.54	38.84	21.1%
Panama	98.72	75.62	58.43	-40.8%	2484	2868	3170	27.6%	8.1	5.205	3.476	-57.1%	20.99	27.37	33.3	58.6%
Belize	103.1	63.87	47.74	-53.7%	2718	2821	3017	11.0%	14.03	9.955	6.936	-50.6%	19.9	21.27	24.3	22.1%
America-Central	**143.7**	**119**	**105.3**	**-26.7%**	**2444**	**2603**	**2840**	**16.2%**	**13.33**	**8.824**	**5.734**	**-57.0%**	**28.3**	**32.53**	**39.12**	**38.2%**
United States of America	95.3	80	66.93	-29.8%	3748	3611	3529	-5.8%	1.6	1.907	2.128	33.0%	52.43	48.93	46.93	-10.5%
Mexico	98.77	83.94	74.11	-25.0%	3266	3226	3219	-1.4%	1.964	2.212	2.393	21.8%	44.15	43.17	43	-2.6%
Canada	69.22	56.69	49.83	-28.0%	3532	3497	3456	-2.2%	0	0.642	1.292		31.36	30.77	30.1	-4.0%
America-North	**93.84**	**79.26**	**67.51**	**-28.1%**	**3616**	**3509**	**3453**	**-4.5%**	**1.566**	**1.887**	**2.127**	**35.8%**	**48.85**	**46.18**	**44.78**	**-8.3%**
Brazil	162.3	121	105.2	-35.2%	3113	3229	3246	4.3%	5.7	4.235	3.463	-39.2%	24.23	26.08	26.42	9.0%
Colombia	135.8	117	111.1	-18.2%	2685	2897	3045	13.4%	3.247	2.845	2.647	-18.5%	30.57	34.77	37.95	24.1%
Argentina	114.8	85	66.44	-42.1%	2941	3147	3279	11.5%	2.266	2.295	2.301	1.5%	47.39	52.98	56.75	19.8%
Peru	125.2	93.05	75.6	-39.6%	2457	2776	2992	21.8%	7.1	4.885	3.883	-45.3%	36.17	43.62	49.32	36.4%
Venezuela (Bolivarian Rep. of)	126.5	101.8	88.66	-29.9%	2632	2883	3183	20.9%	4.4	3.478	2.715	-38.3%	37.24	43.04	50.76	36.3%
Ecuador	119.2	100.9	93.55	-21.5%	2301	2571	2791	21.3%	11.6	7.628	5.481	-52.8%	17.89	21.93	25.73	43.8%
Chile	88.96	72.69	65.97	-25.8%	2920	3097	3151	7.9%	10.29	7.067	5.511	-46.4%	38.03	41.95	43.24	13.7%
Bolivia (Plurinational State of)	187.7	141	110.3	-41.2%	2064	2430	2809	36.1%	5.321	4.066	2.868	-46.1%	37.74	46.94	58.12	54.0%
Paraguay	141.5	116.1	97.43	-31.1%	2634	2735	2878	9.3%	4.6	4.536	3.856	-16.2%	18.29	19.67	21.82	19.3%
Uruguay	97.2	74.47	57.06	-41.3%	2829	3046	3244	14.7%	4.5	3.762	3.161	-29.8%	36.35	41.07	45.8	26.0%
Guyana	169.4	122.2	95.92	-43.4%	2759	2810	2942	6.6%	13.6	8.988	6.646	-51.1%	18.12	18.73	20.59	13.6%
Suriname	185.7	144.9	108.5	-41.6%	2492	2773	3044	22.2%	11.55	6.852	4.847	-58.0%	18.33	22.49	27.16	48.2%
America-South	**144.6**	**111**	**95.86**	**-33.7%**	**2884**	**3049**	**3152**	**9.3%**	**5.457**	**4.115**	**3.368**	**-38.3%**	**29.93**	**33.71**	**36.69**	**22.6%**

Health

Base Case: Countries in Descending Year 2060 Population Sequence	Adult Mortality Probability: Deaths per 1,000 Adults before Age 60				Calories per Capita: Available per Person per Day				Undernourished Children: Percent of All Children				Adult Obesity Rate: Percent of Adults 30 Years or Older			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA																
China	108.4	82.14	61.62	-43.2%	2981	3263	3412	14.5%	7.8	3.859	3.194	-59.1%	4.74	7.352	8.909	88.0%
Japan	62.1	52.98	47.45	-23.6%	2812	3013	3244	15.4%	8.284	6.287	4.534	-45.3%	2.528	3.782	5.532	118.8%
Korea, Rep. of	79.2	64.5	57.44	-27.5%	3074	3212	3309	7.6%	1.22	1.581	1.925	57.8%	15.51	17.37	18.8	21.2%
Korea, Dem. People's Rep. of	143.2	112.3	88.2	-38.4%	2087	2342	2555	22.4%	15.77	8.643	6.515	-58.7%	11.47	14.69	17.89	56.0%
Taiwan, China	79.2	70.38	65.14	-17.8%	3413	3436	3422	0.3%	0	0	0		26.67	27.1	26.96	1.1%
Hong Kong SAR, China	53.89	45.95	44.1	-18.2%	3514	3514	3418	-2.7%	0	0	0		28.34	28.41	26.8	-5.4%
Mongolia	217.6	175.8	137.8	-36.7%	2285	2647	2930	28.2%	12.7	6.446	4.1	-67.7%	27.83	35.3	42.09	51.2%
Asia-East	**103.9**	**79.98**	**61.3**	**-41.0%**	**2964**	**3232**	**3382**	**14.1%**	**7.615**	**3.97**	**3.246**	**-57.4%**	**5.466**	**7.966**	**9.545**	**74.6%**
India	206.3	139.2	100	-51.5%	2352	2743	3085	31.2%	36.21	12.68	6.04	-83.3%	2.742	4.748	7.272	165.2%
Pakistan	149.2	121.4	93.31	-37.5%	2293	2424	2651	15.6%	37.8	22.61	10.7	-71.7%	4.359	5.024	6.471	48.5%
Bangladesh	159.6	133.5	94.78	-40.6%	2281	2542	2857	25.3%	37.56	17.75	9.184	-75.5%	0.3	0.237	0.655	118.3%
Afghanistan	431.7	329.1	261.6	-39.4%	2155	2392	2620	21.6%	29.96	16.3	8.846	-70.5%	1.917	2.72	3.83	99.8%
Iran, Islamic Rep. of	122.2	93.69	78.37	-35.9%	3044	3137	3118	2.4%	10.9	8.063	6.482	-40.5%	26.29	27.83	27.66	5.2%
Nepal	177.6	138	110.2	-38.0%	2360	2428	2566	8.7%	37.76	23.31	11.75	-68.9%	0.4	0.401	0.486	21.5%
Uzbekistan	178.6	130.4	103.7	-41.9%	2581	2807	2942	14.0%	7.9	5.379	4.462	-43.5%	17.89	21.12	23.3	30.2%
Sri Lanka	129.3	113	104.7	-19.0%	2361	2645	2970	25.8%	29.4	16.29	9.877	-66.4%	0.249	0.677	1.64	558.6%
Kazakhstan	265.3	188.4	168.5	-36.5%	3490	3533	3345	-4.2%	4.2	3.423	3.494	-16.8%	14	14.49	12.51	-10.6%
Tajikistan	172	142	114.3	-33.5%	2118	2291	2504	18.2%	30.82	22.66	9.983	-67.6%	11.24	13.16	15.96	42.0%
Kyrgyz Rep.	190.7	162.9	141.7	-25.7%	2644	2613	2699	2.1%	3.39	3.308	3.468	2.3%	14.34	13.96	14.97	4.4%
Turkmenistan	217.7	112.5	91.12	-58.1%	2731	3265	3251	19.0%	8.793	4.497	3.939	-55.2%	17.77	26.03	25.79	45.1%
Bhutan	180	118.9	87.91	-51.2%	2516	2805	3091	22.9%	18.7	9.497	5.046	-73.0%	15.14	18.8	23.02	52.0%
Maldives	101	67.41	52.5	-48.0%	2685	2760	2861	6.6%	30.2	22.94	14.66	-51.5%	23.89	25.05	26.63	11.5%
Asia-South Central	**195.7**	**138.4**	**104.4**	**-46.7%**	**2381**	**2692**	**2976**	**25.0%**	**34.27**	**14.26**	**7.153**	**-79.1%**	**4.072**	**5.562**	**7.399**	**81.7%**
Indonesia	157.7	112.1	91.8	-41.8%	2538	2791	2925	15.2%	19.25	8.422	5.439	-71.7%	2.807	3.646	4.261	51.8%
Philippines	154.2	120.9	98.48	-36.1%	2565	2741	2962	15.5%	26.56	15.48	9.369	-64.7%	4.34	5.329	6.882	58.6%
Vietnam	109.1	89.96	69.31	-36.5%	2816	2903	2944	4.5%	23.13	12.57	8.517	-63.2%	0.606	0.764	0.855	41.1%
Thailand	201.2	150.2	121.7	-39.5%	2539	2766	2984	17.5%	17.6	11.77	7.916	-55.0%	10.01	12.18	14.57	45.6%
Myanmar	217.8	156.3	118.6	-45.5%	2465	2609	2882	16.9%	33.67	18.5	10.34	-69.3%	9.833	11.4	14.82	50.7%
Malaysia	101.4	71.98	51.77	-48.9%	2923	3123	3274	12.0%	3.116	2.852	2.663	-14.5%	8.756	10.36	11.74	34.1%
Cambodia	235.9	160	118.8	-49.6%	2268	2551	2811	23.9%	21.94	11.04	6.04	-72.5%	0.598	2.033	3.809	537.0%
Lao People's Democratic Rep.	186.6	125	92.31	-50.5%	2240	2606	2925	30.6%	40.4	11.58	6.551	-83.8%	11.06	15.72	20.75	87.6%
Singapore	63.61	43.5	34.77	-45.3%	3260	3406	3404	4.4%	3.4	2.968	2.851	-16.1%	2.74	3.442	3.442	25.6%
Timor-Leste	230	122.3	102.3	-55.5%	2066	2324	2593	25.5%	45.8	17.23	7.355	-83.9%	16.53	19.98	24.22	46.5%
Brunei Darussalam	110.8	82.75	72.77	-34.3%	2968	3161	3260	9.8%	3.997	3.331	3.024	-24.3%	29.03	32.58	34.56	19.0%
Asia-South Eastern	**159.7**	**116.5**	**92.89**	**-41.8%**	**2592**	**2794**	**2955**	**14.0%**	**21.48**	**11.27**	**7.124**	**-66.8%**	**4.515**	**5.48**	**6.662**	**47.6%**

Health

Base Case: Countries in Descending Year 2060 Population Sequence	Adult Mortality Probability: Deaths per 1,000 Adults before Age 60				Calories per Capita: Available per Person per Day				Undernourished Children: Percent of All Children				Adult Obesity Rate: Percent of Adults 30 Years or Older			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA continued																
Turkey	116.3	83.49	63.86	-45.1%	3517	3405	3339	-5.1%	0	0	0		29.94	28.14	27.22	-9.1%
Iraq	149.6	119.3	106	-29.1%	2535	2759	2964	16.9%	15.9	7.817	5.647	-64.5%	18.03	21.01	24.2	34.2%
Yemen, Rep. of	212.8	155.6	127.1	-40.3%	2068	2316	2561	23.8%	56.09	22.85	9.819	-82.5%	5.781	7.592	9.852	70.4%
Saudi Arabia	116.5	79.96	65.17	-44.1%	3144	3227	3220	2.4%	14.3	9.391	6.966	-51.3%	37.83	40	40.29	6.5%
Syrian Arab Rep.	99.86	71.13	53.61	-46.3%	3034	2994	3096	2.0%	6.9	5.499	4.49	-34.9%	23.62	23.02	24.54	3.9%
Jordan	119.3	92	69.76	-41.5%	3015	3031	3164	4.9%	4.4	4.275	3.454	-21.5%	39.39	39.8	42.89	8.9%
Israel	60.69	46.01	37.8	-37.7%	3527	3548	3551	0.7%	0	0	0		31.27	31.58	31.61	1.1%
Palestine	110.5	87.32	75.99	-31.2%	2020	2160	2452	21.4%	5.5	5.679	4.296	-21.9%	7.428	8.321	10.71	44.2%
Azerbaijan	127.8	91.67	74.03	-42.1%	2961	3058	3080	4.0%	6.8	3.995	3.654	-46.3%	28.78	30.44	30.8	7.0%
United Arab Emirates	69.97	45.77	34.99	-50.0%	3171	3342	3359	5.9%	0	0.711	1.379		36.27	41.43	43.35	19.5%
Kuwait	58.36	32.63	25.02	-57.1%	3064	3333	3381	10.3%	10.29	7.004	5.393	-47.6%	49.11	58.49	61.14	24.5%
Lebanon	123.8	93.12	75.76	-38.8%	3107	3198	3211	3.3%	4.575	3.929	3.533	-22.8%	30.02	31.53	31.71	5.6%
Oman	82.08	56.92	47.76	-41.8%	2852	3046	3109	9.0%	17.8	10.91	8.009	-55.0%	15.3	18.03	19.23	25.7%
Armenia	113.7	94.65	76.43	-32.8%	2280	2490	2792	22.5%	4.625	4.032	3.429	-25.9%	23.15	26.59	32.36	39.8%
Georgia	126.1	95.61	76.74	-39.1%	2859	2904	2969	3.8%	0	0.953	1.789		16.1	16.55	17.27	7.3%
Qatar	76.69	46.16	39.45	-48.6%	3260	3314	3353	2.9%	5.5	4.65	3.917	-28.8%	27.68	29.51	31.45	13.6%
Bahrain	77.64	57.9	46.48	-40.1%	3407	3376	3304	-3.0%	8.7	6.924	5.758	-33.8%	34.5	34.78	34.48	-0.1%
Cyprus	55.23	42.01	35.51	-35.7%	3181	3169	3154	-0.8%	0	0.798	1.582		23.39	23.26	23.11	-1.2%
Asia-West	**122.4**	**92.67**	**82.14**	**-32.9%**	**3020**	**3005**	**3046**	**0.9%**	**11.37**	**6.945**	**4.662**	**-59.0%**	**25.71**	**25.26**	**25.5**	**-0.8%**
Australia	61.23	47.82	41.37	-32.4%	3227	3342	3410	5.7%	0	0	0		34.26	36.57	37.98	10.9%
Papua New Guinea	282.9	228.6	172.7	-39.0%	2156	2462	2719	26.1%	29.9	13.94	7.013	-76.5%	2.639	4.555	6.66	152.4%
New Zealand	69.89	57.07	47.44	-32.1%	3159	3195	3352	6.1%	0	0.785	1.385		42.75	43.55	47.3	10.6%
Solomon Islands	180.1	145.9	119.3	-33.8%	2422	2534	2607	7.6%	21.1	13.45	9.258	-56.1%	15.57	17.06	18.11	16.3%
Fiji	196.3	147.4	111	-43.5%	3041	2947	3021	-0.7%	9.202	7.185	4.94	-46.3%	31.51	29.87	31.19	-1.0%
Vanuatu	139.9	106	80.28	-42.6%	2740	2756	2836	3.5%	8.347	6.973	4.69	-43.8%	29.59	29.89	31.41	6.2%
Micronesia (Federated States of)	163	133.8	105.3	-35.4%	2347	2494	2658	13.3%	22.63	13.39	7.401	-67.3%	75.8	83.35	92.19	21.6%
Tonga	142.7	110.7	84.4	-40.9%	2999	2916	2986	-0.4%	3.175	3.447	3.221	1.4%	74.79	70.94	74.16	-0.8%
Samoa	142.1	102.5	74.35	-47.7%	2886	2902	3023	4.7%	11.45	8.74	6.436	-43.8%	61.97	62.48	66.91	8.0%
Oceania	**101.2**	**93.42**	**82.94**	**-18.0%**	**2986**	**3082**	**3184**	**6.6%**	**6.519**	**3.96**	**2.407**	**-63.1%**	**29.19**	**29.59**	**30.48**	**4.4%**

Health

Base Case: Countries in Descending Year 2060 Population Sequence	Adult Mortality Probability: Deaths per 1,000 Adults before Age 60				Calories per Capita: Available per Person per Day				Undernourished Children: Percent of All Children				Adult Obesity Rate: Percent of Adults 30 Years or Older			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
EUROPE																
Russian Federation	267.4	196.1	171	-36.1%	3376	3458	3344	-0.9%	5.5	3.513	3.34	-39.3%	25.18	26.57	24.94	-1.0%
Ukraine	245.7	196.4	159.5	-35.1%	3224	3239	3155	-2.1%	1	1.437	2.053	105.3%	20.41	20.62	19.55	-4.2%
Poland	131.5	98.6	82.03	-37.6%	3421	3423	3370	-1.5%	0	0	0		22.99	23.05	22.32	-2.9%
Romania	138.8	109.5	89.53	-35.5%	3455	3322	3253	-5.8%	3.2	3.141	2.673	-16.5%	13.04	11.75	11.18	-14.3%
Czech Rep.	102.7	85.17	75.04	-26.9%	3260	3248	3252	-0.2%	0	0.76	1.481		31.09	30.86	30.95	-0.5%
Belarus	230.1	171.1	142.6	-38.0%	3146	3209	3235	2.8%	0	0.777	1.499		27.27	28.41	28.89	5.9%
Hungary	163.7	133.6	115.6	-29.4%	3465	3433	3388	-2.2%	0	0	0		22.97	22.52	21.89	-4.7%
Bulgaria	137.8	108.2	86.28	-37.4%	2766	2902	3070	11.0%	9.595	7.44	5.514	-42.5%	25.3	27.63	30.71	21.4%
Slovak Rep.	126	97.43	83.39	-33.8%	2893	3065	3183	10.0%	6.044	4.867	3.99	-34.0%	24.41	27.29	29.47	20.7%
Moldova, Rep. of	204.9	173.7	146.7	-28.4%	2771	2713	2819	1.7%	3.2	3.284	3.195	-0.2%	13.68	12.97	14.16	3.5%
Europe-East	**222.9**	**166.1**	**142.7**	**-36.0%**	**3323**	**3365**	**3293**	**-0.9%**	**3.439**	**2.512**	**2.473**	**-28.1%**	**23.32**	**24.13**	**23.25**	**-0.3%**
United Kingdom	76.26	58.55	46.73	-38.7%	3458	3433	3452	-0.2%	0	0	0		33.02	32.54	32.89	-0.4%
Sweden	60.23	46.94	40.08	-33.5%	3110	3240	3371	8.4%	0.283	0.953	1.484	424.4%	17.8	19.63	21.61	21.4%
Denmark	87.06	68.67	56.38	-35.2%	3416	3404	3454	1.1%	0	0	0		14.03	13.88	14.47	3.1%
Ireland	69.72	53.64	46.9	-32.7%	3612	3589	3506	-2.9%	0	0	0		15.4	15.11	14.16	-8.1%
Norway	65.07	50.45	47.19	-27.5%	3464	3517	3437	-0.8%	0	0	0		15.8	16.48	15.46	-2.2%
Finland	88.56	70.61	59.51	-32.8%	3221	3285	3377	4.8%	0	0	0		27.35	28.44	30.08	10.0%
Lithuania	204.1	170.6	146.5	-28.2%	3436	3383	3372	-1.9%	0	0.9	1.424		21.14	20.41	20.26	-4.2%
Latvia	183.6	146.6	113.3	-38.3%	2962	3057	3169	7.0%	4.154	3.689	2.954	-28.9%	18.09	19.28	20.84	15.2%
Estonia	173.4	139	103.9	-40.1%	3154	3255	3360	6.5%	0	0.754	1.378		11.95	13.03	14.24	19.2%
Iceland	53.31	40.55	34.65	-35.0%	3362	3424	3457	2.8%	0	0.677	1.291		28.78	29.87	30.46	5.8%
Europe-North	**84.12**	**64.61**	**51.32**	**-39.0%**	**3401**	**3408**	**3436**	**1.0%**	**0.121**	**0.195**	**0.235**	**94.2%**	**27.53**	**27.55**	**28.04**	**1.9%**
Italy	63.07	50.79	40.94	-35.1%	3646	3473	3398	-6.8%	0	0	0		20.65	18.44	17.55	-15.0%
Spain	69.19	57.16	45.97	-33.6%	3272	3248	3302	0.9%	0	0	0		24.9	24.52	25.38	1.9%
Greece	71.15	57.56	46.82	-34.2%	3725	3468	3338	-10.4%	0	0	0		33.96	29.47	27.4	-19.3%
Portugal	85.94	71.18	57.59	-33.0%	3584	3396	3327	-7.2%	0	0	0		23.02	20.4	19.53	-15.2%
Serbia	114.4	87.97	70.99	-37.9%	2710	2885	3036	12.0%	1.9	2.138	2.385	25.5%	27.38	30.61	33.6	22.7%
Croatia	98.26	77.69	64.81	-34.0%	2990	3031	3127	4.6%	0.6	1.31	1.876	212.7%	26.81	27.53	29.24	9.1%
Bosnia and Herzegovina	99.15	72.86	56.73	-42.8%	3078	3134	3119	1.3%	0	0.819	1.62		25.64	26.56	26.31	2.6%
Albania	70.18	54.98	46.07	-34.4%	2880	2995	3055	6.1%	14	9.816	7.351	-47.5%	30.74	33.01	34.24	11.4%
Macedonia, TFYR	103.4	77.98	61.9	-40.1%	3105	3013	3027	-2.5%	0	0.921	1.722		21.53	20.36	20.69	-3.9%
Slovenia	90.55	75.9	67.7	-25.2%	3223	3232	3259	1.1%	0	0.769	1.474		26.87	27.04	27.6	2.7%
Montenegro	120.5	96.68	79.97	-33.6%	2447	2573	2779	13.6%	19.32	13.42	8.583	-55.6%	13.47	14.65	16.87	25.2%
Malta	59.16	45.85	37.78	-36.1%	3611	3471	3361	-6.9%	0	0	0		43.65	40.54	38.23	-12.4%
Europe-South	**73.18**	**59.07**	**47.52**	**-35.1%**	**3422**	**3326**	**3311**	**-3.2%**	**0.478**	**0.447**	**0.44**	**-7.9%**	**24.05**	**22.82**	**22.78**	**-5.3%**
Germany	75.37	62.1	50.81	-32.6%	3547	3467	3479	-1.9%	0	0	0		31.1	29.71	29.91	-3.8%
France	80.99	67.07	55.41	-31.6%	3532	3437	3467	-1.8%	0	0	0		11.87	10.93	11.23	-5.4%
Netherlands	66.45	54.83	45.59	-31.4%	3278	3255	3304	0.8%	0	0	0		17.75	17.46	18.11	2.0%
Belgium	76.7	63.56	54.45	-29.0%	3694	3522	3464	-6.2%	0	0	0		18.39	16.27	15.59	-15.2%
Switzerland	53.9	44.99	37.25	-30.9%	3465	3436	3448	-0.5%	0	0	0		23.21	22.77	22.95	-1.1%
Austria	71.24	58.01	48.94	-31.3%	3819	3662	3581	-6.2%	0	0	0		32.18	29.5	28.18	-12.4%
Luxembourg	77.59	55.3	45.27	-41.7%	3681	3665	3580	-2.7%	0	0	0		20.66	20.45	19.35	-6.3%
Europe-West	**75.42**	**62.36**	**51.68**	**-31.5%**	**3536**	**3448**	**3460**	**-2.1%**	**0**	**0**	**0**		**22.47**	**20.84**	**20.52**	**-8.7%**

Health

Base Case

Source: International Futures Model Version 6.61, Jan 2013

	Adult Smoking Rate				HIV Prevalence Rate				Disability-Adjusted Life Years							
	Percentage of Adults Who Smoke Tobacco				Percent of Population Infected				Communicable Diseases				Noncommunicable Diseases			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	24.07	23.37	22.65	-5.9%	0.737	0.609	0.275	-62.7%	548.4	278.2	117.6	-78.6%	726.3	853.4	904.6	24.5%
Africa	10.46	11.19	12.04	15.1%	3.936	2.377	0.805	-79.5%	284.1	172.1	73.27	-74.2%	104	147.9	205.1	97.2%
Americas	24.06	23.35	23.05	-4.2%	0.505	0.434	0.173	-65.7%	21.1	11.17	5.535	-73.8%	99.01	117	122.4	23.6%
Asia with Oceania	25.71	26.24	26.47	3.0%	0.18	0.123	0.049	-72.8%	234.4	90.45	36.78	-84.3%	432.8	508.7	513.3	18.6%
Europe	33.96	32.94	31.56	-7.1%	0.436	0.33	0.13	-70.2%	8.775	4.403	1.983	-77.4%	89.44	78.77	62.95	-29.6%
World	24.07	23.37	22.65	-5.9%	0.737	0.609	0.275	-62.7%	548.4	278.2	117.6	-78.6%	726.3	853.4	904.6	24.5%
Africa-Eastern	9.216	10.32	11.62	26.1%	5.714	3.385	1.134	-80.2%	90.42	54.77	21.54	-76.2%	30.56	46.46	65.61	114.7%
Africa-Middle	8.123	9.142	9.942	22.4%	2.491	1.894	0.624	-74.9%	56.18	42.33	21.73	-61.3%	15.31	23.62	36.26	136.8%
Africa-Northern	15.81	17.14	18.44	16.6%	0.278	0.211	0.09	-67.6%	12.86	4.652	1.771	-86.2%	19.89	25.88	31.25	57.1%
Africa-Southern	17.15	18.3	19.54	13.9%	17.99	12.21	4.663	-74.1%	16.64	11.11	3.649	-78.1%	4.457	4.854	5.211	16.9%
Africa-Western	7.808	9.012	10.19	30.5%	2.489	1.507	0.496	-80.1%	108	59.23	24.57	-77.3%	33.81	47.06	66.79	97.5%
Africa	10.46	11.19	12.04	15.1%	3.936	2.377	0.805	-79.5%	284.1	172.1	73.27	-74.2%	104	147.9	205.1	97.2%
America-Caribbean	22.85	21.62	20.84	-8.8%	0.903	0.695	0.288	-68.1%	2.605	1.698	0.825	-68.3%	4.306	5.171	5.288	22.8%
America-Central	17.88	18.09	18.53	3.6%	0.645	0.411	0.155	-76.0%	1.984	0.979	0.419	-78.9%	4.164	5.65	7.162	72.0%
America-North	23.35	22.29	22.18	-5.0%	0.49	0.515	0.201	-59.0%	5.107	3.658	1.915	-62.5%	47.23	56.62	57.76	22.3%
America-South	25.67	25.42	24.97	-2.7%	0.468	0.325	0.131	-72.0%	11.4	4.84	2.376	-79.2%	43.31	49.54	52.17	20.5%
Americas	24.06	23.35	23.05	-4.2%	0.505	0.434	0.173	-65.7%	21.1	11.17	5.535	-73.8%	99.01	117	122.4	23.6%
Asia-East	32.89	34.58	34.95	6.3%	0.065	0.058	0.025	-61.5%	27.61	10.26	4.765	-82.7%	161.8	174.4	147.2	-9.0%
Asia-South Central	18.25	19.45	20.8	14.0%	0.244	0.144	0.056	-77.0%	170	63.14	23.25	-86.3%	185.9	224	243.5	31.0%
Asia-South East	28.62	29.41	30.46	6.4%	0.375	0.236	0.088	-76.5%	27.05	12.12	6.279	-76.8%	59.7	76.24	80.46	34.8%
Asia-West	25.35	24.83	24.51	-3.3%	0.026	0.017	0.006	-76.9%	8.599	4.134	2.129	-75.2%	21.82	29.63	37.19	70.4%
Oceania	24.89	24.42	24.46	-1.7%	0.317	0.273	0.11	-65.3%	1.218	0.806	0.361	-70.4%	3.524	4.562	5.046	43.2%
Asia with Oceania	25.71	26.24	26.47	3.0%	0.18	0.123	0.049	-72.8%	234.4	90.45	36.78	-84.3%	432.8	508.7	513.3	18.6%
Europe-East	40.18	39.79	38.84	-3.3%	0.688	0.527	0.226	-67.2%	6.056	2.816	1.148	-81.0%	44.81	34.81	26.2	-41.5%
Europe-North	30.83	29.12	27.38	-11.2%	0.185	0.142	0.054	-70.8%	0.734	0.418	0.228	-68.9%	10.61	10.33	9.148	-13.8%
Europe-South	29.79	29.57	28.6	-4.0%	0.336	0.267	0.11	-67.3%	0.923	0.514	0.252	-72.7%	15.97	15.67	13.05	-18.3%
Europe-West	29.23	28.12	27.07	-7.4%	0.21	0.174	0.068	-67.6%	1.085	0.69	0.37	-65.9%	19.14	19.02	15.4	-19.5%
Europe	33.96	32.94	31.56	-7.1%	0.436	0.33	0.13	-70.2%	8.775	4.403	1.983	-77.4%	89.44	78.77	62.95	-29.6%

Health

	Adult Smoking Rate				HIV Prevalence Rate				Disability-Adjusted Life Years							
Base Case: Countries in Descending Year 2060 Population Sequence	Percentage of Adults Who Smoke Tobacco				Percent of Population Infected				Communicable Diseases				Noncommunicable Diseases			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA																
Ethiopia	3.193	4.389	5.862	83.6%	2.089	1.293	0.439	-79.0%	20.39	7.508	1.458	-92.8%	8.465	11.59	14.57	72.1%
Tanzania, United Rep. of	12.23	13.11	14.9	21.8%	5.962	3.774	1.212	-79.7%	11.71	8.745	1.781	-84.8%	3.463	5.827	7.75	123.8%
Uganda	9.865	10.77	11.9	20.6%	5.669	3.078	0.977	-82.8%	10.46	7.86	2.62	-75.0%	2.826	5.16	8.018	183.7%
Kenya	12.87	13.85	14.78	14.8%	6.558	3.87	1.316	-79.9%	10.23	8.283	3.964	-61.3%	3.334	5.626	8.179	145.3%
Madagascar	9.166	9.781	10.39	13.4%	0.129	0.085	0.03	-76.7%	3.372	3.091	3.391	0.6%	1.75	2.915	5.061	189.2%
Mozambique	12.07	13.17	14.36	19.0%	12.18	7.565	2.451	-79.9%	8.846	3.295	0.928	-89.5%	2.933	3.536	4.622	57.6%
Malawi	11.67	12.17	12.7	8.8%	11.6	7.333	2.395	-79.4%	4.944	3.632	1.947	-60.6%	1.082	1.792	3.024	179.5%
Zambia	10.27	11.11	11.87	15.6%	16.4	10.02	3.282	-80.0%	5.384	3.033	1.493	-72.3%	1.527	2.175	3.33	118.1%
Somalia	13.75	14.45	15.39	11.9%	0.491	0.32	0.103	-79.0%	3.747	1.256	0.372	-90.1%	1.199	1.63	2.573	114.6%
Rwanda	8.858	9.782	10.93	23.4%	2.667	1.402	0.476	-82.2%	3.676	2.457	0.818	-77.7%	1.209	1.847	2.459	103.4%
Zimbabwe	11.7	12.59	13.27	13.4%	18.15	7.44	2.745	-84.9%	3.869	2.5	1.615	-58.3%	1.083	1.617	2.177	101.0%
Burundi	8.979	9.678	10.31	14.8%	2.174	1.162	0.408	-81.2%	2.812	2.516	0.952	-66.1%	0.909	1.529	2.092	130.1%
Eritrea	8.512	9.407	10.3	21.0%	1.301	0.98	0.341	-73.8%	0.703	0.362	0.109	-84.5%	0.485	0.827	1.321	172.4%
Comoros	16.81	16.3	15.99	-4.9%	0.054	0.036	0.013	-75.9%	0.089	0.105	0.054	-39.3%	0.052	0.096	0.152	192.3%
Djibouti	15.2	16.06	17	11.8%	2.99	2.024	0.727	-75.7%	0.176	0.114	0.036	-79.5%	0.111	0.141	0.143	28.8%
Mauritius	18.43	20.77	22.55	22.4%	1.425	1.087	0.445	-68.8%	0.018	0.011	0.004	-77.8%	0.137	0.156	0.135	-1.5%
Africa-Eastern	**9.216**	**10.32**	**11.62**	**26.1%**	**5.714**	**3.385**	**1.134**	**-80.2%**	**90.42**	**54.77**	**21.54**	**-76.2%**	**30.56**	**46.46**	**65.61**	**114.7%**
Congo, Democratic Rep. of	7.671	8.359	9.061	18.1%	1.299	1.5	0.495	-61.9%	33.1	26.75	13.06	-60.5%	8.163	13.51	22.1	170.7%
Angola	9.93	12.45	14.01	41.1%	1.964	1.202	0.391	-80.1%	8.062	3.334	1.711	-78.8%	2.348	2.921	4.119	75.4%
Cameroon	7.812	8.643	9.354	19.7%	4.838	3.147	1.092	-77.4%	6.284	5.38	3.065	-51.2%	2.476	3.669	4.81	94.3%
Chad	8.055	8.803	9.538	18.4%	3.363	2.179	0.737	-78.1%	5.47	4.797	2.929	-46.5%	1.149	1.935	3.128	172.2%
Central African Rep.	8.981	9.709	10.43	16.1%	6.38	4.146	1.433	-77.5%	1.733	1.318	0.59	-66.0%	0.55	0.803	1.076	95.6%
Congo, Rep. of	6.554	8.585	9.813	49.7%	3.777	2.328	0.802	-78.8%	1.063	0.442	0.187	-82.4%	0.4	0.471	0.617	54.2%
Gabon	10.6	12.99	14.58	37.5%	5.416	3.467	1.29	-76.2%	0.228	0.143	0.074	-67.5%	0.119	0.169	0.221	85.7%
Equatorial Guinea	9.209	8.172	7.902	-14.2%	2.744	2.438	0.819	-70.2%	0.228	0.15	0.111	-51.3%	0.097	0.116	0.156	60.8%
São Tomé and Príncipe	13.22	13.74	14.22	7.6%	0.018	0.011	0.004	-77.8%	0.019	0.017	0.009	-52.6%	0.014	0.021	0.03	114.3%
Africa-Middle	**8.123**	**9.142**	**9.942**	**22.4%**	**2.491**	**1.894**	**0.624**	**-74.9%**	**56.18**	**42.33**	**21.73**	**-61.3%**	**15.31**	**23.62**	**36.26**	**136.8%**
Egypt, Arab Rep.	15.09	16.08	17.27	14.4%	0.017	0.011	0.004	-76.5%	2.524	1.127	0.567	-77.5%	8.788	11.08	13.33	51.7%
Sudan	15.41	16.6	18.28	18.6%	1.314	0.82	0.282	-78.5%	7.645	2.105	0.325	-95.7%	4.607	5.855	7.262	57.6%
Algeria	15.93	17.97	19.09	19.8%	0.087	0.061	0.026	-70.1%	1.177	0.76	0.55	-53.3%	2.35	3.483	4.289	82.5%
Morocco	14.65	16.36	17.83	21.7%	0.098	0.068	0.027	-72.4%	1.013	0.413	0.178	-82.4%	2.697	3.589	4.094	51.8%
Tunisia	26.37	28.27	29.95	13.6%	0.05	0.037	0.016	-68.0%	0.371	0.182	0.102	-72.5%	0.885	1.091	1.238	39.9%
Libya	15.71	18.1	18.99	20.9%	0.015	0.01	0.004	-73.3%	0.128	0.065	0.049	-61.7%	0.562	0.782	1.034	84.0%
Africa-Northern	**15.81**	**17.14**	**18.44**	**16.6%**	**0.278**	**0.211**	**0.09**	**-67.6%**	**12.86**	**4.652**	**1.771**	**-86.2%**	**19.89**	**25.88**	**31.25**	**57.1%**

Health

Base Case: Countries in Descending Year 2060 Population Sequence	Adult Smoking Rate: Percentage of Adults Who Smoke Tobacco 2010	2035	2060	% Chg	HIV Prevalence Rate: Percent of Population Infected 2010	2035	2060	% Chg	Disability-Adjusted Life Years: Communicable Diseases 2010	2035	2060	% Chg	Disability-Adjusted Life Years: Noncommunicable Diseases 2010	2035	2060	% Chg
AFRICA continued																
South Africa	17.87	19.04	20.35	13.9%	17.53	11.99	4.59	-73.8%	14.88	10.26	3.311	-77.7%	3.627	3.934	4.151	14.4%
Namibia	20.08	21.02	21.69	8.0%	15.09	9.547	3.592	-76.2%	0.298	0.137	0.061	-79.5%	0.186	0.242	0.301	61.8%
Lesotho	9.865	11.05	11.96	21.2%	22.21	13.64	5.083	-77.1%	0.689	0.322	0.12	-82.6%	0.26	0.276	0.312	20.0%
Botswana	9.603	12.78	14.06	46.4%	23.89	15.54	6.268	-73.8%	0.411	0.184	0.075	-81.8%	0.23	0.226	0.244	6.1%
Swaziland	6.943	8.265	9.359	34.8%	27.14	17.13	6.211	-77.1%	0.364	0.203	0.083	-77.2%	0.153	0.176	0.203	32.7%
Africa-Southern	**17.15**	**18.3**	**19.54**	**13.9%**	**17.99**	**12.21**	**4.663**	**-74.1%**	**16.64**	**11.11**	**3.649**	**-78.1%**	**4.457**	**4.854**	**5.211**	**16.9%**
Nigeria	6.323	7.703	9.048	43.1%	3.053	1.918	0.638	-79.1%	65.85	29.35	8.391	-87.3%	19.95	25.41	33.67	68.8%
Niger	10.56	11.22	11.8	11.7%	0.773	0.507	0.168	-78.3%	6.518	6.053	4.181	-35.9%	1.318	2.47	4.719	258.0%
Côte d'Ivoire	8.681	9.427	10.26	18.2%	4.026	1.968	0.676	-83.2%	4.872	3.864	1.612	-66.9%	1.742	2.793	3.913	124.6%
Burkina Faso	14.19	14.14	14.18	-0.1%	1.521	0.772	0.26	-82.9%	5.942	4.276	1.897	-68.1%	1.506	2.481	3.909	159.6%
Ghana	4.502	5.634	7.057	56.8%	1.855	1.172	0.406	-78.1%	5	2.641	0.899	-82.0%	2.633	3.526	4.276	62.4%
Mali	10.84	11.63	12.32	13.7%	1.482	0.926	0.306	-79.4%	6.263	2.485	1.057	-83.1%	1.456	1.993	3.312	127.5%
Senegal	10.51	11.5	12.35	17.5%	0.966	0.614	0.21	-78.3%	2.877	2.962	1.944	-32.4%	1.277	2.175	3.38	164.7%
Guinea	9.888	10.59	11.2	13.3%	1.569	1.025	0.353	-77.5%	2.495	1.475	1.014	-59.4%	0.978	1.391	2.245	129.6%
Benin	8.728	9.566	10.42	19.4%	1.304	0.845	0.286	-78.1%	1.903	1.451	0.784	-58.8%	0.794	1.283	1.972	148.4%
Togo	8.215	8.888	9.469	15.3%	3.365	2.208	0.804	-76.1%	1.226	1.492	1.193	-2.7%	0.482	0.827	1.266	162.7%
Sierra Leone	8.557	9.429	10.58	23.6%	1.71	1.588	0.518	-69.7%	2.233	1.218	0.388	-82.6%	0.607	0.962	1.455	139.7%
Liberia	8.811	9.548	10.38	17.8%	1.58	0.985	0.33	-79.1%	0.99	0.513	0.232	-76.6%	0.316	0.598	0.959	203.5%
Mauritania	13.41	13.92	14.4	7.4%	0.724	0.478	0.169	-76.7%	0.72	0.626	0.423	-41.3%	0.322	0.518	0.752	133.5%
Gambia	14.87	15.72	16.63	11.8%	0.87	0.537	0.181	-79.2%	0.373	0.21	0.092	-75.3%	0.176	0.289	0.47	167.0%
Guinea-Bissau	8.368	9.053	9.642	15.2%	1.754	1.158	0.418	-76.2%	0.68	0.609	0.463	-31.9%	0.21	0.3	0.43	104.8%
Cape Verde	8.784	10.26	11.61	32.2%	0.016	0.01	0.004	-75.0%	0.017	0.007	0.004	-76.5%	0.034	0.046	0.058	70.6%
Africa-Western	**7.808**	**9.012**	**10.19**	**30.5%**	**2.489**	**1.507**	**0.496**	**-80.1%**	**108**	**59.23**	**24.57**	**-77.3%**	**33.81**	**47.06**	**66.79**	**97.5%**

Health

Base Case: Countries in Descending Year 2060 Population Sequence	Adult Smoking Rate				HIV Prevalence Rate				Disability-Adjusted Life Years							
	Percentage of Adults Who Smoke Tobacco				Percent of Population Infected				Communicable Diseases				Noncommunicable Diseases			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS																
Haiti	20.78	19.93	19.24	-7.4%	1.974	1.272	0.462	-76.6%	1.706	1.334	0.679	-60.2%	1.099	1.564	1.978	80.0%
Dominican Rep.	12.97	14.19	15.14	16.7%	0.967	0.614	0.244	-74.8%	0.586	0.196	0.073	-87.5%	0.968	1.156	1.264	30.6%
Cuba	37.22	34.99	33.67	-9.5%	0.079	0.065	0.027	-65.8%	0.078	0.042	0.022	-71.8%	1.155	1.24	0.881	-23.7%
Puerto Rico	20.67	21.37	22.29	7.8%	0.015	0.011	0.005	-66.7%	0.036	0.017	0.009	-75.0%	0.513	0.557	0.529	3.1%
Jamaica	14.17	14.49	15.03	6.1%	1.577	1.096	0.422	-73.2%	0.12	0.078	0.029	-75.8%	0.28	0.331	0.334	19.3%
Trinidad and Tobago	21.45	23.68	24.53	14.4%	1.437	1.093	0.478	-66.7%	0.057	0.021	0.008	-86.0%	0.19	0.194	0.177	-6.8%
Bahamas	22.7	22.62	22.34	-1.6%	2.536	1.947	0.79	-68.8%	0.009	0.005	0.002	-77.8%	0.034	0.046	0.046	35.3%
Barbados	10.83	12.72	14.85	37.1%	1.202	0.987	0.407	-66.1%	0.005	0.003	0.001	-80.0%	0.026	0.031	0.027	3.8%
Saint Lucia	19.26	19.83	20.4	5.9%	0.015	0.011	0.005	-66.7%	0.003	0.001	0.001	-66.7%	0.02	0.022	0.02	0.0%
Grenada	25.49	24.92	24.61	-3.5%	0.015	0.01	0.004	-73.3%	0.002	0.001	0		0.01	0.013	0.016	60.0%
Saint Vincent and the Grenadines	11.48	12.43	13.66	19.0%	0.015	0.011	0.004	-73.3%	0.004	0.001	0.001	-75.0%	0.012	0.015	0.016	33.3%
America-Caribbean	**22.85**	**21.62**	**20.84**	**-8.8%**	**0.903**	**0.695**	**0.288**	**-68.1%**	**2.605**	**1.698**	**0.825**	**-68.3%**	**4.306**	**5.171**	**5.288**	**22.8%**
Guatemala	14.1	15.1	16.47	16.8%	0.757	0.468	0.164	-78.3%	0.934	0.427	0.167	-82.1%	1.279	1.791	2.494	95.0%
Honduras	16.48	17.37	18.14	10.1%	0.624	0.355	0.133	-78.7%	0.485	0.222	0.091	-81.2%	0.784	1.117	1.463	86.6%
Nicaragua	22.08	21.21	20.51	-7.1%	0.217	0.139	0.054	-75.1%	0.178	0.117	0.068	-61.8%	0.591	0.879	1.136	92.2%
El Salvador	21.37	21.04	20.98	-1.8%	0.926	0.595	0.242	-73.9%	0.225	0.129	0.056	-75.1%	0.752	0.902	1.015	35.0%
Costa Rica	17.15	18.39	19.52	13.8%	0.305	0.225	0.095	-68.9%	0.041	0.022	0.01	-75.6%	0.394	0.525	0.568	44.2%
Panama	23.39	24.26	23.68	1.2%	0.884	0.616	0.244	-72.4%	0.108	0.056	0.024	-77.8%	0.339	0.399	0.439	29.5%
Belize	26.36	25.67	25.54	-3.1%	1.716	1.121	0.436	-74.6%	0.013	0.007	0.003	-76.9%	0.025	0.036	0.046	84.0%
America-Central	**17.88**	**18.09**	**18.53**	**3.6%**	**0.645**	**0.411**	**0.155**	**-76.0%**	**1.984**	**0.979**	**0.419**	**-78.9%**	**4.164**	**5.65**	**7.162**	**72.0%**
United States of America	22.96	21.36	21.18	-7.8%	0.58	0.664	0.252	-56.6%	2.714	2.297	1.232	-54.6%	32.98	38.76	38.76	17.5%
Mexico	24.82	25.43	26	4.8%	0.286	0.198	0.08	-72.0%	2.217	1.221	0.593	-73.3%	10.98	13.9	15.08	37.3%
Canada	22.14	20.56	19.91	-10.1%	0.307	0.253	0.097	-68.4%	0.176	0.14	0.091	-48.3%	3.273	3.964	3.913	19.6%
America-North	**23.35**	**22.29**	**22.18**	**-5.0%**	**0.49**	**0.515**	**0.201**	**-59.0%**	**5.107**	**3.658**	**1.915**	**-62.5%**	**47.23**	**56.62**	**57.76**	**22.3%**
Brazil	24.45	24.48	24.26	-0.8%	0.553	0.398	0.166	-70.0%	5.37	2.005	0.998	-81.4%	23.16	25.3	25.06	8.2%
Colombia	24.51	24.26	23.94	-2.3%	0.559	0.394	0.157	-71.9%	1.433	0.694	0.294	-79.5%	4.727	5.889	6.598	39.6%
Argentina	29.5	29.25	28.14	-4.6%	0.457	0.319	0.129	-71.8%	0.837	0.477	0.248	-70.4%	4.494	4.881	5.266	17.2%
Peru	20.84	21.39	21.55	3.4%	0.403	0.271	0.11	-72.7%	1.082	0.497	0.302	-72.1%	2.871	3.412	3.947	37.5%
Venezuela (Bolivarian Rep. of)	30.61	29.28	28.54	-6.8%	0.015	0.011	0.004	-73.3%	0.727	0.263	0.115	-84.2%	2.825	3.562	3.944	39.6%
Ecuador	14.63	15.68	16.4	12.1%	0.298	0.201	0.081	-72.8%	0.373	0.177	0.091	-75.6%	1.252	1.579	1.851	47.8%
Chile	37.87	36.1	34.03	-10.1%	0.264	0.204	0.083	-68.6%	0.136	0.091	0.055	-59.6%	1.591	1.915	1.94	21.9%
Bolivia (Plurinational State of)	32.82	30.38	28.54	-13.0%	0.141	0.087	0.032	-77.3%	0.979	0.408	0.176	-82.0%	1.172	1.572	1.972	68.3%
Paraguay	24.26	23.72	23.37	-3.7%	0.53	0.349	0.133	-74.9%	0.341	0.173	0.076	-77.7%	0.694	0.915	1.113	60.4%
Uruguay	31.03	30.6	29.42	-5.2%	0.468	0.334	0.132	-71.8%	0.05	0.027	0.011	-78.0%	0.372	0.361	0.343	-7.8%
Guyana	22.12	21.26	20.78	-6.1%	2.75	1.811	0.709	-74.2%	0.052	0.019	0.007	-86.5%	0.085	0.089	0.079	-7.1%
Suriname	24.32	24.24	24.45	0.5%	1.993	1.407	0.556	-72.1%	0.023	0.01	0.003	-87.0%	0.067	0.067	0.057	-14.9%
America-South	**25.67**	**25.42**	**24.97**	**-2.7%**	**0.468**	**0.325**	**0.131**	**-72.0%**	**11.4**	**4.84**	**2.376**	**-79.2%**	**43.31**	**49.54**	**52.17**	**20.5%**

Health

Base Case: Countries in Descending Year 2060 Population Sequence	Adult Smoking Rate: Percentage of Adults Who Smoke Tobacco				HIV Prevalence Rate: Percent of Population Infected				Disability-Adjusted Life Years: Communicable Diseases				Disability-Adjusted Life Years: Noncommunicable Diseases			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA																
China	33.59	35.53	35.97	7.1%	0.072	0.064	0.027	-62.5%	24.78	8.81	4.065	-83.6%	138.9	149.1	125.9	-9.4%
Japan	29.42	28.74	27.86	-5.3%	0.012	0.01	0.004	-66.7%	0.875	0.674	0.388	-55.7%	10.97	10.41	8.092	-26.2%
Korea, Rep. of	29.63	31.03	31.39	5.9%	0.037	0.031	0.013	-64.9%	0.227	0.16	0.101	-55.5%	3.942	4.58	3.758	-4.7%
Korea, Dem. People's Rep. of	33.18	33.48	33.59	1.2%	0.015	0.011	0.004	-73.3%	1.55	0.545	0.19	-87.7%	2.768	3.171	2.993	8.1%
Taiwan, China	22.31	21.29	20.54	-7.9%	0.014	0.012	0.005	-64.3%	0.025	0.012	0.006	-76.0%	3.782	5.156	4.526	19.7%
Hong Kong SAR, China	21.49	20.22	20.35	-5.3%	0.013	0.012	0.005	-61.5%	0.004	0.003	0.002	-50.0%	1.012	1.471	1.477	45.9%
Mongolia	24.72	25.85	26.64	7.8%	0.054	0.038	0.015	-72.2%	0.148	0.051	0.013	-91.2%	0.37	0.453	0.453	22.4%
Asia-East	**32.89**	**34.58**	**34.95**	**6.3%**	**0.065**	**0.058**	**0.025**	**-61.5%**	**27.61**	**10.26**	**4.765**	**-82.7%**	**161.8**	**174.4**	**147.2**	**-9.0%**
India	17.29	18.72	20.48	18.4%	0.318	0.187	0.074	-76.7%	113.7	27.18	6.455	-94.3%	133.4	151.3	156	16.9%
Pakistan	18.66	19.11	19.72	5.7%	0.092	0.061	0.022	-76.1%	18.47	14.49	6.529	-64.7%	13.56	20.31	25.83	90.5%
Bangladesh	23.97	24.71	25.85	7.8%	0.011	0.007	0.003	-72.7%	13.34	6.722	2.354	-82.4%	13.68	20.6	22.87	67.2%
Afghanistan	18.53	18.99	19.54	5.5%	0.019	0.012	0.004	-78.9%	15.17	10.39	5.653	-62.7%	5.607	8.838	12.79	128.1%
Iran, Islamic Rep. of	15.51	17.47	18.37	18.4%	0.162	0.116	0.054	-66.7%	2.463	0.995	0.578	-76.5%	6.865	7.946	9.287	35.3%
Nepal	26.23	24.34	22.58	-13.9%	0.393	0.245	0.092	-76.6%	2.375	1.391	0.686	-71.1%	2.447	3.709	4.973	103.2%
Uzbekistan	12.66	14.17	15.35	21.2%	0.086	0.058	0.024	-72.1%	1.92	0.593	0.217	-88.7%	3.563	4.024	4.393	23.3%
Sri Lanka	16.05	17.53	19.16	19.4%	0.028	0.02	0.008	-71.4%	0.304	0.149	0.076	-75.0%	1.885	2.189	2.033	7.9%
Kazakhstan	26.15	27.81	28.26	8.1%	0.015	0.011	0.004	-73.3%	0.637	0.216	0.122	-80.8%	2.758	2.251	1.944	-29.5%
Tajikistan	26.76	25.95	25.21	-5.8%	0.238	0.155	0.056	-76.5%	0.793	0.71	0.393	-50.4%	0.781	1.097	1.372	75.7%
Kyrgyz Rep.	23.32	24.19	24.98	7.1%	0.119	0.083	0.031	-73.9%	0.304	0.216	0.125	-58.9%	0.636	0.907	1.072	68.6%
Turkmenistan	28.27	30.43	29.05	2.8%	0.014	0.01	0.004	-71.4%	0.397	0.071	0.045	-88.7%	0.668	0.624	0.731	9.4%
Bhutan	17.02	18.31	19.77	16.2%	0.107	0.072	0.03	-72.0%	0.056	0.02	0.01	-82.1%	0.065	0.077	0.084	29.2%
Maldives	26.94	27.02	27.25	1.2%	0.015	0.01	0.004	-73.3%	0.007	0.004	0.003	-57.1%	0.026	0.038	0.05	92.3%
Asia-South Central	**18.25**	**19.45**	**20.8**	**14.0%**	**0.244**	**0.144**	**0.056**	**-77.0%**	**170**	**63.14**	**23.25**	**-86.3%**	**185.9**	**224**	**243.5**	**31.0%**
Indonesia	34.67	35.66	36.79	6.1%	0.172	0.123	0.05	-70.9%	10.24	3.581	2.131	-79.2%	20.87	27.05	28.71	37.6%
Philippines	24.93	25.26	25.76	3.3%	0.015	0.01	0.004	-73.3%	4.016	2.644	1.639	-59.2%	9.822	14.19	16.64	69.4%
Vietnam	23.02	23.72	25.47	10.6%	0.466	0.345	0.147	-68.5%	2.892	1.671	0.705	-75.6%	8.429	10.28	10.71	27.1%
Thailand	21.33	22.74	24.41	14.4%	1.268	0.966	0.388	-69.4%	2.317	0.965	0.407	-82.4%	10.73	11.25	9.535	-11.1%
Myanmar	28.11	27.58	27.72	-1.4%	0.404	0.23	0.092	-77.2%	3.97	1.49	0.518	-87.0%	4.089	5.813	5.977	46.2%
Malaysia	29.4	31.89	33.48	13.9%	0.441	0.306	0.119	-73.0%	0.54	0.494	0.352	-34.8%	2.495	3.461	4.053	62.4%
Cambodia	21.83	21.8	21.66	-0.8%	0.775	0.287	0.114	-85.3%	2.121	0.957	0.407	-80.8%	2.106	2.627	2.95	40.1%
Lao People's Democratic Rep.	38.45	38.25	38.25	-0.5%	0.139	0.087	0.035	-74.8%	0.7	0.208	0.06	-91.4%	0.608	0.757	0.934	53.6%
Singapore	24.59	23.61	23.54	-4.3%	0.111	0.094	0.039	-64.9%	0.04	0.041	0.027	-32.5%	0.398	0.582	0.598	50.3%
Timor-Leste	24.4	24.84	25.45	4.3%	0.02	0.012	0.004	-80.0%	0.209	0.06	0.03	-85.6%	0.099	0.152	0.263	165.7%
Brunei Darussalam	27.47	26.03	25.3	-7.9%	0.014	0.01	0.004	-71.4%	0.005	0.004	0.003	-40.0%	0.046	0.077	0.092	100.0%
Asia-South Eastern	**28.62**	**29.41**	**30.46**	**6.4%**	**0.375**	**0.236**	**0.088**	**-76.5%**	**27.05**	**12.12**	**6.279**	**-76.8%**	**59.7**	**76.24**	**80.46**	**34.8%**

Health

Base Case: Countries in Descending Year 2060 Population Sequence	Adult Smoking Rate: Percentage of Adults Who Smoke Tobacco				HIV Prevalence Rate: Percent of Population Infected				Disability-Adjusted Life Years: Communicable Diseases				Disability-Adjusted Life Years: Noncommunicable Diseases			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA continued																
Turkey	36.82	36.51	36.2	-1.7%	0.004	0.003	0.001	-75.0%	1.698	0.901	0.532	-68.7%	8.359	9.841	10.11	20.9%
Iraq	13.83	15.27	16.58	19.9%	0.019	0.012	0.004	-78.9%	1.861	0.892	0.291	-84.4%	2.161	3.515	5.186	140.0%
Yemen, Rep. of	20.61	21.48	22.19	7.7%	0.019	0.012	0.004	-78.9%	2.893	1.188	0.54	-81.3%	2.224	3.625	6.053	172.2%
Saudi Arabia	15.6	17.8	18.55	18.9%	0.015	0.01	0.004	-73.3%	0.525	0.317	0.287	-45.3%	2.236	3.489	4.484	100.5%
Syrian Arab Rep.	23.63	24.47	25.51	8.0%	0.017	0.011	0.004	-76.5%	0.436	0.198	0.089	-79.6%	1.927	2.658	3.431	78.0%
Jordan	35.58	35.82	36.69	3.1%	0.028	0.018	0.007	-75.0%	0.212	0.135	0.067	-68.4%	0.611	0.889	1.212	98.4%
Israel	24.17	24.2	23.48	-2.9%	0.108	0.074	0.028	-74.1%	0.058	0.041	0.031	-46.6%	0.699	0.883	1.055	50.9%
Palestine	12.71	13.43	14.22	11.9%	0.018	0.012	0.004	-77.8%	0.139	0.124	0.077	-44.6%	0.346	0.616	1.016	193.6%
Azerbaijan	24.01	26.6	28.1	17.0%	0.121	0.092	0.038	-68.6%	0.447	0.153	0.088	-80.3%	1.044	1.184	1.181	13.1%
United Arab Emirates	19.64	17.81	16.21	-17.5%	0.012	0.01	0.005	-58.3%	0.025	0.032	0.036	44.0%	0.217	0.503	0.664	206.0%
Kuwait	23.88	22.09	21.62	-9.5%	0.049	0.035	0.015	-69.4%	0.019	0.011	0.012	-36.8%	0.162	0.278	0.442	172.8%
Lebanon	17.7	19.6	20.77	17.3%	0.104	0.074	0.031	-70.2%	0.082	0.044	0.025	-69.5%	0.472	0.542	0.56	18.6%
Oman	15	16.94	17.86	19.1%	0.014	0.01	0.005	-64.3%	0.019	0.01	0.008	-57.9%	0.183	0.328	0.524	186.3%
Armenia	26.75	28.4	30.24	13.0%	0.113	0.084	0.035	-69.0%	0.072	0.042	0.02	-72.2%	0.394	0.415	0.38	-3.6%
Georgia	29.37	30.49	31.66	7.8%	0.093	0.071	0.03	-67.7%	0.092	0.03	0.015	-83.7%	0.551	0.441	0.338	-38.7%
Qatar	25.61	24.84	23.73	-7.3%	0.012	0.01	0.005	-58.3%	0.01	0.005	0.005	-50.0%	0.091	0.191	0.263	189.0%
Bahrain	17.38	15.5	14.38	-17.3%	0.159	0.125	0.055	-65.4%	0.008	0.006	0.005	-37.5%	0.058	0.135	0.18	210.3%
Cyprus	22.99	23.39	23.42	1.9%	0.08	0.062	0.028	-65.0%	0.004	0.002	0.002	-50.0%	0.082	0.101	0.106	29.3%
Asia-West	**25.35**	**24.83**	**24.51**	**-3.3%**	**0.026**	**0.017**	**0.006**	**-76.9%**	**8.599**	**4.134**	**2.129**	**-75.2%**	**21.82**	**29.63**	**37.19**	**70.4%**
Australia	23.41	21.77	21.4	-8.6%	0.119	0.093	0.036	-69.7%	0.132	0.083	0.054	-59.1%	1.892	2.294	2.426	28.2%
Papua New Guinea	29.79	30.57	31.14	4.5%	1.347	0.874	0.302	-77.6%	0.947	0.616	0.236	-75.1%	0.921	1.391	1.712	85.9%
New Zealand	25.07	24.87	22.93	-8.5%	0.048	0.038	0.014	-70.8%	0.027	0.015	0.008	-70.4%	0.405	0.472	0.434	7.2%
Solomon Islands	26.86	27.4	27.96	4.1%	0.018	0.012	0.004	-77.8%	0.049	0.045	0.038	-22.4%	0.079	0.129	0.189	139.2%
Fiji	15.12	15.61	16.48	9.0%	0.015	0.011	0.004	-73.3%	0.032	0.019	0.01	-68.8%	0.143	0.157	0.135	-5.6%
Vanuatu	30.37	30.55	30.79	1.4%	0.017	0.011	0.004	-76.5%	0.013	0.012	0.007	-46.2%	0.03	0.048	0.063	110.0%
Micronesia (Federated States of)	27.21	27.93	28.4	4.4%	0.017	0.011	0.004	-76.5%	0.007	0.006	0.004	-42.9%	0.016	0.025	0.034	112.5%
Tonga	38.39	37.71	37.28	-2.9%	0.018	0.011	0.004	-77.8%	0.004	0.004	0.003	-25.0%	0.015	0.022	0.028	86.7%
Samoa	41.27	39.67	38.38	-7.0%	0.018	0.012	0.004	-77.8%	0.007	0.004	0.002	-71.4%	0.023	0.025	0.024	4.3%
Oceania	**24.89**	**24.42**	**24.46**	**-1.7%**	**0.317**	**0.273**	**0.11**	**-65.3%**	**1.218**	**0.806**	**0.361**	**-70.4%**	**3.524**	**4.562**	**5.046**	**43.2%**

Health

Base Case: Countries in Descending Year 2060 Population Sequence	Adult Smoking Rate: Percentage of Adults Who Smoke Tobacco				HIV Prevalence Rate: Percent of Population Infected				Disability-Adjusted Life Years: Communicable Diseases				Disability-Adjusted Life Years: Noncommunicable Diseases			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
EUROPE																
Russian Federation	44.94	44.83	43.69	-2.8%	0.919	0.722	0.309	-66.4%	3.834	1.76	0.714	-81.4%	23.53	17.43	13.13	-44.2%
Ukraine	39.55	38.89	38.16	-3.5%	1.367	1.065	0.454	-66.8%	1.403	0.654	0.231	-83.5%	7.596	5.367	3.769	-50.4%
Poland	34.49	34.18	32.98	-4.4%	0.073	0.058	0.026	-64.4%	0.214	0.104	0.054	-74.8%	4.409	3.969	3.12	-29.2%
Romania	34.09	32.88	31.87	-6.5%	0.1	0.076	0.034	-66.0%	0.237	0.112	0.054	-77.2%	2.765	2.436	1.859	-32.8%
Czech Rep.	29.53	29.16	28.72	-2.7%	0.02	0.016	0.007	-65.0%	0.064	0.041	0.026	-59.4%	1.199	1.189	0.99	-17.4%
Belarus	38.88	39.18	39.38	1.3%	0.189	0.147	0.062	-67.2%	0.107	0.04	0.018	-83.2%	1.539	1.224	0.931	-39.5%
Hungary	37.16	35.81	34.38	-7.5%	0.048	0.037	0.016	-66.7%	0.051	0.026	0.015	-70.6%	1.507	1.232	0.896	-40.5%
Bulgaria	32.82	31.91	31.42	-4.3%	0.015	0.011	0.005	-66.7%	0.053	0.024	0.012	-77.4%	1.083	0.832	0.575	-46.9%
Slovak Rep.	29.63	30.15	29.95	1.1%	0.013	0.01	0.004	-69.2%	0.031	0.017	0.01	-67.7%	0.61	0.604	0.491	-19.5%
Moldova, Rep. of	31.99	30.62	29.58	-7.5%	0.361	0.261	0.109	-69.8%	0.062	0.039	0.015	-75.8%	0.57	0.529	0.436	-23.5%
Europe-East	**40.18**	**39.79**	**38.84**	**-3.3%**	**0.688**	**0.527**	**0.226**	**-67.2%**	**6.056**	**2.816**	**1.148**	**-81.0%**	**44.81**	**34.81**	**26.2**	**-41.5%**
United Kingdom	32.86	31.02	28.72	-12.6%	0.187	0.146	0.056	-70.1%	0.483	0.263	0.146	-69.8%	6.75	6.653	5.928	-12.2%
Sweden	21.24	19.69	19.24	-9.4%	0.101	0.08	0.031	-69.3%	0.043	0.029	0.018	-58.1%	0.862	0.824	0.722	-16.2%
Denmark	32.57	30.53	28.84	-11.5%	0.132	0.103	0.038	-71.2%	0.034	0.021	0.011	-67.6%	0.653	0.631	0.539	-17.5%
Ireland	24.39	22.7	22.29	-8.6%	0.183	0.137	0.055	-69.9%	0.023	0.017	0.012	-47.8%	0.403	0.475	0.51	26.6%
Norway	30.49	28.55	27.61	-9.4%	0.092	0.073	0.028	-69.6%	0.028	0.021	0.014	-50.0%	0.439	0.474	0.47	7.1%
Finland	25.76	24.69	23.94	-7.1%	0.068	0.055	0.021	-69.1%	0.021	0.012	0.005	-76.2%	0.516	0.472	0.377	-26.9%
Lithuania	30.04	30.08	30.54	1.7%	0.096	0.075	0.032	-66.7%	0.037	0.019	0.008	-78.4%	0.467	0.389	0.287	-38.5%
Latvia	34.79	35.01	35.26	1.4%	0.652	0.502	0.214	-67.2%	0.038	0.022	0.008	-78.9%	0.321	0.259	0.193	-39.9%
Estonia	36.2	35.97	34.69	-4.2%	1.096	0.865	0.353	-67.8%	0.025	0.014	0.005	-80.0%	0.177	0.131	0.097	-45.2%
Iceland	25.44	23.4	22.79	-10.4%	0.232	0.181	0.072	-69.0%	0.002	0.001	0.001	-50.0%	0.023	0.026	0.026	13.0%
Europe-North	**30.83**	**29.12**	**27.38**	**-11.2%**	**0.185**	**0.142**	**0.054**	**-70.8%**	**0.734**	**0.418**	**0.228**	**-68.9%**	**10.61**	**10.33**	**9.148**	**-13.8%**
Italy	23.37	24.14	23.92	2.4%	0.377	0.304	0.121	-67.9%	0.301	0.158	0.069	-77.1%	6.233	5.967	4.777	-23.4%
Spain	31.81	31.09	29.23	-8.1%	0.444	0.353	0.149	-66.4%	0.306	0.183	0.092	-69.9%	4.531	4.744	4.172	-7.9%
Greece	47.41	45.78	44.19	-6.8%	0.145	0.113	0.046	-68.3%	0.061	0.037	0.022	-63.9%	1.17	1.161	1.015	-13.2%
Portugal	31.19	30.49	30.08	-3.6%	0.477	0.372	0.156	-67.3%	0.099	0.057	0.026	-73.7%	1.228	1.188	0.975	-20.6%
Serbia	40.9	37.76	34.7	-15.2%	0.129	0.095	0.041	-68.2%	0.047	0.023	0.011	-76.6%	0.951	0.819	0.65	-31.7%
Croatia	31.21	30.36	29.37	-5.9%	0.017	0.013	0.005	-70.6%	0.025	0.013	0.007	-72.0%	0.547	0.48	0.365	-33.3%
Bosnia and Herzegovina	40.08	38.03	35.61	-11.2%	0.019	0.015	0.007	-63.2%	0.021	0.01	0.006	-71.4%	0.447	0.433	0.346	-22.6%
Albania	21.8	23.35	24.4	11.9%	0.015	0.011	0.005	-66.7%	0.027	0.014	0.009	-66.7%	0.291	0.299	0.282	-3.1%
Macedonia, TFYR	26.93	26.35	26	-3.5%	0.035	0.026	0.011	-68.6%	0.02	0.01	0.005	-75.0%	0.245	0.248	0.209	-14.7%
Slovenia	24.65	25.09	24.56	-0.4%	0.035	0.029	0.012	-65.7%	0.01	0.006	0.003	-70.0%	0.214	0.211	0.164	-23.4%
Montenegro	26.64	26.19	26	-2.4%	0.015	0.011	0.004	-73.3%	0.004	0.002	0.001	-75.0%	0.071	0.072	0.063	-11.3%
Malta	26.9	26.92	26.53	-1.4%	0.169	0.138	0.06	-64.5%	0.002	0.001	0.001	-50.0%	0.043	0.046	0.038	-11.6%
Europe-South	**29.79**	**29.57**	**28.6**	**-4.0%**	**0.336**	**0.267**	**0.11**	**-67.3%**	**0.923**	**0.514**	**0.252**	**-72.7%**	**15.97**	**15.67**	**13.05**	**-18.3%**
Germany	28.82	27.77	26.99	-6.3%	0.098	0.081	0.031	-68.4%	0.416	0.285	0.151	-63.7%	8.814	8.428	6.52	-26.0%
France	28.4	27.61	26.47	-6.8%	0.343	0.27	0.102	-70.3%	0.407	0.232	0.126	-69.0%	6.009	6.06	5.107	-15.0%
Netherlands	33.39	31.73	30.16	-9.7%	0.162	0.131	0.049	-69.8%	0.096	0.073	0.041	-57.3%	1.657	1.828	1.545	-6.8%
Belgium	25.12	23.84	23.43	-6.7%	0.21	0.168	0.063	-70.0%	0.078	0.051	0.029	-62.8%	1.08	1.096	0.936	-13.3%
Switzerland	24.8	23.99	23.52	-5.2%	0.47	0.396	0.158	-66.4%	0.048	0.028	0.012	-75.0%	0.658	0.687	0.55	-16.4%
Austria	40.54	37.64	35.27	-13.0%	0.173	0.142	0.058	-66.5%	0.034	0.018	0.008	-76.5%	0.882	0.869	0.68	-22.9%
Luxembourg	32.18	30.39	29.56	-8.1%	0.144	0.112	0.043	-70.1%	0.006	0.004	0.002	-66.7%	0.043	0.054	0.06	39.5%
Europe-West	**29.23**	**28.12**	**27.07**	**-7.4%**	**0.21**	**0.174**	**0.068**	**-67.6%**	**1.085**	**0.69**	**0.37**	**-65.9%**	**19.14**	**19.02**	**15.4**	**-19.5%**

Health

Base Case

Source: International Futures Model Version 6.61, Jan 2013

Millions of Life Years Lived with Disability

	Disability-Adjusted Life Years Injuries				Years (in Millions) Lived with Disability Communicable Diseases				Years (in Millions) Lived with Disability Noncommunicable Diseases				Years (in Millions) Lived with Disability Injuries			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	157.9	188.1	209.9	32.9%	109.5	65.08	32.21	-70.6%	418.4	460.3	481.6	15.1%	49.46	57.56	62.37	26.1%
Africa	37.01	57.58	78.07	110.9%	44.03	33.69	17.56	-60.1%	55.55	73.29	95.45	71.8%	11.3	16.82	21.65	91.6%
Americas	17.48	21.03	23.35	33.6%	6.869	3.915	2.19	-68.1%	63.14	72.88	76.94	21.9%	5.837	6.788	7.237	24.0%
Asia with Oceania	90.26	99.37	99.64	10.4%	55.08	25.65	11.55	-79.0%	253.6	272.7	274.1	8.1%	29.15	31.4	31.33	7.5%
Europe	12.97	10.03	8.739	-32.6%	3.494	1.814	0.904	-74.1%	45.57	40.89	34.63	-24.0%	3.127	2.509	2.112	-32.5%
World	157.9	188.1	209.9	32.9%	109.5	65.08	32.21	-70.6%	418.4	460.3	481.6	15.1%	49.46	57.56	62.37	26.1%
Africa-Eastern	13.01	20.8	28.69	120.5%	14.74	11.42	5.374	-63.5%	16.6	22.78	30.01	80.8%	3.716	5.738	7.416	99.6%
Africa-Middle	6.82	12.01	18.35	169.1%	8.845	8.239	5.264	-40.5%	8.291	11.75	15.91	91.9%	1.959	3.285	4.77	143.5%
Africa-Northern	4.914	6.321	6.805	38.5%	2.475	1.157	0.468	-81.1%	10.88	13.43	15.96	46.7%	1.823	2.207	2.26	24.0%
Africa-Southern	1.444	1.671	1.789	23.9%	2.068	1.338	0.554	-73.2%	2.307	2.354	2.471	7.1%	0.35	0.381	0.386	10.3%
Africa-Western	10.83	16.78	22.43	107.1%	15.9	11.53	5.897	-62.9%	17.48	22.98	31.09	77.9%	3.455	5.209	6.821	97.4%
Africa	37.01	57.58	78.07	110.9%	44.03	33.69	17.56	-60.1%	55.55	73.29	95.45	71.8%	11.3	16.82	21.65	91.6%
America-Caribbean	0.704	0.865	0.876	24.4%	0.704	0.495	0.276	-60.8%	2.726	3.094	3.095	13.5%	0.227	0.273	0.277	22.0%
America-Central	1.136	1.746	2.211	94.6%	0.535	0.297	0.145	-72.9%	2.797	3.641	4.451	59.1%	0.387	0.571	0.687	77.5%
America-North	5.654	6.782	7.781	37.6%	1.913	1.416	0.858	-55.1%	30.49	36.32	37.76	23.8%	1.624	1.904	2.053	26.4%
America-South	9.99	11.63	12.49	25.0%	3.718	1.708	0.912	-75.5%	27.12	29.82	31.63	16.6%	3.599	4.04	4.221	17.3%
Americas	17.48	21.03	23.35	33.6%	6.869	3.915	2.19	-68.1%	63.14	72.88	76.94	21.9%	5.837	6.788	7.237	24.0%
Asia-East	26.15	24.68	19.92	-23.8%	9.35	3.864	1.93	-79.4%	93.8	91.84	79.09	-15.7%	7.141	6.119	4.88	-31.7%
Asia-South Central	46.61	53.54	56.55	21.3%	35.32	16.13	6.396	-81.9%	106.9	117.3	125.1	17.0%	15.93	18.04	18.75	17.7%
Asia-South East	12.68	14.31	13.98	10.3%	7.728	3.983	2.249	-70.9%	37.45	43.79	45.73	22.1%	4.299	4.796	4.522	5.2%
Asia-West	4.399	6.295	8.532	94.0%	2.252	1.364	0.818	-63.7%	13.16	17.02	21.17	60.9%	1.658	2.298	3.012	81.7%
Oceania	0.422	0.538	0.658	55.9%	0.423	0.31	0.161	-61.9%	2.232	2.797	3.066	37.4%	0.121	0.148	0.17	40.5%
Asia with Oceania	90.26	99.37	99.64	10.4%	55.08	25.65	11.55	-79.0%	253.6	272.7	274.1	8.1%	29.15	31.4	31.33	7.5%
Europe-East	9.73	6.886	5.735	-41.1%	2.271	1.073	0.49	-78.4%	19.81	15.5	12.54	-36.7%	2.168	1.568	1.244	-42.6%
Europe-North	0.894	0.868	0.863	-3.5%	0.328	0.194	0.112	-65.9%	6.134	5.991	5.521	-10.0%	0.265	0.255	0.241	-9.1%
Europe-South	1.095	0.973	0.837	-23.6%	0.393	0.224	0.117	-70.2%	9.186	8.94	7.74	-15.7%	0.337	0.308	0.268	-20.5%
Europe-West	1.397	1.444	1.414	1.2%	0.514	0.336	0.19	-63.0%	10.98	10.96	9.227	-16.0%	0.397	0.417	0.39	-1.8%
Europe	12.97	10.03	8.739	-32.6%	3.494	1.814	0.904	-74.1%	45.57	40.89	34.63	-24.0%	3.127	2.509	2.112	-32.5%

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Disability-Adjusted Life Years Injuries				Years (in Millions) Lived with Disability Communicable Diseases				Years (in Millions) Lived with Disability Noncommunicable Diseases				Years (in Millions) Lived with Disability Injuries			
					Millions of Life Years Lived with Disability											
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA																
Ethiopia	2.857	4.214	5.6	96.0%	3.366	1.738	0.401	-88.1%	4.542	5.318	6.212	36.8%	0.793	1.112	1.338	68.7%
Tanzania, United Rep. of	1.438	2.542	3.531	145.5%	1.951	1.799	0.436	-77.7%	2.019	3.161	3.992	97.7%	0.4	0.67	0.843	110.8%
Uganda	1.657	3.121	4.727	185.3%	1.688	1.637	0.709	-58.0%	1.579	2.62	3.76	138.1%	0.468	0.839	1.177	151.5%
Kenya	1.867	3.071	4.291	129.8%	1.719	1.717	1.043	-39.3%	1.8	2.807	3.736	107.6%	0.49	0.791	1.05	114.3%
Madagascar	0.418	0.692	1.101	163.4%	0.533	0.59	0.705	32.3%	0.916	1.499	2.529	176.1%	0.133	0.228	0.368	176.7%
Mozambique	1.227	1.81	2.464	100.8%	1.363	0.647	0.203	-85.1%	1.511	1.525	1.887	24.9%	0.339	0.477	0.608	79.4%
Malawi	0.287	0.493	0.719	150.5%	0.695	0.644	0.434	-37.6%	0.682	1.076	1.652	142.2%	0.086	0.147	0.206	139.5%
Zambia	0.736	1.196	1.794	143.8%	0.798	0.569	0.35	-56.1%	0.821	1.069	1.537	87.2%	0.209	0.326	0.46	120.1%
Somalia	0.811	1.117	1.36	67.7%	0.676	0.343	0.132	-80.5%	0.654	0.787	1.117	70.8%	0.326	0.457	0.539	65.3%
Rwanda	0.559	0.839	0.976	74.6%	0.663	0.558	0.244	-63.2%	0.624	0.843	1.023	63.9%	0.158	0.229	0.26	64.6%
Zimbabwe	0.484	0.694	0.807	66.7%	0.652	0.568	0.416	-36.2%	0.572	0.789	0.997	74.3%	0.123	0.176	0.202	64.2%
Burundi	0.403	0.629	0.831	106.2%	0.47	0.498	0.252	-46.4%	0.478	0.74	0.881	84.3%	0.111	0.171	0.22	98.2%
Eritrea	0.191	0.299	0.407	113.1%	0.118	0.073	0.027	-77.1%	0.254	0.359	0.489	92.5%	0.054	0.084	0.112	107.4%
Comoros	0.013	0.022	0.031	138.5%	0.013	0.017	0.011	-15.4%	0.029	0.052	0.079	172.4%	0.004	0.007	0.011	175.0%
Djibouti	0.043	0.047	0.045	4.7%	0.032	0.025	0.01	-68.8%	0.06	0.072	0.069	15.0%	0.017	0.019	0.017	0.0%
Mauritius	0.015	0.015	0.013	-13.3%	0.003	0.002	0.001	-66.7%	0.058	0.06	0.053	-8.6%	0.005	0.005	0.004	-20.0%
Africa-Eastern	**13.01**	**20.8**	**28.69**	**120.5%**	**14.74**	**11.42**	**5.374**	**-63.5%**	**16.6**	**22.78**	**30.01**	**80.8%**	**3.716**	**5.738**	**7.416**	**99.6%**
Congo, Democratic Rep. of	3.736	6.921	11.35	203.8%	5.616	5.523	3.436	-38.8%	4.565	6.677	9.121	99.8%	1.002	1.781	2.728	172.3%
Angola	1.139	1.985	2.789	144.9%	1.127	0.653	0.392	-65.2%	1.237	1.48	1.988	60.7%	0.36	0.565	0.777	115.8%
Cameroon	0.951	1.441	1.876	97.3%	0.844	0.849	0.578	-31.5%	1.251	1.806	2.279	82.2%	0.306	0.461	0.593	93.8%
Chad	0.452	0.816	1.262	179.2%	0.732	0.812	0.629	-14.1%	0.621	1.011	1.554	150.2%	0.146	0.264	0.406	178.1%
Central African Rep.	0.255	0.393	0.516	102.4%	0.276	0.253	0.143	-48.2%	0.283	0.388	0.475	67.8%	0.065	0.099	0.129	98.5%
Congo, Rep. of	0.193	0.319	0.385	99.5%	0.179	0.096	0.049	-72.6%	0.213	0.236	0.296	39.0%	0.05	0.075	0.086	72.0%
Gabon	0.05	0.069	0.079	58.0%	0.034	0.025	0.015	-55.9%	0.064	0.088	0.112	75.0%	0.016	0.021	0.024	50.0%
Equatorial Guinea	0.039	0.056	0.082	110.3%	0.034	0.025	0.02	-41.2%	0.049	0.057	0.075	53.1%	0.013	0.017	0.025	92.3%
São Tomé and Príncipe	0.005	0.007	0.009	80.0%	0.003	0.003	0.002	-33.3%	0.007	0.011	0.014	100.0%	0.002	0.002	0.003	50.0%
Africa-Middle	**6.82**	**12.01**	**18.35**	**169.1%**	**8.845**	**8.239**	**5.264**	**-40.5%**	**8.291**	**11.75**	**15.91**	**91.9%**	**1.959**	**3.285**	**4.77**	**143.5%**
Egypt, Arab Rep.	1.073	1.302	1.302	21.3%	0.559	0.295	0.17	-69.6%	4.789	5.809	6.846	43.0%	0.404	0.459	0.438	8.4%
Sudan	2.843	3.808	4.192	47.4%	1.339	0.533	0.087	-93.5%	2.504	3.035	3.736	49.2%	1.061	1.329	1.374	29.5%
Algeria	0.403	0.522	0.597	48.1%	0.182	0.123	0.091	-50.0%	1.273	1.726	2.071	62.7%	0.127	0.161	0.184	44.9%
Morocco	0.407	0.468	0.477	17.2%	0.195	0.097	0.049	-74.9%	1.409	1.756	1.984	40.8%	0.159	0.175	0.174	9.4%
Tunisia	0.109	0.122	0.118	8.3%	0.145	0.078	0.047	-67.6%	0.549	0.635	0.721	31.3%	0.041	0.043	0.042	2.4%
Libya	0.078	0.098	0.118	51.3%	0.055	0.03	0.024	-56.4%	0.357	0.464	0.607	70.0%	0.031	0.038	0.048	54.8%
Africa-Northern	**4.914**	**6.321**	**6.805**	**38.5%**	**2.475**	**1.157**	**0.468**	**-81.1%**	**10.88**	**13.43**	**15.96**	**46.7%**	**1.823**	**2.207**	**2.26**	**24.0%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Disability-Adjusted Life Years: Injuries				Years (in Millions) Lived with Disability: Communicable Diseases				Years (in Millions) Lived with Disability: Noncommunicable Diseases				Years (in Millions) Lived with Disability: Injuries			
	Millions of Life Years Lived with Disability															
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA continued																
South Africa	1.037	1.169	1.256	21.1%	1.818	1.192	0.481	-73.5%	1.87	1.892	1.96	4.8%	0.238	0.249	0.251	5.5%
Namibia	0.074	0.113	0.132	78.4%	0.044	0.024	0.013	-70.5%	0.103	0.128	0.155	50.5%	0.019	0.028	0.032	68.4%
Lesotho	0.165	0.18	0.171	3.6%	0.102	0.06	0.028	-72.5%	0.134	0.132	0.139	3.7%	0.046	0.05	0.046	0.0%
Botswana	0.094	0.107	0.112	19.1%	0.055	0.029	0.015	-72.7%	0.119	0.112	0.12	0.8%	0.026	0.027	0.027	3.8%
Swaziland	0.073	0.102	0.119	63.0%	0.048	0.034	0.017	-64.6%	0.081	0.089	0.097	19.8%	0.02	0.027	0.03	50.0%
Africa-Southern	**1.444**	**1.671**	**1.789**	**23.9%**	**2.068**	**1.338**	**0.554**	**-73.2%**	**2.307**	**2.354**	**2.471**	**7.1%**	**0.35**	**0.381**	**0.386**	**10.3%**
Nigeria	6.532	9.885	12.96	98.4%	9.775	5.975	2.195	-77.5%	9.985	11.92	15.13	51.5%	2.097	3.031	3.851	83.6%
Niger	0.313	0.628	1.122	258.5%	0.91	1.103	0.971	6.7%	0.724	1.315	2.385	229.4%	0.103	0.211	0.38	268.9%
Côte d'Ivoire	0.693	1.115	1.416	104.3%	0.773	0.764	0.405	-47.6%	1.004	1.573	2.092	108.4%	0.183	0.293	0.372	103.3%
Burkina Faso	0.543	0.894	1.205	121.9%	0.799	0.756	0.443	-44.6%	0.842	1.305	1.896	125.2%	0.181	0.299	0.398	119.9%
Ghana	0.777	1.122	1.325	70.5%	0.787	0.514	0.211	-73.2%	1.327	1.624	1.903	43.4%	0.25	0.351	0.401	60.4%
Mali	0.428	0.669	0.924	115.9%	0.873	0.541	0.298	-65.9%	0.791	0.962	1.443	82.4%	0.144	0.225	0.305	111.8%
Senegal	0.322	0.541	0.75	132.9%	0.448	0.525	0.41	-8.5%	0.67	1.094	1.577	135.4%	0.103	0.175	0.243	135.9%
Guinea	0.339	0.511	0.73	115.3%	0.351	0.277	0.226	-35.6%	0.526	0.718	1.128	114.4%	0.11	0.168	0.243	120.9%
Benin	0.232	0.386	0.547	135.8%	0.265	0.254	0.169	-36.2%	0.449	0.701	1.028	129.0%	0.075	0.126	0.176	134.7%
Togo	0.128	0.198	0.267	108.6%	0.176	0.235	0.216	22.7%	0.282	0.475	0.694	146.1%	0.041	0.064	0.088	114.6%
Sierra Leone	0.208	0.323	0.486	133.7%	0.333	0.23	0.094	-71.8%	0.307	0.432	0.592	92.8%	0.067	0.101	0.139	107.5%
Liberia	0.068	0.132	0.21	208.8%	0.151	0.102	0.056	-62.9%	0.182	0.285	0.406	123.1%	0.022	0.04	0.061	177.3%
Mauritania	0.11	0.164	0.211	91.8%	0.109	0.111	0.09	-17.4%	0.173	0.265	0.369	113.3%	0.036	0.054	0.07	94.4%
Gambia	0.051	0.081	0.109	113.7%	0.054	0.041	0.022	-59.3%	0.091	0.137	0.204	124.2%	0.017	0.027	0.035	105.9%
Guinea-Bissau	0.079	0.117	0.164	107.6%	0.095	0.1	0.09	-5.3%	0.105	0.148	0.208	98.1%	0.025	0.039	0.055	120.0%
Cape Verde	0.007	0.009	0.01	42.9%	0.003	0.001	0.001	-66.7%	0.019	0.023	0.028	47.4%	0.002	0.003	0.003	50.0%
Africa-Western	**10.83**	**16.78**	**22.43**	**107.1%**	**15.9**	**11.53**	**5.897**	**-62.9%**	**17.48**	**22.98**	**31.09**	**77.9%**	**3.455**	**5.209**	**6.821**	**97.4%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Disability-Adjusted Life Years Injuries				Years (in Millions) Lived with Disability Communicable Diseases				Years (in Millions) Lived with Disability Noncommunicable Diseases				Years (in Millions) Lived with Disability Injuries			
	Millions of Life Years Lived with Disability															
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS																
Haiti	0.194	0.257	0.27	39.2%	0.416	0.37	0.22	-47.1%	0.689	0.92	1.063	54.3%	0.069	0.09	0.094	36.2%
Dominican Rep.	0.252	0.318	0.316	25.4%	0.188	0.071	0.03	-84.0%	0.622	0.717	0.784	26.0%	0.082	0.098	0.098	19.5%
Cuba	0.102	0.104	0.095	-6.9%	0.03	0.015	0.007	-76.7%	0.698	0.679	0.498	-28.7%	0.025	0.026	0.025	0.0%
Puerto Rico	0.044	0.044	0.041	-6.8%	0.013	0.007	0.004	-69.2%	0.359	0.388	0.371	3.3%	0.01	0.01	0.008	-20.0%
Jamaica	0.072	0.103	0.116	61.1%	0.034	0.022	0.01	-70.6%	0.177	0.203	0.205	15.8%	0.026	0.035	0.037	42.3%
Trinidad and Tobago	0.029	0.026	0.025	-13.8%	0.016	0.006	0.003	-81.3%	0.116	0.11	0.099	-14.7%	0.01	0.009	0.009	-10.0%
Bahamas	0.005	0.006	0.006	20.0%	0.002	0.002	0.001	-50.0%	0.022	0.027	0.028	27.3%	0.002	0.002	0.002	0.0%
Barbados	0.001	0.001	0.001	0.0%	0.002	0.001	0.001	-50.0%	0.017	0.019	0.017	0.0%	0	0	0	
Saint Lucia	0.003	0.003	0.003	0.0%	0.001	0.001	0		0.013	0.013	0.012	-7.7%	0.001	0.001	0.001	0.0%
Grenada	0.001	0.001	0.001	0.0%	0.001	0	0		0.006	0.008	0.01	66.7%	0	0.001	0.001	
Saint Vincent and the Grenadines	0.001	0.002	0.002	100.0%	0.001	0.001	0		0.007	0.009	0.009	28.6%	0.001	0.001	0.001	0.0%
America-Caribbean	**0.704**	**0.865**	**0.876**	**24.4%**	**0.704**	**0.495**	**0.276**	**-60.8%**	**2.726**	**3.094**	**3.095**	**13.5%**	**0.227**	**0.273**	**0.277**	**22.0%**
Guatemala	0.466	0.816	1.151	147.0%	0.201	0.107	0.048	-76.1%	0.848	1.17	1.556	83.5%	0.147	0.249	0.331	125.2%
Honduras	0.162	0.243	0.304	87.7%	0.167	0.09	0.042	-74.9%	0.532	0.724	0.908	70.7%	0.062	0.089	0.105	69.4%
Nicaragua	0.113	0.144	0.154	36.3%	0.044	0.031	0.02	-54.5%	0.387	0.543	0.672	73.6%	0.038	0.049	0.052	36.8%
El Salvador	0.273	0.391	0.437	60.1%	0.071	0.041	0.021	-70.4%	0.506	0.583	0.643	27.1%	0.095	0.13	0.14	47.4%
Costa Rica	0.061	0.078	0.084	37.7%	0.015	0.008	0.004	-73.3%	0.27	0.333	0.355	31.5%	0.022	0.028	0.031	40.9%
Panama	0.055	0.066	0.072	30.9%	0.034	0.017	0.009	-73.5%	0.236	0.263	0.286	21.2%	0.021	0.023	0.024	14.3%
Belize	0.005	0.008	0.009	80.0%	0.004	0.002	0.001	-75.0%	0.019	0.026	0.032	68.4%	0.002	0.003	0.003	50.0%
America-Central	**1.136**	**1.746**	**2.211**	**94.6%**	**0.535**	**0.297**	**0.145**	**-72.9%**	**2.797**	**3.641**	**4.451**	**59.1%**	**0.387**	**0.571**	**0.687**	**77.5%**
United States of America	3.906	4.585	5.361	37.3%	1.062	0.909	0.565	-46.8%	20.88	24.77	25.54	22.3%	0.99	1.125	1.221	23.3%
Mexico	1.47	1.877	2.035	38.4%	0.777	0.442	0.247	-68.2%	7.575	9.084	9.684	27.8%	0.568	0.703	0.747	31.5%
Canada	0.279	0.32	0.385	38.0%	0.074	0.065	0.046	-37.8%	2.04	2.47	2.543	24.7%	0.066	0.076	0.086	30.3%
America-North	**5.654**	**6.782**	**7.781**	**37.6%**	**1.913**	**1.416**	**0.858**	**-55.1%**	**30.49**	**36.32**	**37.76**	**23.8%**	**1.624**	**1.904**	**2.053**	**26.4%**
Brazil	5.294	5.693	5.884	11.1%	1.898	0.797	0.422	-77.8%	14.04	14.71	14.83	5.6%	1.889	1.968	1.993	5.5%
Colombia	1.588	2.147	2.549	60.5%	0.462	0.222	0.112	-75.8%	3.173	3.735	4.175	31.6%	0.561	0.715	0.813	44.9%
Argentina	0.567	0.593	0.63	11.1%	0.268	0.152	0.092	-65.7%	2.819	3.045	3.318	17.7%	0.224	0.227	0.235	4.9%
Peru	0.63	0.723	0.727	15.4%	0.268	0.133	0.084	-68.7%	1.869	2.132	2.438	30.4%	0.244	0.277	0.278	13.9%
Venezuela (Bolivarian Rep. of)	0.823	1.074	1.166	41.7%	0.268	0.112	0.052	-80.6%	1.869	2.219	2.438	30.4%	0.283	0.353	0.373	31.8%
Ecuador	0.336	0.454	0.521	55.1%	0.093	0.049	0.029	-68.8%	0.813	0.973	1.11	36.5%	0.115	0.15	0.164	42.6%
Chile	0.222	0.256	0.283	27.5%	0.044	0.029	0.019	-56.8%	1.014	1.161	1.182	16.6%	0.082	0.092	0.1	22.0%
Bolivia (Plurinational State of)	0.297	0.393	0.397	33.7%	0.255	0.13	0.062	-75.7%	0.741	0.96	1.174	58.4%	0.115	0.15	0.15	30.4%
Paraguay	0.16	0.23	0.264	65.0%	0.12	0.066	0.033	-72.5%	0.465	0.582	0.681	46.5%	0.059	0.081	0.09	52.5%
Uruguay	0.041	0.041	0.041	0.0%	0.016	0.008	0.004	-75.0%	0.221	0.214	0.206	-6.8%	0.016	0.016	0.015	-6.3%
Guyana	0.019	0.018	0.014	-26.3%	0.017	0.007	0.003	-82.4%	0.056	0.053	0.044	-21.4%	0.007	0.007	0.005	-28.6%
Suriname	0.014	0.013	0.011	-21.4%	0.007	0.003	0.001	-85.7%	0.04	0.038	0.033	-17.5%	0.005	0.005	0.004	-20.0%
America-South	**9.99**	**11.63**	**12.49**	**25.0%**	**3.718**	**1.708**	**0.912**	**-75.5%**	**27.12**	**29.82**	**31.63**	**16.6%**	**3.599**	**4.04**	**4.221**	**17.3%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Disability-Adjusted Life Years Injuries				Years (in Millions) Lived with Disability Communicable Diseases				Years (in Millions) Lived with Disability Noncommunicable Diseases				Years (in Millions) Lived with Disability Injuries			
	Millions of Life Years Lived with Disability															
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA																
China	24.05	22.65	18.12	-24.7%	8.522	3.4	1.698	-80.1%	79.56	76.29	65.71	-17.4%	6.638	5.634	4.465	-32.7%
Japan	1.077	1.008	0.896	-16.8%	0.352	0.244	0.135	-61.6%	6.553	6.378	5.225	-20.3%	0.254	0.237	0.197	-22.4%
Korea, Rep. of	0.572	0.583	0.497	-13.1%	0.076	0.053	0.033	-56.6%	2.334	2.48	2.041	-12.6%	0.12	0.124	0.106	-11.7%
Korea, Dem. People's Rep. of	0.282	0.282	0.258	-8.5%	0.346	0.145	0.055	-84.1%	1.532	1.517	1.398	-8.7%	0.089	0.089	0.082	-7.9%
Taiwan, China	0.101	0.074	0.059	-41.6%	0.008	0.004	0.002	-75.0%	2.831	3.834	3.381	19.4%	0.023	0.016	0.012	-47.8%
Hong Kong SAR, China	0.013	0.012	0.013	0.0%	0.001	0.001	0.001	0.0%	0.762	1.102	1.114	46.2%	0.003	0.002	0.002	-33.3%
Mongolia	0.06	0.073	0.071	18.3%	0.045	0.018	0.005	-88.9%	0.224	0.231	0.223	-0.4%	0.014	0.016	0.015	7.1%
Asia-East	**26.15**	**24.68**	**19.92**	**-23.8%**	**9.35**	**3.864**	**1.93**	**-79.4%**	**93.8**	**91.84**	**79.09**	**-15.7%**	**7.141**	**6.119**	**4.88**	**-31.7%**
India	32.52	35.85	36.56	12.4%	23.28	7.25	1.501	-93.6%	76.49	79.78	82.6	8.0%	10.64	11.4	11.23	5.5%
Pakistan	3.45	4.867	5.861	69.9%	3.539	3.161	1.686	-52.4%	7.747	10.91	12.98	67.5%	1.473	2.063	2.458	66.9%
Bangladesh	3.11	3.456	3.209	3.2%	3.041	1.788	0.701	-76.9%	8.184	10.19	10.5	28.3%	1.085	1.207	1.146	5.6%
Afghanistan	2.527	4.108	5.721	126.4%	2.703	2.459	1.661	-38.5%	2.784	3.984	5.469	96.4%	1.027	1.639	2.205	114.7%
Iran, Islamic Rep. of	2.419	2.446	2.283	-5.6%	0.996	0.448	0.281	-71.8%	4.175	4.464	5.102	22.2%	0.943	0.921	0.896	-5.0%
Nepal	0.434	0.552	0.609	40.3%	0.525	0.352	0.198	-62.3%	1.47	1.964	2.371	61.3%	0.145	0.183	0.204	40.7%
Uzbekistan	0.543	0.592	0.577	6.3%	0.555	0.226	0.095	-82.9%	2.154	2.092	2.209	2.6%	0.208	0.207	0.189	-9.1%
Sri Lanka	0.572	0.686	0.722	26.2%	0.091	0.048	0.026	-71.4%	1.135	1.221	1.119	-1.4%	0.119	0.138	0.137	15.1%
Kazakhstan	0.644	0.544	0.526	-18.3%	0.164	0.07	0.041	-75.0%	1.446	1.12	0.971	-32.8%	0.129	0.108	0.099	-23.3%
Tajikistan	0.126	0.166	0.175	38.9%	0.229	0.224	0.141	-38.4%	0.52	0.665	0.756	45.4%	0.059	0.077	0.08	35.6%
Kyrgyz Rep.	0.119	0.165	0.186	56.3%	0.083	0.067	0.043	-48.2%	0.38	0.498	0.559	47.1%	0.045	0.062	0.069	53.3%
Turkmenistan	0.125	0.086	0.095	-24.0%	0.107	0.028	0.018	-83.2%	0.365	0.321	0.381	4.4%	0.049	0.026	0.028	-42.9%
Bhutan	0.022	0.023	0.022	0.0%	0.012	0.005	0.003	-75.0%	0.037	0.04	0.042	13.5%	0.008	0.008	0.007	-12.5%
Maldives	0.002	0.002	0.002	0.0%	0.001	0.001	0.001	0.0%	0.016	0.022	0.026	62.5%	0.001	0.001	0.001	0.0%
Asia-South Central	**46.61**	**53.54**	**56.55**	**21.3%**	**35.32**	**16.13**	**6.396**	**-81.9%**	**106.9**	**117.3**	**125.1**	**17.0%**	**15.93**	**18.04**	**18.75**	**17.7%**
Indonesia	3.611	4.535	4.669	29.3%	2.902	1.16	0.727	-74.9%	12.22	14.34	15.22	24.5%	1.176	1.564	1.615	37.3%
Philippines	1.05	1.669	2.093	99.3%	1.43	1	0.623	-56.4%	6.792	9.277	10.65	56.8%	0.235	0.333	0.377	60.4%
Vietnam	1.212	1.4	1.487	22.7%	0.923	0.549	0.269	-70.9%	5.672	5.884	5.848	3.1%	0.327	0.366	0.385	17.7%
Thailand	2.238	2.216	1.902	-15.0%	0.542	0.252	0.124	-77.1%	6.541	6.702	5.819	-11.0%	0.809	0.816	0.695	-14.1%
Myanmar	3.836	3.631	2.935	-23.5%	0.788	0.368	0.15	-81.0%	2.374	2.839	2.788	17.4%	1.569	1.512	1.236	-21.2%
Malaysia	0.266	0.319	0.321	20.7%	0.175	0.166	0.131	-25.1%	1.721	2.279	2.668	55.0%	0.063	0.075	0.078	23.8%
Cambodia	0.277	0.308	0.318	14.8%	0.664	0.362	0.175	-73.6%	1.385	1.542	1.655	19.5%	0.066	0.068	0.067	1.5%
Lao People's Democratic Rep.	0.14	0.168	0.183	30.7%	0.239	0.09	0.028	-88.3%	0.395	0.417	0.47	19.0%	0.04	0.045	0.047	17.5%
Singapore	0.025	0.027	0.028	12.0%	0.014	0.012	0.007	-50.0%	0.251	0.372	0.403	60.6%	0.006	0.006	0.006	0.0%
Timor-Leste	0.02	0.029	0.042	110.0%	0.049	0.021	0.012	-75.5%	0.065	0.09	0.137	110.8%	0.007	0.01	0.014	100.0%
Brunei Darussalam	0.004	0.004	0.004	0.0%	0.003	0.002	0.002	-33.3%	0.033	0.054	0.065	97.0%	0.001	0.001	0.001	0.0%
Asia-South Eastern	**12.68**	**14.31**	**13.98**	**10.3%**	**7.728**	**3.983**	**2.249**	**-70.9%**	**37.45**	**43.79**	**45.73**	**22.1%**	**4.299**	**4.796**	**4.522**	**5.2%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Disability-Adjusted Life Years Injuries				Years (in Millions) Lived with Disability Communicable Diseases				Years (in Millions) Lived with Disability Noncommunicable Diseases				Years (in Millions) Lived with Disability Injuries			
					Millions of Life Years Lived with Disability											
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA continued																
Turkey	0.762	0.805	0.79	3.7%	0.535	0.315	0.197	-63.2%	4.834	5.294	5.424	12.2%	0.278	0.279	0.266	-4.3%
Iraq	1.323	2.355	3.883	193.5%	0.362	0.235	0.096	-73.5%	1.339	2.12	2.99	123.3%	0.455	0.8	1.277	180.7%
Yemen, Rep. of	0.874	1.434	2.005	129.4%	0.513	0.293	0.16	-68.8%	1.249	1.942	3.065	145.4%	0.346	0.554	0.756	118.5%
Saudi Arabia	0.573	0.609	0.633	10.5%	0.225	0.147	0.135	-40.0%	1.447	2.135	2.807	94.0%	0.24	0.249	0.257	7.1%
Syrian Arab Rep.	0.26	0.354	0.39	50.0%	0.188	0.098	0.048	-74.5%	1.264	1.667	2.089	65.3%	0.113	0.149	0.16	41.6%
Jordan	0.105	0.157	0.176	67.6%	0.091	0.065	0.035	-61.5%	0.407	0.565	0.751	84.5%	0.04	0.057	0.062	55.0%
Israel	0.041	0.061	0.083	102.4%	0.03	0.023	0.019	-36.7%	0.487	0.613	0.735	50.9%	0.011	0.014	0.018	63.6%
Palestine	0.092	0.162	0.239	159.8%	0.063	0.061	0.041	-34.9%	0.244	0.417	0.657	169.3%	0.038	0.067	0.096	152.6%
Azerbaijan	0.099	0.09	0.084	-15.2%	0.125	0.053	0.033	-73.6%	0.586	0.603	0.608	3.8%	0.042	0.035	0.032	-23.8%
United Arab Emirates	0.041	0.05	0.038	-7.3%	0.01	0.012	0.015	50.0%	0.163	0.302	0.415	154.6%	0.013	0.015	0.012	-7.7%
Kuwait	0.023	0.025	0.03	30.4%	0.007	0.005	0.005	-28.6%	0.114	0.177	0.276	142.1%	0.008	0.008	0.011	37.5%
Lebanon	0.07	0.074	0.073	4.3%	0.035	0.02	0.012	-65.7%	0.266	0.293	0.309	16.2%	0.026	0.027	0.027	3.8%
Oman	0.029	0.025	0.029	0.0%	0.008	0.005	0.004	-50.0%	0.123	0.2	0.316	156.9%	0.012	0.01	0.012	0.0%
Armenia	0.033	0.034	0.028	-15.2%	0.024	0.015	0.007	-70.8%	0.232	0.236	0.214	-7.8%	0.013	0.013	0.01	-23.1%
Georgia	0.043	0.033	0.027	-37.2%	0.027	0.011	0.006	-77.8%	0.251	0.192	0.156	-37.8%	0.014	0.01	0.008	-42.9%
Qatar	0.02	0.016	0.012	-40.0%	0.004	0.003	0.003	-25.0%	0.064	0.11	0.167	160.9%	0.007	0.005	0.004	-42.9%
Bahrain	0.006	0.006	0.006	0.0%	0.003	0.003	0.002	-33.3%	0.041	0.087	0.12	192.7%	0.002	0.002	0.002	0.0%
Cyprus	0.005	0.006	0.006	20.0%	0.002	0.001	0.001	-50.0%	0.054	0.064	0.068	25.9%	0.002	0.002	0.002	0.0%
Asia-West	**4.399**	**6.295**	**8.532**	**94.0%**	**2.252**	**1.364**	**0.818**	**-63.7%**	**13.16**	**17.02**	**21.17**	**60.9%**	**1.658**	**2.298**	**3.012**	**81.7%**
Australia	0.186	0.202	0.239	28.5%	0.076	0.049	0.032	-57.9%	1.195	1.44	1.561	30.6%	0.056	0.059	0.065	16.1%
Papua New Guinea	0.171	0.261	0.341	99.4%	0.296	0.22	0.099	-66.6%	0.577	0.797	0.922	59.8%	0.046	0.068	0.085	84.8%
New Zealand	0.042	0.046	0.047	11.9%	0.016	0.009	0.005	-68.8%	0.254	0.293	0.274	7.9%	0.012	0.012	0.011	-8.3%
Solomon Islands	0.007	0.011	0.014	100.0%	0.015	0.015	0.014	-6.7%	0.055	0.086	0.124	125.5%	0.002	0.004	0.005	150.0%
Fiji	0.01	0.009	0.006	-40.0%	0.011	0.007	0.004	-63.6%	0.093	0.099	0.085	-8.6%	0.003	0.003	0.002	-33.3%
Vanuatu	0.002	0.003	0.004	100.0%	0.004	0.004	0.003	-25.0%	0.021	0.033	0.042	100.0%	0.001	0.001	0.001	0.0%
Micronesia (Federated States of)	0.001	0.002	0.002	100.0%	0.002	0.002	0.002	0.0%	0.011	0.016	0.022	100.0%	0	0.001	0.001	
Tonga	0.001	0.001	0.002	100.0%	0.001	0.002	0.001	0.0%	0.011	0.016	0.019	72.7%	0	0	0	
Samoa	0.001	0.002	0.001	0.0%	0.002	0.001	0.001	-50.0%	0.016	0.017	0.016	0.0%	0	0	0	
Oceania	**0.422**	**0.538**	**0.658**	**55.9%**	**0.423**	**0.31**	**0.161**	**-61.9%**	**2.232**	**2.797**	**3.066**	**37.4%**	**0.121**	**0.148**	**0.17**	**40.5%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Disability-Adjusted Life Years Injuries				Years (in Millions) Lived with Disability Communicable Diseases				Years (in Millions) Lived with Disability Noncommunicable Diseases				Years (in Millions) Lived with Disability Injuries			
					Millions of Life Years Lived with Disability											
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
EUROPE																
Russian Federation	6.649	4.509	3.887	-41.5%	1.458	0.68	0.313	-78.5%	10.28	7.756	6.306	-38.7%	1.359	0.934	0.765	-43.7%
Ukraine	1.328	0.925	0.711	-46.5%	0.56	0.264	0.108	-80.7%	3.161	2.187	1.675	-47.0%	0.272	0.191	0.143	-47.4%
Poland	0.582	0.473	0.371	-36.3%	0.061	0.029	0.015	-75.4%	2.106	1.866	1.563	-25.8%	0.199	0.16	0.122	-38.7%
Romania	0.339	0.284	0.203	-40.1%	0.062	0.031	0.015	-75.8%	1.245	1.091	0.876	-29.6%	0.129	0.107	0.074	-42.6%
Czech Rep.	0.127	0.124	0.114	-10.2%	0.026	0.017	0.011	-57.7%	0.608	0.604	0.537	-11.7%	0.041	0.04	0.036	-12.2%
Belarus	0.348	0.263	0.206	-40.8%	0.039	0.016	0.008	-79.5%	0.674	0.542	0.442	-34.4%	0.071	0.054	0.042	-40.8%
Hungary	0.117	0.104	0.087	-25.6%	0.022	0.011	0.007	-68.2%	0.694	0.567	0.434	-37.5%	0.023	0.02	0.016	-30.4%
Bulgaria	0.089	0.064	0.047	-47.2%	0.014	0.007	0.004	-71.4%	0.467	0.365	0.276	-40.9%	0.031	0.022	0.015	-51.6%
Slovak Rep.	0.075	0.065	0.051	-32.0%	0.007	0.004	0.002	-71.4%	0.29	0.276	0.235	-19.0%	0.027	0.024	0.018	-33.3%
Moldova, Rep. of	0.077	0.074	0.056	-27.3%	0.022	0.014	0.006	-72.7%	0.281	0.25	0.201	-28.5%	0.015	0.015	0.011	-26.7%
Europe-East	**9.73**	**6.886**	**5.735**	**-41.1%**	**2.271**	**1.073**	**0.49**	**-78.4%**	**19.81**	**15.5**	**12.54**	**-36.7%**	**2.168**	**1.568**	**1.244**	**-42.6%**
United Kingdom	0.437	0.435	0.443	1.4%	0.22	0.125	0.073	-66.8%	3.99	3.94	3.632	-9.0%	0.14	0.137	0.131	-6.4%
Sweden	0.073	0.076	0.08	9.6%	0.021	0.014	0.009	-57.1%	0.498	0.478	0.434	-12.9%	0.022	0.022	0.022	0.0%
Denmark	0.046	0.046	0.047	2.2%	0.016	0.01	0.006	-62.5%	0.374	0.362	0.321	-14.2%	0.014	0.015	0.014	0.0%
Ireland	0.039	0.043	0.051	30.8%	0.01	0.007	0.004	-60.0%	0.256	0.292	0.322	25.8%	0.012	0.013	0.014	16.7%
Norway	0.044	0.046	0.056	27.3%	0.014	0.011	0.008	-42.9%	0.266	0.285	0.292	9.8%	0.015	0.015	0.017	13.3%
Finland	0.084	0.078	0.074	-11.9%	0.01	0.006	0.003	-70.0%	0.285	0.252	0.211	-26.0%	0.028	0.025	0.022	-21.4%
Lithuania	0.101	0.088	0.068	-32.7%	0.013	0.007	0.003	-76.9%	0.216	0.181	0.143	-33.8%	0.02	0.017	0.013	-35.0%
Latvia	0.042	0.035	0.027	-35.7%	0.014	0.008	0.003	-78.6%	0.15	0.123	0.099	-34.0%	0.008	0.007	0.005	-37.5%
Estonia	0.025	0.018	0.014	-44.0%	0.009	0.005	0.002	-77.8%	0.084	0.062	0.051	-39.3%	0.005	0.004	0.003	-40.0%
Iceland	0.002	0.003	0.003	50.0%	0.001	0	0		0.014	0.016	0.015	7.1%	0.001	0.001	0.001	0.0%
Europe-North	**0.894**	**0.868**	**0.863**	**-3.5%**	**0.328**	**0.194**	**0.112**	**-65.9%**	**6.134**	**5.991**	**5.521**	**-10.0%**	**0.265**	**0.255**	**0.241**	**-9.1%**
Italy	0.385	0.347	0.312	-19.0%	0.139	0.075	0.036	-74.1%	3.639	3.473	2.897	-20.4%	0.115	0.11	0.103	-10.4%
Spain	0.301	0.271	0.234	-22.3%	0.137	0.083	0.046	-66.4%	2.762	2.828	2.559	-7.3%	0.093	0.085	0.073	-21.5%
Greece	0.092	0.079	0.065	-29.3%	0.022	0.013	0.008	-63.6%	0.653	0.653	0.605	-7.4%	0.029	0.025	0.021	-27.6%
Portugal	0.086	0.077	0.062	-27.9%	0.039	0.023	0.01	-74.4%	0.718	0.695	0.595	-17.1%	0.023	0.021	0.017	-26.1%
Serbia	0.062	0.053	0.041	-33.9%	0.016	0.009	0.005	-68.8%	0.45	0.385	0.319	-29.1%	0.02	0.016	0.012	-40.0%
Croatia	0.047	0.042	0.036	-23.4%	0.011	0.006	0.003	-72.7%	0.275	0.242	0.194	-29.5%	0.014	0.013	0.011	-21.4%
Bosnia and Herzegovina	0.035	0.029	0.022	-37.1%	0.007	0.004	0.002	-71.4%	0.218	0.206	0.171	-21.6%	0.013	0.01	0.008	-38.5%
Albania	0.037	0.03	0.024	-35.1%	0.008	0.004	0.003	-62.5%	0.175	0.166	0.152	-13.1%	0.015	0.011	0.009	-40.0%
Macedonia, TFYR	0.013	0.013	0.011	-15.4%	0.007	0.004	0.002	-71.4%	0.124	0.121	0.105	-15.3%	0.005	0.005	0.004	-20.0%
Slovenia	0.027	0.026	0.023	-14.8%	0.004	0.002	0.001	-75.0%	0.113	0.111	0.091	-19.5%	0.008	0.008	0.007	-12.5%
Montenegro	0.005	0.005	0.005	0.0%	0.002	0.001	0.001	-50.0%	0.032	0.033	0.031	-3.1%	0.002	0.002	0.001	-50.0%
Malta	0.002	0.002	0.002	0.0%	0.001	0.001	0		0.026	0.027	0.023	-11.5%	0.001	0.001	0.001	0.0%
Europe-South	**1.095**	**0.973**	**0.837**	**-23.6%**	**0.393**	**0.224**	**0.117**	**-70.2%**	**9.186**	**8.94**	**7.74**	**-15.7%**	**0.337**	**0.308**	**0.268**	**-20.5%**
Germany	0.511	0.488	0.447	-12.5%	0.193	0.134	0.075	-61.1%	4.824	4.682	3.833	-20.5%	0.143	0.139	0.122	-14.7%
France	0.562	0.617	0.627	11.6%	0.201	0.122	0.071	-64.7%	3.592	3.62	3.107	-13.5%	0.164	0.182	0.175	6.7%
Netherlands	0.085	0.098	0.104	22.4%	0.042	0.032	0.018	-57.1%	0.976	1.072	0.937	-4.0%	0.024	0.028	0.029	20.8%
Belgium	0.106	0.11	0.115	8.5%	0.037	0.024	0.015	-59.5%	0.636	0.655	0.583	-8.3%	0.028	0.029	0.028	0.0%
Switzerland	0.057	0.058	0.055	-3.5%	0.022	0.013	0.006	-72.7%	0.401	0.396	0.321	-20.0%	0.017	0.017	0.016	-5.9%
Austria	0.071	0.067	0.059	-16.9%	0.017	0.009	0.004	-76.5%	0.528	0.507	0.41	-22.3%	0.021	0.02	0.018	-14.3%
Luxembourg	0.005	0.005	0.007	40.0%	0.002	0.002	0.001	-50.0%	0.025	0.032	0.037	48.0%	0.001	0.002	0.002	100.0%
Europe-West	**1.397**	**1.444**	**1.414**	**1.2%**	**0.514**	**0.336**	**0.19**	**-63.0%**	**10.98**	**10.96**	**9.227**	**-16.0%**	**0.397**	**0.417**	**0.39**	**-1.8%**

Health

Base Case	Total Deaths				Deaths from Communicable Diseases: Deaths from AIDS				Deaths from Diarrheal Diseases				Deaths from Malaria			
Source: International Futures	Annual Deaths in Millions				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
Model Version 6.61, Jan 2013	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	55.29	75.41	99.29	79.6%	1891	1346	469.6	-75.2%	2547	1526	1260	-50.5%	994.4	385.1	111	-88.8%
Africa	12.46	13.43	18.02	44.6%	1435	1043	385.5	-73.1%	1112	516.6	257.2	-76.9%	943.6	370.7	105.6	-88.8%
Americas	5.821	9.303	12.84	120.6%	98.77	89.33	26.65	-73.0%	42.52	34.75	34.04	-19.9%	1.148	0.588	0.284	-75.3%
Asia with Oceania	29.18	43.54	58.99	102.2%	285.5	166.6	46.49	-83.7%	1384	966	961.3	-30.5%	49.61	13.8	5.112	-89.7%
Europe	7.743	9.02	9.326	20.4%	71.37	47.5	10.89	-84.7%	8.636	8.257	7.247	-16.1%	0.061	0.03	0.016	-73.8%
World	55.29	75.41	99.29	79.6%	1891	1346	469.6	-75.2%	2547	1526	1260	-50.5%	994.4	385.1	111	-88.8%
Africa-Eastern	3.811	4.172	5.704	49.7%	633.9	402.7	162.3	-74.4%	352.4	156.9	67.14	-80.9%	184.6	72.13	18.95	-89.7%
Africa-Middle	2.108	2.328	3.028	43.6%	113.4	138.2	57.55	-49.3%	243.3	132.9	63.69	-73.8%	238.4	125.6	42.54	-82.2%
Africa-Northern	1.36	2	3.167	132.9%	27.77	17.99	6.029	-78.3%	50.13	17.91	16.71	-66.7%	11.09	1.546	0.135	-98.8%
Africa-Southern	0.815	0.805	0.716	-12.1%	385	304.5	88.27	-77.1%	35.24	20.15	13.3	-62.3%	0.713	0.283	0.207	-71.0%
Africa-Western	4.369	4.127	5.407	23.8%	274.9	179.4	71.43	-74.0%	431.3	188.7	96.38	-77.7%	508.9	171.1	43.78	-91.4%
Africa	12.46	13.43	18.02	44.6%	1435	1043	385.5	-73.1%	1112	516.6	257.2	-76.9%	943.6	370.7	105.6	-88.8%
America-Caribbean	0.294	0.423	0.557	89.5%	14.27	7.503	2.245	-84.3%	7.102	4.846	2.718	-61.7%	0.622	0.418	0.183	-70.6%
America-Central	0.217	0.344	0.586	170.0%	9.4	9.534	3.216	-65.8%	7.016	2.671	2.179	-68.9%	0.02	0.008	0.008	-60.0%
America-North	2.965	4.843	6.258	111.1%	33.5	41.08	12.15	-63.7%	10.99	15.31	15.5	41.0%	0.005	0.004	0.004	-20.0%
America-South	2.346	3.693	5.435	131.7%	41.6	31.21	9.048	-78.3%	17.41	11.92	13.64	-21.7%	0.502	0.157	0.089	-82.3%
Americas	5.821	9.303	12.84	120.6%	98.77	89.33	26.65	-73.0%	42.52	34.75	34.04	-19.9%	1.148	0.588	0.284	-75.3%
Asia-East	10.82	17.94	21.8	101.5%	39.94	36.72	8.905	-77.7%	25.58	14.13	14.34	-43.9%	0.26	0.356	0.285	9.6%
Asia-South Central	13.36	17.34	24.66	84.6%	143	69.57	20.99	-85.3%	1272	903.7	899.7	-29.3%	27.19	6.31	1.822	-93.3%
Asia-South East	3.534	5.835	8.458	139.3%	99.01	56.77	15.45	-84.4%	53.52	32.61	31.87	-40.5%	17.58	5.001	2.166	-87.7%
Asia-West	1.222	2.037	3.543	189.9%	2.275	1.997	0.627	-72.4%	31.1	14.3	14.19	-54.4%	1.27	0.413	0.198	-84.4%
Oceania	0.235	0.386	0.523	122.6%	1.312	1.513	0.519	-60.4%	1.376	1.236	1.178	-14.4%	3.31	1.716	0.641	-80.6%
Asia with Oceania	29.18	43.54	58.99	102.2%	285.5	166.6	46.49	-83.7%	1384	966	961.3	-30.5%	49.61	13.8	5.112	-89.7%
Europe-East	3.815	3.825	3.679	-3.6%	61.15	40.18	9.101	-85.1%	0.966	0.409	0.263	-72.8%	0.009	0.004	0.002	-77.8%
Europe-North	0.909	1.164	1.274	40.2%	2.125	1.675	0.432	-79.7%	3.514	3.44	3.024	-13.9%	0.01	0.005	0.002	-80.0%
Europe-South	1.413	1.827	2.062	45.9%	5.048	3.685	0.861	-82.9%	0.803	0.767	0.762	-5.1%	0.02	0.01	0.005	-75.0%
Europe-West	1.689	2.315	2.422	43.4%	3.1	1.978	0.498	-83.9%	3.26	3.625	3.191	-2.1%	0.023	0.013	0.007	-69.6%
Europe	7.743	9.02	9.326	20.4%	71.37	47.5	10.89	-84.7%	8.636	8.257	7.247	-16.1%	0.061	0.03	0.016	-73.8%

Health

Base Case: Countries in Year 2060 Descending Population Sequence					Deaths from Communicable Diseases											
	Total Deaths				Deaths from AIDS				Deaths from Diarrheal Diseases				Deaths from Malaria			
	Annual Deaths in Millions				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA																
Ethiopia	0.919	0.934	1.349	46.8%	67	40.58	14.48	-78.4%	122.2	28.63	6.197	-94.9%	9.233	1.659	0.167	-98.2%
Tanzania, United Rep. of	0.473	0.566	0.651	37.6%	96	69.01	28.66	-70.1%	32.31	20.52	6.323	-80.4%	38.33	19.43	1.214	-96.8%
Uganda	0.404	0.48	0.642	58.9%	77	51.16	22.52	-70.8%	37.05	22.63	7.676	-79.3%	33.57	17.14	2.831	-91.6%
Kenya	0.441	0.555	0.776	76.0%	107.5	63.76	24.76	-77.0%	33.12	25.9	12.48	-62.3%	7.674	5.517	2.236	-70.9%
Madagascar	0.173	0.239	0.42	142.8%	1	1.463	0.673	-32.7%	18.12	13.46	14.64	-19.2%	2.538	1.694	1.571	-38.1%
Mozambique	0.369	0.312	0.4	8.4%	81	52.01	19.8	-75.6%	18.92	2.864	0.734	-96.1%	45.33	4.422	0.355	-99.2%
Malawi	0.183	0.194	0.262	43.2%	68	51.4	22.88	-66.4%	11.7	6.321	3.834	-67.2%	13.69	5.972	2.337	-82.9%
Zambia	0.211	0.196	0.266	26.1%	56	39.19	16.14	-71.2%	15.88	5.454	3.672	-76.9%	15.43	4.521	1.768	-88.5%
Somalia	0.146	0.128	0.19	30.1%	1.6	2.377	1.004	-37.3%	19.96	3.358	0.762	-96.2%	2.974	0.395	0.05	-98.3%
Rwanda	0.147	0.162	0.199	35.4%	7.8	3.974	1.579	-79.8%	18.97	9.8	2.565	-86.5%	2.825	1.366	0.296	-89.5%
Zimbabwe	0.167	0.162	0.214	28.1%	55.98	18.08	6.055	-89.2%	4.823	4.177	4.515	-6.4%	8.921	6.784	5.338	-40.2%
Burundi	0.114	0.15	0.183	60.5%	11	4.759	1.834	-83.3%	14.45	11.91	3.034	-79.0%	3.676	2.911	0.683	-81.4%
Eritrea	0.041	0.06	0.111	170.7%	2.6	4.228	1.628	-37.4%	3.864	0.898	0.232	-94.0%	0.046	0.009	0.001	-97.8%
Comoros	0.004	0.008	0.012	200.0%	0.1	0.066	0.03	-70.0%	0.431	0.506	0.254	-41.1%	0.307	0.298	0.097	-68.4%
Djibouti	0.009	0.011	0.012	33.3%	1.1	0.529	0.158	-85.6%	0.658	0.421	0.207	-68.5%	0.014	0.009	0.002	-85.7%
Mauritius	0.01	0.015	0.018	80.0%	0.2	0.16	0.039	-80.5%	0.021	0.023	0.02	-4.8%	0	0	0	
Africa-Eastern	**3.811**	**4.172**	**5.704**	**49.7%**	**633.9**	**402.7**	**162.3**	**-74.4%**	**352.4**	**156.9**	**67.14**	**-80.9%**	**184.6**	**72.13**	**18.95**	**-89.7%**
Congo, Democratic Rep. of	1.175	1.367	1.799	53.1%	29	75.91	32.73	12.9%	139.1	76.67	29.23	-79.0%	145.1	76.32	22.58	-84.4%
Angola	0.309	0.252	0.354	14.6%	11	15.36	6.115	-44.4%	44.63	11.6	7.539	-83.1%	23.21	5.098	1.892	-91.8%
Cameroon	0.279	0.332	0.406	45.5%	39	24.09	9.315	-76.1%	24.37	21.71	15.1	-38.0%	25.1	18.23	8.133	-67.6%
Chad	0.197	0.223	0.273	38.6%	14	10.28	4.841	-65.4%	25.57	17.36	8.544	-66.6%	29.09	18.54	7.572	-74.0%
Central African Rep.	0.074	0.08	0.093	25.7%	11	6.379	2.438	-77.8%	5.095	3.586	1.662	-67.4%	9.257	5.641	1.6	-82.7%
Congo, Rep. of	0.049	0.044	0.063	28.6%	6.4	3.776	1.295	-79.8%	3.033	0.914	0.58	-80.9%	5.285	1.174	0.345	-93.5%
Gabon	0.013	0.016	0.024	84.6%	2.3	1.268	0.42	-81.7%	0.571	0.55	0.519	-9.1%	0.549	0.275	0.124	-77.4%
Equatorial Guinea	0.01	0.011	0.014	40.0%	0.7	1.103	0.391	-44.1%	0.842	0.521	0.497	-41.0%	0.829	0.331	0.283	-65.9%
São Tomé and Príncipe	0.001	0.002	0.003	200.0%	0.002	0.001	0		0.056	0.039	0.017	-69.6%	0.026	0.023	0.016	-38.5%
Africa-Middle	**2.108**	**2.328**	**3.028**	**43.6%**	**113.4**	**138.2**	**57.55**	**-49.3%**	**243.3**	**132.9**	**63.69**	**-73.8%**	**238.4**	**125.6**	**42.54**	**-82.2%**
Egypt, Arab Rep.	0.503	0.794	1.233	145.1%	0.5	0.872	0.265	-47.0%	4.572	1.747	0.93	-79.7%	0.209	0.054	0.017	-91.9%
Sudan	0.428	0.45	0.663	54.9%	25	14.94	5.137	-79.5%	31.46	4.573	2.181	-93.1%	10.87	1.489	0.117	-98.9%
Algeria	0.165	0.306	0.552	234.5%	1	0.993	0.288	-71.2%	8.803	9.285	11.78	33.8%	0	0	0	
Morocco	0.179	0.305	0.466	160.3%	1	0.964	0.276	-72.4%	4.606	1.845	1.288	-72.0%	0	0	0	
Tunisia	0.06	0.095	0.152	153.3%	0.2	0.186	0.052	-74.0%	0.54	0.357	0.378	-30.0%	0.009	0.002	0.001	-88.9%
Libya	0.025	0.05	0.101	304.0%	0.065	0.034	0.01	-84.6%	0.149	0.102	0.15	0.7%	0	0	0	
Africa-Northern	**1.36**	**2**	**3.167**	**132.9%**	**27.77**	**17.99**	**6.029**	**-78.3%**	**50.13**	**17.91**	**16.71**	**-66.7%**	**11.09**	**1.546**	**0.135**	**-98.8%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Total Deaths				Deaths from Communicable Diseases: Deaths from AIDS				Deaths from Diarrheal Diseases				Deaths from Malaria			
	Annual Deaths in Millions				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA continued																
South Africa	0.72	0.718	0.606	-15.8%	350	287.9	83.24	-76.2%	32.52	18.54	11.55	-64.5%	0.102	0.058	0.042	-58.8%
Namibia	0.019	0.022	0.033	73.7%	5.1	2.73	0.884	-82.7%	0.476	0.316	0.466	-2.1%	0.578	0.214	0.16	-72.3%
Lesotho	0.035	0.027	0.031	-11.4%	13.22	5.952	1.721	-87.0%	1.015	0.44	0.43	-57.6%	0.002	0	0	
Botswana	0.024	0.022	0.027	12.5%	9.9	4.478	1.318	-86.7%	0.404	0.402	0.569	40.8%	0.026	0.009	0.004	-84.6%
Swaziland	0.018	0.016	0.019	5.6%	6.814	3.491	1.111	-83.7%	0.819	0.457	0.284	-65.3%	0.005	0.002	0.001	-80.0%
Africa-Southern	**0.815**	**0.805**	**0.716**	**-12.1%**	**385**	**304.5**	**88.27**	**-77.1%**	**35.24**	**20.15**	**13.3**	**-62.3%**	**0.713**	**0.283**	**0.207**	**-71.0%**
Nigeria	2.637	2.159	2.654	0.6%	170	108.1	41.99	-75.3%	250.1	80.3	27.82	-88.9%	319.3	77.64	10.76	-96.6%
Niger	0.228	0.276	0.368	61.4%	4	7.062	3.859	-3.5%	30.68	19.53	9.705	-68.4%	30.82	18.98	8.136	-73.6%
Côte d'Ivoire	0.214	0.27	0.347	62.1%	38	17.35	7.075	-81.4%	13.59	11.9	5.686	-58.2%	20.58	13.74	3.29	-84.0%
Burkina Faso	0.217	0.235	0.321	47.9%	9.2	4.955	2.156	-76.6%	24.85	13.22	4.753	-80.9%	36.52	17.91	4.589	-87.4%
Ghana	0.267	0.291	0.385	44.2%	21	12.02	4.056	-80.7%	27.93	22.88	24.16	-13.5%	17.99	5.78	1.003	-94.4%
Mali	0.221	0.162	0.249	12.7%	5.8	4.235	1.86	-67.9%	32.99	6.891	2.167	-93.4%	22.4	4.156	0.967	-95.7%
Senegal	0.135	0.187	0.277	105.2%	1.8	2.51	1.023	-43.2%	10.71	10.05	6.684	-37.6%	12.08	9.686	4.414	-63.5%
Guinea	0.106	0.116	0.177	67.0%	4.5	3.028	1.35	-70.0%	8.928	4.083	2.992	-66.5%	14.41	5.283	2.558	-82.2%
Benin	0.08	0.104	0.156	95.0%	3.3	2.395	1.041	-68.5%	7.633	5.039	2.812	-63.2%	8.664	4.55	1.624	-81.3%
Togo	0.053	0.086	0.128	141.5%	9.1	5.783	2.329	-74.4%	3.702	5.275	4.697	26.9%	3.93	5.067	3.474	-11.6%
Sierra Leone	0.09	0.09	0.117	30.0%	3.3	6.327	2.448	-25.8%	8.443	3.031	0.965	-88.6%	11.74	3.337	0.568	-95.2%
Liberia	0.039	0.049	0.077	97.4%	2.3	3.237	1.295	-43.7%	3.809	0.976	0.543	-85.7%	3.825	0.964	0.252	-93.4%
Mauritania	0.034	0.047	0.067	97.1%	1	1.304	0.515	-48.5%	3.381	2.492	1.532	-54.7%	1.33	0.91	0.501	-62.3%
Gambia	0.018	0.021	0.037	105.6%	0.5	0.358	0.144	-71.2%	1.456	0.648	0.313	-78.5%	1.909	0.606	0.151	-92.1%
Guinea-Bissau	0.027	0.031	0.039	44.4%	1.1	0.685	0.293	-73.4%	2.951	2.315	1.46	-50.5%	3.371	2.468	1.488	-55.9%
Cape Verde	0.003	0.004	0.007	133.3%	0.005	0.002	0.001	-80.0%	0.134	0.077	0.093	-30.6%	0.001	0	0	
Africa-Western	**4.369**	**4.127**	**5.407**	**23.8%**	**274.9**	**179.4**	**71.43**	**-74.0%**	**431.3**	**188.7**	**96.38**	**-77.7%**	**508.9**	**171.1**	**43.78**	**-91.4%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Total Deaths				Deaths from Communicable Diseases: Deaths from AIDS				Deaths from Diarrheal Diseases				Deaths from Malaria			
	Annual Deaths in Millions				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS																
Haiti	0.09	0.116	0.163	81.1%	7.2	3.743	1.195	-83.4%	5.505	4.075	2.045	-62.9%	0.604	0.414	0.181	-70.0%
Dominican Rep.	0.061	0.084	0.125	104.9%	4.1	1.835	0.547	-86.7%	1.107	0.397	0.353	-68.1%	0.017	0.004	0.001	-94.1%
Cuba	0.079	0.13	0.15	89.9%	0.1	0.084	0.019	-81.0%	0.189	0.181	0.153	-19.0%	0	0	0	
Puerto Rico	0.029	0.041	0.051	75.9%	0.04	0.016	0.004	-90.0%	0.009	0.01	0.01	11.1%	0	0	0	
Jamaica	0.019	0.027	0.035	84.2%	1.5	1.329	0.36	-76.0%	0.265	0.151	0.124	-53.2%	0	0	0	
Trinidad and Tobago	0.01	0.015	0.019	90.0%	1	0.378	0.089	-91.1%	0.022	0.027	0.028	27.3%	0	0	0	
Bahamas	0.002	0.004	0.005	150.0%	0.2	0.087	0.023	-88.5%	0.003	0.003	0.002	-33.3%	0	0	0	
Barbados	0.002	0.003	0.003	50.0%	0.075	0.028	0.006	-92.0%	0.002	0.002	0.002	0.0%	0	0	0	
Saint Lucia	0.001	0.001	0.002	100.0%	0.002	0.001	0		0.001	0	0		0	0	0	
Grenada	0.001	0.001	0.001	0.0%	0.001	0.001	0		0.001	0.001	0.001	0.0%	0	0	0	
Saint Vincent and the Grenadines	0.001	0.001	0.002	100.0%	0.054	0.002	0.001	-98.1%	0	0	0		0	0	0	
America-Caribbean	**0.294**	**0.423**	**0.557**	**89.5%**	**14.27**	**7.503**	**2.245**	**-84.3%**	**7.102**	**4.846**	**2.718**	**-61.7%**	**0.622**	**0.418**	**0.183**	**-70.6%**
Guatemala	0.077	0.11	0.193	150.6%	3.9	5.127	1.878	-51.8%	4.999	1.578	1.183	-76.3%	0.01	0.005	0.007	-30.0%
Honduras	0.037	0.058	0.107	189.2%	1.9	0.938	0.312	-83.6%	1.007	0.408	0.323	-67.9%	0.009	0.003	0.001	-88.9%
Nicaragua	0.025	0.047	0.085	240.0%	0.5	0.548	0.172	-65.6%	0.451	0.293	0.256	-43.2%	0	0	0	
El Salvador	0.04	0.057	0.084	110.0%	1.7	1.648	0.483	-71.6%	0.266	0.16	0.156	-41.4%	0	0	0	
Costa Rica	0.019	0.04	0.066	247.4%	0.2	0.19	0.053	-73.5%	0.051	0.073	0.099	94.1%	0	0	0	
Panama	0.017	0.03	0.047	176.5%	1	0.974	0.284	-71.6%	0.23	0.15	0.143	-37.8%	0	0	0	
Belize	0.001	0.002	0.004	300.0%	0.2	0.108	0.034	-83.0%	0.013	0.009	0.018	38.5%	0	0	0	
America-Central	**0.217**	**0.344**	**0.586**	**170.0%**	**9.4**	**9.534**	**3.216**	**-65.8%**	**7.016**	**2.671**	**2.179**	**-68.9%**	**0.02**	**0.008**	**0.008**	**-60.0%**
United States of America	2.24	3.546	4.335	93.5%	22	30.22	9.117	-58.6%	6.328	10.02	9.583	51.4%	0.005	0.004	0.004	-20.0%
Mexico	0.487	0.891	1.422	192.0%	11	10.4	2.893	-73.7%	3.576	3.46	4.144	15.9%	0	0	0	
Canada	0.238	0.406	0.501	110.5%	0.5	0.458	0.136	-72.8%	1.087	1.832	1.774	63.2%	0	0	0	
America-North	**2.965**	**4.843**	**6.258**	**111.1%**	**33.5**	**41.08**	**12.15**	**-63.7%**	**10.99**	**15.31**	**15.5**	**41.0%**	**0.005**	**0.004**	**0.004**	**-20.0%**
Brazil	1.21	1.873	2.708	123.8%	15	6.492	1.788	-88.1%	7.174	5.7	6.654	-7.2%	0.233	0.056	0.024	-89.7%
Colombia	0.245	0.441	0.678	176.7%	9.8	9.599	2.805	-71.4%	1.696	1.156	1.265	-25.4%	0.158	0.053	0.029	-81.6%
Argentina	0.293	0.393	0.527	79.9%	7	6.391	1.853	-73.5%	0.362	0.316	0.313	-13.5%	0	0	0	
Peru	0.155	0.246	0.399	157.4%	3.3	3.302	0.995	-69.8%	1.923	1.465	2.092	8.8%	0.047	0.013	0.007	-85.1%
Venezuela (Bolivarian Rep. of)	0.143	0.259	0.4	179.7%	1.4	0.632	0.19	-86.4%	1.602	1.197	1.336	-16.6%	0.017	0.012	0.014	-17.6%
Ecuador	0.067	0.117	0.194	189.6%	1.4	1.425	0.431	-69.2%	0.589	0.267	0.246	-58.2%	0.002	0.001	0	
Chile	0.092	0.168	0.238	158.7%	1.1	0.982	0.268	-75.6%	0.164	0.296	0.387	136.0%	0	0	0	
Bolivia (Plurinational State of)	0.068	0.092	0.145	113.2%	0.5	0.564	0.183	-63.4%	3.062	1.137	1.048	-65.8%	0.008	0.003	0.001	-87.5%
Paraguay	0.034	0.057	0.091	167.6%	1	1.102	0.35	-65.0%	0.616	0.243	0.164	-73.4%	0	0	0	
Uruguay	0.029	0.035	0.041	41.4%	0.5	0.418	0.114	-77.2%	0.08	0.065	0.059	-26.3%	0	0	0	
Guyana	0.005	0.006	0.008	60.0%	0.398	0.148	0.033	-91.7%	0.099	0.041	0.036	-63.6%	0.024	0.014	0.009	-62.5%
Suriname	0.004	0.005	0.006	50.0%	0.2	0.156	0.037	-81.5%	0.042	0.035	0.043	2.4%	0.014	0.006	0.004	-71.4%
America-South	**2.346**	**3.693**	**5.435**	**131.7%**	**41.6**	**31.21**	**9.048**	**-78.3%**	**17.41**	**11.92**	**13.64**	**-21.7%**	**0.502**	**0.157**	**0.089**	**-82.3%**

Health

	Total Deaths				Deaths from Communicable Diseases: Deaths from AIDS				Deaths from Diarrheal Diseases				Deaths from Malaria			
Base Case: Countries in Year 2060	Annual Deaths in Millions				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA																
China	9.054	15.04	18.74	107.0%	39	35.31	8.584	-78.0%	19.93	9.55	10.9	-45.3%	0	0	0	
Japan	1.084	1.643	1.503	38.7%	0.1	0.885	0.197	97.0%	2.176	3.117	2.464	13.2%	0.001	0.001	0	
Korea, Rep. of	0.271	0.558	0.712	162.7%	0.5	0.383	0.085	-83.0%	0.119	0.223	0.262	120.2%	0.004	0.002	0.001	-75.0%
Korea, Dem. People's Rep. of	0.226	0.298	0.335	48.2%	0.24	0.097	0.026	-89.2%	2.873	0.768	0.307	-89.3%	0	0	0	
Taiwan, China	0.128	0.282	0.346	170.3%	0	0	0		0.185	0.26	0.209	13.0%	0.185	0.257	0.205	10.8%
Hong Kong SAR, China	0.042	0.089	0.124	195.2%	0	0	0		0.07	0.099	0.08	14.3%	0.07	0.097	0.079	12.9%
Mongolia	0.017	0.029	0.042	147.1%	0.1	0.048	0.014	-86.0%	0.226	0.109	0.115	-49.1%	0	0	0	
Asia-East	**10.82**	**17.94**	**21.8**	**101.5%**	**39.94**	**36.72**	**8.905**	**-77.7%**	**25.58**	**14.13**	**14.34**	**-43.9%**	**0.26**	**0.356**	**0.285**	**9.6%**
India	9.401	11.61	15.96	69.8%	126.1	50.85	15.18	-88.0%	1030	754.1	806.4	-21.7%	23.17	4.705	1.355	-94.2%
Pakistan	1.123	1.705	2.604	131.9%	5.1	5.969	2.034	-60.1%	91.13	73.14	44.64	-51.0%	0.846	0.576	0.223	-73.6%
Bangladesh	1.066	1.659	2.485	133.1%	0.5	1.601	0.46	-8.0%	36.48	22.74	20.6	-43.5%	3.042	0.97	0.218	-92.8%
Afghanistan	0.588	0.641	0.84	42.9%	0.1	0.227	0.099	-1.0%	89.69	42.62	20.54	-77.1%	0.108	0.051	0.022	-79.6%
Iran, Islamic Rep. of	0.403	0.624	1.148	184.9%	4.3	3.9	1.051	-75.6%	5.565	1.47	1.09	-80.4%	0.003	0.001	0.001	-66.7%
Nepal	0.179	0.278	0.465	159.8%	5	5.378	1.661	-66.8%	7.5	4.501	3.736	-50.2%	0.012	0.005	0.002	-83.3%
Uzbekistan	0.181	0.262	0.406	124.3%	0.5	0.506	0.15	-70.0%	5.055	0.687	0.185	-96.3%	0	0	0	
Sri Lanka	0.134	0.22	0.275	105.2%	0.2	0.18	0.049	-75.5%	0.925	1.256	1.217	31.6%	0	0	0	
Kazakhstan	0.163	0.175	0.202	23.9%	0.3	0.115	0.029	-90.3%	0.363	0.093	0.044	-87.9%	0.002	0	0	
Tajikistan	0.044	0.067	0.104	136.4%	0.5	0.569	0.189	-62.2%	2.976	2.436	0.876	-70.6%	0	0	0	
Kyrgyz Rep.	0.036	0.058	0.087	141.7%	0.2	0.216	0.066	-67.0%	0.888	0.479	0.207	-76.7%	0	0	0	
Turkmenistan	0.038	0.04	0.073	92.1%	0.1	0.049	0.015	-85.0%	1.231	0.112	0.087	-92.9%	0	0	0	
Bhutan	0.005	0.006	0.01	100.0%	0	0.003	0.001		0.159	0.075	0.077	-51.6%	0.001	0	0	
Maldives	0.002	0.003	0.005	150.0%	0.081	0.007	0.002	-97.5%	0.007	0.004	0.002	-71.4%	0.003	0.002	0.001	-66.7%
Asia-South Central	**13.36**	**17.34**	**24.66**	**84.6%**	**143**	**69.57**	**20.99**	**-85.3%**	**1272**	**903.7**	**899.7**	**-29.3%**	**27.19**	**6.31**	**1.822**	**-93.3%**
Indonesia	1.288	2.196	3.344	159.6%	8.7	8.12	2.275	-73.9%	21.56	7.458	8.379	-61.1%	5.635	1.262	0.636	-88.7%
Philippines	0.393	0.779	1.242	216.0%	0.2	1.03	0.32	60.0%	4.947	4.509	4.261	-13.9%	0.178	0.085	0.041	-77.0%
Vietnam	0.444	0.839	1.324	198.2%	24	22.49	6.218	-74.1%	2.608	1.925	2.122	-18.6%	0.104	0.039	0.019	-81.7%
Thailand	0.666	0.863	0.955	43.4%	30	11.2	2.687	-91.0%	9.663	10.95	9.738	0.8%	0.318	0.101	0.041	-87.1%
Myanmar	0.435	0.626	0.785	80.5%	25	8.045	2.172	-91.3%	9.461	3.512	2.091	-77.9%	9.384	3.066	1.203	-87.2%
Malaysia	0.116	0.249	0.38	227.6%	3.9	3.968	1.201	-69.2%	0.214	0.444	0.638	198.1%	0.027	0.012	0.007	-74.1%
Cambodia	0.117	0.16	0.23	96.6%	6.9	1.621	0.486	-93.0%	3.582	3.255	3.898	8.8%	0.514	0.177	0.064	-87.5%
Lao People's Democratic Rep.	0.041	0.055	0.093	126.8%	0.1	0.106	0.033	-67.0%	1.105	0.475	0.665	-39.8%	0.156	0.034	0.011	-92.9%
Singapore	0.025	0.056	0.082	228.0%	0.2	0.186	0.05	-75.0%	0.016	0.035	0.048	200.0%	0.001	0.001	0	
Timor-Leste	0.009	0.01	0.019	111.1%	0.012	0.008	0.003	-75.0%	0.368	0.043	0.013	-96.5%	1.262	0.226	0.143	-88.7%
Brunei Darussalam	0.001	0.003	0.006	500.0%	0	0.002	0.001		0.004	0.009	0.018	350.0%	0	0	0	
Asia-South Eastern	**3.534**	**5.835**	**8.458**	**139.3%**	**99.01**	**56.77**	**15.45**	**-84.4%**	**53.52**	**32.61**	**31.87**	**-40.5%**	**17.58**	**5.001**	**2.166**	**-87.7%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Total Deaths Annual Deaths in Millions				Deaths from Communicable Diseases: Deaths from AIDS Annual Deaths in Thousands				Deaths from Diarrheal Diseases Annual Deaths in Thousands				Deaths from Malaria Annual Deaths in Thousands			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA continued																
Turkey	0.445	0.739	1.091	145.2%	0.1	0.339	0.094	-6.0%	1.654	1.352	1.496	-9.6%	0	0	0	
Iraq	0.162	0.26	0.522	222.2%	0.323	0.226	0.088	-72.8%	9.6	6.112	7.533	-21.5%	0	0	0	
Yemen, Rep. of	0.164	0.217	0.431	162.8%	0.2	0.177	0.073	-63.5%	16.14	4.856	2.631	-83.7%	1.261	0.408	0.195	-84.5%
Saudi Arabia	0.097	0.208	0.421	334.0%	0.1	0.136	0.042	-58.0%	0.802	0.561	1.008	25.7%	0.008	0.003	0.002	-75.0%
Syrian Arab Rep.	0.081	0.156	0.288	255.6%	0.216	0.12	0.039	-81.9%	0.79	0.547	0.681	-13.8%	0	0	0	
Jordan	0.025	0.044	0.087	248.0%	0.1	0.063	0.022	-78.0%	0.233	0.118	0.068	-70.8%	0	0	0	
Israel	0.041	0.068	0.101	146.3%	0.2	0.217	0.071	-64.5%	0.159	0.229	0.262	64.8%	0	0	0	
Palestine	0.013	0.03	0.067	415.4%	0.042	0.03	0.013	-69.0%	0.069	0.065	0.059	-14.5%	0	0	0	
Azerbaijan	0.064	0.094	0.129	101.6%	0.1	0.093	0.026	-74.0%	1.353	0.242	0.118	-91.3%	0	0	0	
United Arab Emirates	0.005	0.03	0.091	1720.0%	0.1	0.047	0.012	-88.0%	0.005	0.012	0.062	1140.0%	0	0	0	
Kuwait	0.006	0.018	0.054	800.0%	0.1	0.057	0.02	-80.0%	0.006	0.001	0		0.001	0	0	
Lebanon	0.028	0.042	0.061	117.9%	0.2	0.176	0.046	-77.0%	0.069	0.049	0.053	-23.2%	0	0	0	
Oman	0.007	0.018	0.051	628.6%	0.029	0.015	0.004	-86.2%	0.037	0.055	0.144	289.2%	0	0	0	
Armenia	0.026	0.034	0.039	50.0%	0.2	0.16	0.04	-80.0%	0.05	0.041	0.027	-46.0%	0	0	0	
Georgia	0.05	0.05	0.047	-6.0%	0.1	0.063	0.014	-86.0%	0.13	0.036	0.016	-87.7%	0	0	0	
Qatar	0.003	0.012	0.033	1000.0%	0.015	0.007	0.002	-86.7%	0.004	0	0		0	0	0	
Bahrain	0.002	0.008	0.017	750.0%	0.1	0.051	0.015	-85.0%	0.005	0.016	0.024	380.0%	0	0	0	
Cyprus	0.005	0.009	0.013	160.0%	0.05	0.02	0.005	-90.0%	0.003	0.005	0.006	100.0%	0	0	0	
Asia-West	**1.222**	**2.037**	**3.543**	**189.9%**	**2.275**	**1.997**	**0.627**	**-72.4%**	**31.1**	**14.3**	**14.19**	**-54.4%**	**1.27**	**0.413**	**0.198**	**-84.4%**
Australia	0.141	0.239	0.321	127.7%	0.1	0.214	0.066	-34.0%	0.083	0.107	0.118	42.2%	0	0	0	
Papua New Guinea	0.053	0.081	0.116	118.9%	1	1.234	0.434	-56.6%	1.083	0.87	0.763	-29.5%	3.05	1.506	0.471	-84.6%
New Zealand	0.029	0.047	0.057	96.6%	0.1	0.043	0.012	-88.0%	0.059	0.085	0.102	72.9%	0	0	0	
Solomon Islands	0.003	0.005	0.01	233.3%	0.005	0.004	0.001	-80.0%	0.052	0.071	0.12	130.8%	0.232	0.183	0.151	-34.9%
Fiji	0.005	0.008	0.01	100.0%	0.1	0.015	0.004	-96.0%	0.061	0.07	0.053	-13.1%	0	0	0	
Vanuatu	0.001	0.002	0.004	300.0%	0.002	0.002	0.001	-50.0%	0.014	0.015	0.009	-35.7%	0.025	0.025	0.019	-24.0%
Micronesia (Federated States of)	0.001	0.001	0.002	100.0%	0.001	0.001	0		0.009	0.009	0.008	-11.1%	0	0	0	
Tonga	0.001	0.001	0.001	0.0%	0.001	0.001	0		0.006	0.006	0.004	-33.3%	0.001	0.001	0	
Samoa	0.001	0.001	0.002	100.0%	0.002	0.001	0		0.01	0.005	0.002	-80.0%	0.002	0.001	0	
Oceania	**0.235**	**0.386**	**0.523**	**122.6%**	**1.312**	**1.513**	**0.519**	**-60.4%**	**1.376**	**1.236**	**1.178**	**-14.4%**	**3.31**	**1.716**	**0.641**	**-80.6%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Total Deaths Annual Deaths in Millions				Deaths from Communicable Diseases: Deaths from AIDS Annual Deaths in Thousands				Deaths from Diarrheal Diseases Annual Deaths in Thousands				Deaths from Malaria Annual Deaths in Thousands			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
EUROPE																
Russian Federation	1.965	1.869	1.826	-7.1%	40	27.35	6.273	-84.3%	0.647	0.213	0.135	-79.1%	0.004	0.001	0.001	-75.0%
Ukraine	0.677	0.605	0.522	-22.9%	19	11.8	2.592	-86.4%	0.082	0.026	0.012	-85.4%	0.003	0.001	0	
Poland	0.368	0.467	0.472	28.3%	0.2	0.273	0.062	-69.0%	0.042	0.039	0.028	-33.3%	0.002	0.001	0.001	-50.0%
Romania	0.249	0.27	0.273	9.6%	0.5	0.166	0.036	-92.8%	0.058	0.027	0.012	-79.3%	0	0	0	
Czech Rep.	0.106	0.139	0.139	31.1%	0.1	0.038	0.009	-91.0%	0.064	0.062	0.05	-21.9%	0	0	0	
Belarus	0.131	0.128	0.124	-5.3%	1.1	0.377	0.089	-91.9%	0.005	0.001	0.001	-80.0%	0	0	0	
Hungary	0.127	0.133	0.121	-4.7%	0.1	0.067	0.015	-85.0%	0.025	0.017	0.011	-56.0%	0	0	0	
Bulgaria	0.101	0.099	0.084	-16.8%	0	0.023	0.005		0.02	0.009	0.005	-75.0%	0	0	0	
Slovak Rep.	0.05	0.068	0.073	46.0%	0.05	0.019	0.004	-92.0%	0.01	0.008	0.006	-40.0%	0	0	0	
Moldova, Rep. of	0.041	0.046	0.045	9.8%	0.1	0.072	0.016	-84.0%	0.014	0.006	0.002	-85.7%	0.001	0.001	0	
Europe-East	**3.815**	**3.825**	**3.679**	**-3.6%**	**61.15**	**40.18**	**9.101**	**-85.1%**	**0.966**	**0.409**	**0.263**	**-72.8%**	**0.009**	**0.004**	**0.002**	**-77.8%**
United Kingdom	0.569	0.722	0.806	41.7%	0.5	0.516	0.143	-71.4%	2.883	2.692	2.337	-18.9%	0.005	0.002	0.001	-80.0%
Sweden	0.086	0.111	0.116	34.9%	0.1	0.081	0.022	-78.0%	0.134	0.16	0.147	9.7%	0.002	0.001	0.001	-50.0%
Denmark	0.053	0.07	0.07	32.1%	0.1	0.081	0.022	-78.0%	0.139	0.149	0.127	-8.6%	0	0	0	
Ireland	0.028	0.046	0.065	132.1%	0.1	0.093	0.027	-73.0%	0.038	0.055	0.064	68.4%	0	0	0	
Norway	0.039	0.055	0.067	71.8%	0.1	0.087	0.024	-76.0%	0.219	0.264	0.26	18.7%	0.001	0	0	
Finland	0.047	0.068	0.064	36.2%	0.1	0.079	0.02	-80.0%	0.092	0.11	0.08	-13.0%	0.002	0.001	0	
Lithuania	0.041	0.043	0.04	-2.4%	0.11	0.076	0.017	-84.5%	0.006	0.004	0.003	-50.0%	0	0	0	
Latvia	0.028	0.029	0.027	-3.6%	0.5	0.343	0.08	-84.0%	0.002	0.002	0.003	50.0%	0	0	0	
Estonia	0.016	0.016	0.014	-12.5%	0.5	0.313	0.074	-85.2%	0	0	0		0	0	0	
Iceland	0.002	0.003	0.004	100.0%	0.015	0.006	0.002	-86.7%	0.002	0.003	0.003	50.0%	0	0	0	
Europe-North	**0.909**	**1.164**	**1.274**	**40.2%**	**2.125**	**1.675**	**0.432**	**-79.7%**	**3.514**	**3.44**	**3.024**	**-13.9%**	**0.01**	**0.005**	**0.002**	**-80.0%**
Italy	0.588	0.748	0.807	37.2%	1.9	1.362	0.314	-83.5%	0.177	0.16	0.138	-22.0%	0.006	0.002	0.001	-83.3%
Spain	0.379	0.525	0.662	74.7%	2.3	1.74	0.413	-82.0%	0.475	0.496	0.545	14.7%	0.009	0.005	0.003	-66.7%
Greece	0.112	0.137	0.153	36.6%	0.1	0.085	0.021	-79.0%	0	0	0		0.001	0.001	0	
Portugal	0.104	0.131	0.14	34.6%	0.5	0.356	0.08	-84.0%	0.06	0.055	0.043	-28.3%	0.003	0.002	0	
Serbia	0.082	0.088	0.088	7.3%	0.1	0.068	0.015	-85.0%	0.017	0.009	0.006	-64.7%	0	0	0	
Croatia	0.048	0.057	0.053	10.4%	0.05	0.017	0.004	-92.0%	0.016	0.01	0.006	-62.5%	0	0	0	
Bosnia and Herzegovina	0.035	0.048	0.052	48.6%	0	0.014	0.003		0.005	0.001	0.001	-80.0%	0	0	0	
Albania	0.018	0.029	0.038	111.1%	0.032	0.012	0.003	-90.6%	0.029	0.021	0.015	-48.3%	0	0	0	
Macedonia, TFYR	0.018	0.025	0.027	50.0%	0.05	0.018	0.004	-92.0%	0.02	0.009	0.004	-80.0%	0	0	0	
Slovenia	0.019	0.027	0.027	42.1%	0	0.007	0.002		0.003	0.003	0.002	-33.3%	0	0	0	
Montenegro	0.006	0.008	0.008	33.3%	0.006	0.002	0.001	-83.3%	0	0	0		0	0	0	
Malta	0.003	0.005	0.005	66.7%	0.01	0.003	0.001	-90.0%	0.002	0.002	0.002	0.0%	0	0	0	
Europe-South	**1.413**	**1.827**	**2.062**	**45.9%**	**5.048**	**3.685**	**0.861**	**-82.9%**	**0.803**	**0.767**	**0.762**	**-5.1%**	**0.02**	**0.01**	**0.005**	**-75.0%**
Germany	0.81	1.064	1.056	30.4%	0.5	0.596	0.142	-71.6%	1.322	1.576	1.36	2.9%	0.005	0.003	0.002	-60.0%
France	0.51	0.714	0.782	53.3%	1.6	0.631	0.169	-89.4%	1.341	1.362	1.214	-9.5%	0.014	0.008	0.004	-71.4%
Netherlands	0.134	0.208	0.22	64.2%	0.2	0.162	0.042	-79.0%	0.174	0.233	0.2	14.9%	0.003	0.002	0.001	-66.7%
Belgium	0.096	0.13	0.14	45.8%	0.1	0.087	0.023	-77.0%	0.303	0.33	0.307	1.3%	0	0	0	
Switzerland	0.06	0.092	0.106	76.7%	0.5	0.382	0.09	-82.0%	0.045	0.048	0.041	-8.9%	0.001	0	0	
Austria	0.074	0.102	0.111	50.0%	0.1	0.073	0.017	-83.0%	0.067	0.064	0.057	-14.9%	0	0	0	
Luxembourg	0.004	0.006	0.008	100.0%	0.1	0.048	0.015	-85.0%	0.009	0.011	0.012	33.3%	0	0	0	
Europe-West	**1.689**	**2.315**	**2.422**	**43.4%**	**3.1**	**1.978**	**0.498**	**-83.9%**	**3.26**	**3.625**	**3.191**	**-2.1%**	**0.023**	**0.013**	**0.007**	**-69.6%**

Health

Base Case *Source: International Futures* *Model Version 6.61, Jan 2013*	Deaths from Communicable Diseases								Deaths from Noncommunicable Diseases							
	Deaths from Respiratory Infections				Deaths from Other Communicable Diseases				Deaths from Cardiovascular Diseases				Deaths from Diabetes			
	Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	3599	2701	2567	-28.7%	7498	4306	2197	-70.7%	16015	26433	34979	118.4%	1206	2391	3933	226.1%
Africa	1379	810.6	572.4	-58.5%	3115	2176	1047	-66.4%	1592	3363	6558	311.9%	195	393.2	811.5	316.2%
Americas	233.7	275.1	329.2	40.9%	385.9	257.8	210.8	-45.4%	1789	2864	3623	102.5%	262.8	542.7	878	234.1%
Asia with Oceania	1813	1445	1518	-16.3%	3843	1789	885.7	-77.0%	8833	15900	20630	133.6%	620.9	1262	1998	221.8%
Europe	170.4	167.5	145.2	-14.8%	153.7	81.82	52.99	-65.5%	3765	4254	4115	9.3%	126.4	192.2	243.9	93.0%
World	3599	2701	2567	-28.7%	7498	4306	2197	-70.7%	16015	26433	34979	118.4%	1206	2391	3933	226.1%
Africa-Eastern	402.7	228.6	153.9	-61.8%	954.4	668.9	286.2	-70.0%	410.4	1034	2154	424.9%	56.82	115.3	244.1	329.6%
Africa-Middle	301.5	197.8	128.4	-57.4%	603.6	535.1	315.8	-47.7%	186.1	406	942.4	406.4%	25.95	52.46	115.1	343.5%
Africa-Northern	94.45	57.79	63.93	-32.3%	190.1	82.21	40.83	-78.5%	445.1	872.1	1455	226.9%	29.56	64.89	124.9	322.5%
Africa-Southern	51.84	39.87	33.56	-35.3%	102	44.61	20.49	-79.9%	79.67	131.4	163.5	105.2%	19.27	36.49	58.17	201.9%
Africa-Western	528.8	286.5	192.6	-63.6%	1265	845.6	383.6	-69.7%	471.2	919.3	1844	291.3%	63.44	124.1	269.2	324.3%
Africa	1379	810.6	572.4	-58.5%	3115	2176	1047	-66.4%	1592	3363	6558	311.9%	195	393.2	811.5	316.2%
America-Caribbean	18.85	17.89	17.64	-6.4%	38.88	31.25	20.86	-46.3%	88.89	147.3	199.1	124.0%	12.79	23.54	37.29	191.6%
America-Central	16.71	11.25	13.91	-16.8%	25.67	13.51	9.275	-63.9%	45.62	93.75	173.1	279.4%	10.62	23.96	49.39	365.1%
America-North	71.55	102.4	113	57.9%	114.9	100.7	87.81	-23.6%	958.3	1446	1620	69.0%	135.5	273.1	409	201.8%
America-South	126.6	143.6	184.7	45.9%	206.4	112.4	92.86	-55.0%	696.2	1177	1630	134.1%	103.9	222.1	382.3	267.9%
Americas	233.7	275.1	329.2	40.9%	385.9	257.8	210.8	-45.4%	1789	2864	3623	102.5%	262.8	542.7	878	234.1%
Asia-East	339.9	420.7	442.6	30.2%	557.2	289.7	172.5	-69.0%	3969	6344	6211	56.5%	241.9	468.5	615.1	154.3%
Asia-South Central	1122	672.5	636.2	-43.3%	2652	1132	444.6	-83.2%	3249	6274	9315	186.7%	221.5	452.2	796.6	259.6%
Asia-South East	277	299.4	375.5	35.6%	488.4	280.7	210.8	-56.8%	1035	2211	3311	219.9%	120.1	247.9	382	218.1%
Asia-West	64.06	41.89	53.3	-16.8%	127	71.97	49.64	-60.9%	505.7	947.5	1634	223.1%	31.29	80.29	184.1	488.4%
Oceania	9.597	10.82	10.76	12.1%	18.27	14.21	8.197	-55.1%	75.08	124.4	159.3	112.2%	6.107	12.79	20.48	235.4%
Asia with Oceania	1813	1445	1518	-16.3%	3843	1789	885.7	-77.0%	8833	15900	20630	133.6%	620.9	1262	1998	221.8%
Europe-East	46.12	35.13	26.28	-43.0%	78.87	27.49	14.52	-81.6%	2245	2313	2273	1.2%	28.88	35.6	38.76	34.2%
Europe-North	43.76	42.79	37.88	-13.4%	13.53	8.05	5.353	-60.4%	333.8	399.8	366.1	9.7%	12.31	19.35	25.46	106.8%
Europe-South	33.48	32.37	29.96	-10.5%	26.17	17.11	12.1	-53.8%	577.7	741.4	765.9	32.6%	42.55	65.04	86.7	103.8%
Europe-West	49.65	60.02	53.36	7.5%	35.61	29.68	21.2	-40.5%	644.4	851.7	762.7	18.4%	43.67	73.69	94.51	116.4%
Europe	170.4	167.5	145.2	-14.8%	153.7	81.82	52.99	-65.5%	3765	4254	4115	9.3%	126.4	192.2	243.9	93.0%

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Deaths from Communicable Diseases								Deaths from Noncommunicable Diseases							
	Deaths from Respiratory Infections				Deaths from Other Communicable Diseases				Deaths from Cardiovascular Diseases				Deaths from Diabetes			
	Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA																
Ethiopia	123.6	44.72	17.88	-85.5%	248.6	99.77	14.89	-94.0%	123.1	339.5	662	437.8%	16.95	31.13	59.32	250.0%
Tanzania, United Rep. of	48.02	38.59	18.81	-60.8%	115.1	99.12	14.03	-87.8%	46.82	122.1	246	425.4%	6.453	14.12	30.31	369.7%
Uganda	38.31	26.56	15.17	-60.4%	98.26	91.51	31.11	-68.3%	31.98	84.03	201.1	528.8%	4.286	9.469	23.89	457.4%
Kenya	32.81	31.4	30.58	-6.8%	108	106.5	61.21	-43.3%	39.57	93.24	213.1	438.5%	5.332	13.37	32.22	504.3%
Madagascar	23.66	20.79	26.59	12.4%	51.84	51.96	59.88	15.5%	27.82	54.25	115.3	314.5%	3.725	8.604	20.22	442.8%
Mozambique	31.62	5.656	2.171	-93.1%	70.86	26.29	4.215	-94.1%	39.14	98.24	178.1	355.0%	5.412	8.481	16.29	201.0%
Malawi	16.28	10.41	8.857	-45.6%	34.63	30.01	19.32	-44.2%	14.91	42.73	104.4	600.2%	2.023	4.457	11	443.7%
Zambia	19.98	9.413	8.528	-57.3%	42.71	25.95	14.81	-65.3%	17.97	37.34	78.77	338.3%	2.423	4.573	11.37	369.3%
Somalia	22.39	3.781	0.801	-96.4%	48.05	19.06	5.397	-88.8%	16.46	45.52	97.16	490.3%	1.351	2.57	4.542	236.2%
Rwanda	17.55	11.35	5.507	-68.6%	50.26	38.52	14.13	-71.9%	14.04	31.79	68.48	387.7%	1.924	4.041	8.511	342.4%
Zimbabwe	8.119	8.198	10.67	31.4%	39.94	37.43	29.45	-26.3%	14.49	26.14	49.37	240.7%	1.874	3.647	8.677	363.0%
Burundi	14.37	14.89	6.837	-52.4%	33.47	35.3	15.05	-55.0%	11.43	28.56	68.29	497.5%	1.581	3.72	7.051	346.0%
Eritrea	4.464	1.453	0.587	-86.9%	8.858	3.94	0.947	-89.3%	6.85	20.39	55.62	712.0%	1.021	2.263	4.343	325.4%
Comoros	0.605	0.825	0.599	-1.0%	1.093	1.472	0.828	-24.2%	0.629	1.599	4.388	597.6%	0.136	0.409	0.941	591.9%
Djibouti	0.734	0.428	0.142	-80.7%	2.359	1.9	0.766	-67.5%	1.803	3.271	5.368	197.7%	0.08	0.163	0.279	248.8%
Mauritius	0.137	0.153	0.154	12.4%	0.377	0.241	0.168	-55.4%	3.358	5.369	6.142	82.9%	2.257	4.241	5.171	129.1%
Africa-Eastern	**402.7**	**228.6**	**153.9**	**-61.8%**	**954.4**	**668.9**	**286.2**	**-70.0%**	**410.4**	**1034**	**2154**	**424.9%**	**56.82**	**115.3**	**244.1**	**329.6%**
Congo, Democratic Rep. of	178	115	61.08	-65.7%	367.8	345.1	193	-47.5%	90.89	232.2	601.6	561.9%	12.73	25.88	55.3	334.4%
Angola	47.67	18.71	16.84	-64.7%	91.44	43.43	24.52	-73.2%	26.87	47.23	91.28	239.7%	3.754	7.632	18.95	404.8%
Cameroon	33.66	32.36	28.28	-16.0%	58.62	61.58	41.06	-30.0%	33.48	60.03	111	231.5%	4.588	9.368	19.92	334.2%
Chad	27.72	21.68	14.52	-47.6%	53.15	60.49	43.75	-17.7%	16.52	34.58	76.24	361.5%	2.333	4.836	11.26	382.6%
Central African Rep.	7.513	5.901	3.425	-54.4%	15.97	15.2	8.056	-49.6%	8.269	15.07	30.25	265.8%	1.155	2.004	3.806	229.5%
Congo, Rep. of	4.252	1.889	1.739	-59.1%	10.97	5.328	2.597	-76.3%	6.375	10.5	20.48	221.3%	0.882	1.601	3.516	298.6%
Gabon	1.19	1.214	1.466	23.2%	2.676	1.972	1.238	-53.7%	2.285	3.906	7.305	219.7%	0.308	0.675	1.442	368.2%
Equatorial Guinea	1.305	0.925	0.94	-28.0%	2.622	1.665	1.413	-46.1%	1.238	2.074	3.393	174.1%	0.171	0.415	0.752	339.8%
São Tomé and Príncipe	0.14	0.118	0.094	-32.9%	0.316	0.317	0.226	-28.5%	0.2	0.375	0.886	343.0%	0.025	0.052	0.131	424.0%
Africa-Middle	**301.5**	**197.8**	**128.4**	**-57.4%**	**603.6**	**535.1**	**315.8**	**-47.7%**	**186.1**	**406**	**942.4**	**406.4%**	**25.95**	**52.46**	**115.1**	**343.5%**
Egypt, Arab Rep.	15.81	9.583	9.495	-39.9%	53.51	26.97	17.07	-68.1%	201.4	373.6	582.2	189.1%	12.23	25.71	48.38	295.6%
Sudan	45.06	11.21	5.809	-87.1%	90.86	27.09	2.757	-97.0%	87.36	174.3	306.9	251.3%	6.926	13.5	25.82	272.8%
Algeria	18.86	26.09	37.8	100.4%	20.26	15.04	12.82	-36.7%	46.41	100	192.8	315.4%	6.249	16.15	33.04	428.7%
Morocco	8.033	4.924	4.326	-46.1%	16.47	7.529	3.614	-78.1%	75.13	156.2	248.7	231.0%	2.899	6.537	11.36	291.9%
Tunisia	5.793	4.991	5.1	-12.0%	6.99	4.398	3.515	-49.7%	23.61	43.68	72.11	205.4%	0.808	1.781	3.503	333.5%
Libya	0.905	0.993	1.401	54.8%	1.992	1.18	1.057	-46.9%	11.16	24.28	52.59	371.2%	0.44	1.215	2.778	531.4%
Africa-Northern	**94.45**	**57.79**	**63.93**	**-32.3%**	**190.1**	**82.21**	**40.83**	**-78.5%**	**445.1**	**872.1**	**1455**	**226.9%**	**29.56**	**64.89**	**124.9**	**322.5%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Deaths from Communicable Diseases								Deaths from Noncommunicable Diseases							
	Deaths from Respiratory Infections				Deaths from Other Communicable Diseases				Deaths from Cardiovascular Diseases				Deaths from Diabetes			
	Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA continued																
South Africa	46.85	35.87	28.5	-39.2%	88.74	37.74	16.44	-81.5%	67.24	111.8	130.2	93.6%	17.5	33.2	51.57	194.7%
Namibia	1.108	0.992	1.546	39.5%	2.551	1.154	0.807	-68.4%	3.294	6.325	10.93	231.8%	0.499	1.116	2.278	356.5%
Lesotho	1.728	0.97	1.135	-34.3%	5.505	2.721	1.301	-76.4%	4.168	5.587	10.02	140.4%	0.567	0.786	1.555	174.3%
Botswana	0.853	1.15	1.665	95.2%	2.892	1.464	1.09	-62.3%	3.023	4.695	6.978	130.8%	0.427	0.895	1.706	299.5%
Swaziland	1.3	0.89	0.712	-45.2%	2.357	1.529	0.861	-63.5%	1.948	2.995	5.306	172.4%	0.273	0.494	1.065	290.1%
Africa-Southern	**51.84**	**39.87**	**33.56**	**-35.3%**	**102**	**44.61**	**20.49**	**-79.9%**	**79.67**	**131.4**	**163.5**	**105.2%**	**19.27**	**36.49**	**58.17**	**201.9%**
Nigeria	304.6	135	82.69	-72.9%	779.1	418	114.8	-85.3%	280.5	490.1	916.8	226.8%	39.17	69.49	146.4	273.8%
Niger	39.13	28.08	17.85	-54.4%	73.01	85.76	67.3	-7.8%	17.21	44.5	104.3	506.0%	2.57	6.189	14.79	475.5%
Côte d'Ivoire	21.39	21.56	13.81	-35.4%	47	48.9	23.59	-49.8%	25.79	59.95	122.7	375.8%	3.6	8.405	17.83	395.3%
Burkina Faso	32.52	21.62	12.29	-62.2%	57.91	57.27	30.56	-47.2%	18.18	43.48	110.5	507.8%	2.64	6.471	15.76	497.0%
Ghana	18.27	10.39	8.193	-55.2%	69.85	42.75	18.11	-74.1%	42.56	79.83	138.9	226.4%	2.87	5.422	10.01	248.8%
Mali	36.37	9.209	4.613	-87.3%	71.03	38.39	17.62	-75.2%	15.72	35.97	92.41	487.8%	2.305	4.538	11.15	383.7%
Senegal	16.4	16.97	16.17	-1.4%	41.25	47.97	37.74	-8.5%	18.76	33.11	74.66	298.0%	2.778	5.955	14.69	428.8%
Guinea	14.31	7.736	6.499	-54.6%	27.05	20.74	15.83	-41.5%	12.77	31.23	64.78	407.3%	1.744	3.774	8.206	370.5%
Benin	12.53	9.811	7.697	-38.6%	20.54	19.25	11.64	-43.3%	9.212	24.87	56.71	515.6%	1.261	3.314	7.571	500.4%
Togo	5.289	8.44	9.678	83.0%	13.76	20.54	20.26	47.2%	6.408	15.01	33.91	429.2%	0.871	2.425	5.906	578.1%
Sierra Leone	11.38	5.497	2.882	-74.7%	29.24	17.64	6.203	-78.8%	8.901	22.17	44.65	401.6%	1.4	2.952	5.731	309.4%
Liberia	5.328	2.872	2.089	-60.8%	12.7	7.044	3.303	-74.0%	4.187	16.87	36.76	778.0%	0.598	1.428	2.866	379.3%
Mauritania	4.729	4.327	3.961	-16.2%	10.2	10.23	8.202	-19.6%	4.701	9.783	19.48	314.4%	0.691	1.722	3.821	453.0%
Gambia	2.272	1.218	0.916	-59.7%	4.523	3.254	1.592	-64.8%	2.451	5.904	15.08	515.3%	0.354	0.876	2.153	508.2%
Guinea-Bissau	3.931	3.484	2.995	-23.8%	7.302	7.712	6.659	-8.8%	2.873	5.132	9.28	223.0%	0.401	0.789	1.656	313.0%
Cape Verde	0.332	0.198	0.281	-15.4%	0.387	0.168	0.11	-71.6%	0.935	1.375	2.613	179.5%	0.188	0.305	0.641	241.0%
Africa-Western	**528.8**	**286.5**	**192.6**	**-63.6%**	**1265**	**845.6**	**383.6**	**-69.7%**	**471.2**	**919.3**	**1844**	**291.3%**	**63.44**	**124.1**	**269.2**	**324.3%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Deaths from Communicable Diseases								Deaths from Noncommunicable Diseases							
	Deaths from Respiratory Infections				Deaths from Other Communicable Diseases				Deaths from Cardiovascular Diseases				Deaths from Diabetes			
	Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS																
Haiti	8.099	6.926	5.099	-37.0%	26.8	25.24	16.55	-38.2%	17.64	33.51	64.49	265.6%	3.176	6.11	11.69	268.1%
Dominican Rep.	3.235	2.097	2.433	-24.8%	7.321	2.932	1.865	-74.5%	19.18	32.85	49.25	156.8%	2.694	5.389	9.564	255.0%
Cuba	4.995	6.363	7.558	51.3%	1.043	0.499	0.426	-59.2%	31.94	52.09	50.77	59.0%	1.979	3.158	3.234	63.4%
Puerto Rico	1.082	1.106	1.036	-4.3%	1.431	1.079	0.893	-37.6%	8.543	11.51	11.59	35.7%	2.258	3.643	4.957	119.5%
Jamaica	0.954	0.816	0.882	-7.5%	1.258	0.867	0.612	-51.4%	6.136	8.601	11.61	89.2%	0.76	1.331	2.041	168.6%
Trinidad and Tobago	0.238	0.293	0.319	34.0%	0.601	0.296	0.219	-63.6%	3.325	4.99	6.48	94.9%	1.378	2.781	4.02	191.7%
Bahamas	0.032	0.054	0.063	96.9%	0.101	0.1	0.096	-5.0%	0.637	1.493	2.005	214.8%	0.115	0.321	0.52	352.2%
Barbados	0.111	0.142	0.142	27.9%	0.136	0.131	0.105	-22.8%	0.61	0.943	0.953	56.2%	0.192	0.375	0.499	159.9%
Saint Lucia	0.038	0.033	0.04	5.3%	0.085	0.042	0.038	-55.3%	0.348	0.522	0.721	107.2%	0.126	0.234	0.387	207.1%
Grenada	0.036	0.03	0.04	11.1%	0.041	0.024	0.023	-43.9%	0.229	0.325	0.533	132.8%	0.058	0.097	0.202	248.3%
Saint Vincent and the Grenadines	0.026	0.026	0.029	11.5%	0.062	0.041	0.035	-43.5%	0.301	0.464	0.66	119.3%	0.056	0.104	0.175	212.5%
America-Caribbean	**18.85**	**17.89**	**17.64**	**-6.4%**	**38.88**	**31.25**	**20.86**	**-46.3%**	**88.89**	**147.3**	**199.1**	**124.0%**	**12.79**	**23.54**	**37.29**	**191.6%**
Guatemala	9.323	5.011	6.131	-34.2%	11.66	5.287	3.425	-70.6%	10.57	24.67	50.02	373.2%	3.486	7.794	17.62	405.5%
Honduras	2.137	1.035	1.019	-52.3%	5.836	3.059	1.616	-72.3%	9.282	20.12	42.06	353.1%	1.681	3.996	8.759	421.1%
Nicaragua	1.328	1.186	1.504	13.3%	2.682	1.975	1.622	-39.5%	6.393	14.49	28.63	347.8%	1.751	4.278	8.618	392.2%
El Salvador	2.612	2.262	2.697	3.3%	3.249	1.843	1.413	-56.5%	8.844	13.94	22.27	151.8%	1.75	3.131	5.624	221.4%
Costa Rica	0.412	0.633	0.893	116.7%	0.696	0.394	0.305	-56.2%	5.736	11.58	16.93	195.2%	0.831	2.099	3.859	364.4%
Panama	0.844	1.034	1.464	73.5%	1.422	0.868	0.792	-44.3%	4.555	8.371	11.87	160.6%	1.036	2.426	4.355	320.4%
Belize	0.056	0.089	0.203	262.5%	0.13	0.088	0.102	-21.5%	0.241	0.574	1.279	430.7%	0.081	0.234	0.546	574.1%
America-Central	**16.71**	**11.25**	**13.91**	**-16.8%**	**25.67**	**13.51**	**9.275**	**-63.9%**	**45.62**	**93.75**	**173.1**	**279.4%**	**10.62**	**23.96**	**49.39**	**365.1%**
United States of America	49.77	72.06	74.07	48.8%	69.01	64.06	51.05	-26.0%	755.2	1084	1115	47.6%	66.88	121.1	163.4	144.3%
Mexico	15.39	20.19	28.07	82.4%	41.26	32.15	33.19	-19.6%	125.3	240.3	376.5	200.5%	60.31	134.9	221.6	267.4%
Canada	6.386	10.14	10.83	69.6%	4.671	4.455	3.574	-23.5%	77.73	121.8	129	66.0%	8.29	17.15	24.07	190.3%
America-North	**71.55**	**102.4**	**113**	**57.9%**	**114.9**	**100.7**	**87.81**	**-23.6%**	**958.3**	**1446**	**1620**	**69.0%**	**135.5**	**273.1**	**409**	**201.8%**
Brazil	58.7	66.54	83.39	42.1%	101	50.27	40.25	-60.1%	382.8	630.6	842.2	120.0%	60.41	128.2	218.3	261.4%
Colombia	9.299	8.846	11.08	19.2%	19.02	9.062	6.714	-64.7%	67.67	138.9	208.7	208.4%	8.56	20.91	37.2	334.6%
Argentina	17.35	19.33	21.43	23.5%	19.92	13.48	11.82	-40.7%	94.58	120.5	142	50.1%	8.316	12.96	20	140.5%
Peru	18.74	24.9	37.6	100.6%	21.2	13.8	14.13	-33.3%	27.81	53.62	90.25	224.5%	3.675	8.087	15.31	316.6%
Venezuela (Bolivarian Rep. of)	4.254	5.105	7.192	69.1%	12.77	6.178	4.463	-65.1%	46.03	96.96	143.1	210.9%	9.819	23.42	40.91	316.6%
Ecuador	4.257	4.546	6.289	47.7%	6.898	4.405	4.052	-41.3%	15.63	32.24	55.72	256.5%	3.936	9.091	17.15	335.7%
Chile	3.906	7.096	9.652	147.1%	3.046	2.851	2.711	-11.0%	26.46	44.28	57.32	116.6%	3.719	8.048	12.33	231.5%
Bolivia (Plurinational State of)	6.955	4.557	5.065	-27.2%	15.78	8.475	5.944	-62.3%	12.57	24.73	42.28	236.4%	1.781	3.761	7.559	324.4%
Paraguay	1.753	1.346	1.601	-8.7%	4.864	2.897	2.155	-55.7%	9.22	18.83	31.38	240.3%	2.434	5.512	10.81	344.1%
Uruguay	1.117	1.051	1.021	-8.6%	0.952	0.506	0.331	-65.2%	10.48	11.33	11.11	6.0%	0.722	0.992	1.347	86.6%
Guyana	0.165	0.175	0.236	43.0%	0.685	0.357	0.229	-66.6%	1.42	2.697	3.609	154.2%	0.329	0.718	0.979	197.6%
Suriname	0.129	0.124	0.131	1.6%	0.311	0.12	0.069	-77.8%	1.461	2.114	2.317	58.6%	0.209	0.351	0.441	111.0%
America-South	**126.6**	**143.6**	**184.7**	**45.9%**	**206.4**	**112.4**	**92.86**	**-55.0%**	**696.2**	**1177**	**1630**	**134.1%**	**103.9**	**222.1**	**382.3**	**267.9%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Deaths from Communicable Diseases								Deaths from Noncommunicable Diseases							
	Deaths from Respiratory Infections				Deaths from Other Communicable Diseases				Deaths from Cardiovascular Diseases				Deaths from Diabetes			
	Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA																
China	183.4	193.5	260.2	41.9%	479.9	235.1	140	-70.8%	3462	5539	5481	58.3%	171.3	323.5	432.9	152.7%
Japan	117.6	186.2	145.4	23.6%	26.88	24.38	14.51	-46.0%	333.2	489.4	362.2	8.7%	14.24	23.74	25.49	79.0%
Korea, Rep. of	7.304	17.14	21.65	196.4%	8.886	11.25	10.51	18.3%	78.05	143.6	157.6	101.9%	14.82	34.82	46.83	216.0%
Korea, Dem. People's Rep. of	29.61	22.45	14.48	-51.1%	39.39	18.06	7.12	-81.9%	72.12	129.4	161.7	124.2%	6.316	9.364	10.63	68.3%
Taiwan, China	0.418	0.663	0.536	28.2%	0.338	0.155	0.087	-74.3%	13.58	24.09	22.94	68.9%	26.44	58.5	72.7	175.0%
Hong Kong SAR, China	0.177	0.261	0.208	17.5%	0.053	0.037	0.026	-50.9%	4.22	6.304	7.336	73.8%	8.75	18.54	26.34	201.0%
Mongolia	1.376	0.442	0.231	-83.2%	1.729	0.721	0.273	-84.2%	6.169	12.33	18.32	197.0%	0.036	0.07	0.212	488.9%
Asia-East	**339.9**	**420.7**	**442.6**	**30.2%**	**557.2**	**289.7**	**172.5**	**-69.0%**	**3969**	**6344**	**6211**	**56.5%**	**241.9**	**468.5**	**615.1**	**154.3%**
India	687.2	314.1	294.3	-57.2%	1775	475.5	93.48	-94.7%	2118	3998	5244	147.6%	160.9	320.3	540.9	236.2%
Pakistan	148	159.3	160	8.1%	287.4	261.1	136.1	-52.6%	268.2	558.3	1083	303.8%	14.85	35.56	77.19	419.8%
Bangladesh	111.7	103.1	113.7	1.8%	269.5	168.7	76.8	-71.5%	306.1	721	1240	305.1%	18.43	38.36	69.14	275.1%
Afghanistan	106	52.82	22.38	-78.9%	184.7	151.2	88.19	-52.3%	79.95	168.4	320	300.3%	3.112	6.36	14.27	358.5%
Iran, Islamic Rep. of	14.66	9.998	14.37	-2.0%	29.29	13.44	10.61	-63.8%	170.6	288.7	557.4	226.7%	8.366	19.39	42.76	411.1%
Nepal	18.63	16.86	19.04	2.2%	44.82	29.06	18.39	-59.0%	45.1	106.3	210.7	367.2%	3.245	7.084	14.25	339.1%
Uzbekistan	12.03	3.04	1.902	-84.2%	26.23	9.024	3.325	-87.3%	83.69	169.2	293.1	250.2%	3.87	7.442	10.56	172.9%
Sri Lanka	3.979	4.195	3.734	-6.2%	7.877	5.253	3.609	-54.2%	45.4	79.24	88.81	95.6%	6.079	13	19.92	227.7%
Kazakhstan	9.751	2.873	1.757	-82.0%	6.593	2.925	1.856	-71.8%	82.63	98.74	119.8	45.0%	1.205	1.665	1.957	62.4%
Tajikistan	4.341	3.612	2.789	-35.8%	11.26	11.59	8.968	-20.4%	13.55	28.5	56.58	317.6%	0.594	1.31	2.652	346.5%
Kyrgyz Rep.	2.185	1.433	0.936	-57.2%	3.877	3.091	2.005	-48.3%	15.72	29.1	48.03	205.5%	0.326	0.637	0.906	177.9%
Turkmenistan	3.234	0.74	0.742	-77.1%	4.975	0.992	0.714	-85.6%	17.7	24.27	47.32	167.3%	0.45	0.838	1.628	261.8%
Bhutan	0.496	0.342	0.442	-10.9%	1.053	0.471	0.317	-69.9%	1.24	2.421	3.985	221.4%	0.07	0.152	0.337	381.4%
Maldives	0.047	0.051	0.063	34.0%	0.161	0.146	0.16	-0.6%	0.694	1.204	2.471	256.1%	0.019	0.039	0.093	389.5%
Asia-South Central	**1122**	**672.5**	**636.2**	**-43.3%**	**2652**	**1132**	**444.6**	**-83.2%**	**3249**	**6274**	**9315**	**186.7%**	**221.5**	**452.2**	**796.6**	**259.6%**
Indonesia	128.5	117.6	139.5	8.6%	191	89.95	80.4	-57.9%	389.6	874.4	1339	243.7%	37.35	83.75	141.8	279.7%
Philippines	35	72.33	117.2	234.9%	77.72	59.51	47.3	-39.1%	117.1	290.8	470.1	301.5%	15.02	36.97	65.51	336.2%
Vietnam	17.76	18.09	22.57	27.1%	46.73	28.36	15.85	-66.1%	161.2	367.7	600.4	272.5%	11.55	26.98	47.83	314.1%
Thailand	28.5	24.85	22.6	-20.7%	40.34	20.08	11.44	-71.6%	188	260.2	276.9	47.3%	41.89	67.55	74.07	76.8%
Myanmar	34.32	26.27	22.44	-34.6%	72.88	36.07	16.8	-76.9%	97.86	235.2	345.6	253.2%	6.967	14.46	19.76	183.6%
Malaysia	8.345	20.2	29.06	248.2%	15.57	22.2	24.49	57.3%	37.13	82.65	115.7	211.6%	2.771	7.709	14.18	411.7%
Cambodia	15.97	9.946	9.062	-43.3%	29.1	18.96	11.95	-58.9%	23.81	55.58	88.38	271.2%	3.068	6.633	11.63	279.1%
Lao People's Democratic Rep.	4.714	2.086	2.227	-52.8%	11.01	3.824	1.254	-88.6%	9.951	22.73	41.1	313.0%	0.521	1.128	2.34	349.1%
Singapore	3.458	7.897	10.57	205.7%	0.452	0.526	0.588	30.1%	8.361	16.03	22.72	171.7%	0.68	1.947	3.312	387.1%
Timor-Leste	0.375	0.108	0.084	-77.6%	3.538	1.171	0.663	-81.3%	1.232	4.142	9.013	631.6%	0.092	0.196	0.472	413.0%
Brunei Darussalam	0.042	0.082	0.117	178.6%	0.078	0.07	0.065	-16.7%	0.43	1.036	2.073	382.1%	0.153	0.574	1.109	624.8%
Asia-South Eastern	**277**	**299.4**	**375.5**	**35.6%**	**488.4**	**280.7**	**210.8**	**-56.8%**	**1035**	**2211**	**3311**	**219.9%**	**120.1**	**247.9**	**382**	**218.1%**

Health

	Deaths from Communicable Diseases								Deaths from Noncommunicable Diseases							
	Deaths from Respiratory Infections				Deaths from Other Communicable Diseases				Deaths from Cardiovascular Diseases				Deaths from Diabetes			
Base Case: Countries in Year 2060	Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA continued																
Turkey	15.92	13.56	15.46	-2.9%	27.48	15.34	9.785	-64.4%	216.6	376.7	540.1	149.4%	9.805	19.99	32.65	233.0%
Iraq	11.42	3.843	1.98	-82.7%	29.72	17.28	7.479	-74.8%	42.63	91.75	202.8	375.7%	1.582	3.728	9.532	502.5%
Yemen, Rep. of	19.97	7.593	4.661	-76.7%	37.34	17.37	8.081	-78.4%	37.25	86.46	207.1	456.0%	1.486	3.537	9.646	549.1%
Saudi Arabia	4.754	6.355	14.98	215.1%	8.545	6.851	10.02	17.3%	41.43	94.84	183.9	343.9%	5.885	21.4	56.73	864.0%
Syrian Arab Rep.	2.855	1.928	2.043	-28.4%	6.166	2.931	1.803	-70.8%	38.47	83.35	150.6	291.5%	2.072	5.089	10.49	406.3%
Jordan	1.107	0.929	1.347	21.7%	2.952	2.078	1.63	-44.8%	9.272	19.11	38.59	316.2%	1.697	4.031	10.63	526.4%
Israel	1.075	1.519	1.799	67.3%	2.04	2.128	2.224	9.0%	10.99	15.32	16.78	52.7%	2.658	5.296	9.025	239.5%
Palestine	0.45	0.459	0.558	24.0%	1.954	1.745	1.187	-39.3%	4.525	13.28	33.03	629.9%	0.393	1.294	3.506	792.1%
Azerbaijan	3.636	1.694	1.698	-53.3%	5.724	2.192	1.296	-77.4%	32.1	55.05	77.92	142.7%	0.835	1.666	2.075	148.5%
United Arab Emirates	0.198	1.417	4.445	2144.9%	0.378	1.051	2.933	675.9%	1.754	12.05	36.02	1953.6%	0.149	2.269	9.387	6200.0%
Kuwait	0.267	0.642	1.748	554.7%	0.301	0.338	0.768	155.1%	2.955	8.3	25.27	755.2%	0.253	1.356	6.03	2283.4%
Lebanon	0.583	0.556	0.659	13.0%	1.351	0.826	0.656	-51.4%	12.48	19.34	27.89	123.5%	0.437	0.856	1.499	243.0%
Oman	0.069	0.062	0.134	94.2%	0.24	0.148	0.14	-41.7%	3.828	9.109	24.25	533.5%	0.546	2.029	7.019	1185.5%
Armenia	0.735	0.646	0.558	-24.1%	1.115	0.659	0.369	-66.9%	11.47	15.64	17.32	51.0%	1.959	2.911	3.482	77.7%
Georgia	0.829	0.268	0.134	-83.8%	1.35	0.446	0.233	-82.7%	36.5	39.2	37.84	3.7%	0.744	0.767	0.668	-10.2%
Qatar	0.039	0.097	0.569	1359.0%	0.161	0.271	0.593	268.3%	0.58	2.206	5.191	795.0%	0.173	1.79	6.919	3899.4%
Bahrain	0.047	0.176	0.377	702.1%	0.116	0.214	0.351	202.6%	0.541	2.053	4.214	678.9%	0.228	1.477	3.553	1458.3%
Cyprus	0.107	0.143	0.152	42.1%	0.098	0.098	0.088	-10.2%	2.329	3.759	4.673	100.6%	0.391	0.809	1.287	229.2%
Asia-West	**64.06**	**41.89**	**53.3**	**-16.8%**	**127**	**71.97**	**49.64**	**-60.9%**	**505.7**	**947.5**	**1634**	**223.1%**	**31.29**	**80.29**	**184.1**	**488.4%**
Australia	3.066	4.564	5.168	68.6%	3.04	2.782	2.476	-18.6%	48.46	74.14	86.41	78.3%	3.878	8.065	12.52	222.8%
Papua New Guinea	5.334	4.814	3.996	-25.1%	12.85	9.08	3.641	-71.7%	12.08	26.59	45.77	278.9%	0.923	2.114	3.989	332.2%
New Zealand	0.468	0.693	0.874	86.8%	0.366	0.277	0.205	-44.0%	10.45	16.18	16.26	55.6%	0.849	1.591	2.119	149.6%
Solomon Islands	0.262	0.242	0.265	1.1%	0.67	0.744	0.784	17.0%	0.787	1.821	3.502	345.0%	0.095	0.256	0.607	538.9%
Fiji	0.239	0.287	0.258	7.9%	0.717	0.708	0.564	-21.3%	2.142	3.567	3.951	84.5%	0.218	0.453	0.612	180.7%
Vanuatu	0.08	0.088	0.08	0.0%	0.231	0.268	0.225	-2.6%	0.354	0.769	1.46	312.4%	0.043	0.117	0.269	525.6%
Micronesia (Federated States of)	0.058	0.058	0.053	-8.6%	0.118	0.125	0.111	-5.9%	0.216	0.434	0.72	233.3%	0.027	0.057	0.128	374.1%
Tonga	0.035	0.037	0.04	14.3%	0.107	0.114	0.114	6.5%	0.23	0.339	0.549	138.7%	0.029	0.054	0.111	282.8%
Samoa	0.056	0.038	0.027	-51.8%	0.169	0.116	0.077	-54.4%	0.356	0.546	0.684	92.1%	0.045	0.081	0.13	188.9%
Oceania	**9.597**	**10.82**	**10.76**	**12.1%**	**18.27**	**14.21**	**8.197**	**-55.1%**	**75.08**	**124.4**	**159.3**	**112.2%**	**6.107**	**12.79**	**20.48**	**235.4%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Deaths from Communicable Diseases: Deaths from Respiratory Infections, Annual Deaths in Thousands 2010	2035	2060	% Chg	Deaths from Communicable Diseases: Deaths from Other Communicable Diseases, Annual Deaths in Thousands 2010	2035	2060	% Chg	Deaths from Noncommunicable Diseases: Deaths from Cardiovascular Diseases, Annual Deaths in Thousands 2010	2035	2060	% Chg	Deaths from Noncommunicable Diseases: Deaths from Diabetes, Annual Deaths in Thousands 2010	2035	2060	% Chg
EUROPE																
Russian Federation	19.98	12.15	8.239	-58.8%	47.06	14.62	7.871	-83.3%	1159	1143	1163	0.3%	9.461	9.993	9.598	1.4%
Ukraine	1.597	0.818	0.473	-70.4%	17.36	5.703	2.7	-84.4%	440.2	416.1	372.7	-15.3%	2.263	1.906	1.466	-35.2%
Poland	9.77	10.07	8.281	-15.2%	4.625	2.078	1.163	-74.9%	180	233	228.6	27.0%	6.808	10.53	12.99	90.8%
Romania	5.55	3.677	2.635	-52.5%	3.662	1.797	0.907	-75.2%	152.7	171.4	179.5	17.6%	2.176	2.568	2.833	30.2%
Czech Rep.	3.111	3.476	2.907	-6.6%	1.315	0.967	0.669	-49.1%	53.14	72.76	70.58	32.8%	2.022	3.239	4.015	98.6%
Belarus	0.715	0.333	0.171	-76.1%	1.301	0.446	0.228	-82.5%	79.99	80.26	78.83	-1.5%	0.452	0.474	0.445	-1.5%
Hungary	0.868	0.756	0.597	-31.2%	1.039	0.581	0.364	-65.0%	62.79	64.47	54.73	-12.8%	2.772	3.349	3.595	29.7%
Bulgaria	1.786	1.228	0.841	-52.9%	1.095	0.489	0.253	-76.9%	67.28	67.72	57.22	-15.0%	1.993	2.192	2.2	10.4%
Slovak Rep.	1.84	1.951	1.77	-3.8%	0.505	0.268	0.185	-63.4%	26.7	37.54	41.85	56.7%	0.594	0.972	1.25	110.4%
Moldova, Rep. of	0.905	0.675	0.365	-59.7%	0.903	0.54	0.178	-80.3%	23.07	26.61	26.14	13.3%	0.337	0.371	0.369	9.5%
Europe-East	**46.12**	**35.13**	**26.28**	**-43.0%**	**78.87**	**27.49**	**14.52**	**-81.6%**	**2245**	**2313**	**2273**	**1.2%**	**28.88**	**35.6**	**38.76**	**34.2%**
United Kingdom	34.96	32.35	27.86	-20.3%	7.713	3.595	2.143	-72.2%	190.6	228.8	210.2	10.3%	6.458	10.14	13.74	112.8%
Sweden	2.257	2.707	2.504	10.9%	1.928	1.792	1.406	-27.1%	35.83	40.88	34.89	-2.6%	1.948	3.103	3.899	100.2%
Denmark	1.747	1.884	1.562	-10.6%	0.992	0.708	0.459	-53.7%	16.93	21.22	17.28	2.1%	1.318	2.012	2.339	77.5%
Ireland	1.464	2.337	2.891	97.5%	0.34	0.244	0.209	-38.5%	9.607	14.52	18.43	91.8%	0.466	1.007	1.745	274.5%
Norway	1.611	2.011	1.952	21.2%	0.84	0.78	0.629	-25.1%	13.72	16.72	19.67	43.4%	0.701	1.227	1.752	149.9%
Finland	0.456	0.55	0.397	-12.9%	0.458	0.322	0.181	-60.5%	19.27	26.52	19.55	1.5%	0.521	0.828	0.88	68.9%
Lithuania	0.721	0.519	0.366	-49.2%	0.699	0.347	0.178	-74.5%	21.73	23.98	22.21	2.2%	0.269	0.307	0.318	18.2%
Latvia	0.328	0.227	0.156	-52.4%	0.368	0.16	0.08	-78.3%	16.62	17.27	15.42	-7.2%	0.391	0.434	0.469	19.9%
Estonia	0.147	0.101	0.07	-52.4%	0.157	0.076	0.045	-71.3%	8.844	8.898	7.375	-16.6%	0.217	0.242	0.245	12.9%
Iceland	0.061	0.095	0.119	95.1%	0.029	0.027	0.022	-24.1%	0.677	0.989	1.108	63.7%	0.026	0.052	0.078	200.0%
Europe-North	**43.76**	**42.79**	**37.88**	**-13.4%**	**13.53**	**8.05**	**5.353**	**-60.4%**	**333.8**	**399.8**	**366.1**	**9.7%**	**12.31**	**19.35**	**25.46**	**106.8%**
Italy	8.645	7.774	6.712	-22.4%	10.48	6.525	4.266	-59.3%	233.5	298.4	297.7	27.5%	20.58	30.93	39.33	91.1%
Spain	10.63	10.84	11.27	6.0%	8.36	6.076	4.92	-41.1%	122.8	159.8	174.1	41.8%	10.19	17.14	26.35	158.6%
Greece	4.967	4.854	4.649	-6.4%	1.55	1.087	0.846	-45.4%	54.73	68.51	73.94	35.1%	1.396	1.965	2.627	88.2%
Portugal	6.221	5.847	4.664	-25.0%	2.7	1.755	1.055	-60.9%	37	48.04	48.91	32.2%	4.718	7.145	9.153	94.0%
Serbia	0.436	0.295	0.221	-49.3%	1.02	0.5	0.29	-71.6%	47.92	51.52	50.06	4.5%	2.498	3.107	3.694	47.9%
Croatia	0.799	0.62	0.422	-47.2%	0.49	0.252	0.136	-72.2%	24.58	30.6	27.2	10.7%	1.214	1.68	1.856	52.9%
Bosnia and Herzegovina	0.249	0.204	0.165	-33.7%	0.429	0.215	0.13	-69.7%	23.32	32.86	35.91	54.0%	0.63	0.895	1.05	66.7%
Albania	0.622	0.799	0.891	43.2%	0.426	0.273	0.211	-50.5%	10.13	17.31	22.53	122.4%	0.169	0.304	0.436	158.0%
Macedonia, TFYR	0.122	0.095	0.081	-33.6%	0.368	0.195	0.109	-70.4%	11.26	16.41	18.09	60.7%	0.635	0.982	1.186	86.8%
Slovenia	0.616	0.81	0.709	15.1%	0.237	0.161	0.095	-59.9%	7.51	10.84	10.51	39.9%	0.286	0.464	0.523	82.9%
Montenegro	0.034	0.028	0.02	-41.2%	0.075	0.043	0.026	-65.3%	3.753	5.046	5.072	35.1%	0.107	0.158	0.197	84.1%
Malta	0.132	0.207	0.156	18.2%	0.034	0.026	0.016	-52.9%	1.287	2.127	1.904	47.9%	0.133	0.259	0.298	124.1%
Europe-South	**33.48**	**32.37**	**29.96**	**-10.5%**	**26.17**	**17.11**	**12.1**	**-53.8%**	**577.7**	**741.4**	**765.9**	**32.6%**	**42.55**	**65.04**	**86.7**	**103.8%**
Germany	21.94	27.75	24.45	11.4%	13.52	11.51	7.643	-43.5%	362.2	462.5	407.7	12.6%	22.37	37.06	47	110.1%
France	14.13	15.33	13.78	-2.5%	14.73	12.02	9.265	-37.1%	151.4	208.3	182.3	20.4%	11.51	19.38	24.74	114.9%
Netherlands	6.087	8.652	7.43	22.1%	2.779	2.766	1.916	-31.1%	41.23	58.89	52.33	26.9%	3.303	6.043	7.511	127.4%
Belgium	4.73	5.224	4.799	1.5%	2.71	2.135	1.542	-43.1%	33.39	43.05	38.91	16.5%	1.621	2.678	3.506	116.3%
Switzerland	1.438	1.654	1.556	8.2%	0.925	0.646	0.432	-53.3%	22.84	33.49	34.78	52.3%	1.45	2.707	3.786	161.1%
Austria	1.228	1.269	1.172	-4.6%	0.824	0.49	0.294	-64.3%	31.91	43.25	43.74	37.1%	3.359	5.727	7.799	132.2%
Luxembourg	0.105	0.142	0.162	54.3%	0.12	0.119	0.11	-8.3%	1.463	2.205	2.903	98.4%	0.052	0.1	0.163	213.5%
Europe-West	**49.65**	**60.02**	**53.36**	**7.5%**	**35.61**	**29.68**	**21.2**	**-40.5%**	**644.4**	**851.7**	**762.7**	**18.4%**	**43.67**	**73.69**	**94.51**	**116.4%**

Health

	Deaths from Noncommunicable Diseases															
Base Case	Deaths from Digestive Disorders				Deaths from Malignant Neoplasms				Deaths from Mental Health				Deaths from Respiratory Conditions			
Source: International Futures	Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
Model Version 6.61, Jan 2013	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	**2064**	**2978**	**4236**	**105.2%**	**7259**	**12046**	**15200**	**109.4%**	**1232**	**2564**	**4685**	**280.3%**	**3946**	**8281**	**14714**	**272.9%**
Africa	**314.3**	**474.1**	**715.9**	**127.8%**	**522.1**	**1099**	**2005**	**284.0%**	**163.6**	**336.1**	**678.9**	**315.0%**	**352.1**	**687.1**	**1424**	**304.4%**
Americas	**293.4**	**513.4**	**800.7**	**172.9%**	**1138**	**1876**	**2406**	**111.4%**	**312.4**	**719.1**	**1310**	**319.3%**	**366.9**	**775.1**	**1318**	**259.2%**
Asia with Oceania	**1092**	**1562**	**2234**	**104.6%**	**3907**	**7089**	**8881**	**127.3%**	**456.9**	**992.4**	**1928**	**322.0%**	**2911**	**6318**	**11307**	**288.4%**
Europe	**355.9**	**419.8**	**477.8**	**34.3%**	**1669**	**1955**	**1881**	**12.7%**	**297.3**	**513.8**	**764.6**	**157.2%**	**313**	**496.1**	**659.4**	**110.7%**
World	**2064**	**2978**	**4236**	**105.2%**	**7259**	**12046**	**15200**	**109.4%**	**1232**	**2564**	**4685**	**280.3%**	**3946**	**8281**	**14714**	**272.9%**
Africa-Eastern	**76.37**	**110.3**	**152.1**	**99.2%**	**143.7**	**344.8**	**662**	**360.7%**	**48.86**	**101.6**	**208.1**	**325.9%**	**104.8**	**207.1**	**423**	**303.6%**
Africa-Middle	**36.26**	**64.07**	**105**	**189.6%**	**54.26**	**125.4**	**279.6**	**415.3%**	**24.05**	**47.67**	**91.66**	**281.1%**	**51.36**	**97.62**	**205**	**299.1%**
Africa-Northern	**101.6**	**163.5**	**263**	**158.9%**	**120.2**	**216.3**	**316.5**	**163.3%**	**25.11**	**53.32**	**108.8**	**333.3%**	**50.53**	**114.2**	**238.2**	**371.4%**
Africa-Southern	**10.57**	**16.21**	**23.82**	**125.4%**	**46.23**	**80.63**	**121.5**	**162.8%**	**7.356**	**15.12**	**27.79**	**277.8%**	**19.5**	**36.04**	**58.56**	**200.3%**
Africa-Western	**89.51**	**120.1**	**171.9**	**92.0%**	**157.6**	**331.6**	**625.6**	**297.0%**	**58.25**	**118.4**	**242.6**	**316.5%**	**125.9**	**232**	**499.3**	**296.6%**
Africa	**314.3**	**474.1**	**715.9**	**127.8%**	**522.1**	**1099**	**2005**	**284.0%**	**163.6**	**336.1**	**678.9**	**315.0%**	**352.1**	**687.1**	**1424**	**304.4%**
America-Caribbean	**12.49**	**19.42**	**27.38**	**119.2%**	**42.39**	**76.65**	**105.2**	**148.2%**	**8.944**	**18.88**	**36.59**	**309.1%**	**11.15**	**20.74**	**34.08**	**205.7%**
America-Central	**11.74**	**20.69**	**37.63**	**220.5%**	**28.6**	**56.16**	**99.76**	**248.8%**	**7.879**	**17.5**	**34.48**	**337.6%**	**7.659**	**17.92**	**39.86**	**420.4%**
America-North	**138.1**	**258.6**	**390.1**	**182.5%**	**663.2**	**1015**	**1178**	**77.6%**	**231.3**	**540.5**	**956.4**	**313.5%**	**208.3**	**429.5**	**650.7**	**212.4%**
America-South	**131.2**	**214.7**	**345.6**	**163.4%**	**404.2**	**728.2**	**1024**	**153.3%**	**64.21**	**142.2**	**282.2**	**339.5%**	**139.8**	**306.9**	**592.9**	**324.1%**
Americas	**293.4**	**513.4**	**800.7**	**172.9%**	**1138**	**1876**	**2406**	**111.4%**	**312.4**	**719.1**	**1310**	**319.3%**	**366.9**	**775.1**	**1318**	**259.2%**
Asia-East	**319.4**	**545.6**	**792.6**	**148.2%**	**2369**	**4159**	**4701**	**98.4%**	**137.7**	**320.8**	**585.5**	**325.2%**	**1436**	**3227**	**5581**	**288.6%**
Asia-South Central	**570.3**	**685**	**921.2**	**61.5%**	**901.1**	**1692**	**2449**	**171.8%**	**220.3**	**433.9**	**857.9**	**289.4%**	**1166**	**2345**	**4296**	**268.4%**
Asia-South East	**154.6**	**245.8**	**364.3**	**135.6%**	**424.3**	**845.1**	**1147**	**170.3%**	**62.51**	**149.7**	**303**	**384.7%**	**229.9**	**562.4**	**1041**	**352.8%**
Asia-West	**40.25**	**70.84**	**132.9**	**230.2%**	**155.6**	**298.8**	**465.7**	**199.3%**	**23.09**	**55.05**	**120**	**419.7%**	**64.79**	**153.6**	**339.8**	**424.5%**
Oceania	**7.889**	**14.89**	**23.21**	**194.2%**	**56.24**	**93.89**	**118.9**	**111.4%**	**13.39**	**32.99**	**61.38**	**358.4%**	**13.98**	**30.51**	**49.39**	**253.3%**
Asia with Oceania	**1092**	**1562**	**2234**	**104.6%**	**3907**	**7089**	**8881**	**127.3%**	**456.9**	**992.4**	**1928**	**322.0%**	**2911**	**6318**	**11307**	**288.4%**
Europe-East	**176**	**166**	**160.2**	**-9.0%**	**589.3**	**649.3**	**585.7**	**-0.6%**	**52.48**	**60.94**	**64.54**	**23.0%**	**92.51**	**123.7**	**154**	**66.5%**
Europe-North	**44.62**	**57.59**	**71.67**	**60.6%**	**244.5**	**300.3**	**314.4**	**28.6%**	**65.44**	**123.4**	**191.2**	**192.2%**	**60.83**	**98.2**	**129.6**	**113.1%**
Europe-South	**59.9**	**80.02**	**100.2**	**67.3%**	**382.1**	**445.1**	**435.4**	**13.9%**	**71.69**	**125.8**	**203.4**	**183.7%**	**86.97**	**147.1**	**216.7**	**149.2%**
Europe-West	**82.83**	**124.5**	**153.6**	**85.4%**	**476.3**	**587.9**	**572.4**	**20.2%**	**109.9**	**206.7**	**309.1**	**181.3%**	**75.68**	**131.9**	**164.8**	**117.8%**
Europe	**355.9**	**419.8**	**477.8**	**34.3%**	**1669**	**1955**	**1881**	**12.7%**	**297.3**	**513.8**	**764.6**	**157.2%**	**313**	**496.1**	**659.4**	**110.7%**

Health

	Deaths from Noncommunicable Diseases															
	Deaths from Digestive Disorders				Deaths from Malignant Neoplasms				Deaths from Mental Health				Deaths from Respiratory Conditions			
Base Case: Countries in Year 2060	Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA																
Ethiopia	23.21	27.16	24.81	6.9%	29.47	73.32	130.4	342.5%	14.99	28.5	54.63	264.4%	33.27	54.94	105.5	217.1%
Tanzania, United Rep. of	8.162	14.56	20.88	155.8%	14.52	35.43	59.43	309.3%	5.19	12.03	27.85	436.6%	11.7	28.24	50.83	334.4%
Uganda	6.34	12.44	19.25	203.6%	14.8	41.33	89.31	503.4%	4.438	10.26	22.85	414.9%	8.535	18.96	43.49	409.5%
Kenya	6.559	13.69	25.42	287.6%	25.4	59.08	117	360.6%	4.707	10.49	23.27	394.4%	10.03	24.71	55.32	451.5%
Madagascar	4.737	7.375	14.36	203.1%	11.88	26.46	57.19	381.4%	3.026	6.756	15.05	397.4%	7.027	15.76	37.14	428.5%
Mozambique	7.994	5.842	5.409	-32.3%	10.97	25.22	38.87	254.3%	4.81	9.343	17.23	258.2%	10.62	15.1	27.03	154.5%
Malawi	2.359	3.953	7.207	205.5%	3.113	7.856	20.31	552.4%	1.41	3.411	7.673	444.2%	2.866	6.656	17.05	494.9%
Zambia	3.859	5.305	9.364	142.7%	5.239	11.68	24.66	370.7%	2.555	5.21	10.43	308.2%	5.085	9.984	21.63	325.4%
Somalia	3.322	3.157	2.958	-11.0%	4.032	10.16	21.18	425.3%	1.666	3.413	6.062	263.9%	2.42	4.426	8.336	244.5%
Rwanda	2.77	4.6	5.71	106.1%	6.99	16.51	30.45	335.6%	1.943	3.78	7.371	279.4%	3.929	7.939	15.26	288.4%
Zimbabwe	2.498	4.218	7.454	198.4%	8.734	16.94	31.28	258.1%	1.435	2.913	5.723	298.8%	3.535	7.441	17.35	390.8%
Burundi	2.31	4.824	6.009	160.1%	4.055	9.96	21.43	428.5%	1.493	2.995	5.319	256.3%	3.123	7.171	12.93	314.0%
Eritrea	1.326	1.745	1.651	24.5%	2.699	7.559	15.89	488.7%	0.717	1.635	3.353	367.6%	1.826	3.848	7.594	315.9%
Comoros	0.113	0.237	0.343	203.5%	0.203	0.53	1.155	469.0%	0.081	0.217	0.505	523.5%	0.182	0.533	1.249	586.3%
Djibouti	0.329	0.559	0.664	101.8%	0.464	0.841	1.245	168.3%	0.191	0.307	0.441	130.9%	0.204	0.421	0.725	255.4%
Mauritius	0.478	0.63	0.655	37.0%	1.158	1.922	2.131	84.0%	0.206	0.301	0.376	82.5%	0.484	1.009	1.576	225.6%
Africa-Eastern	**76.37**	**110.3**	**152.1**	**99.2%**	**143.7**	**344.8**	**662**	**360.7%**	**48.86**	**101.6**	**208.1**	**325.9%**	**104.8**	**207.1**	**423**	**303.6%**
Congo, Democratic Rep. of	17.4	34.29	57.06	227.9%	29.2	76.45	187.1	540.8%	11.71	23.13	42.06	259.2%	24.99	49.29	100.6	302.6%
Angola	5.709	7.776	14.52	154.3%	7.835	14.33	27.39	249.6%	4.091	8.33	17.49	327.5%	8.024	13.07	31.9	297.6%
Cameroon	6.855	11.6	17.72	158.5%	8.326	16.67	29.58	255.3%	4.37	8.343	15.73	260.0%	9.27	17.84	33.93	266.0%
Chad	3.038	5.265	8.148	168.2%	3.919	9.031	20.18	414.9%	1.94	4.163	9.027	365.3%	4.386	9.188	21.39	387.7%
Central African Rep.	1.578	2.573	3.223	104.2%	2.017	3.98	7.54	273.8%	0.911	1.61	2.862	214.2%	2.171	3.865	7.443	242.8%
Congo, Rep. of	1.056	1.451	2.374	124.8%	1.734	2.855	4.525	161.0%	0.675	1.309	2.877	326.2%	1.584	2.458	5.712	260.6%
Gabon	0.338	0.669	1.194	253.3%	0.732	1.235	1.755	139.8%	0.188	0.425	0.987	425.0%	0.538	1.065	2.478	360.6%
Equatorial Guinea	0.26	0.399	0.721	177.3%	0.366	0.571	0.804	119.7%	0.149	0.319	0.55	269.1%	0.344	0.739	1.352	293.0%
São Tomé and Príncipe	0.025	0.043	0.074	196.0%	0.136	0.303	0.7	414.7%	0.022	0.038	0.072	227.3%	0.054	0.102	0.245	353.7%
Africa-Middle	**36.26**	**64.07**	**105**	**189.6%**	**54.26**	**125.4**	**279.6**	**415.3%**	**24.05**	**47.67**	**91.66**	**281.1%**	**51.36**	**97.62**	**205**	**299.1%**
Egypt, Arab Rep.	64.07	101.9	164.7	157.1%	50.99	84.87	126.3	147.7%	8.007	17.56	35.67	345.5%	15.21	34.47	69.57	357.4%
Sudan	15.93	19.38	26.14	64.1%	14.96	31.02	51.21	242.3%	6.676	12.58	24.34	264.6%	12.48	21.82	42.38	239.6%
Algeria	6.83	15.32	27.99	309.8%	19.88	41.09	59.45	199.0%	3.709	9.805	24.17	551.7%	10.97	29.43	67.47	515.0%
Morocco	11	19.15	29.13	164.8%	21.97	36.3	46.53	111.8%	4.996	9.694	16.52	230.7%	8.394	20.06	38.87	363.1%
Tunisia	2.515	4.663	8.547	239.8%	9.135	15.64	22.1	141.9%	1.134	2.289	4.879	330.2%	2.479	5.667	12.48	403.4%
Libya	1.314	3.031	6.517	396.0%	3.305	7.331	10.95	231.3%	0.591	1.388	3.22	444.8%	1.002	2.764	7.422	640.7%
Africa-Northern	**101.6**	**163.5**	**263**	**158.9%**	**120.2**	**216.3**	**316.5**	**163.3%**	**25.11**	**53.32**	**108.8**	**333.3%**	**50.53**	**114.2**	**238.2**	**371.4%**

Health

	Deaths from Noncommunicable Diseases															
	Deaths from Digestive Disorders				Deaths from Malignant Neoplasms				Deaths from Mental Health				Deaths from Respiratory Conditions			
Base Case: Countries in Year 2060	Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA continued																
South Africa	8.112	12.95	18.7	130.5%	43.48	76.03	113.9	162.0%	6.07	12.78	23.23	282.7%	16.54	31.32	49.06	196.6%
Namibia	0.645	1.007	1.726	167.6%	0.524	1.038	1.903	263.2%	0.255	0.627	1.478	479.6%	0.538	1.033	2.142	298.1%
Lesotho	0.797	0.859	1.128	41.5%	0.855	1.39	2.278	166.4%	0.466	0.657	1.108	137.8%	1.042	1.462	2.949	183.0%
Botswana	0.611	0.851	1.394	128.2%	0.946	1.491	2.186	131.1%	0.324	0.64	1.22	276.5%	0.83	1.255	2.569	209.5%
Swaziland	0.403	0.549	0.873	116.6%	0.426	0.684	1.148	169.5%	0.241	0.409	0.752	212.0%	0.545	0.969	1.843	238.2%
Africa-Southern	**10.57**	**16.21**	**23.82**	**125.4%**	**46.23**	**80.63**	**121.5**	**162.8%**	**7.356**	**15.12**	**27.79**	**277.8%**	**19.5**	**36.04**	**58.56**	**200.3%**
Nigeria	54.61	63.9	89.07	63.1%	93.5	178.5	297.9	218.6%	35.64	69.89	141.8	297.9%	74.78	122.6	255.5	241.7%
Niger	2.942	5.003	7.665	160.5%	7.933	19.7	48.58	512.4%	2.013	5.044	11.72	482.2%	4.658	10.99	26.65	472.1%
Côte d'Ivoire	4.821	8.885	11.53	139.2%	4.657	11.66	26.62	471.6%	2.791	6.616	13.86	396.6%	7.015	16.14	33.49	377.4%
Burkina Faso	3.468	6.162	9.048	160.9%	6.015	15.62	37.15	517.6%	2.491	5.563	12.46	400.2%	4.995	11.83	29.59	492.4%
Ghana	7.228	9.89	13.6	88.2%	13.5	28.51	46.53	244.7%	4.806	8.499	13.95	190.3%	10.8	19.92	38.39	255.5%
Mali	2.885	3.027	4.115	42.6%	8.615	20.73	46.34	437.9%	2.267	4.554	9.683	327.1%	4.431	7.903	20.79	369.2%
Senegal	3.344	6.213	10.72	220.6%	7.553	17.13	37.12	391.5%	1.903	3.877	8.922	368.8%	4.976	10.25	25.41	410.7%
Guinea	2.674	3.57	5.255	96.5%	3.171	7.373	16.38	416.6%	1.721	3.805	7.739	349.7%	3.572	7.398	16.29	356.0%
Benin	1.844	3.173	5.087	175.9%	2.802	7.014	15.2	442.5%	1.21	3.065	6.705	454.1%	2.465	6.547	14.42	485.0%
Togo	1.115	2.666	5.236	369.6%	1.979	4.782	10.41	426.0%	0.737	1.824	4.152	463.4%	1.646	4.611	10.99	567.7%
Sierra Leone	1.788	2.608	3.178	77.7%	3.136	8.039	16.63	430.3%	0.956	1.939	3.753	292.6%	2.514	4.975	9.114	262.5%
Liberia	0.787	1.649	2.223	182.5%	1.307	4.681	10.99	740.9%	0.456	1.068	2.123	365.6%	1.088	2.477	4.925	352.7%
Mauritania	0.852	1.632	2.618	207.3%	1.53	3.614	7.29	376.5%	0.536	1.169	2.491	364.7%	1.246	2.954	6.285	404.4%
Gambia	0.464	0.671	0.992	113.8%	0.878	2.265	4.841	451.4%	0.271	0.629	1.492	450.6%	0.68	1.5	3.624	432.9%
Guinea-Bissau	0.597	0.916	1.354	126.8%	0.765	1.505	2.825	269.3%	0.378	0.729	1.396	269.3%	0.8	1.547	3.081	285.1%
Cape Verde	0.095	0.122	0.223	134.7%	0.276	0.463	0.783	183.7%	0.073	0.127	0.325	345.2%	0.214	0.359	0.776	262.6%
Africa-Western	**89.51**	**120.1**	**171.9**	**92.0%**	**157.6**	**331.6**	**625.6**	**297.0%**	**58.25**	**118.4**	**242.6**	**316.5%**	**125.9**	**232**	**499.3**	**296.6%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Deaths from Noncommunicable Diseases															
	Deaths from Digestive Disorders				Deaths from Malignant Neoplasms				Deaths from Mental Health				Deaths from Respiratory Conditions			
	Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS																
Haiti	3.835	6.411	8.477	121.0%	5.228	11.27	24.41	366.9%	1.761	3.629	7.411	320.8%	1.862	3.07	5.655	203.7%
Dominican Rep.	2.985	4.881	8.203	174.8%	7.391	13.06	19.53	164.2%	0.856	1.92	4.144	384.1%	2.511	5.321	11.3	350.0%
Cuba	2.79	3.677	4.505	61.5%	19.62	36.48	41.25	110.2%	4.218	9.11	17.86	323.4%	3.095	5.58	6.306	103.7%
Puerto Rico	1.447	1.913	2.397	65.7%	4.577	6.779	8.745	91.1%	1.563	3.16	5.415	246.4%	1.9	3.402	5.115	169.2%
Jamaica	0.822	1.446	2.253	174.1%	3.079	4.655	5.826	89.2%	0.175	0.267	0.41	134.3%	1.339	2.469	4.252	217.6%
Trinidad and Tobago	0.407	0.709	0.998	145.2%	1.341	2.354	2.782	107.5%	0.229	0.475	0.815	255.9%	0.241	0.473	0.777	222.4%
Bahamas	0.067	0.151	0.209	211.9%	0.337	0.724	0.91	170.0%	0.052	0.147	0.261	401.9%	0.06	0.149	0.239	298.3%
Barbados	0.064	0.114	0.155	142.2%	0.407	0.673	0.729	79.1%	0.033	0.067	0.096	190.9%	0.061	0.118	0.151	147.5%
Saint Lucia	0.028	0.04	0.055	96.4%	0.184	0.287	0.379	106.0%	0.026	0.048	0.077	196.2%	0.053	0.095	0.173	226.4%
Grenada	0.021	0.032	0.059	181.0%	0.119	0.184	0.33	177.3%	0.012	0.02	0.04	233.3%	0.014	0.026	0.049	250.0%
Saint Vincent and the Grenadines	0.027	0.047	0.071	163.0%	0.109	0.185	0.264	142.2%	0.019	0.034	0.064	236.8%	0.018	0.036	0.063	250.0%
America-Caribbean	**12.49**	**19.42**	**27.38**	**119.2%**	**42.39**	**76.65**	**105.2**	**148.2%**	**8.944**	**18.88**	**36.59**	**309.1%**	**11.15**	**20.74**	**34.08**	**205.7%**
Guatemala	3.757	5.19	9.565	154.6%	8.568	15.85	31.6	268.8%	2.919	6.802	13.99	379.3%	1.798	3.878	8.571	376.7%
Honduras	2.11	4.406	8.76	315.2%	4.367	8.573	15.24	249.0%	0.962	2.03	3.728	287.5%	1.215	2.925	7.223	494.5%
Nicaragua	1.805	3.229	5.322	194.8%	3.48	8.069	15.55	346.8%	0.662	1.374	2.336	252.9%	1.123	2.918	6.893	513.8%
El Salvador	1.942	3.155	5.296	172.7%	4.671	6.818	9.928	112.5%	2.145	4.079	7.064	229.3%	1.482	2.762	5.232	253.0%
Costa Rica	1.401	3.208	5.868	318.8%	4.209	9.56	15.4	265.9%	0.787	2.181	4.972	531.8%	1.183	3.293	7.199	508.5%
Panama	0.676	1.382	2.554	277.8%	3.184	6.98	11.32	255.5%	0.385	0.99	2.281	492.5%	0.821	2.046	4.506	448.8%
Belize	0.051	0.124	0.262	413.7%	0.12	0.309	0.722	501.7%	0.019	0.045	0.112	489.5%	0.037	0.099	0.238	543.2%
America-Central	**11.74**	**20.69**	**37.63**	**220.5%**	**28.6**	**56.16**	**99.76**	**248.8%**	**7.879**	**17.5**	**34.48**	**337.6%**	**7.659**	**17.92**	**39.86**	**420.4%**
United States of America	82.51	145.2	206.1	149.8%	531.6	788.6	890.3	67.5%	203.1	473.6	834	310.6%	164.2	323.2	448.9	173.4%
Mexico	46.34	95.04	156.8	238.4%	60.86	116.2	167.9	175.9%	9.761	21.57	43.68	347.5%	29.51	73.75	155.5	426.9%
Canada	9.203	18.34	27.1	194.5%	70.81	110.3	119.8	69.2%	18.51	45.33	78.75	325.4%	14.67	32.53	46.44	216.6%
America-North	**138.1**	**258.6**	**390.1**	**182.5%**	**663.2**	**1015**	**1178**	**77.6%**	**231.3**	**540.5**	**956.4**	**313.5%**	**208.3**	**429.5**	**650.7**	**212.4%**
Brazil	69.25	104.7	159.3	130.0%	195.3	348.6	470.9	141.1%	39.54	88.54	180.2	355.7%	71.19	158	303.4	326.2%
Colombia	11.35	23.04	41.92	269.3%	41.54	88.64	131.6	216.8%	2.65	5.34	9.283	250.3%	14.93	39.89	82.48	452.4%
Argentina	13.46	19.15	28.91	114.8%	60.64	88.74	119.3	96.7%	6.843	13.46	24.75	261.7%	28.06	49.6	85.57	205.0%
Peru	11.57	20.9	37.61	225.1%	28.93	54.41	83.38	188.2%	2.317	4.762	8.849	281.9%	6.309	13.61	29.63	369.6%
Venezuela (Bolivarian Rep. of)	6.233	11.42	18.45	196.0%	23.67	48.52	77.31	226.6%	1.942	4.34	8.608	343.3%	5.266	14.62	32.06	508.8%
Ecuador	3.686	7.253	13.31	261.1%	13.3	26.33	42.21	217.4%	1.574	3.343	6.271	298.4%	2.349	6.007	13.84	489.2%
Chile	6.768	12.33	17.94	165.1%	22.12	42.25	52.24	136.2%	5.693	15.51	31.97	461.6%	5.642	13.5	24.03	325.9%
Bolivia (Plurinational State of)	5.751	10.77	19.73	243.1%	5.455	9.622	15.74	188.5%	1.316	2.608	4.689	256.3%	3.058	6.341	12.74	316.6%
Paraguay	1.493	3.039	5.616	276.2%	5.431	10.84	18.32	237.3%	0.449	0.952	1.869	316.3%	0.82	2.081	4.302	424.6%
Uruguay	1.146	1.491	2.045	78.4%	7.074	8.836	10.71	51.4%	1.772	3.158	5.394	204.4%	1.968	2.925	4.343	120.7%
Guyana	0.214	0.323	0.389	81.8%	0.313	0.678	0.997	218.5%	0.069	0.122	0.188	172.5%	0.086	0.173	0.262	204.7%
Suriname	0.232	0.331	0.454	95.7%	0.45	0.711	0.881	95.8%	0.052	0.08	0.113	117.3%	0.095	0.159	0.261	174.7%
America-South	**131.2**	**214.7**	**345.6**	**163.4%**	**404.2**	**728.2**	**1024**	**153.3%**	**64.21**	**142.2**	**282.2**	**339.5%**	**139.8**	**306.9**	**592.9**	**324.1%**

Health

	Deaths from Noncommunicable Diseases															
	Deaths from Digestive Disorders				Deaths from Malignant Neoplasms				Deaths from Mental Health				Deaths from Respiratory Conditions			
Base Case: Countries in Year 2060	Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA																
China	252.2	427	648.6	157.2%	1910	3462	3993	109.1%	100.3	228.7	440.5	339.2%	1283	2880	5123	299.3%
Japan	43.25	78.14	91.3	111.1%	337.4	452.6	425.2	26.0%	22.46	46.99	57.97	158.1%	59.43	129.3	151.9	155.6%
Korea, Rep. of	12.67	25.51	37.66	197.2%	81.21	166.8	187.4	130.8%	12.34	40.75	80.85	555.2%	14.24	44.39	77.07	441.2%
Korea, Dem. People's Rep. of	8.602	9.947	7.951	-7.6%	28.81	52.76	64.85	125.1%	2.454	4.002	5.748	134.2%	15.51	25.23	32.81	111.5%
Taiwan, China	1.152	2.512	3.177	175.8%	6.357	12.11	12.37	94.6%	0	0	0		47.28	111.6	142.5	201.4%
Hong Kong SAR, China	0.401	0.872	1.239	209.0%	2.281	4.346	4.811	110.9%	0	0	0		16.06	35.69	51.44	220.3%
Mongolia	1.158	1.66	2.704	133.5%	3.434	8.258	13.15	282.9%	0.158	0.269	0.475	200.6%	0.47	1.034	2.047	335.5%
Asia-East	**319.4**	**545.6**	**792.6**	**148.2%**	**2369**	**4159**	**4701**	**98.4%**	**137.7**	**320.8**	**585.5**	**325.2%**	**1436**	**3227**	**5581**	**288.6%**
India	447.2	490.9	638.4	42.8%	604.2	1070	1449	139.8%	136.7	249.2	442	223.3%	983.9	1954	3524	258.2%
Pakistan	31.21	55.96	82.41	164.0%	74.36	161.6	279.3	275.6%	22.47	55.44	130.8	482.1%	55.7	129.4	270.7	386.0%
Bangladesh	33.81	54.02	68.49	102.6%	83.94	202.3	315.5	275.9%	19.89	40.92	99.79	401.7%	63.66	131.1	236.3	271.2%
Afghanistan	14.83	22.72	34.7	134.0%	14.75	35.06	74.2	403.1%	10.45	23.39	43.71	318.3%	10.15	19.4	39.39	288.1%
Iran, Islamic Rep. of	8.222	15.68	35.35	329.9%	47.99	88.9	134.6	180.5%	11.9	24.91	70.2	489.9%	16.8	36.2	92.37	449.8%
Nepal	5.41	8.547	12.54	131.8%	19.68	43.62	79.78	305.4%	2.343	5.477	12.29	424.5%	9.597	21.88	45.67	375.9%
Uzbekistan	10.26	11.5	14.65	42.8%	12.35	23.57	32.44	162.7%	3.677	5.38	6.615	79.9%	3.879	7.772	15.14	290.3%
Sri Lanka	5.286	8.63	11.47	117.0%	14.61	20.79	22.77	55.9%	8.247	22.95	44.54	440.1%	13.14	26.86	38.88	195.9%
Kazakhstan	8.531	8.514	9.894	16.0%	19.73	26.6	27.85	41.2%	2.451	2.73	2.948	20.3%	5.037	7.944	12.17	141.6%
Tajikistan	1.343	2.636	4.719	251.4%	2.925	6.518	12.21	317.4%	0.946	1.504	1.842	94.7%	1.203	2.699	5.758	378.6%
Kyrgyz Rep.	2.175	3.711	4.872	124.0%	3.226	6.715	10.53	226.4%	0.549	0.898	1.238	125.5%	1.942	4.565	9.26	376.8%
Turkmenistan	1.81	1.818	3.186	76.0%	2.792	5.379	8.231	194.8%	0.549	0.869	1.172	113.5%	1.006	1.82	4.605	357.8%
Bhutan	0.158	0.206	0.34	115.2%	0.429	0.842	1.468	242.2%	0.103	0.243	0.668	548.5%	0.263	0.534	1.074	308.4%
Maldives	0.049	0.096	0.191	289.8%	0.109	0.211	0.375	244.0%	0.03	0.061	0.131	336.7%	0.206	0.453	1.094	431.1%
Asia-South Central	**570.3**	**685**	**921.2**	**61.5%**	**901.1**	**1692**	**2449**	**171.8%**	**220.3**	**433.9**	**857.9**	**289.4%**	**1166**	**2345**	**4296**	**268.4%**
Indonesia	48.18	74.45	117.4	143.7%	173.2	352.5	479	176.6%	28.16	78.16	169.3	501.2%	90.66	232.3	457.7	404.9%
Philippines	18.79	43.52	74.9	298.6%	39.78	83.65	134	236.9%	4.231	9.192	17.47	312.9%	20.61	58.97	115.5	460.4%
Vietnam	18.55	30	46.86	152.6%	58.9	137.4	194	229.4%	9.655	22.89	50.83	426.5%	31.49	83.3	175.4	457.0%
Thailand	47.53	61.5	71.96	51.4%	79.36	108.6	105	32.3%	10.54	18.09	27.09	157.0%	48.31	86.55	116.9	142.0%
Myanmar	10.92	14.01	14.32	31.1%	35.52	80.53	109.9	209.4%	5.513	11.98	21.09	282.6%	21.08	50.62	69.28	228.7%
Malaysia	4.551	12.7	24.25	432.8%	17.36	34.9	51.12	194.5%	0.976	2.236	3.874	296.9%	8.225	26.78	56.78	590.3%
Cambodia	4.127	6.487	9.289	125.1%	8.588	20.15	32.79	281.8%	2.419	4.748	8.065	233.4%	5.519	13.9	26.95	388.3%
Lao People's Democratic Rep.	1.233	1.455	2.298	86.4%	3.362	7.622	13.45	300.1%	0.838	1.962	4.564	444.6%	2.724	5.753	13.08	380.2%
Singapore	0.534	1.452	2.588	384.6%	7.395	17.51	22.72	207.2%	0.081	0.168	0.228	181.5%	0.904	3.207	6.441	612.5%
Timor-Leste	0.168	0.159	0.253	50.6%	0.593	1.569	3.922	561.4%	0.071	0.192	0.419	490.1%	0.271	0.645	1.455	436.9%
Brunei Darussalam	0.035	0.095	0.195	457.1%	0.229	0.642	0.992	333.2%	0.022	0.044	0.05	127.3%	0.098	0.4	1.166	1089.8%
Asia-South Eastern	**154.6**	**245.8**	**364.3**	**135.6%**	**424.3**	**845.1**	**1147**	**170.3%**	**62.51**	**149.7**	**303**	**384.7%**	**229.9**	**562.4**	**1041**	**352.8%**

Health

	Deaths from Noncommunicable Diseases															
	Deaths from Digestive Disorders				Deaths from Malignant Neoplasms				Deaths from Mental Health				Deaths from Respiratory Conditions			
Base Case: Countries in Year 2060	Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA continued																
Turkey	12.29	20	29.91	143.4%	79.15	137.8	179.4	126.7%	6.269	14.45	29.73	374.2%	39.73	92.04	186.7	369.9%
Iraq	4.803	8.475	18.68	288.9%	11.51	27.06	58.25	406.1%	2.229	5.509	13.95	525.8%	4.336	10.2	27.82	541.6%
Yemen, Rep. of	6.229	8.79	16.58	166.2%	8.638	20.58	46.78	441.6%	3.407	8.737	18.06	430.1%	4.363	10.16	27.01	519.1%
Saudi Arabia	3.138	8.551	20.26	545.6%	8.447	23.47	41.87	395.7%	1.331	2.992	7.664	475.8%	2.598	9.011	24.04	825.3%
Syrian Arab Rep.	2.454	4.447	9.222	275.8%	6.142	11.9	20.56	234.7%	3.45	9.587	24.25	602.9%	3.898	9.755	22.37	473.9%
Jordan	0.758	1.575	3.941	419.9%	2.697	5.474	10.63	294.1%	0.471	0.879	1.801	282.4%	0.811	1.823	4.866	500.0%
Israel	1.346	2.747	5.05	275.2%	11.06	18.44	26.98	143.9%	2.304	5.485	10.82	369.6%	2.352	4.967	8.944	280.3%
Palestine	0.284	0.571	1.202	323.2%	1.075	3.023	7.276	576.8%	0.256	0.547	1.025	300.4%	0.268	0.995	2.887	977.2%
Azerbaijan	3.772	6.184	8.705	130.8%	7.699	13.58	17.26	124.2%	1.571	3.295	5.74	265.4%	2.013	3.98	7.138	254.6%
United Arab Emirates	0.151	1.152	3.907	2487.4%	0.619	5.796	11.31	1727.1%	0.055	0.308	0.632	1049.1%	0.093	1.156	4.45	4684.9%
Kuwait	0.172	0.595	1.802	947.7%	0.82	3.529	8.931	989.1%	0.05	0.145	0.585	1070.0%	0.098	0.482	2	1940.8%
Lebanon	1.318	2.264	3.853	192.3%	5.385	8.287	10.37	92.6%	0.571	1.058	1.936	239.1%	1.285	2.571	5.048	292.8%
Oman	0.274	0.907	2.929	969.0%	0.767	2.393	5.144	570.7%	0.106	0.261	0.923	770.8%	0.242	0.833	3.363	1289.7%
Armenia	1.477	2.241	2.92	97.7%	4.153	5.022	5.435	30.9%	0.436	0.712	1.015	132.8%	1.656	2.862	4.123	149.0%
Georgia	1.431	1.196	1.072	-25.1%	5.525	5.129	4.374	-20.8%	0.276	0.248	0.233	-15.6%	0.561	0.595	0.648	15.5%
Qatar	0.11	0.447	1.45	1218.2%	0.595	4.515	7.158	1103.0%	0.04	0.198	0.507	1167.5%	0.086	0.777	5.053	5775.6%
Bahrain	0.057	0.324	0.836	1366.7%	0.226	1.157	2.023	795.1%	0.041	0.147	0.309	653.7%	0.099	0.677	2.159	2080.8%
Cyprus	0.186	0.368	0.576	209.7%	1.124	1.706	1.988	76.9%	0.226	0.488	0.802	254.9%	0.298	0.667	1.146	284.6%
Asia-West	**40.25**	**70.84**	**132.9**	**230.2%**	**155.6**	**298.8**	**465.7**	**199.3%**	**23.09**	**55.05**	**120**	**419.7%**	**64.79**	**153.6**	**339.8**	**424.5%**
Australia	4.75	9.266	15.15	218.9%	41.58	67.38	81.27	95.5%	10.67	26.62	49.44	363.4%	8.656	18.32	28.59	230.3%
Papua New Guinea	1.923	3.142	3.988	107.4%	4.883	11.18	18.96	288.3%	0.662	1.509	3.278	395.2%	2.719	6.75	12.56	361.9%
New Zealand	0.8	1.613	2.587	223.4%	8.533	13.07	15.23	78.5%	1.911	4.559	8.136	325.7%	1.905	3.867	5.463	186.8%
Solomon Islands	0.102	0.216	0.447	338.2%	0.291	0.689	1.297	345.7%	0.035	0.078	0.168	380.0%	0.15	0.389	0.915	510.0%
Fiji	0.172	0.37	0.519	201.7%	0.678	1.079	1.274	87.9%	0.069	0.132	0.194	181.2%	0.343	0.732	0.997	190.7%
Vanuatu	0.044	0.113	0.229	420.5%	0.116	0.227	0.367	216.4%	0.013	0.032	0.072	453.8%	0.066	0.161	0.349	428.8%
Micronesia (Federated States of)	0.028	0.049	0.085	203.6%	0.052	0.114	0.21	303.8%	0.009	0.018	0.033	266.7%	0.04	0.094	0.189	372.5%
Tonga	0.028	0.052	0.107	282.1%	0.05	0.082	0.148	196.0%	0.007	0.013	0.028	300.0%	0.042	0.078	0.16	281.0%
Samoa	0.043	0.064	0.092	114.0%	0.055	0.076	0.097	76.4%	0.012	0.02	0.033	175.0%	0.064	0.119	0.168	162.5%
Oceania	**7.889**	**14.89**	**23.21**	**194.2%**	**56.24**	**93.89**	**118.9**	**111.4%**	**13.39**	**32.99**	**61.38**	**358.4%**	**13.98**	**30.51**	**49.39**	**253.3%**

Health

	Deaths from Noncommunicable Diseases															
	Deaths from Digestive Disorders				Deaths from Malignant Neoplasms				Deaths from Mental Health				Deaths from Respiratory Conditions			
Base Case: Countries in Year 2060	Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
EUROPE																
Russian Federation	84.39	74.69	74.04	-12.3%	258.1	289.2	258.8	0.3%	19.95	21.57	21.33	6.9%	41.97	55.38	70.68	68.4%
Ukraine	30.76	23.97	18.97	-38.3%	75.04	68.57	54.77	-27.0%	13.54	12.72	11.16	-17.6%	15.43	17.02	19.22	24.6%
Poland	17.86	21.3	23.44	31.2%	97.88	122.3	118.5	21.1%	7.09	10.38	12.16	71.5%	10.72	17.93	22.66	111.4%
Romania	14.8	16.03	14.63	-1.1%	44.84	46.38	41.7	-7.0%	2.089	2.743	3.566	70.7%	6.968	9.511	12.64	81.4%
Czech Rep.	4.821	6.417	6.882	42.8%	28.5	34.1	32.33	13.4%	1.525	2.293	2.784	82.6%	2.818	4.526	5.507	95.4%
Belarus	5.038	4.287	3.961	-21.4%	19.28	20.13	18.3	-5.1%	1.782	2.1	2.309	29.6%	4.33	5.703	7.548	74.3%
Hungary	8.186	8.638	8.109	-0.9%	31.43	31.39	27.18	-13.5%	4.203	6.178	7.801	85.6%	5.288	6.819	7.69	45.4%
Bulgaria	3.312	3.189	2.807	-15.2%	17.15	15.32	12.06	-29.7%	1.011	1.245	1.463	44.7%	2.485	2.924	3.118	25.5%
Slovak Rep.	2.95	3.639	3.848	30.4%	11.62	15.57	15.29	31.6%	0.771	1.136	1.414	83.4%	1.026	1.731	2.339	128.0%
Moldova, Rep. of	3.875	3.886	3.547	-8.5%	5.431	6.293	6.753	24.3%	0.516	0.583	0.554	7.4%	1.473	2.117	2.562	73.9%
Europe-East	**176**	**166**	**160.2**	**-9.0%**	**589.3**	**649.3**	**585.7**	**-0.6%**	**52.48**	**60.94**	**64.54**	**23.0%**	**92.51**	**123.7**	**154**	**66.5%**
United Kingdom	29.74	37.7	47.37	59.3%	159.4	192.2	204.6	28.4%	41.04	74.71	121	194.8%	46.37	74.12	98.24	111.9%
Sweden	3.007	4.599	6.016	100.1%	21.76	27.17	27.89	28.2%	7.803	14.74	21.58	176.6%	3.413	5.191	6.529	91.3%
Denmark	2.925	3.835	4.547	55.5%	16.02	19.73	19.12	19.4%	4.161	7.545	10.58	154.3%	3.513	5.452	6.074	72.9%
Ireland	1.065	1.97	3.308	210.6%	8.147	13.39	16.52	102.8%	1.47	3.482	6.739	358.4%	1.898	4.271	7.5	295.2%
Norway	1.265	2.148	3.039	140.2%	10.73	15.29	15.54	44.8%	3.183	6.211	9.627	202.5%	2.403	4.112	5.446	126.6%
Finland	2.345	2.839	2.887	23.1%	10.87	14.02	12.82	17.9%	6.052	14.42	18.68	208.7%	1.508	2.748	2.966	96.7%
Lithuania	2.452	2.581	2.5	2.0%	7.965	8.252	7.911	-0.7%	0.641	0.77	0.886	38.2%	0.922	1.254	1.566	69.8%
Latvia	1.064	1.107	1.13	6.2%	5.617	5.828	5.649	0.6%	0.501	0.613	0.697	39.1%	0.369	0.438	0.476	29.0%
Estonia	0.704	0.705	0.687	-2.4%	3.49	3.599	3.368	-3.5%	0.396	0.446	0.461	16.4%	0.342	0.413	0.482	40.9%
Iceland	0.051	0.106	0.184	260.8%	0.528	0.854	0.991	87.7%	0.201	0.502	0.966	380.6%	0.096	0.202	0.314	227.1%
Europe-North	**44.62**	**57.59**	**71.67**	**60.6%**	**244.5**	**300.3**	**314.4**	**28.6%**	**65.44**	**123.4**	**191.2**	**192.2%**	**60.83**	**98.2**	**129.6**	**113.1%**
Italy	24.16	30.78	36.42	50.7%	171.6	192.5	179.4	4.5%	30.91	52.69	78.53	154.1%	31.71	52.53	72.7	129.3%
Spain	19.55	29.09	41.06	110.0%	102.7	130.5	137.1	33.5%	30.66	57.65	103.7	238.2%	34.49	60.3	96.19	178.9%
Greece	2.776	3.801	4.957	78.6%	30.4	34.16	35.19	15.8%	1.606	2.329	3.237	101.6%	6.61	11.13	16.7	152.6%
Portugal	5.101	6.556	7.183	40.8%	27.06	30.57	29.28	8.2%	3.371	5.101	6.993	107.4%	6.649	11.3	15.77	137.2%
Serbia	2.996	3.297	3.744	25.0%	16.84	17.07	15.82	-6.1%	1.889	2.561	3.328	76.2%	2.912	3.725	4.53	55.6%
Croatia	2.233	2.334	2.183	-2.2%	12.4	12.66	10.99	-11.4%	1.446	2.169	2.645	82.9%	1.37	2.143	2.478	80.9%
Bosnia and Herzegovina	0.886	1.023	1.043	17.7%	6.355	8.017	7.807	22.8%	0.364	0.592	0.84	130.8%	0.99	1.644	2.217	123.9%
Albania	0.316	0.559	0.821	159.8%	3.47	5.542	6.809	96.2%	0.578	1.227	2.209	282.2%	0.556	1.19	2.043	267.4%
Macedonia, TFYR	0.376	0.437	0.435	15.7%	3.288	3.868	3.604	9.6%	0.191	0.291	0.369	93.2%	0.664	1.184	1.624	144.6%
Slovenia	1.227	1.721	1.851	50.9%	6.076	7.792	7.175	18.1%	0.412	0.627	0.712	72.8%	0.602	1.187	1.498	148.8%
Montenegro	0.161	0.2	0.222	37.9%	1.123	1.241	1.181	5.2%	0.086	0.147	0.209	143.0%	0.269	0.429	0.518	92.6%
Malta	0.118	0.223	0.254	115.3%	0.819	1.147	1.069	30.5%	0.175	0.448	0.603	244.6%	0.148	0.336	0.404	173.0%
Europe-South	**59.9**	**80.02**	**100.2**	**67.3%**	**382.1**	**445.1**	**435.4**	**13.9%**	**71.69**	**125.8**	**203.4**	**183.7%**	**86.97**	**147.1**	**216.7**	**149.2%**
Germany	43.02	64.53	77.27	79.6%	215.1	255.9	238.6	10.9%	33.43	56.48	77.61	132.2%	34.99	57.56	69.53	98.7%
France	24.19	34.7	43.83	81.2%	156.3	193.5	199.7	27.8%	49.23	94.57	145.2	194.9%	19.88	35.82	46.45	133.7%
Netherlands	5.55	10.26	13.14	136.8%	42.72	58.56	54.73	28.1%	11.41	25.01	37.81	231.4%	8.116	16.2	19.77	143.6%
Belgium	4.4	6.573	8.706	97.9%	25.11	30.29	29.9	19.1%	6.465	12.15	18.48	185.8%	7.232	12.35	15.78	118.2%
Switzerland	2.503	4.063	5.434	117.1%	16.14	22.38	22	36.3%	6.052	12.67	21.23	250.8%	2.37	4.533	6.112	157.9%
Austria	2.993	4.044	4.781	59.7%	19.92	25.72	25.59	28.5%	3.098	5.299	7.75	150.2%	2.913	5.032	6.533	124.3%
Luxembourg	0.172	0.291	0.457	165.7%	0.989	1.567	1.899	92.0%	0.228	0.523	1.022	348.2%	0.181	0.364	0.586	223.8%
Europe-West	**82.83**	**124.5**	**153.6**	**85.4%**	**476.3**	**587.9**	**572.4**	**20.2%**	**109.9**	**206.7**	**309.1**	**181.3%**	**75.68**	**131.9**	**164.8**	**117.8%**

Health

Base Case	Deaths from Noncommunicable Diseases				Deaths from Injuries											
Source: International Futures	Deaths from Other Noncom Diseases				Deaths from Road Traffic Accidents				Deaths from Other Unintentional Injuries				Deaths from Intentional Injuries			
Model Version 6.61, Jan 2013	Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	2213	3112	4375	97.7%	1173	2176	2802	138.9%	2263	3120	4857	114.6%	1386	2040	2900	109.2%
Africa	438.7	599	956	117.9%	243.9	522.9	917.4	276.1%	353.2	506.7	701	98.5%	302.7	534.4	885.7	192.6%
Americas	362.9	559.7	810.9	123.4%	136.6	185	193.3	41.5%	192.7	300	473.4	145.7%	203.8	310.4	422.5	107.3%
Asia with Oceania	1159	1638	2261	95.1%	704.6	1392	1633	131.8%	1387	1977	3293	137.4%	728.6	1027	1408	93.2%
Europe	249.5	312.3	344.6	38.1%	86.5	74.75	56.9	-34.2%	325.8	330.9	384.6	18.0%	149.4	166.4	181.6	21.6%
World	2213	3112	4375	97.7%	1173	2176	2802	138.9%	2263	3120	4857	114.6%	1386	2040	2900	109.2%
Africa-Eastern	120	158.2	244	103.3%	76.65	175.8	366.1	377.6%	133.5	196.6	254.5	90.6%	112.1	199.1	307.7	174.5%
Africa-Middle	64.71	86.69	125.9	94.6%	40.75	81.09	133	226.4%	62.35	98.22	155.6	149.6%	62.19	138.6	266.9	329.2%
Africa-Northern	100.8	159.1	277.3	175.1%	44	88.7	122.8	179.1%	36.37	44.3	59.42	63.4%	33.3	46.67	73.32	120.2%
Africa-Southern	15.65	21.92	31.11	98.8%	10.86	15.11	17.91	64.9%	10.22	12.06	15.91	55.7%	20.63	30.56	42.08	104.0%
Africa-Western	137.5	173	277.7	102.0%	71.61	162.2	277.6	287.7%	110.8	155.5	215.6	94.6%	74.43	119.4	195.7	162.9%
Africa	438.7	599	956	117.9%	243.9	522.9	917.4	276.1%	353.2	506.7	701	98.5%	302.7	534.4	885.7	192.6%
America-Caribbean	14.79	19.25	24.54	65.9%	6.166	9.324	9.962	61.6%	8.749	14.06	24.24	177.1%	7.866	11.85	14.94	89.9%
America-Central	16.6	25.49	44.59	168.6%	4.93	7.98	10.23	107.5%	8.714	14.24	23.18	166.0%	15.39	29.07	45.15	193.4%
America-North	186.1	301.7	384.6	106.7%	50.25	53.71	50.48	0.5%	97.11	160.5	240.6	147.8%	65.6	105.2	149.7	128.2%
America-South	145.4	213.3	357.2	145.7%	75.25	113.9	122.6	62.9%	78.14	111.2	185.3	137.1%	114.9	164.3	212.7	85.1%
Americas	362.9	559.7	810.9	123.4%	136.6	185	193.3	41.5%	192.7	300	473.4	145.7%	203.8	310.4	422.5	107.3%
Asia-East	378.6	551.5	640	69.0%	294.5	554.4	541.4	83.8%	478.8	647.1	1055	120.3%	235.3	359.9	443.5	88.5%
Asia-South Central	508.5	646.4	899.2	76.8%	273.6	589	749.1	173.8%	665.5	974.3	1721	158.6%	368.8	465.6	653.4	77.2%
Asia-South East	193.8	313.2	479.6	147.5%	101.1	177.6	226.8	124.3%	194.3	281	395.7	103.7%	82.79	127	172.7	108.6%
Asia-West	65.4	104.6	212.2	224.5%	32.49	66.91	109.1	235.8%	40.57	60.85	99.55	145.4%	37.41	67.55	128.5	243.5%
Oceania	13.1	22.29	30.13	130.0%	2.915	4.494	6.744	131.4%	7.906	13.65	21.84	176.2%	4.34	6.882	9.978	129.9%
Asia with Oceania	1159	1638	2261	95.1%	704.6	1392	1633	131.8%	1387	1977	3293	137.4%	728.6	1027	1408	93.2%
Europe-East	60.89	49.28	49.76	-18.3%	57.45	49.43	36.47	-36.5%	227.6	172.4	159.7	-29.8%	98.39	102	107.3	9.1%
Europe-North	41.75	53.16	57.56	37.9%	5.519	5.027	4.295	-22.2%	25.88	37.09	49.95	93.0%	11.64	14.29	17.2	47.8%
Europe-South	69.06	94.69	116.5	68.7%	13.41	11.34	8.793	-34.4%	30.56	46.65	66.66	118.1%	13.36	16.35	17.67	32.3%
Europe-West	80	117.8	123.3	54.1%	11.44	10.09	8.233	-28.0%	45.67	79.78	113.8	149.2%	27.73	35.82	41.53	49.8%
Europe	249.5	312.3	344.6	38.1%	86.5	74.75	56.9	-34.2%	325.8	330.9	384.6	18.0%	149.4	166.4	181.6	21.6%

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Deaths from Noncommunicable Diseases				Deaths from Injuries											
	Deaths from Other Noncom Diseases				Deaths from Road Traffic Accidents				Deaths from Other Unintentional Injuries				Deaths from Intentional Injuries			
	Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA																
Ethiopia	33.43	37	50.32	50.5%	20.22	49.41	113.8	462.8%	30.97	41.83	49.59	60.1%	22.78	35.55	45.3	98.9%
Tanzania, United Rep. of	14.21	21.63	28.4	99.9%	8.69	23.37	47.3	444.3%	16.21	24.76	27.5	69.6%	11.66	23.22	43.16	270.2%
Uganda	10.47	15.43	24.79	136.8%	7.906	21.51	54.15	584.9%	17.76	28.07	36.76	107.0%	13.26	29.72	47.43	257.7%
Kenya	12.12	20.81	37.47	209.2%	11.76	21.27	42.21	258.9%	16.67	27.23	37.63	125.7%	19.34	37.71	61.22	216.5%
Madagascar	6.873	11.86	25.02	264.0%	3.36	5.309	7.932	136.1%	4.299	8.114	14.88	246.1%	2.684	4.886	9.374	249.3%
Mozambique	11.46	9.149	11.93	4.1%	7.633	21.85	42.22	453.1%	12.8	15.51	19.06	48.9%	10.13	12.43	16.43	62.2%
Malawi	4.856	7.407	13.09	169.6%	1.396	2.789	5.916	323.8%	3.882	6.709	10.39	167.6%	1.883	3.846	7.333	289.4%
Zambia	5.997	6.764	11.81	96.9%	3.647	9.769	19.55	436.1%	8.159	10.94	15.29	87.4%	5.871	10.2	18.08	208.0%
Somalia	5.548	5.759	7.541	35.9%	1.324	2.531	5.636	325.7%	5.815	7.599	8.795	51.2%	9.028	14	19.7	118.2%
Rwanda	4.665	6.049	8.435	80.8%	3.447	6.894	10.79	213.0%	5.98	8.064	9.354	56.4%	4.021	7.322	10.25	154.9%
Zimbabwe	4.049	6.301	11.17	175.9%	3.199	4.845	6.375	99.3%	3.963	5.933	8.036	102.8%	5.596	9.146	12.48	123.0%
Burundi	3.4	5.931	7.871	131.5%	2.305	3.282	4.528	96.4%	4.049	6.826	9.902	144.6%	3.77	7.417	11.8	213.0%
Eritrea	1.797	2.444	3.687	105.2%	1.135	2.187	4.669	311.4%	2.227	4.037	6.089	173.4%	1.767	3.135	4.484	153.8%
Comoros	0.183	0.409	0.749	309.3%	0.087	0.141	0.235	170.1%	0.135	0.272	0.446	230.4%	0.082	0.171	0.283	245.1%
Djibouti	0.553	0.778	0.973	75.9%	0.354	0.439	0.62	75.1%	0.383	0.453	0.449	17.2%	0.118	0.14	0.14	18.6%
Mauritius	0.378	0.53	0.72	90.5%	0.186	0.214	0.183	-1.6%	0.22	0.284	0.344	56.4%	0.132	0.171	0.178	34.8%
Africa-Eastern	**120**	**158.2**	**244**	**103.3%**	**76.65**	**175.8**	**366.1**	**377.6%**	**133.5**	**196.6**	**254.5**	**90.6%**	**112.1**	**199.1**	**307.7**	**174.5%**
Congo, Democratic Rep. of	35.37	47.76	63.24	78.8%	19.18	31.66	56.44	194.3%	33.92	61.53	104.7	208.7%	40.18	95.5	192.5	379.1%
Angola	9.647	9.867	16.1	66.9%	8.284	24.59	35.91	333.5%	10.29	9.504	12.07	17.3%	7.026	15.56	31.33	345.9%
Cameroon	9.875	15.09	23.64	139.4%	6.505	11.43	18.51	184.6%	9.237	13.61	18.2	97.0%	6.045	10.29	15.42	155.1%
Chad	4.823	7.455	12.5	159.2%	2.68	5.411	10.64	297.0%	4.264	7.345	11.69	174.2%	3.671	7.487	12.69	245.7%
Central African Rep.	2.262	3.139	4.222	86.6%	1.808	2.706	4.397	143.2%	2.099	3.294	4.636	120.9%	2.854	5.176	7.379	158.5%
Congo, Rep. of	1.766	1.936	3.583	102.9%	1.58	4.143	5.657	258.0%	1.607	1.785	2.451	52.5%	1.798	3.329	5.307	195.2%
Gabon	0.515	0.846	1.653	221.0%	0.402	0.663	0.851	111.7%	0.492	0.662	1.044	112.2%	0.338	0.674	1.096	224.3%
Equatorial Guinea	0.406	0.532	0.863	112.6%	0.281	0.439	0.517	84.0%	0.381	0.396	0.663	74.0%	0.259	0.581	1.085	318.9%
São Tomé and Príncipe	0.046	0.063	0.11	139.1%	0.032	0.059	0.102	218.8%	0.06	0.092	0.124	106.7%	0.015	0.027	0.041	173.3%
Africa-Middle	**64.71**	**86.69**	**125.9**	**94.6%**	**40.75**	**81.09**	**133**	**226.4%**	**62.35**	**98.22**	**155.6**	**149.6%**	**62.19**	**138.6**	**266.9**	**329.2%**
Egypt, Arab Rep.	50.84	78.62	128.7	153.1%	15	25.53	35.87	139.1%	8.49	9.45	10.09	18.8%	1.865	2.878	3.885	108.3%
Sudan	22	28.46	49.2	123.6%	16.62	39.93	52.38	215.2%	16.47	16.26	15.83	-3.9%	25.79	33.72	52.74	104.5%
Algeria	9.141	19.18	42.81	368.3%	3.827	7.368	11.39	197.6%	4.703	8.644	17.53	272.7%	3.998	7.519	12.95	223.9%
Morocco	13.19	23.29	37.6	185.1%	5.726	10.8	16.25	183.8%	4.493	6.508	9.655	114.9%	1.03	1.511	2.14	107.8%
Tunisia	3.712	5.969	10.82	191.5%	1.909	3.37	4.646	143.4%	1.206	1.74	2.863	137.4%	0.321	0.499	0.761	137.1%
Libya	1.959	3.59	8.144	315.7%	0.915	1.698	2.272	148.3%	1.008	1.705	3.447	242.0%	0.291	0.549	0.836	187.3%
Africa-Northern	**100.8**	**159.1**	**277.3**	**175.1%**	**44**	**88.7**	**122.8**	**179.1%**	**36.37**	**44.3**	**59.42**	**63.4%**	**33.3**	**46.67**	**73.32**	**120.2%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Deaths from Noncommunicable Diseases				Deaths from Injuries											
	Deaths from Other Noncom Diseases				Deaths from Road Traffic Accidents				Deaths from Other Unintentional Injuries				Deaths from Intentional Injuries			
	Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA continued																
South Africa	12.28	17.76	24.03	95.7%	8.097	10.63	12.21	50.8%	5.979	6.995	9.248	54.7%	16.92	24.89	34.16	101.9%
Namibia	0.811	1.271	2.468	204.3%	0.74	1.444	1.794	142.4%	0.708	1.061	1.81	155.6%	0.711	1.357	2.215	211.5%
Lesotho	1.103	1.1	1.669	51.3%	1.024	1.474	1.957	91.1%	1.793	1.888	1.938	8.1%	1.346	1.529	1.644	22.1%
Botswana	0.856	1.069	1.84	115.0%	0.595	0.944	1.122	88.6%	0.965	1.059	1.573	63.0%	1	1.596	2.244	124.4%
Swaziland	0.601	0.714	1.097	82.5%	0.404	0.621	0.82	103.0%	0.779	1.057	1.345	72.7%	0.655	1.182	1.816	177.3%
Africa-Southern	**15.65**	**21.92**	**31.11**	**98.8%**	**10.86**	**15.11**	**17.91**	**64.9%**	**10.22**	**12.06**	**15.91**	**55.7%**	**20.63**	**30.56**	**42.08**	**104.0%**
Nigeria	82.26	90.49	135.9	65.2%	43.9	109.1	179.8	309.6%	64.37	78.94	99.24	54.2%	44.67	66.38	113.7	154.5%
Niger	5.1	8.814	15.72	208.2%	2.272	4.492	8.45	271.9%	3.909	8.226	16.49	321.8%	1.44	3.199	6.493	350.9%
Côte d'Ivoire	7.02	12.99	20.7	194.9%	3.199	5.714	10.31	222.3%	6.569	10.95	15.71	139.2%	8.222	15.03	21.25	158.5%
Burkina Faso	6.068	9.32	16.56	172.9%	3.043	5.887	11.63	282.2%	6.288	10.64	15.49	146.3%	2.81	5.31	8.171	190.8%
Ghana	10.54	12.82	19.53	85.3%	6.08	12.63	21.42	252.3%	8.372	11.55	14.64	74.9%	5.45	8.535	12.41	127.7%
Mali	6.164	5.94	10.36	68.1%	2.237	4.742	9.415	320.9%	5.17	8.298	12.27	137.3%	2.238	3.438	5.73	156.0%
Senegal	5.218	8.44	15.57	198.4%	2.426	4.328	7.525	210.2%	3.41	5.938	9.662	183.3%	2.116	4.134	6.708	217.0%
Guinea	3.687	5.178	9.554	159.1%	2.086	3.662	5.693	172.9%	3.484	5.45	8.779	152.0%	2.12	3.412	5.452	157.2%
Benin	3.061	5.164	9.275	203.0%	1.584	2.99	5.84	268.7%	2.395	4.161	6.065	153.2%	1.294	2.441	4.037	212.0%
Togo	1.833	4.124	8.433	360.1%	0.97	1.383	1.884	94.2%	1.279	2.32	3.822	198.8%	0.763	1.486	2.55	234.2%
Sierra Leone	2.275	3.068	4.49	97.4%	1.587	3.229	8.467	433.5%	2.178	3.281	4.34	99.3%	1.326	2.297	3.249	145.0%
Liberia	1.229	1.82	2.798	127.7%	0.562	1.213	2.767	392.3%	0.698	1.479	2.498	257.9%	0.472	1.202	1.953	313.8%
Mauritania	1.319	2.335	4.341	229.1%	0.739	1.204	1.737	135.0%	1.172	1.904	2.897	147.2%	0.675	1.177	1.78	163.7%
Gambia	0.685	0.99	1.94	183.2%	0.349	0.706	1.473	322.1%	0.568	0.944	1.445	154.4%	0.295	0.519	0.832	182.0%
Guinea-Bissau	0.84	1.268	2.114	151.7%	0.516	0.746	0.989	91.7%	0.821	1.291	2.011	144.9%	0.462	0.775	1.216	163.2%
Cape Verde	0.174	0.219	0.465	167.2%	0.067	0.133	0.201	200.0%	0.104	0.138	0.242	132.7%	0.067	0.101	0.165	146.3%
Africa-Western	**137.5**	**173**	**277.7**	**102.0%**	**71.61**	**162.2**	**277.6**	**287.7%**	**110.8**	**155.5**	**215.6**	**94.6%**	**74.43**	**119.4**	**195.7**	**162.9%**

Health

	Deaths from Noncommunicable Diseases				Deaths from Injuries											
	Deaths from Other Noncom Diseases				Deaths from Road Traffic Accidents				Deaths from Other Unintentional Injuries				Deaths from Intentional Injuries			
Base Case: Countries in Year 2060	Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands				Annual Deaths in Thousands			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS																
Haiti	3.378	4.677	6.603	95.5%	0.557	0.869	1.303	133.9%	2.507	3.441	4.331	72.8%	1.653	2.895	3.636	120.0%
Dominican Rep.	2.215	2.547	3.917	76.8%	3.639	5.669	6.137	68.6%	1.401	1.858	3.509	150.5%	1.902	3.134	4.569	140.2%
Cuba	2.614	2.243	0.649	-75.2%	0.912	1.589	1.338	46.7%	3.473	6.857	13.64	292.7%	1.79	2.056	2.158	20.6%
Puerto Rico	4.487	6.698	8.603	91.7%	0.405	0.414	0.362	-10.6%	0.673	0.916	1.265	88.0%	0.646	0.842	0.964	49.2%
Jamaica	0.94	1.316	2.039	116.9%	0.379	0.488	0.568	49.9%	0.389	0.55	0.835	114.7%	1.352	2.264	2.86	111.5%
Trinidad and Tobago	0.689	0.921	1.411	104.8%	0.188	0.191	0.155	-17.6%	0.18	0.236	0.387	115.0%	0.426	0.521	0.573	34.5%
Bahamas	0.115	0.265	0.456	296.5%	0.036	0.044	0.042	16.7%	0.058	0.107	0.157	170.7%	0.034	0.049	0.072	111.8%
Barbados	0.194	0.364	0.5	157.7%	0.013	0.015	0.012	-7.7%	0.015	0.022	0.025	66.7%	0.012	0.017	0.018	50.0%
Saint Lucia	0.068	0.084	0.137	101.5%	0.024	0.027	0.026	8.3%	0.02	0.025	0.028	40.0%	0.036	0.048	0.053	47.2%
Grenada	0.041	0.061	0.119	190.2%	0.007	0.007	0.008	14.3%	0.017	0.025	0.034	100.0%	0.002	0.003	0.006	200.0%
Saint Vincent and the Grenadines	0.046	0.071	0.109	137.0%	0.007	0.01	0.011	57.1%	0.018	0.026	0.032	77.8%	0.013	0.021	0.028	115.4%
America-Caribbean	**14.79**	**19.25**	**24.54**	**65.9%**	**6.166**	**9.324**	**9.962**	**61.6%**	**8.749**	**14.06**	**24.24**	**177.1%**	**7.866**	**11.85**	**14.94**	**89.9%**
Guatemala	4.27	6	10.91	155.5%	0.58	1.076	1.586	173.4%	4.128	6.845	10.57	156.1%	7.278	15.21	26.31	261.5%
Honduras	2.648	4.26	7.981	201.4%	0.779	1.253	1.742	123.6%	1.104	1.563	2.396	117.0%	1.708	3.502	5.633	229.8%
Nicaragua	2.397	4.285	7.617	217.8%	0.676	1.082	1.475	118.2%	1.034	1.686	2.727	163.7%	1.168	1.654	2.04	74.7%
El Salvador	4.358	5.959	9.39	115.5%	1.771	2.672	3.345	88.9%	1.18	1.782	2.669	126.2%	3.978	6.674	8.56	115.2%
Costa Rica	1.458	2.65	4.495	208.3%	0.645	1.025	1.065	65.1%	0.777	1.735	3.707	377.1%	0.607	0.965	1.198	97.4%
Panama	1.394	2.195	3.867	177.4%	0.425	0.778	0.886	108.5%	0.441	0.555	0.96	117.7%	0.62	0.985	1.291	108.2%
Belize	0.076	0.139	0.328	331.6%	0.052	0.095	0.128	146.2%	0.048	0.075	0.148	208.3%	0.036	0.075	0.119	230.6%
America-Central	**16.6**	**25.49**	**44.59**	**168.6%**	**4.93**	**7.98**	**10.23**	**107.5%**	**8.714**	**14.24**	**23.18**	**166.0%**	**15.39**	**29.07**	**45.15**	**193.4%**
United States of America	131.3	206.2	227	72.9%	37.93	38.33	35.24	-7.1%	73.89	117.6	166.1	124.8%	45.93	72.25	105.7	130.1%
Mexico	42.3	73.47	130.6	208.7%	9.554	12.52	12.57	31.6%	16.54	29.53	52.85	219.5%	15.51	27.03	35.8	130.8%
Canada	12.47	22.03	26.98	116.4%	2.761	2.853	2.667	-3.4%	6.682	13.38	21.65	224.0%	4.159	5.879	8.219	97.6%
America-North	**186.1**	**301.7**	**384.6**	**106.7%**	**50.25**	**53.71**	**50.48**	**0.5%**	**97.11**	**160.5**	**240.6**	**147.8%**	**65.6**	**105.2**	**149.7**	**128.2%**
Brazil	67.71	91.75	145.6	115.0%	42.53	56.97	55.64	30.8%	35.74	53.47	97.28	172.2%	63.69	83.32	102.7	61.2%
Colombia	17.02	29.78	55.88	228.3%	7.808	15.49	19.07	144.2%	6.396	8.707	13.17	105.9%	26.77	41.97	56.49	111.0%
Argentina	19.47	26.64	40.5	108.0%	4.083	4.887	4.628	13.3%	7.99	9.993	14.94	87.0%	5.014	7.539	10.48	109.0%
Peru	12.38	20.78	42.92	246.7%	4.557	9.807	12.18	167.3%	11.07	13.89	20.96	89.3%	1.524	2.535	3.518	130.8%
Venezuela (Bolivarian Rep. of)	8.434	12.66	19.99	137.0%	8.161	13.05	15.07	84.7%	4.049	6.341	11.53	184.8%	9.277	14.79	19.79	113.3%
Ecuador	4.338	6.804	12.52	188.6%	2.323	3.986	4.734	103.8%	3.64	5.603	8.734	139.9%	3.333	5.739	8.131	144.0%
Chile	6.164	10.04	14.21	130.5%	2.01	2.897	2.854	42.0%	2.643	4.472	7.292	175.9%	2.668	3.861	5.062	89.7%
Bolivia (Plurinational State of)	5.249	8.743	16.63	216.8%	1.827	3.821	4.985	172.9%	4.376	5.691	7.076	61.7%	0.619	1.213	1.813	192.9%
Paraguay	2.364	3.587	6.062	156.4%	1.451	2.382	2.827	94.8%	1.276	1.893	2.731	114.0%	1.13	2.172	3.259	188.4%
Uruguay	1.751	1.838	1.891	8.0%	0.258	0.324	0.317	22.9%	0.699	0.872	1.235	76.7%	0.531	0.732	0.95	78.9%
Guyana	0.244	0.306	0.451	84.8%	0.126	0.183	0.196	55.6%	0.151	0.175	0.213	41.1%	0.194	0.24	0.234	20.6%
Suriname	0.255	0.364	0.582	128.2%	0.12	0.141	0.111	-7.5%	0.116	0.135	0.168	44.8%	0.161	0.214	0.238	47.8%
America-South	**145.4**	**213.3**	**357.2**	**145.7%**	**75.25**	**113.9**	**122.6**	**62.9%**	**78.14**	**111.2**	**185.3**	**137.1%**	**114.9**	**164.3**	**212.7**	**85.1%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Deaths from Noncommunicable Diseases: Deaths from Other Noncom Diseases (Annual Deaths in Thousands)				Deaths from Injuries: Deaths from Road Traffic Accidents (Annual Deaths in Thousands)				Deaths from Injuries: Deaths from Other Unintentional Injuries (Annual Deaths in Thousands)				Deaths from Injuries: Deaths from Intentional Injuries (Annual Deaths in Thousands)			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA																
China	261.5	316.6	360.2	37.7%	274.8	531.4	520.3	89.3%	430.6	559.6	942.7	118.9%	186.6	299.1	381.1	104.2%
Japan	57.23	109.5	119.1	108.1%	6.572	6.208	4.872	-25.9%	33.1	59.46	70.04	111.6%	30.43	33.55	32.56	7.0%
Korea, Rep. of	10.58	20.74	25.02	136.5%	8.029	10.39	9.026	12.4%	9.61	21.14	34.39	257.9%	13.14	21.11	23.44	78.4%
Korea, Dem. People's Rep. of	9.521	11.83	13.34	40.1%	2.375	3.537	4.63	94.9%	4.331	5.751	6.858	58.3%	3.648	4.496	4.37	19.8%
Taiwan, China	29.06	69.66	88.91	206.0%	1.731	1.327	0.964	-44.3%	0.472	0.393	0.302	-36.0%	0.791	0.865	0.904	14.3%
Hong Kong SAR, China	9.921	22.14	32.26	225.2%	0.205	0.208	0.199	-2.9%	0.078	0.068	0.078	0.0%	0.16	0.193	0.24	50.0%
Mongolia	0.776	0.949	1.206	55.4%	0.726	1.339	1.398	92.6%	0.622	0.674	0.681	9.5%	0.478	0.612	0.86	79.9%
Asia-East	**378.6**	**551.5**	**640**	**69.0%**	**294.5**	**554.4**	**541.4**	**83.8%**	**478.8**	**647.1**	**1055**	**120.3%**	**235.3**	**359.9**	**443.5**	**88.5%**
India	367.6	468.8	661	79.8%	190.8	446.7	542.8	184.5%	484	705.7	1283	165.1%	266	301.9	420.4	58.0%
Pakistan	37.06	48.42	52.69	42.2%	14.12	27.6	53.89	281.7%	48.73	88.77	163.1	234.7%	24.3	43.49	68.03	180.0%
Bangladesh	28.81	38.35	44.2	53.4%	16.25	24.45	32.95	102.8%	51.34	77.39	123.8	141.1%	22.41	33.57	42.79	90.9%
Afghanistan	25.24	33.49	50.1	98.5%	8.998	19.47	36.06	300.8%	19.35	27.39	33.76	74.5%	20.66	38.54	62.88	204.4%
Iran, Islamic Rep. of	21.33	27	52.95	148.2%	31.64	50.84	58.02	83.4%	27.07	36.97	69.34	156.2%	5.592	6.866	8.155	45.8%
Nepal	5.505	8.784	15.11	174.5%	2.309	3.891	6.602	185.9%	6.098	10.01	16.77	175.0%	3.694	6.07	8.113	119.6%
Uzbekistan	7.175	5.705	6.841	-4.7%	3.497	7.527	9.622	175.2%	6.349	6.784	7.237	14.0%	2.876	3.445	4.434	54.2%
Sri Lanka	6.698	8.289	6.958	3.9%	1.307	2.554	2.996	129.2%	5.213	6.179	6.286	20.6%	14.66	20.4	24.17	64.9%
Kazakhstan	4.669	2.713	2.352	-49.6%	2.963	3.206	2.554	-13.8%	12	8.605	8.768	-26.9%	6.551	8.321	10.14	54.8%
Tajikistan	1.763	2.21	2.951	67.4%	0.292	0.506	0.735	151.7%	1.842	2.663	3.184	72.9%	0.233	0.419	0.613	163.1%
Kyrgyz Rep.	1.379	1.868	2.58	87.1%	0.878	1.293	1.766	101.1%	1.575	2.545	3.156	100.4%	0.702	1.118	1.43	103.7%
Turkmenistan	1.034	0.472	0.929	-10.2%	0.406	0.726	0.817	101.2%	1.493	0.736	1.376	-7.8%	0.915	1.283	1.967	115.0%
Bhutan	0.112	0.105	0.105	-6.3%	0.101	0.217	0.301	198.0%	0.33	0.417	0.756	129.1%	0.137	0.198	0.302	120.4%
Maldives	0.092	0.159	0.364	295.7%	0.006	0.008	0.007	16.7%	0.04	0.066	0.137	242.5%	0.005	0.005	0.005	0.0%
Asia-South Central	**508.5**	**646.4**	**899.2**	**76.8%**	**273.6**	**589**	**749.1**	**173.8%**	**665.5**	**974.3**	**1721**	**158.6%**	**368.8**	**465.6**	**653.4**	**77.2%**
Indonesia	52.76	84.41	136.7	159.1%	36.37	72.57	86.3	137.3%	44.35	71	118.4	167.0%	31.89	47.6	67.15	110.6%
Philippines	26.67	55.42	100.2	275.7%	6.362	13.36	21.54	238.6%	9.7	15.65	23.01	137.2%	16.57	33.51	50.33	203.7%
Vietnam	18.55	23.33	32.9	77.4%	17.23	34.09	52.33	203.7%	19.82	33.8	63.3	219.4%	5.443	8.323	12.9	137.0%
Thailand	69.84	102.6	135.2	93.6%	27.92	33.17	27.82	-0.4%	25.38	35.95	51.12	101.4%	17.98	21.98	22.36	24.4%
Myanmar	9.852	15.34	18.21	84.8%	3.457	6.457	14.26	312.5%	87.34	113	119.2	36.5%	5.521	7.575	8.743	58.4%
Malaysia	7.63	17.55	32.22	322.3%	6.51	11.12	14.36	120.6%	2.497	4.89	9.983	299.8%	0.615	1.247	2.181	254.6%
Cambodia	5.618	8.449	12.77	127.3%	1.957	3.804	5.73	192.8%	2.46	2.674	3.544	44.1%	3.044	4.068	4.898	60.9%
Lao People's Democratic Rep.	1.029	0.907	0.915	-11.1%	0.822	2.328	3.459	320.8%	2.185	2.9	5.052	131.2%	1.032	1.475	2.431	135.6%
Singapore	1.518	4.657	9.493	525.4%	0.275	0.402	0.446	62.2%	0.33	0.689	1.26	281.8%	0.53	0.952	1.238	133.6%
Timor-Leste	0.237	0.259	0.437	84.4%	0.099	0.212	0.483	387.9%	0.253	0.437	0.765	202.4%	0.144	0.211	0.377	161.8%
Brunei Darussalam	0.133	0.33	0.529	297.7%	0.07	0.081	0.068	-2.9%	0.021	0.025	0.036	71.4%	0.028	0.041	0.057	103.6%
Asia-South Eastern	**193.8**	**313.2**	**479.6**	**147.5%**	**101.1**	**177.6**	**226.8**	**124.3%**	**194.3**	**281**	**395.7**	**103.7%**	**82.79**	**127**	**172.7**	**108.6%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Deaths from Noncommunicable Diseases: Deaths from Other Noncom Diseases – Annual Deaths in Thousands				Deaths from Injuries: Deaths from Road Traffic Accidents – Annual Deaths in Thousands				Deaths from Injuries: Deaths from Other Unintentional Injuries – Annual Deaths in Thousands				Deaths from Injuries: Deaths from Intentional Injuries – Annual Deaths in Thousands			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA continued																
Turkey	14.25	15.31	17.55	23.2%	6.438	9.481	10.9	69.3%	10.76	16.45	28.27	162.7%	4.278	6.418	8.854	107.0%
Iraq	8.955	13.46	26.36	194.4%	6.172	18.43	36.57	492.5%	5.064	8.532	16.43	224.4%	23.26	45.04	94.25	305.2%
Yemen, Rep. of	9.77	14.6	31.94	226.9%	7.109	16.34	29.49	314.8%	7.27	11.18	17.42	139.6%	3.876	6.411	10.94	182.2%
Saudi Arabia	7.444	16.4	39.61	432.1%	4.258	7.018	7.486	75.8%	6.519	7.633	9.268	42.2%	1.848	2.622	3.672	98.7%
Syrian Arab Rep.	8.516	14.95	26.97	216.7%	2.169	4.332	7.332	238.0%	3.61	6.171	10.39	187.8%	0.439	0.839	1.286	192.9%
Jordan	2.156	3.193	6.636	207.8%	1.215	2.421	3.746	208.3%	0.912	1.379	2.309	153.2%	0.306	0.623	1.028	235.9%
Israel	4.344	7.842	12.56	189.1%	0.278	0.358	0.366	31.7%	1.024	2.178	4.171	307.3%	0.716	1.376	2.2	207.3%
Palestine	1.448	3.136	7.116	391.4%	0.648	1.245	2.949	355.1%	0.893	1.777	2.818	215.6%	0.674	1.507	3.069	355.3%
Azerbaijan	2.301	2.728	3.928	70.7%	0.509	0.865	0.884	73.7%	1.461	1.447	1.668	14.2%	0.448	0.671	0.817	82.4%
United Arab Emirates	0.384	2.525	13.14	3321.9%	0.843	2.124	4.149	392.2%	0.194	0.387	0.426	119.6%	0.077	0.138	0.091	18.2%
Kuwait	0.39	1.069	5.141	1218.2%	0.361	0.7	1.04	188.1%	0.195	0.296	0.941	382.6%	0.064	0.13	0.173	170.3%
Lebanon	1.879	2.693	4.356	131.8%	1.11	1.622	2.027	82.6%	0.812	1.175	1.951	140.3%	0.496	0.731	1	101.6%
Oman	0.553	1.451	5.147	830.7%	0.215	0.314	0.67	211.6%	0.317	0.373	0.883	178.5%	0.107	0.131	0.187	74.8%
Armenia	1.497	2.008	2.438	62.9%	0.304	0.379	0.372	22.4%	0.629	0.837	1.03	63.8%	0.157	0.216	0.24	52.9%
Georgia	0.682	0.518	0.459	-32.7%	0.362	0.352	0.291	-19.6%	0.58	0.526	0.488	-15.9%	0.53	0.508	0.505	-4.7%
Qatar	0.225	1.038	4.85	2055.6%	0.312	0.679	0.63	101.9%	0.153	0.156	0.502	228.1%	0.053	0.083	0.045	-15.1%
Bahrain	0.22	0.972	2.843	1192.3%	0.112	0.166	0.163	45.5%	0.007	0.013	0.046	557.1%	0.051	0.066	0.07	37.3%
Cyprus	0.393	0.748	1.171	198.0%	0.072	0.077	0.072	0.0%	0.168	0.332	0.54	221.4%	0.032	0.043	0.046	43.8%
Asia-West	**65.4**	**104.6**	**212.2**	**224.5%**	**32.49**	**66.91**	**109.1**	**235.8%**	**40.57**	**60.85**	**99.55**	**145.4%**	**37.41**	**67.55**	**128.5**	**243.5%**
Australia	8.72	15.18	20.75	138.0%	1.468	1.519	1.456	-0.8%	4.326	7.909	13.23	205.8%	2.079	3.158	4.602	121.4%
Papua New Guinea	1.904	2.888	4	110.1%	0.953	2.431	4.731	396.4%	2.372	3.71	5.566	134.7%	1.683	2.858	4.191	149.0%
New Zealand	1.493	2.531	2.744	83.8%	0.408	0.403	0.356	-12.7%	0.791	1.499	2.415	205.3%	0.504	0.732	0.968	92.1%
Solomon Islands	0.229	0.441	0.869	279.5%	0.032	0.063	0.094	193.8%	0.12	0.179	0.259	115.8%	0.02	0.041	0.079	295.0%
Fiji	0.474	0.767	0.943	98.9%	0.024	0.028	0.027	12.5%	0.195	0.21	0.182	-6.7%	0.029	0.046	0.058	100.0%
Vanuatu	0.091	0.185	0.354	289.0%	0.011	0.02	0.033	200.0%	0.038	0.06	0.081	113.2%	0.008	0.018	0.035	337.5%
Micronesia (Federated States of)	0.051	0.093	0.166	225.5%	0.007	0.011	0.016	128.6%	0.024	0.033	0.042	75.0%	0.004	0.008	0.015	275.0%
Tonga	0.056	0.089	0.146	160.7%	0.004	0.008	0.016	300.0%	0.016	0.025	0.032	100.0%	0.004	0.009	0.016	300.0%
Samoa	0.08	0.115	0.158	97.5%	0.007	0.011	0.015	114.3%	0.024	0.028	0.028	16.7%	0.006	0.01	0.016	166.7%
Oceania	**13.1**	**22.29**	**30.13**	**130.0%**	**2.915**	**4.494**	**6.744**	**131.4%**	**7.906**	**13.65**	**21.84**	**176.2%**	**4.34**	**6.882**	**9.978**	**129.9%**

Health

Base Case: Countries in Year 2060 Descending Population Sequence	Deaths from Noncommunicable Diseases: Deaths from Other Noncom Diseases, Annual Deaths in Thousands 2010	2035	2060	% Chg	Deaths from Injuries: Deaths from Road Traffic Accidents, Annual Deaths in Thousands 2010	2035	2060	% Chg	Deaths from Injuries: Deaths from Other Unintentional Injuries, Annual Deaths in Thousands 2010	2035	2060	% Chg	Deaths from Injuries: Deaths from Intentional Injuries, Annual Deaths in Thousands 2010	2035	2060	% Chg
EUROPE																
Russian Federation	27.97	17.6	16.16	-42.2%	34.18	29.38	21.47	-37.2%	155.4	104.8	94.72	-39.0%	67.27	68.96	74.07	10.1%
Ukraine	7.393	3.122	2.048	-72.3%	8.638	7.319	5.283	-38.8%	33.91	24.94	19.29	-43.1%	11.79	11.2	11.3	-4.2%
Poland	10.06	12.83	15.52	54.3%	5.625	4.947	3.752	-33.3%	11.23	14.25	17.66	57.3%	6.292	7.135	6.887	9.5%
Romania	3.922	3.891	4.102	4.6%	2.839	2.551	2.017	-29.0%	6.357	6.518	5.793	-8.9%	2.768	3.17	3.066	10.8%
Czech Rep.	2.399	3.466	4.165	73.6%	0.911	0.771	0.598	-34.4%	3.434	5.182	6.432	87.3%	1.609	2.036	2.293	42.5%
Belarus	2.259	1.698	1.484	-34.3%	1.931	1.665	1.221	-36.8%	9.238	7.32	5.804	-37.2%	3.481	3.698	3.846	10.5%
Hungary	2.939	2.584	2.103	-28.4%	1.19	0.982	0.713	-40.1%	3.273	4.256	5.064	54.7%	2.589	2.949	2.985	15.3%
Bulgaria	1.886	1.686	1.492	-20.9%	0.925	0.679	0.487	-47.4%	1.453	1.291	1.121	-22.8%	1.068	1.115	1.13	5.8%
Slovak Rep.	1.129	1.466	1.792	58.7%	0.697	0.66	0.507	-27.3%	1.448	1.736	1.913	32.1%	0.653	0.836	0.842	28.9%
Moldova, Rep. of	0.935	0.935	0.891	-4.7%	0.515	0.474	0.431	-16.3%	1.868	2.091	1.909	2.2%	0.872	0.947	0.87	-0.2%
Europe-East	**60.89**	**49.28**	**49.76**	**-18.3%**	**57.45**	**49.43**	**36.47**	**-36.5%**	**227.6**	**172.4**	**159.7**	**-29.8%**	**98.39**	**102**	**107.3**	**9.1%**
United Kingdom	29.13	37.9	41.39	42.1%	2.983	2.727	2.401	-19.5%	12.3	18.41	26.67	116.8%	5.188	6.45	8.064	55.4%
Sweden	3.336	3.757	2.762	-17.2%	0.414	0.392	0.341	-17.6%	2.737	4.513	6.231	127.7%	1.303	1.647	2.004	53.8%
Denmark	2.699	3.611	3.476	28.8%	0.295	0.275	0.237	-19.7%	1.501	2.519	3.44	129.2%	0.733	0.951	1.152	57.2%
Ireland	1.449	2.474	4.002	176.2%	0.251	0.278	0.276	10.0%	0.822	1.245	1.97	139.7%	0.423	0.63	0.871	105.9%
Norway	1.956	2.825	3.922	100.5%	0.24	0.242	0.222	-7.5%	1.525	2.597	4.094	168.5%	0.51	0.697	0.928	82.0%
Finland	1.266	0.756	0.134	-89.4%	0.336	0.338	0.281	-16.4%	2.564	3.622	3.965	54.6%	1.105	1.281	1.496	35.4%
Lithuania	0.755	0.7	0.652	-13.6%	0.537	0.402	0.273	-49.2%	2.564	2.461	1.998	-22.1%	1.398	1.569	1.579	12.9%
Latvia	0.723	0.713	0.765	5.8%	0.305	0.247	0.175	-42.6%	1.081	1.015	0.882	-18.4%	0.617	0.686	0.701	13.6%
Estonia	0.363	0.346	0.38	4.7%	0.141	0.107	0.073	-48.2%	0.734	0.595	0.508	-30.8%	0.328	0.331	0.347	5.8%
Iceland	0.067	0.079	0.079	17.9%	0.017	0.018	0.016	-5.9%	0.058	0.112	0.199	243.1%	0.038	0.052	0.063	65.8%
Europe-North	**41.75**	**53.16**	**57.56**	**37.9%**	**5.519**	**5.027**	**4.295**	**-22.2%**	**25.88**	**37.09**	**49.95**	**93.0%**	**11.64**	**14.29**	**17.2**	**47.8%**
Italy	30.16	40.54	46.78	55.1%	5.364	4.266	3.191	-40.5%	14.66	24.27	36.4	148.3%	4.482	5.249	5.505	22.8%
Spain	22.67	32.58	42.76	88.6%	3.008	2.536	1.931	-35.8%	7.763	11.41	16.71	115.3%	3.763	4.754	5.249	39.5%
Greece	3.861	5.41	7.567	96.0%	1.603	1.331	1.059	-33.9%	1.589	1.867	2.015	26.8%	0.497	0.59	0.678	36.4%
Portugal	5.563	8.144	10.7	92.3%	1.389	1.182	0.939	-32.4%	1.75	2.568	3.391	93.8%	1.491	1.922	2.136	43.3%
Serbia	2.466	2.502	2.683	8.8%	0.704	0.681	0.565	-19.7%	0.988	1.071	1.22	23.5%	1.056	1.3	1.473	39.5%
Croatia	1.234	1.455	1.448	17.3%	0.541	0.438	0.32	-40.9%	1.337	2.085	2.687	101.0%	0.743	0.897	0.919	23.7%
Bosnia and Herzegovina	0.926	1.06	1.149	24.1%	0.201	0.266	0.219	9.0%	0.619	0.657	0.728	17.6%	0.382	0.453	0.45	17.8%
Albania	0.821	1.037	1.249	52.1%	0.206	0.291	0.295	43.2%	0.573	0.588	0.676	18.0%	0.229	0.278	0.29	26.6%
Macedonia, TFYR	0.534	0.668	0.736	37.8%	0.106	0.106	0.092	-13.2%	0.266	0.388	0.502	88.7%	0.16	0.212	0.237	48.1%
Slovenia	0.554	0.853	1.006	81.6%	0.219	0.18	0.131	-40.2%	0.869	1.503	2.025	133.0%	0.436	0.549	0.57	30.7%
Montenegro	0.113	0.158	0.179	58.4%	0.056	0.049	0.041	-26.8%	0.069	0.086	0.091	31.9%	0.097	0.126	0.141	45.4%
Malta	0.158	0.273	0.282	78.5%	0.011	0.011	0.01	-9.1%	0.082	0.166	0.211	157.3%	0.021	0.026	0.025	19.0%
Europe-South	**69.06**	**94.69**	**116.5**	**68.7%**	**13.41**	**11.34**	**8.793**	**-34.4%**	**30.56**	**46.65**	**66.66**	**118.1%**	**13.36**	**16.35**	**17.67**	**32.3%**
Germany	31.24	46.24	51.57	65.1%	4.806	4.022	3.18	-33.8%	15.33	25.44	34.85	127.3%	10.64	13.31	14.65	37.7%
France	30.76	44.37	42.93	39.6%	3.929	3.572	3.009	-23.4%	20.43	36.31	52.44	156.7%	10.68	14.17	17.17	60.8%
Netherlands	7.269	12.09	12.61	73.5%	0.72	0.72	0.597	-17.1%	3	6.217	9.152	205.1%	1.604	2.061	2.452	52.9%
Belgium	4.581	6.717	7.383	61.2%	1.005	0.87	0.711	-29.3%	2.766	4.597	6.433	132.6%	2.082	2.569	3.089	48.4%
Switzerland	2.514	3.353	2.85	13.4%	0.335	0.336	0.287	-14.3%	1.86	3.389	5.274	183.5%	1.311	1.861	2.133	62.7%
Austria	3.515	4.817	5.556	58.1%	0.613	0.535	0.418	-31.8%	2.168	3.607	5.212	140.4%	1.346	1.749	1.877	39.5%
Luxembourg	0.126	0.218	0.355	181.7%	0.034	0.034	0.031	-8.8%	0.115	0.217	0.391	240.0%	0.068	0.107	0.155	127.9%
Europe-West	**80**	**117.8**	**123.3**	**54.1%**	**11.44**	**10.09**	**8.233**	**-28.0%**	**45.67**	**79.78**	**113.8**	**149.2%**	**27.73**	**35.82**	**41.53**	**49.8%**

Education

Base Case

Source: International Futures Model Version 6.61, Jan 2013

	Literacy				Years of Education, Female Adults 25+				Years of Education, Male Adults 25+				Primary Enrollment Rate, Net			
	Percent of Population 15 and Older				Number of Years Completed				Number of Years Completed				Percent of Primary Age Chlidren Enrolled			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	**81.84**	**93.63**	**98.98**	**20.9%**	**6.278**	**7.74**	**9.5**	**51.3%**	**7.516**	**8.722**	**10.12**	**34.6%**	**88.57**	**96.25**	**99.31**	**12.1%**
Africa	**62.27**	**87.37**	**97.77**	**57.0%**	**3.846**	**5.569**	**8.006**	**108.2%**	**5.265**	**6.465**	**8.294**	**57.5%**	**73.58**	**88.55**	**97.75**	**32.8%**
Americas	**94.21**	**97.53**	**99.76**	**5.9%**	**9.346**	**10.92**	**12.21**	**30.6%**	**9.511**	**10.92**	**12.11**	**27.3%**	**93.41**	**99.37**	**99.83**	**6.9%**
Asia with Oceania	**80.85**	**94.02**	**99.24**	**22.7%**	**5.513**	**7.14**	**9.032**	**63.8%**	**7.101**	**8.49**	**10.07**	**41.8%**	**90.21**	**97.68**	**99.83**	**10.7%**
Europe	**99.26**	**99.92**	**100**	**0.7%**	**10.11**	**12.14**	**13.87**	**37.2%**	**10.47**	**12.31**	**13.74**	**31.2%**	**94.28**	**100**	**99.99**	**6.1%**
World	**81.84**	**93.63**	**98.98**	**20.9%**	**6.278**	**7.74**	**9.5**	**51.3%**	**7.516**	**8.722**	**10.12**	**34.6%**	**88.57**	**96.25**	**99.31**	**12.1%**
Africa-Eastern	**61.3**	**86.34**	**97.52**	**59.1%**	**3.174**	**4.781**	**7.401**	**133.2%**	**4.508**	**5.694**	**7.842**	**74.0%**	**84.99**	**92.89**	**99.63**	**17.2%**
Africa-Middle	**65.55**	**86.62**	**96.31**	**46.9%**	**4.761**	**6.428**	**8.668**	**82.1%**	**5.321**	**6.21**	**7.857**	**47.7%**	**46.32**	**69.96**	**87.03**	**87.9%**
Africa-Northern	**67.88**	**90.47**	**99.24**	**46.2%**	**4.537**	**7.051**	**9.286**	**104.7%**	**6.621**	**8.526**	**10.27**	**55.1%**	**82.31**	**96.88**	**99.96**	**21.4%**
Africa-Southern	**88.55**	**95.59**	**100**	**12.9%**	**8.011**	**9.826**	**11.81**	**47.4%**	**8.157**	**10.17**	**12.15**	**49.0%**	**83.92**	**99.18**	**99.83**	**19.0%**
Africa-Western	**53.11**	**86.18**	**97.91**	**84.4%**	**2.917**	**4.76**	**7.517**	**157.7%**	**4.563**	**5.875**	**7.845**	**71.9%**	**64.9**	**86.2**	**99.45**	**53.2%**
Africa	**62.27**	**87.37**	**97.77**	**57.0%**	**3.846**	**5.569**	**8.006**	**108.2%**	**5.265**	**6.465**	**8.294**	**57.5%**	**73.58**	**88.55**	**97.75**	**32.8%**
America-Caribbean	**82.08**	**90.43**	**96.61**	**17.7%**	**7.071**	**8.147**	**9.752**	**37.9%**	**8.279**	**9.454**	**11.02**	**33.1%**	**81.9**	**90.93**	**96.11**	**17.4%**
America-Central	**82.16**	**91.45**	**98.44**	**19.8%**	**5.815**	**8.152**	**9.671**	**66.3%**	**6.606**	**8.381**	**9.698**	**46.8%**	**93.57**	**97.39**	**99.89**	**6.8%**
America-North	**98.43**	**99.35**	**100**	**1.6%**	**11.37**	**12.38**	**13.44**	**18.2%**	**11.5**	**12.26**	**13.18**	**14.6%**	**93.89**	**99.99**	**99.99**	**6.5%**
America-South	**91.91**	**96.96**	**100**	**8.8%**	**7.631**	**9.907**	**11.38**	**49.1%**	**7.668**	**9.871**	**11.33**	**47.8%**	**94.02**	**99.76**	**99.99**	**6.3%**
Americas	**94.21**	**97.53**	**99.76**	**5.9%**	**9.346**	**10.92**	**12.21**	**30.6%**	**9.511**	**10.92**	**12.11**	**27.3%**	**93.41**	**99.37**	**99.83**	**6.9%**
Asia-East	**94.87**	**97.98**	**100**	**5.4%**	**7.34**	**8.694**	**10.33**	**40.7%**	**8.61**	**9.749**	**11.24**	**30.5%**	**94.24**	**99.78**	**99.97**	**6.1%**
Asia-South Central	**63.3**	**89.88**	**98.57**	**55.7%**	**3.605**	**5.442**	**7.801**	**116.4%**	**5.782**	**7.353**	**9.218**	**59.4%**	**86.25**	**95.96**	**99.7**	**15.6%**
Asia-South East	**92.31**	**98**	**99.93**	**8.3%**	**5.936**	**8.395**	**10.12**	**70.5%**	**6.741**	**8.774**	**10.22**	**51.6%**	**91.95**	**98.52**	**99.94**	**8.7%**
Asia-West	**85.77**	**93.71**	**99.39**	**15.9%**	**5.531**	**7.712**	**9.574**	**73.1%**	**7.098**	**8.979**	**10.51**	**48.1%**	**89.08**	**97.9**	**99.96**	**12.2%**
Oceania	**91.48**	**96.23**	**99.38**	**8.6%**	**10.28**	**11.36**	**12.71**	**23.6%**	**10.41**	**11.64**	**12.88**	**23.7%**	**83.16**	**92.69**	**99.87**	**20.1%**
Asia with Oceania	**80.85**	**94.02**	**99.24**	**22.7%**	**5.513**	**7.14**	**9.032**	**63.8%**	**7.101**	**8.49**	**10.07**	**41.8%**	**90.21**	**97.68**	**99.83**	**10.7%**
Europe-East	**99.4**	**100**	**100**	**0.6%**	**10.11**	**11.98**	**13.47**	**33.2%**	**10.38**	**12.18**	**13.34**	**28.5%**	**89.53**	**100**	**99.99**	**11.7%**
Europe-North	**99.98**	**100**	**100**	**0.0%**	**10.15**	**12.66**	**14.64**	**44.2%**	**9.828**	**12.29**	**14.19**	**44.4%**	**97.08**	**99.98**	**100**	**3.0%**
Europe-South	**97.56**	**99.62**	**100**	**2.5%**	**9.219**	**11.61**	**13.44**	**45.8%**	**9.828**	**12**	**13.57**	**38.1%**	**97.67**	**100**	**99.99**	**2.4%**
Europe-West	**100**	**100**	**100**	**0.0%**	**10.92**	**12.6**	**14.32**	**31.1%**	**11.58**	**12.85**	**14.19**	**22.5%**	**97.22**	**100**	**100**	**2.9%**
Europe	**99.26**	**99.92**	**100**	**0.7%**	**10.11**	**12.14**	**13.87**	**37.2%**	**10.47**	**12.31**	**13.74**	**31.2%**	**94.28**	**100**	**99.99**	**6.1%**

Education

Base Case: Countries in Year 2060 Descending Population Sequence	Literacy: Percent of Population 15 and Older				Years of Education, Female Adults 25+: Number of Years Completed				Years of Education, Male Adults 25+: Number of Years Completed				Primary Enrollment Rate, Net: Percent of Primary Age Chlidren Enrolled			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA																
Ethiopia	29.82	85.93	98.79	231.3%	1.467	3.369	7.191	390.2%	2.702	3.744	7.019	159.8%	79.59	91.6	100	25.6%
Tanzania, United Rep. of	72.9	87.83	98.09	34.6%	4.461	5.613	8.449	89.4%	5.776	6.717	9.127	58.0%	95.43	97.14	100	4.8%
Uganda	71.62	82.16	95.75	33.7%	3.803	4.626	7.412	94.9%	5.651	6.201	8.286	46.6%	92.39	95.23	100	8.2%
Kenya	87.01	95.42	100	14.9%	6.213	7.62	9.104	46.5%	7.683	8.576	9.548	24.3%	82.61	92.46	99.97	21.0%
Madagascar	64.48	80.94	93.47	45.0%	1.402	3.154	4.078	190.9%	2.642	3.497	3.95	49.5%	98.47	98.53	98.98	0.5%
Mozambique	55.06	78.47	94.69	72.0%	0.746	2.799	6.186	729.2%	1.733	3.565	6.471	273.4%	92.5	95.67	100	8.1%
Malawi	73.69	90.83	100	35.7%	3.347	5.638	7.79	132.7%	5.171	7.464	9.237	78.6%	88.94	91.84	99.98	12.4%
Zambia	70.88	94.34	100	41.1%	5.784	8.437	10.02	73.2%	7.287	9.624	10.99	50.8%	90.92	97.87	100	10.0%
Somalia	53.3	83.11	98.01	83.9%	0.335	2.719	6.539	1851.9%	1.653	3.022	5.76	248.5%	9.189	55.66	91.62	897.1%
Rwanda	70.67	79.51	94.18	33.3%	3.081	3.57	5.838	89.5%	3.645	4.957	6.99	91.8%	94.92	96.31	100	5.4%
Zimbabwe	91.86	96.66	100	8.9%	6.691	8.589	9.418	40.8%	7.809	9.366	10.01	28.2%	86.51	92.3	100	15.6%
Burundi	66.57	70.67	91.05	36.8%	2.15	2.436	4.492	108.9%	3.277	3.79	5.68	73.3%	98.64	99.32	99.76	1.1%
Eritrea	66.58	81.52	96.83	45.4%	0.312	1.804	4.596	1373.1%	1.632	2.567	5.167	216.6%	35.66	70.18	99.37	178.7%
Comoros	74.15	83.25	95.78	29.2%	1.921	3.001	5.381	180.1%	3.122	3.717	5.316	70.3%	87.34	95.59	98.47	12.7%
Djibouti	52.98	87.26	98.29	85.5%	3.454	4.428	7.109	105.8%	4.542	5.232	7.195	58.4%	44.45	72.1	100	125.0%
Mauritius	87.9	93.04	98.33	11.9%	6.732	8.823	11.18	66.1%	7.645	9.754	11.77	54.0%	94	99.64	100	6.4%
Africa-Eastern	**61.3**	**86.34**	**97.52**	**59.1%**	**3.174**	**4.781**	**7.401**	**133.2%**	**4.508**	**5.694**	**7.842**	**74.0%**	**84.99**	**92.89**	**99.63**	**17.2%**
Congo, Democratic Rep. of	66.99	85.83	95.48	42.5%	5.214	7.325	9.733	86.7%	4.93	5.981	7.738	57.0%	32.42	57.88	78.87	143.3%
Angola	69.96	92.5	100	42.9%	5.183	6.672	8.845	70.7%	6.143	7.136	9.324	51.8%	30.03	83.46	100	233.0%
Cameroon	70.68	86.15	96.64	36.7%	5.095	6.061	7.837	53.8%	6.743	7.358	8.694	28.9%	91.28	92.48	100	9.6%
Chad	33.61	81.69	94.47	181.1%	1.948	2.781	4.799	146.4%	3.147	3.814	4.94	57.0%	59.45	69.18	89.51	50.6%
Central African Rep.	55.23	78.96	95.58	73.1%	2.305	3.173	5.528	139.8%	4.878	5.384	7.065	44.8%	66.66	83.28	99.37	49.1%
Congo, Rep. of	85.22	94.65	100	17.3%	2.071	3.693	6.634	220.3%	6.585	8.093	10.62	61.3%	58.91	95.4	100	69.8%
Gabon	87.71	93.93	100	14.0%	8.385	9.535	11.84	41.2%	6.581	7.486	9.963	51.4%	80.27	99.29	100	24.6%
Equatorial Guinea	93.33	97.87	100	7.1%	9.103	11.48	13.38	47.0%	9.774	11.43	13.01	33.1%	53.52	90.16	100	86.8%
São Tomé and Príncipe	88.78	95.27	100	12.6%	2.92	4.196	5.857	100.6%	4.047	4.619	5.788	43.0%	98	99.02	99.96	2.0%
Africa-Middle	**65.55**	**86.62**	**96.31**	**46.9%**	**4.761**	**6.428**	**8.668**	**82.1%**	**5.321**	**6.21**	**7.857**	**47.7%**	**46.32**	**69.96**	**87.03**	**87.9%**
Egypt, Arab Rep.	66.37	92.86	100	50.7%	5.298	8.674	10.71	102.2%	7.544	10.47	11.95	58.4%	93.61	99.99	99.91	6.7%
Sudan	70.21	86.67	98.37	40.1%	2.329	4.32	7.655	228.7%	3.956	5.755	8.594	117.2%	39.24	88.06	100	154.8%
Algeria	72.65	91.54	99.47	36.9%	5.884	7.451	8.946	52.0%	8.195	8.844	10.07	22.9%	93.83	99.97	100	6.6%
Morocco	56.08	87.69	98.13	75.0%	3.167	5.671	7.8	146.3%	5.638	7.115	8.581	52.2%	89.72	98.25	99.99	11.4%
Tunisia	77.56	91.46	99.8	28.7%	5.463	8.356	10.63	94.6%	7.51	9.203	10.93	45.5%	97.89	100	99.98	2.1%
Libya	88.86	95.45	100	12.5%	7.302	10.15	11.81	61.7%	7.225	9.344	11.03	52.7%	96.5	99.95	100	3.6%
Africa-Northern	**67.88**	**90.47**	**99.24**	**46.2%**	**4.537**	**7.051**	**9.286**	**104.7%**	**6.621**	**8.526**	**10.27**	**55.1%**	**82.31**	**96.88**	**99.96**	**21.4%**

Education

Base Case: Countries in Year 2060 Descending Population Sequence	Literacy				Years of Education, Female Adults 25+				Years of Education, Male Adults 25+				Primary Enrollment Rate, Net			
	Percent of Population 15 and Older				Number of Years Completed				Number of Years Completed				Percent of Primary Age Chlidren Enrolled			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA continued																
South Africa	88.72	95.25	100	12.7%	8.067	9.846	11.87	47.1%	8.354	10.31	12.32	47.5%	84.05	99.38	99.91	18.9%
Namibia	88.51	99.51	100	13.0%	7.692	10.65	12.68	64.8%	7.028	10.1	12.32	75.3%	89.08	99.98	100	12.3%
Lesotho	89.66	98.06	100	11.5%	6.699	7.784	9.109	36.0%	4.519	7.147	9.202	103.6%	73.1	94.12	97.55	33.4%
Botswana	84.08	96.17	100	18.9%	8.686	10.94	12.48	43.7%	9.126	10.85	11.93	30.7%	86.94	100	100	15.0%
Swaziland	86.93	94.58	100	15.0%	7.441	9.087	10.99	47.7%	6.764	9.239	11.25	66.3%	82.77	97.61	100	20.8%
Africa-Southern	**88.55**	**95.59**	**100**	**12.9%**	**8.011**	**9.826**	**11.81**	**47.4%**	**8.157**	**10.17**	**12.15**	**49.0%**	**83.92**	**99.18**	**99.83**	**19.0%**
Nigeria	60.82	90.03	100	64.4%	3.341	5.648	8.9	166.4%	4.437	5.994	8.358	88.4%	61.42	87.59	100	62.8%
Niger	18.85	68.68	90.68	381.1%	0.811	2.016	4.527	458.2%	2.046	2.747	4.568	123.3%	57.47	70.34	95.67	66.5%
Côte d'Ivoire	55.26	83.1	96.93	75.4%	2.338	3.529	6.65	184.4%	4.22	4.824	7.075	67.7%	57.24	78.68	99.99	74.7%
Burkina Faso	28.73	85.04	98.73	243.6%	1.951	3.188	6.007	207.9%	3.15	4.364	6.56	108.3%	63.34	81.88	100	57.9%
Ghana	66.62	93.06	100	50.1%	4.809	7.172	9.394	95.3%	9.357	11.63	13.34	42.6%	75.88	99.68	99.72	31.4%
Mali	26.18	75.86	96.11	267.1%	0.997	2.829	6.087	510.5%	1.797	4.084	7.128	296.7%	72.97	90.88	99.98	37.0%
Senegal	49.7	85.77	96.83	94.8%	3.358	4.478	6.842	103.8%	5.667	6.254	7.727	36.4%	73.07	78.73	99.98	36.8%
Guinea	39.46	82.85	96.52	144.6%	1.502	3.04	5.208	246.7%	2.734	4.49	6.169	125.6%	72.94	91.45	99.92	37.0%
Benin	41.65	81.28	94.46	126.8%	2.038	4.004	6.161	202.3%	4.471	5.962	7.128	59.4%	92.6	96.76	99.34	7.3%
Togo	56.89	88	95.83	68.4%	3.285	4.041	5.277	60.6%	7.362	7.856	8.654	17.5%	79.19	90.84	98.52	24.4%
Sierra Leone	40.92	80.34	96.09	134.8%	2.03	3.934	6.593	224.8%	3.781	5.169	7.235	91.4%	44.48	76.84	99.99	124.8%
Liberia	59.05	83.48	95.71	62.1%	2.343	4.252	6.776	189.2%	5.57	6.333	8.233	47.8%	72.67	84.72	97.75	34.5%
Mauritania	57.45	84.17	96.55	68.1%	2.612	3.712	5.804	122.2%	4.923	5.958	7.556	53.5%	76.32	86.51	99.77	30.7%
Gambia	46.5	83.36	98.09	110.9%	1.984	4.248	7.635	284.8%	3.621	6.253	9.399	159.6%	67.15	75.12	100	48.9%
Guinea-Bissau	52.2	82.74	95.36	82.7%	1.731	2.815	4.633	167.6%	2.946	3.472	4.284	45.4%	52.1	70.97	91.23	75.1%
Cape Verde	84.8	94.18	100	17.9%	4.468	7.512	9.529	113.3%	5.481	7.509	9.123	66.4%	82.39	100	99.96	21.3%
Africa-Western	**53.11**	**86.18**	**97.91**	**84.4%**	**2.917**	**4.76**	**7.517**	**157.7%**	**4.563**	**5.875**	**7.845**	**71.9%**	**64.9**	**86.2**	**99.45**	**53.2%**

Education

Base Case: Countries in Year 2060 Descending Population Sequence	Literacy Percent of Population 15 and Older				Years of Education, Female Adults 25+ Number of Years Completed				Years of Education, Male Adults 25+ Number of Years Completed				Primary Enrollment Rate, Net Percent of Primary Age Chlidren Enrolled			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS																
Haiti	48.69	74.32	89.91	84.7%	2.883	3.551	5.731	98.8%	7.103	7.544	9.321	31.2%	53.22	73.47	88.6	66.5%
Dominican Rep.	88.24	95.95	100	13.3%	6.923	9.112	11.42	65.0%	6.888	8.934	11.13	61.6%	86.16	97.55	99.99	16.1%
Cuba	99.83	100	100	0.2%	10.02	11.48	12.77	27.4%	10.39	12.09	13.47	29.6%	99.28	99.99	99.98	0.7%
Puerto Rico	90.48	94.29	100	10.5%	6.943	9.144	11.1	59.9%	7.774	9.742	11.42	46.9%	89.95	100	100	11.2%
Jamaica	86.36	95.7	100	15.8%	9.809	10.27	11.39	16.1%	9.443	9.961	11.13	17.9%	80.22	91.6	99.2	23.7%
Trinidad and Tobago	98.74	100	100	1.3%	9.385	10.93	12.65	34.8%	9.093	10.78	12.67	39.3%	92.8	100	100	7.8%
Bahamas	94.43	97.95	100	5.9%	9.185	10.82	12.01	30.8%	9.85	11.14	12.13	23.1%	91.3	99.92	99.94	9.5%
Barbados	99.7	100	100	0.3%	9.485	10.44	11.54	21.7%	9.176	10.66	11.87	29.4%	99.65	100	99.93	0.3%
Saint Lucia	88.93	94.92	100	12.4%	6.505	9.011	10.73	65.0%	7.367	9.864	11.35	54.1%	89.71	100	99.97	11.4%
Grenada	86.88	94.94	100	15.1%	6.15	9.028	10.45	69.9%	7.039	8.576	9.764	38.7%	93.39	99.29	99.88	6.9%
Saint Vincent and the Grenadines	87.92	93.45	100	13.7%	6.33	8.245	10.14	60.2%	7.206	8.51	9.9	37.4%	94.56	100	99.84	5.6%
America-Caribbean	**82.08**	**90.43**	**96.61**	**17.7%**	**7.071**	**8.147**	**9.752**	**37.9%**	**8.279**	**9.454**	**11.02**	**33.1%**	**81.9**	**90.93**	**96.11**	**17.4%**
Guatemala	74.47	87.58	97.11	30.4%	3.604	7.01	9.01	150.0%	4.606	7.7	9.369	103.4%	93.98	95.49	100	6.4%
Honduras	83.59	94.38	100	19.6%	6.26	8.302	9.468	51.2%	6.746	7.524	8.732	29.4%	95.78	98.12	99.99	4.4%
Nicaragua	79.56	89.68	98.01	23.2%	4.834	7.481	9.061	87.4%	6.745	8.209	9.285	37.7%	90.13	96.39	99.14	10.0%
El Salvador	84.1	91.87	99.43	18.2%	7.112	9.112	10.65	49.7%	8.02	9.67	10.88	35.7%	94.05	99.84	100	6.3%
Costa Rica	96.06	98.8	100	4.1%	8.379	9.697	10.75	28.3%	8.32	9.392	10.48	26.0%	89.52	99.99	99.98	11.7%
Panama	93.61	97.59	100	6.8%	9.537	11.37	12.79	34.1%	9.238	10.91	12.43	34.6%	96.98	99.97	99.97	3.1%
Belize	76.91	96.43	100	30.0%	9.103	10.61	11.8	29.6%	9.261	10.37	11.55	24.7%	97.28	100	100	2.8%
America-Central	**82.16**	**91.45**	**98.44**	**19.8%**	**5.815**	**8.152**	**9.671**	**66.3%**	**6.606**	**8.381**	**9.698**	**46.8%**	**93.57**	**97.39**	**99.89**	**6.8%**
United States of America	100	100	100	0.0%	12.48	13.3	14.22	13.9%	12.41	13.06	13.89	11.9%	91.98	99.99	100	8.7%
Mexico	93.44	97.31	100	7.0%	8.185	9.734	11.05	35.0%	8.883	9.961	10.98	23.6%	98.05	99.99	99.99	2.0%
Canada	100	100	100	0.0%	11.49	12.53	13.43	16.9%	11.49	12.48	13.28	15.6%	98.03	100	99.91	1.9%
America-North	**98.43**	**99.35**	**100**	**1.6%**	**11.37**	**12.38**	**13.44**	**18.2%**	**11.5**	**12.26**	**13.18**	**14.6%**	**93.89**	**99.99**	**99.99**	**6.5%**
Brazil	90.04	95.67	100	11.1%	7.267	9.785	11.36	56.3%	7.081	9.72	11.42	61.3%	94.16	99.95	100	6.2%
Colombia	93.24	98.06	100	7.3%	7.285	9.584	10.81	48.4%	7.397	9.584	10.74	45.2%	89.63	100	100	11.6%
Argentina	97.73	100	100	2.3%	9.42	11.45	12.97	37.7%	9.126	11.09	12.58	37.8%	99.99	99.94	100	0.0%
Peru	89.59	95.75	100	11.6%	8.019	10.3	11.75	46.5%	9.306	10.7	11.82	27.0%	94.44	99.61	100	5.9%
Venezuela (Bolivarian Rep. of)	95.15	100	100	5.1%	6.311	8.735	10.57	67.5%	6.063	8.385	10.2	68.2%	91.9	99.98	100	8.8%
Ecuador	84.21	93.99	100	18.8%	7.427	9.604	10.95	47.4%	7.747	9.535	10.61	37.0%	96.32	99.9	100	3.8%
Chile	98.65	100	100	1.4%	9.587	10.65	11.48	19.7%	9.905	10.93	11.71	18.2%	94.91	99.91	99.98	5.3%
Bolivia (Plurinational State of)	90.7	95.63	100	10.3%	8.44	9.934	11.18	32.5%	10.01	10.69	11.5	14.9%	91.28	99.9	100	9.6%
Paraguay	94.56	98.57	100	5.8%	7.541	8.971	10.06	33.4%	7.867	8.834	9.693	23.2%	87.39	91.54	99.8	14.2%
Uruguay	98.27	100	100	1.8%	8.65	10.34	11.82	36.6%	8.141	9.901	11.46	40.8%	98.65	99.87	100	1.4%
Guyana	97.18	100	100	2.9%	7.826	9.744	11.17	42.7%	8.11	10.13	11.49	41.7%	86.85	99.98	99.96	15.1%
Suriname	94.62	99.01	100	5.7%	6.09	8.265	10.17	67.0%	6.983	7.996	9.656	38.3%	89.17	100	99.99	12.1%
America-South	**91.91**	**96.96**	**100**	**8.8%**	**7.631**	**9.907**	**11.38**	**49.1%**	**7.668**	**9.871**	**11.33**	**47.8%**	**94.02**	**99.76**	**99.99**	**6.3%**

Education

Base Case: Countries in Year 2060 Descending Population Sequence	Literacy: Percent of Population 15 and Older				Years of Education, Female Adults 25+: Number of Years Completed				Years of Education, Male Adults 25+: Number of Years Completed				Primary Enrollment Rate, Net: Percent of Primary Age Chlidren Enrolled			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA																
China	93.98	97.65	100	6.4%	6.871	8.315	10.05	46.3%	8.213	9.39	10.97	33.6%	94.01	100	100	6.4%
Japan	100	100	100	0.0%	11.2	12.28	13.3	18.8%	11.78	13.11	14.14	20.0%	99.96	99.98	100	0.0%
Korea, Rep. of	100	100	100	0.0%	10.97	12.09	13.24	20.7%	12.34	13.52	14.52	17.7%	98.76	100	99.99	1.2%
Korea, Dem. People's Rep. of	100	100	100	0.0%	1.75	2.899	4.986	184.9%	2.963	3.769	5.534	86.8%	64.62	86.09	98.59	52.6%
Taiwan, China	100	100	100	0.0%	10.53	12.05	13.44	27.6%	11.61	12.7	13.75	18.4%	98	100	99.72	1.8%
Hong Kong SAR, China	100	100	100	0.0%	9.749	10.99	13	33.3%	10.34	11.86	13.91	34.5%	93.51	100	99.94	6.9%
Mongolia	97.49	100	100	2.6%	8.45	10.41	11.7	38.5%	8.168	10.28	11.69	43.1%	90.5	99.83	100	10.5%
Asia-East	**94.87**	**97.98**	**100**	**5.4%**	**7.34**	**8.694**	**10.33**	**40.7%**	**8.61**	**9.749**	**11.24**	**30.5%**	**94.24**	**99.78**	**99.97**	**6.1%**
India	62.75	89.93	98.76	57.4%	3.216	5.403	7.985	148.3%	5.545	7.464	9.651	74.0%	89.9	99.02	100	11.2%
Pakistan	55.53	87.12	97.5	75.6%	3.351	4.187	6.525	94.7%	6.307	6.893	8.068	27.9%	66.32	83.54	99.13	49.5%
Bangladesh	55.9	89.59	98.59	76.4%	4.294	5.034	6.951	61.9%	5.235	5.999	7.759	48.2%	86.82	98.77	100	15.2%
Afghanistan	28	82.45	97.36	247.7%	1.324	3.754	6.656	402.7%	5.226	6.049	7.545	44.4%	28.79	60.9	97.24	237.8%
Iran, Islamic Rep. of	85.02	94.3	100	17.6%	6.235	8.302	10.03	60.9%	8.267	9.586	10.72	29.7%	99.48	99.99	100	0.5%
Nepal	59.14	85.65	96.08	62.5%	2.372	4.266	6.156	159.5%	4.201	5.083	6.448	53.5%	71.15	85.37	95.89	34.8%
Uzbekistan	99.34	100	100	0.7%	3.97	7.011	8.726	119.8%	5.02	7.679	9.009	79.5%	87.27	100	99.99	14.6%
Sri Lanka	90.56	96.76	100	10.4%	8.069	9.125	10.5	30.1%	8.354	9.371	10.53	26.0%	93.81	100	100	6.6%
Kazakhstan	99.68	100	100	0.3%	10.3	12.13	13.66	32.6%	10.44	12.47	13.7	31.2%	90.63	100	100	10.3%
Tajikistan	99.67	100	100	0.3%	9.963	10.38	11.32	13.6%	9.654	10.87	11.72	21.4%	97.33	99.13	100	2.7%
Kyrgyz Rep.	99.24	100	100	0.8%	9.243	11.4	12.89	39.5%	9.303	10.79	11.72	26.0%	83.53	93.63	100	19.7%
Turkmenistan	99.56	100	100	0.4%	6.016	8.762	11	82.8%	6.915	9.031	11.16	61.4%	85.42	99.97	99.99	17.1%
Bhutan	52.81	91.64	99.78	88.9%	5.241	8.137	10.32	96.9%	6.197	7.694	9.469	52.8%	87.38	99.79	100	14.4%
Maldives	98.4	100	100	1.6%	4.42	5.31	6.915	56.4%	5.037	5.835	7.413	47.2%	96.23	98.9	99.24	3.1%
Asia-South Central	**63.3**	**89.88**	**98.57**	**55.7%**	**3.605**	**5.442**	**7.801**	**116.4%**	**5.782**	**7.353**	**9.218**	**59.4%**	**86.25**	**95.96**	**99.7**	**15.6%**
Indonesia	92.19	97.94	100	8.5%	5.077	8.35	10.24	101.7%	6.59	9.176	10.65	61.6%	95.33	99.96	100	4.9%
Philippines	95.42	98.37	100	4.8%	8.802	9.629	10.36	17.7%	8.519	9.038	9.71	14.0%	91.69	96.23	100	9.1%
Vietnam	92.78	98.23	100	7.8%	5.25	7.255	9.076	72.9%	5.734	7.844	9.571	66.9%	94	99.99	100	6.4%
Thailand	93.72	99.66	100	6.7%	6.201	8.72	10.84	74.8%	6.945	8.992	10.72	54.4%	87.97	99.98	100	13.7%
Myanmar	92.03	100	100	8.7%	3.911	6.747	9.084	132.3%	4.037	6.671	8.734	116.3%	82.47	91.57	99.46	20.6%
Malaysia	92.46	96.98	100	8.2%	9.158	10.6	12.34	34.7%	9.905	11.17	12.88	30.0%	90.52	99.99	99.99	10.5%
Cambodia	77.59	90.52	98.68	27.2%	5.431	7.02	8.793	61.9%	6.179	7.425	8.885	43.8%	86.42	97.85	99.63	15.3%
Lao People's Democratic Rep.	71.78	89.52	98.72	37.5%	3.761	6.434	8.773	133.3%	5.426	7.523	9.436	73.9%	82.42	100	100	21.3%
Singapore	94.71	98.64	100	5.6%	8.341	10.63	12.49	49.7%	9.319	11.56	13.35	43.3%	91.9	100	99.92	8.7%
Timor-Leste	50.6	84.93	97.21	92.1%	0.964	4.803	7.312	658.5%	2.236	4.512	6.183	176.5%	82	92.27	98.5	20.1%
Brunei Darussalam	95.29	99.48	100	4.9%	8.508	10.96	12.87	51.3%	8.627	11.13	13.2	53.0%	92.9	99.97	100	7.6%
Asia-South Eastern	**92.31**	**98**	**99.93**	**8.3%**	**5.936**	**8.395**	**10.12**	**70.5%**	**6.741**	**8.774**	**10.22**	**51.6%**	**91.95**	**98.52**	**99.94**	**8.7%**

Education

Base Case: Countries in Year 2060 Descending Population Sequence	Literacy: Percent of Population 15 and Older				Years of Education, Female Adults 25+: Number of Years Completed				Years of Education, Male Adults 25+: Number of Years Completed				Primary Enrollment Rate, Net: Percent of Primary Age Chlidren Enrolled			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA continued																
Turkey	90.82	95.86	100	10.1%	5.462	7.841	9.5	73.9%	7.493	8.949	9.851	31.5%	94.69	100	100	5.6%
Iraq	78.06	90.86	100	28.1%	4.415	6.478	8.956	102.9%	6.7	8.858	10.81	61.3%	87.55	98.25	100	14.2%
Yemen, Rep. of	62.39	82.9	96.51	54.7%	1.226	3.479	6.466	427.4%	3.766	6.249	8.377	122.4%	72.69	90.58	99.81	37.3%
Saudi Arabia	86.13	95.02	100	16.1%	7.158	10.11	11.96	67.1%	8.256	10.5	12.22	48.0%	86.33	99.98	100	15.8%
Syrian Arab Rep.	84.19	97.61	100	18.8%	4.482	7.799	9.6	114.2%	5.285	8.431	10.13	91.7%	94.53	99.95	99.99	5.8%
Jordan	92.2	97.9	100	8.5%	7.754	10.32	11.8	52.2%	9.452	11.5	13.16	39.2%	89.49	97.64	100	11.7%
Israel	95.31	98.38	100	4.9%	11.99	13.91	15.32	27.8%	11.83	13.58	15.17	28.2%	96.64	99.84	100	3.5%
Palestine	94.6	100	100	5.7%	4.013	7.021	9.192	129.1%	5.059	7.916	9.713	92.0%	75.21	85.36	99.86	32.8%
Azerbaijan	99.5	100	100	0.5%	6.552	9.146	11.2	70.9%	7.411	9.733	11.6	56.5%	85.19	99.99	100	17.4%
United Arab Emirates	89.19	94.07	100	12.1%	9.124	10.83	12.39	35.8%	9.322	10.46	12.32	32.2%	89.69	100	100	11.5%
Kuwait	93.91	100	100	6.5%	6.723	10.18	12.71	89.1%	5.75	8.639	12.04	109.4%	87.62	99.98	99.99	14.1%
Lebanon	89.61	94.58	100	11.6%	7.109	9.222	10.7	50.5%	7.927	9.465	10.7	35.0%	90.11	98.84	99.99	11.0%
Oman	86.62	96.91	100	15.4%	8.721	10.63	11.86	36.0%	9.42	10.21	11.53	22.4%	74.93	99.98	99.95	33.4%
Armenia	99.53	100	100	0.5%	10.9	11.57	12.4	13.8%	10.65	11.71	12.89	21.0%	84.06	99.99	100	19.0%
Georgia	99.72	100	100	0.3%	5.083	7.856	9.962	96.0%	6.051	9.06	10.78	78.2%	98.74	99.99	99.99	1.3%
Qatar	94.72	98.61	100	5.6%	8.044	10.32	12.28	52.7%	6.999	8.673	10.81	54.5%	93.39	99.98	99.66	6.7%
Bahrain	91.35	96.15	100	9.5%	9.05	10.31	11.93	31.8%	9.663	10.63	12.21	26.4%	97.33	100	99.84	2.6%
Cyprus	97.93	99.68	100	2.1%	9.016	10.93	12.16	34.9%	10.57	11.84	12.52	18.4%	98.7	100	99.99	1.3%
Asia-West	**85.77**	**93.71**	**99.39**	**15.9%**	**5.531**	**7.712**	**9.574**	**73.1%**	**7.098**	**8.979**	**10.51**	**48.1%**	**89.08**	**97.9**	**99.96**	**12.2%**
Australia	100	100	100	0.0%	12.38	14.1	15.1	22.0%	11.68	13.74	15.11	29.4%	96.93	100	99.97	3.1%
Papua New Guinea	60.1	85.92	98.06	63.2%	3.019	4.182	7.581	151.1%	5.607	6.238	8.296	48.0%	26.92	70.74	99.79	270.7%
New Zealand	100	100	100	0.0%	12.43	13.85	14.85	19.5%	12.6	13.87	14.8	17.5%	99.47	100	100	0.5%
Solomon Islands	72.63	87.73	96.76	33.2%	3.682	5.21	6.645	80.5%	4.753	5.154	5.925	24.7%	80.62	86.5	97.81	21.3%
Fiji	92.94	97.22	100	7.6%	10.87	11.81	13.07	20.2%	11.21	12.4	13.46	20.1%	89.47	99.72	99.99	11.8%
Vanuatu	82.03	89.4	98.48	20.1%	4.835	5.888	8.044	66.4%	5.821	6.207	7.725	32.7%	96.63	99.61	99.97	3.5%
Micronesia (Federated States of)	74.39	88.27	97.38	30.9%	3.987	5.601	7.4	85.6%	5.036	5.931	7.006	39.1%	75.55	78.55	99.93	32.3%
Tonga	99.02	100	100	1.0%	10.24	11.38	12.44	21.5%	10.7	11.38	12.3	15.0%	96.55	95.72	100	3.6%
Samoa	98.78	100	100	1.2%	4.769	7.33	9.445	98.0%	5.76	7.486	9.181	59.4%	89.54	97.94	100	11.7%
Oceania	**91.48**	**96.23**	**99.38**	**8.6%**	**10.28**	**11.36**	**12.71**	**23.6%**	**10.41**	**11.64**	**12.88**	**23.7%**	**83.16**	**92.69**	**99.87**	**20.1%**

Education

Base Case: Countries in Year 2060 Descending Population Sequence	Literacy: Percent of Population 15 and Older 2010	2035	2060	% Chg	Years of Education, Female Adults 25+: Number of Years Completed 2010	2035	2060	% Chg	Years of Education, Male Adults 25+: Number of Years Completed 2010	2035	2060	% Chg	Primary Enrollment Rate, Net: Percent of Primary Age Chlidren Enrolled 2010	2035	2060	% Chg
EUROPE																
Russian Federation	99.56	100	100	0.4%	9.685	11.56	13.12	35.5%	10.02	11.58	12.56	25.3%	87.17	100	100	14.7%
Ukraine	99.69	100	100	0.3%	11.22	12.4	13.29	18.4%	11.37	12.97	13.88	22.1%	88.88	100	99.99	12.5%
Poland	99.51	100	100	0.5%	10	12.6	14.61	46.1%	9.89	12.66	14.54	47.0%	95.24	100	99.98	5.0%
Romania	97.65	100	100	2.4%	10.15	12.02	13.44	32.4%	10.75	12.58	13.99	30.1%	90.31	100	99.96	10.7%
Czech Rep.	100	100	100	0.0%	12.15	14.05	15.45	27.2%	12.51	13.84	14.78	18.1%	89.59	99.99	100	11.6%
Belarus	99.73	100	100	0.3%	7.367	9.714	11.34	53.9%	8.166	10.9	12.44	52.3%	94.4	100	99.99	5.9%
Hungary	99.37	100	100	0.6%	11.54	12.93	13.82	19.8%	11.83	12.98	13.57	14.7%	89.69	100	100	11.5%
Bulgaria	98.32	100	100	1.7%	9.957	11.46	12.86	29.2%	9.942	12.03	13.44	35.2%	95.8	99.99	99.99	4.4%
Slovak Rep.	99.68	100	100	0.3%	11.58	13.87	15.53	34.1%	11.54	14.49	16.58	43.7%	96.62	99.99	100	3.5%
Moldova, Rep. of	98.46	100	100	1.6%	9.529	11.7	13.19	38.4%	9.86	11.84	12.93	31.1%	87.52	99.98	99.99	14.2%
Europe-East	**99.4**	**100**	**100**	**0.6%**	**10.11**	**11.98**	**13.47**	**33.2%**	**10.38**	**12.18**	**13.34**	**28.5%**	**89.53**	**100**	**99.99**	**11.7%**
United Kingdom	100	100	100	0.0%	9.486	12.35	14.64	54.3%	9.029	11.87	14.08	55.9%	98	99.98	100	2.0%
Sweden	100	100	100	0.0%	11.79	13.23	14.35	21.7%	11.43	12.8	13.99	22.4%	94.63	100	99.97	5.6%
Denmark	100	100	100	0.0%	10.06	12.67	14.62	45.3%	10.5	13.28	15.1	43.8%	94.83	100	99.99	5.4%
Ireland	100	100	100	0.0%	11.69	13.55	14.74	26.1%	11.53	13.27	14.47	25.5%	97.14	99.96	100	2.9%
Norway	100	100	100	0.0%	12.68	14.57	15.81	24.7%	12.58	14.36	15.51	23.3%	97.97	100	100	2.1%
Finland	100	100	100	0.0%	10.34	12.89	14.81	43.2%	10.23	12.63	14.49	41.6%	96.05	100	99.99	4.1%
Lithuania	99.7	100	100	0.3%	10.87	12.37	13.39	23.2%	10.95	12.31	13	18.7%	92.16	100	99.98	8.5%
Latvia	99.78	100	100	0.2%	10.41	12.21	13.75	32.1%	10.44	11.84	12.88	23.4%	96.83	99.98	100	3.3%
Estonia	99.79	100	100	0.2%	12.23	13.27	14.32	17.1%	11.73	12.65	13.46	14.7%	94.36	100	99.95	5.9%
Iceland	100	100	100	0.0%	10.68	12.54	13.74	28.7%	10.13	11.77	12.99	28.2%	97.57	100	99.97	2.5%
Europe-North	**99.98**	**100**	**100**	**0.0%**	**10.15**	**12.66**	**14.64**	**44.2%**	**9.828**	**12.29**	**14.19**	**44.4%**	**97.08**	**99.98**	**100**	**3.0%**
Italy	98.87	100	100	1.1%	8.896	11.72	13.88	56.0%	9.739	12.34	14.11	44.9%	98.39	100	100	1.6%
Spain	97.68	99.88	100	2.4%	10.23	12.36	13.85	35.4%	10.48	12.44	13.83	32.0%	99.76	100	99.99	0.2%
Greece	97.16	99.4	100	2.9%	10.25	11.68	12.69	23.8%	10.76	12.06	12.93	20.2%	99.4	100	100	0.6%
Portugal	94.91	98.36	100	5.4%	7.504	9.362	11.63	55.0%	7.981	9.849	12.07	51.2%	98.59	100	100	1.4%
Serbia	90.74	97.15	100	10.2%	9.231	11.86	13.49	46.1%	9.892	12.09	13.51	36.6%	94.23	100	99.99	6.1%
Croatia	98.76	100	100	1.3%	8.556	11.66	13.95	63.0%	9.45	12.42	14.41	52.5%	90.82	100	100	10.1%
Bosnia and Herzegovina	97.81	100	100	2.2%	6.102	8.334	10.52	72.4%	6.994	8.883	10.33	47.7%	86.9	100	99.96	15.0%
Albania	95.94	98.53	100	4.2%	10.16	11.46	12.95	27.5%	10.62	11.36	12.64	19.0%	82.66	100	99.97	20.9%
Macedonia, TFYR	97.12	100	100	3.0%	6.399	9.593	11.65	82.1%	7.269	10.33	12.07	66.0%	89.56	100	99.98	11.6%
Slovenia	99.68	100	100	0.3%	8.34	10.11	11.56	38.6%	9.762	10.78	11.63	19.1%	96.96	100	100	3.1%
Montenegro	90.73	95.82	100	10.2%	6.816	9.54	11.44	67.8%	7.656	9.58	10.94	42.9%	89.33	100	99.95	11.9%
Malta	91.1	97.37	100	9.8%	9.435	11.37	13.42	42.2%	10.46	12.57	14.38	37.5%	91.27	99.04	99.89	9.4%
Europe-South	**97.56**	**99.62**	**100**	**2.5%**	**9.219**	**11.61**	**13.44**	**45.8%**	**9.828**	**12**	**13.57**	**38.1%**	**97.67**	**100**	**99.99**	**2.4%**
Germany	100	100	100	0.0%	11.87	12.77	14.36	21.0%	12.58	13.13	14.31	13.8%	97.62	100	99.99	2.4%
France	100	100	100	0.0%	10.21	12.78	14.64	43.4%	10.68	12.74	14.22	33.1%	97.78	100	100	2.3%
Netherlands	100	100	100	0.0%	10.91	11.85	13.35	22.4%	11.43	12.21	13.47	17.8%	98.75	100	100	1.3%
Belgium	100	100	100	0.0%	10.47	12.58	14.11	34.8%	10.67	12.59	13.98	31.0%	93.51	99.99	100	6.9%
Switzerland	100	100	100	0.0%	9.617	12.04	14.23	48.0%	10.98	13.01	14.7	33.9%	90.43	99.98	100	10.6%
Austria	100	100	100	0.0%	8.877	11.57	13.64	53.7%	10.71	12.78	14.26	33.1%	97.37	100	99.99	2.7%
Luxembourg	100	100	100	0.0%	9.779	12.65	14.61	49.4%	10.43	12.26	14.19	36.0%	94.09	99.92	100	6.3%
Europe-West	**100**	**100**	**100**	**0.0%**	**10.92**	**12.6**	**14.32**	**31.1%**	**11.58**	**12.85**	**14.19**	**22.5%**	**97.22**	**100**	**100**	**2.9%**

Education

Base Case

Source: International Futures Model Version 6.61, Jan 2013

	Lower Secondary Enrollment Rate, Gross				Upper Secondary Enrollment Rate, Gross				Tertiary Enrollment Rate, Gross				Knowledge Society Index			
	Total Enrolled as % of Nominal Age Population				Total Enrolled as % of Nominal Age Population				Total Enrolled as % of Nominal Age Population				Index: 0–100			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	82.76	93.56	96.77	16.9%	61.63	75.64	85.45	38.7%	28.8	34.62	41.3	43.4%	53.41	59.85	72.72	36.2%
Africa	53.32	73.65	89.65	68.1%	31.9	45.88	68.85	115.8%	9.47	17.06	27.74	192.9%	13.97	21.98	34.87	149.6%
Americas	100.6	103	102.3	1.7%	80.93	89.31	94.28	16.5%	52.9	53.35	55.51	4.9%	58.96	68.03	78.25	32.7%
Asia with Oceania	82.94	97.06	98.28	18.5%	58.17	79.31	89.3	53.5%	21.97	32.28	41.45	88.7%	48.52	53.99	72.17	48.7%
Europe	100.5	102.3	101.1	0.6%	98.68	100.6	100.9	2.2%	64.15	64.13	65.25	1.7%	55.34	70.85	87.71	58.5%
World	82.76	93.56	96.77	16.9%	61.63	75.64	85.45	38.7%	28.8	34.62	41.3	43.4%	53.41	59.85	72.72	36.2%
Africa-Eastern	43.25	66.45	91.23	110.9%	17.83	34.79	68.96	286.8%	3.214	12.94	28.43	784.6%	4.226	14.05	33.79	699.6%
Africa-Middle	43.38	66.2	81.66	88.2%	25.81	37.37	55.84	116.4%	4.757	10.05	19.16	302.8%	5.646	23.15	35.87	535.3%
Africa-Northern	85.27	103.4	100.4	17.7%	54.37	76.21	85.6	57.4%	22.53	29.6	35.8	58.9%	17.91	26.06	35.52	98.3%
Africa-Southern	91.72	100.3	99.63	8.6%	85.55	104.5	100.1	17.0%	13.78	24.15	36.21	162.8%	20.25	32.87	50.3	148.4%
Africa-Western	38.84	65.63	86.34	122.3%	23.81	38.49	65.14	173.6%	8.236	17	26.85	226.0%	5.11	15.24	28.95	466.5%
Africa	53.32	73.65	89.65	68.1%	31.9	45.88	68.85	115.8%	9.47	17.06	27.74	192.9%	13.97	21.98	34.87	149.6%
America-Caribbean	77.43	91.22	97.03	25.3%	63.59	68.91	76.66	20.6%	43.31	41.56	41.33	-4.6%	30.23	40.92	56.63	87.3%
America-Central	76.08	81.2	91.63	20.4%	53.42	65.22	81.03	51.7%	21.96	25.9	31.69	44.3%	13.69	25.22	39.11	185.7%
America-North	103.2	100.4	100.6	-2.5%	83.77	92.18	97.57	16.5%	66.3	65.68	68.46	3.3%	65.11	78.19	89.85	38.0%
America-South	102.7	110.1	106.5	3.7%	82.43	91.25	94.15	14.2%	41.8	44.03	45.23	8.2%	22.35	35.82	48.61	117.5%
Americas	100.6	103	102.3	1.7%	80.93	89.31	94.28	16.5%	52.9	53.35	55.51	4.9%	58.96	68.03	78.25	32.7%
Asia-East	92.79	104.7	99.7	7.4%	69.33	98.16	101.3	46.1%	29.41	40.74	54.85	86.5%	56.09	62.66	91.33	62.8%
Asia-South Central	73.03	92.99	97.25	33.2%	45.67	66.32	83.47	82.8%	13.16	25.92	35.53	170.0%	16.34	31.45	47.27	189.3%
Asia-South East	84.26	94.31	98.33	16.7%	58.26	78.48	87.4	50.0%	23.01	30.16	35.47	54.2%	25.75	33.61	41.28	60.3%
Asia-West	85.26	93.92	98.86	16.0%	67.25	76.69	86.3	28.3%	28.92	34.73	39.33	36.0%	35.33	52.56	61.54	74.2%
Oceania	92.15	91.56	103.6	12.4%	110.5	81.91	91.27	-17.4%	58.98	60.69	60.25	2.2%	68.59	90.75	94.47	37.7%
Asia with Oceania	82.94	97.06	98.28	18.5%	58.17	79.31	89.3	53.5%	21.97	32.28	41.45	88.7%	48.52	53.99	72.17	48.7%
Europe-East	91.5	104.5	102.6	12.1%	88.05	100.6	100.4	14.0%	71.45	68.77	63.62	-11.0%	51.33	64.79	70.97	38.3%
Europe-North	103.5	98.54	99.88	-3.5%	102.4	97.82	100.3	-2.1%	63.45	66.61	71.28	12.3%	56.18	79.16	95.61	70.2%
Europe-South	107.6	101.3	100.5	-6.6%	103.7	98.02	98.78	-4.7%	65.79	62.64	63.35	-3.7%	45.84	53.12	72.31	57.7%
Europe-West	106.9	102	100.3	-6.2%	108.6	103.9	103.5	-4.7%	51.64	56.99	64.45	24.8%	59.87	75.4	94.61	58.0%
Europe	100.5	102.3	101.1	0.6%	98.68	100.6	100.9	2.2%	64.15	64.13	65.25	1.7%	55.34	70.85	87.71	58.5%

Education

Base Case: Countries in Descending Year 2060 Population Sequence	Lower Secondary Enrollment Rate, Gross — Total Enrolled as % of Nominal Age Population				Upper Secondary Enrollment Rate, Gross — Total Enrolled as % of Nominal Age Population				Tertiary Enrollment Rate, Gross — Total Enrolled as % of Nominal Age Population				Knowledge Society Index — Index: 0–100			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA																
Ethiopia	43.45	91.55	102.3	135.4%	14.56	52.58	98.17	574.2%	3.601	15.35	40.8	1033.0%	4.038	14.91	39.3	873.3%
Tanzania, United Rep. of	7.715	36.42	93.22	1108.3%	5.546	19.28	66.66	1101.9%	1.448	14.12	34.11	2255.7%	1.55	12.26	35.95	2219.4%
Uganda	33.05	61.48	93.81	183.8%	14.56	27.38	63.97	339.4%	4.092	15.28	29.62	623.9%	6.11	16.33	30.32	396.2%
Kenya	89.91	96.68	112.5	25.1%	43.29	51.6	73.39	69.5%	4.052	10.9	22.19	447.6%	3.358	9.565	19.85	491.1%
Madagascar	42.74	32.47	38.22	-10.6%	14.81	17.28	19.64	32.6%	3.583	4.707	6.682	86.5%	2.914	4.201	6.329	117.2%
Mozambique	31.76	60.49	100.9	217.7%	11.51	26.7	89.57	678.2%	1.453	16.06	37.67	2492.6%	6.616	18.88	39.33	494.5%
Malawi	51.7	59.07	87.49	69.2%	14.85	24.66	56.82	282.6%	0.578	7.913	17.3	2893.1%	0.647	6.604	14.76	2181.3%
Zambia	73.44	76.04	88.27	20.2%	22.38	35.74	54.25	142.4%	2.405	17.05	25.03	940.7%	1.176	12.1	21.38	1718.0%
Somalia	10.1	55.77	73.56	628.3%	6.922	25.1	49.2	610.8%	2.518	8.216	21.36	748.3%	1.831	7.273	19.08	942.1%
Rwanda	35.76	40.84	85.17	138.2%	17.41	27.03	63.17	262.8%	4.822	14.19	27.8	476.5%	1.49	10.12	23.78	1496.0%
Zimbabwe	59.36	60.18	73.43	23.7%	29.98	31.57	45.14	50.6%	6.677	14.35	20.12	201.3%	5.336	9.96	16.06	201.0%
Burundi	28.9	30.99	49.72	72.0%	10.84	15.36	32.69	201.6%	2.32	3.073	9.92	327.6%	3.872	5.656	11	184.1%
Eritrea	45.68	75.41	114.2	150.0%	21.01	42.66	89.92	328.0%	1.979	7.771	19.5	885.3%	1.406	6.633	17.09	1115.5%
Comoros	49.54	62	75.49	52.4%	34.4	34.37	48.76	41.7%	2.7	5.571	13.15	387.0%	1.908	4.585	11.55	505.3%
Djibouti	31.24	67.06	104.5	234.5%	18.23	28.57	73.02	300.5%	3.468	10.35	24.88	617.4%	3.637	9.363	21.98	504.3%
Mauritius	96.46	90.21	101.9	5.6%	80.53	91.31	100.9	25.3%	25.91	32.99	39.43	52.2%	16.62	28.53	41.27	148.3%
Africa-Eastern	**43.25**	**66.45**	**91.23**	**110.9%**	**17.83**	**34.79**	**68.96**	**286.8%**	**3.214**	**12.94**	**28.43**	**784.6%**	**4.226**	**14.05**	**33.79**	**699.6%**
Congo, Democratic Rep. of	47.56	70.55	80.86	70.0%	30.66	41.24	54.32	77.2%	5.09	5.416	14.22	179.4%	3.424	5.243	12.21	256.6%
Angola	30.64	73.6	93.78	206.1%	15.69	35.77	67.99	333.3%	0.829	17.45	32.07	3768.5%	3.678	24.49	41.63	1031.9%
Cameroon	50.3	55.24	83.8	66.6%	29.13	37.65	62.17	113.4%	9.026	16.21	23.69	162.5%	7.465	12.42	20.01	168.1%
Chad	28.81	43.45	67.18	133.2%	17.01	21.4	41.51	144.0%	2.003	9.967	17.95	796.2%	1.41	7.734	14.76	946.8%
Central African Rep.	17.62	36.04	56.37	219.9%	7.75	14.31	28.09	262.5%	2.458	7.625	15.74	540.4%	3.759	7.574	15.47	311.5%
Congo, Rep. of	63.97	96.13	106.8	67.0%	21.98	41.89	74.53	239.1%	6.443	26.37	36.61	468.2%	3.504	18.98	32.11	816.4%
Gabon	61.69	94.51	100.2	62.4%	28.66	60.11	88.52	208.9%	7.115	23.44	38.39	439.6%	2.458	17.54	34.69	1311.3%
Equatorial Guinea	34.36	99.53	96.68	181.4%	12.04	41.76	60.23	400.2%	3.282	27.78	37.81	1052.0%	21.42	65.14	67.88	216.9%
São Tomé and Príncipe	71.28	86.35	100.4	40.9%	18.97	27.8	43.01	126.7%	4.399	14.45	20.83	373.5%	4.415	9.721	16.76	279.6%
Africa-Middle	**43.38**	**66.2**	**81.66**	**88.2%**	**25.81**	**37.37**	**55.84**	**116.4%**	**4.757**	**10.05**	**19.16**	**302.8%**	**5.646**	**23.15**	**35.87**	**535.3%**
Egypt, Arab Rep.	90.15	93.39	97.66	8.3%	68.91	84.1	93.45	35.6%	27.37	32.03	36.61	33.8%	15.99	23.99	33.65	110.4%
Sudan	52.52	121.3	100.9	92.1%	27.63	78.27	84.17	204.6%	5.929	23.03	35.81	504.0%	7.995	20.74	37.85	373.4%
Algeria	108.1	112.9	109.3	1.1%	58.32	74.77	83.56	43.3%	30.62	33.74	35.01	14.3%	21.13	27.95	32.86	55.5%
Morocco	74.38	87.67	95.91	28.9%	36.67	47.18	64.66	76.3%	12.88	21.52	30.16	134.2%	14.93	23.4	33.12	121.8%
Tunisia	117.9	115.3	108.1	-8.3%	74.2	82.38	88.62	19.4%	33.74	37.58	40.38	19.7%	17.13	28.48	40.16	134.4%
Libya	116.1	97.36	96.6	-16.8%	77.39	90.19	94.23	21.8%	55.74	53.99	47.28	-15.2%	27.47	37.56	37.73	37.3%
Africa-Northern	**85.27**	**103.4**	**100.4**	**17.7%**	**54.37**	**76.21**	**85.6**	**57.4%**	**22.53**	**29.6**	**35.8**	**58.9%**	**17.91**	**26.06**	**35.52**	**98.3%**

Education

Base Case: Countries in Descending Year 2060 Population Sequence	Lower Secondary Enrollment Rate, Gross — Total Enrolled as % of Nominal Age Population				Upper Secondary Enrollment Rate, Gross — Total Enrolled as % of Nominal Age Population				Tertiary Enrollment Rate, Gross — Total Enrolled as % of Nominal Age Population				Knowledge Society Index — Index: 0–100			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA continued																
South Africa	94.38	101.4	100.1	6.1%	92.18	112.9	104.8	13.7%	14.9	24.94	37.14	149.3%	21.1	33.39	50.87	141.1%
Namibia	86.12	107	106.5	23.7%	34.18	47.6	71.78	110.0%	8.932	21.71	32.99	269.3%	7.474	23.01	36.28	385.4%
Lesotho	50.64	80.78	83.46	64.8%	26.82	42.17	56.4	110.3%	3.624	14.1	22.1	509.8%	1.455	10.33	18.19	1150.2%
Botswana	91.14	95.78	96.14	5.5%	67.13	90.56	96.16	43.2%	7.577	26.98	42.79	464.7%	16.13	37.64	58.85	264.8%
Swaziland	63.89	88.32	100	56.5%	37.17	59.84	83.68	125.1%	4.388	14.3	26.06	493.9%	6.001	15.11	25.98	332.9%
Africa-Southern	**91.72**	**100.3**	**99.63**	**8.6%**	**85.55**	**104.5**	**100.1**	**17.0%**	**13.78**	**24.15**	**36.21**	**162.8%**	**20.25**	**32.87**	**50.3**	**148.4%**
Nigeria	34.21	69.98	94.71	176.8%	26.53	46.17	83.23	213.7%	10.09	21.43	34.76	244.5%	5.505	16.69	31.1	464.9%
Niger	16.57	33.42	59.97	261.9%	5.32	8.369	22.66	325.9%	1.435	5.351	9.455	558.9%	1.157	4.213	7.949	587.0%
Côte d'Ivoire	32.35	48.69	84.23	160.4%	15.2	23.09	55.14	262.8%	8.37	14.27	24.01	186.9%	5.954	11.01	20.04	236.6%
Burkina Faso	26.53	53.94	75.4	184.2%	9.771	20.49	40.67	316.2%	3.402	11.2	19.27	466.4%	2.784	8.022	15.79	467.2%
Ghana	78.24	103	99.82	27.6%	34.99	56.1	71.47	104.3%	8.636	18.3	29.83	245.4%	3.75	13.9	28.15	650.7%
Mali	50.02	74.14	90.01	79.9%	26.03	39.51	61.11	134.8%	6.044	12.93	21.23	251.3%	4.429	10.72	18.26	312.3%
Senegal	40.4	55.36	87.05	115.5%	16.7	25.18	53.65	221.3%	8.053	14.15	21.21	163.4%	5.02	9.243	15.91	216.9%
Guinea	42.98	62.34	68.22	58.7%	25.27	40.3	44.55	76.3%	9.203	13.77	16.68	81.2%	4.102	9.407	13.33	225.0%
Benin	49.76	58.53	73.08	46.9%	22.92	31.58	46.06	101.0%	4.572	11.32	20.17	341.2%	3.88	9.057	17.12	341.2%
Togo	51.34	71.34	79.53	54.9%	26.73	29.66	38.2	42.9%	3.844	4.956	8.041	109.2%	7.691	8.994	11.9	54.7%
Sierra Leone	49.92	55.35	77.6	55.4%	18.94	28.38	53.49	182.4%	2.054	12.98	25.9	1161.0%	1.637	10.68	23.21	1317.8%
Liberia	39.27	59.37	78.9	100.9%	33.28	50.5	72.07	116.6%	17.42	23.13	31.05	78.2%	10.67	17.26	25.2	136.2%
Mauritania	25.51	43.72	64.55	153.0%	23.31	34.51	53	127.4%	3.794	12.95	17.33	356.8%	3.918	8.656	13.36	241.0%
Gambia	61.71	77.73	106	71.8%	35.11	47.03	95.01	170.6%	1.234	10.31	24.72	1903.2%	1.644	8.106	20.38	1139.7%
Guinea-Bissau	24.83	44.01	57.23	130.5%	11.91	19.85	27.43	130.3%	0.585	6.085	9.687	1555.9%	0.909	4.552	7.624	738.7%
Cape Verde	100.7	123.4	116	15.2%	85.41	103.1	110.5	29.4%	14.87	26.05	33.69	126.6%	10.05	21.28	32.53	223.7%
Africa-Western	**38.84**	**65.63**	**86.34**	**122.3%**	**23.81**	**38.49**	**65.14**	**173.6%**	**8.236**	**17**	**26.85**	**226.0%**	**5.11**	**15.24**	**28.95**	**466.5%**

Education

Base Case: Countries in Descending Year 2060 Population Sequence	Lower Secondary Enrollment Rate, Gross: Total Enrolled as % of Nominal Age Population				Upper Secondary Enrollment Rate, Gross: Total Enrolled as % of Nominal Age Population				Tertiary Enrollment Rate, Gross: Total Enrolled as % of Nominal Age Population				Knowledge Society Index: Index: 0–100			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS																
Haiti	37.37	59.49	81.79	118.9%	9.993	17.29	36.23	262.6%	1.234	8.953	15.37	1145.5%	1.023	6.656	12.6	1131.7%
Dominican Rep.	87.69	107.3	105.7	20.5%	71.22	89.48	97.18	36.5%	33.22	36.78	41.63	25.3%	16.51	31.65	49.7	201.0%
Cuba	92.31	99.51	99.42	7.7%	87.1	94.52	97.79	12.3%	89.72	85.62	78.85	-12.1%	34.04	46.27	62	82.1%
Puerto Rico	87.18	105.4	103	18.1%	88.04	92.71	95.23	8.2%	73.78	69.4	66.65	-9.7%	44.02	54.16	72.95	65.7%
Jamaica	95.32	111.4	120.5	26.4%	84.79	80	99.2	17.0%	24.07	25.9	34.28	42.4%	12.83	17.71	28.11	119.1%
Trinidad and Tobago	91.05	104.5	102.6	12.7%	85.91	90.95	95.65	11.3%	11.57	29.73	42.66	268.7%	5.323	39.52	51.8	873.1%
Bahamas	97.22	98.02	98.39	1.2%	89.16	90.52	96.36	8.1%	24.89	34.97	43.91	76.4%	31.2	38.75	53.2	70.5%
Barbados	119.3	96.62	97.37	-18.4%	77.47	82.47	89.35	15.3%	31.53	38.8	46.51	47.5%	31.81	37.61	49.69	56.2%
Saint Lucia	104.9	100.3	101.1	-3.6%	82.59	98.43	100.5	21.7%	16	28.34	35.09	119.3%	9.967	20.88	32.61	227.2%
Grenada	115.3	114.3	113.5	-1.6%	77.17	74.63	89.05	15.4%	53.53	47.77	43.15	-19.4%	15.82	22.46	32.45	105.1%
Saint Vincent and the Grenadines	120.9	100.6	100.8	-16.6%	91.37	88.48	92.7	1.5%	33.83	34.87	37.01	9.4%	12.09	19.92	31.03	156.7%
America-Caribbean	**77.43**	**91.22**	**97.03**	**25.3%**	**63.59**	**68.91**	**76.66**	**20.6%**	**43.31**	**41.56**	**41.33**	**-4.6%**	**30.23**	**40.92**	**56.63**	**87.3%**
Guatemala	62.34	64.97	86.09	38.1%	47.28	55.35	77.15	63.2%	17.71	22.88	30.35	71.4%	5.783	13.82	26.42	356.9%
Honduras	67.51	82.32	92.74	37.4%	59.82	69.36	80.42	34.4%	18.64	22.66	27.4	47.0%	6.742	13.41	20.99	211.3%
Nicaragua	77.72	91.52	94.31	21.3%	52.79	66.98	74.92	41.9%	18.05	21.1	25.25	39.9%	11.97	16.36	21.35	78.4%
El Salvador	82.23	80.53	87.26	6.1%	46	59.6	81.55	77.3%	24.52	28.26	33.7	37.4%	12.2	19.62	29.5	141.8%
Costa Rica	113.1	114.9	110.8	-2.0%	71.47	84.65	96.64	35.2%	25.33	32.25	37.97	49.9%	18.59	30.12	40.25	116.5%
Panama	87.35	105.1	104.3	19.4%	54.99	90.17	101.3	84.2%	45.1	47.5	55.08	22.1%	23.08	39.91	69.97	203.2%
Belize	86.93	92.49	100.4	15.5%	52.63	67.04	85.1	61.7%	11.34	27.47	35.12	209.7%	14.27	22.86	35.52	148.9%
America-Central	**76.08**	**81.2**	**91.63**	**20.4%**	**53.42**	**65.22**	**81.03**	**51.7%**	**21.96**	**25.9**	**31.69**	**44.3%**	**13.69**	**25.22**	**39.11**	**185.7%**
United States of America	99.01	100.1	100.1	1.1%	89.31	97.27	100.2	12.2%	80.45	77.72	79.22	-1.5%	68.47	81.97	94.48	38.0%
Mexico	117.2	101.9	102.7	-12.4%	61.35	76.41	89.51	45.9%	27.19	31.78	36.28	33.4%	21.64	29.17	36.38	68.1%
Canada	96.91	98.29	98.66	1.8%	104.7	96.98	97.95	-6.4%	62.26	66.01	66.63	7.0%	54.49	77.36	87.81	61.1%
America-North	**103.2**	**100.4**	**100.6**	**-2.5%**	**83.77**	**92.18**	**97.57**	**16.5%**	**66.3**	**65.68**	**68.46**	**3.3%**	**65.11**	**78.19**	**89.85**	**38.0%**
Brazil	107.1	118.9	112.1	4.7%	92.17	95.59	93.68	1.6%	34.45	38.89	41.08	19.2%	30.04	41.22	49.33	64.2%
Colombia	103.4	104.7	102.3	-1.1%	76.99	94.63	96.21	25.0%	36.98	39.51	39.96	8.1%	20.4	29.96	36.29	77.9%
Argentina	103.1	102.5	102	-1.1%	66.53	80.81	94.38	41.9%	65.45	65.58	69.16	5.7%	12.79	32.71	59.27	363.4%
Peru	98.5	99.04	102.2	3.8%	74.79	90.95	98.3	31.4%	34.48	38.01	39.27	13.9%	19.7	31.3	38.58	95.8%
Venezuela (Bolivarian Rep. of)	89.85	112.2	104.3	16.1%	70.45	88.14	95.66	35.8%	68.65	62.15	58.17	-15.3%	12.29	26.46	49.2	300.3%
Ecuador	90.93	87.23	93.27	2.6%	70.92	73.42	82.23	15.9%	42.41	40.68	38.67	-8.8%	13.15	21.21	27.66	110.3%
Chile	100.7	99.02	99.91	-0.8%	85.47	99.41	101.5	18.8%	54.79	53.05	48.79	-11.0%	21.05	34.75	43.71	107.6%
Bolivia (Plurinational State of)	94.44	101.5	101.3	7.3%	74.43	86.9	92.67	24.5%	38.32	39.49	40.53	5.8%	12.53	22.07	32.97	163.1%
Paraguay	77.53	89.24	106	36.7%	55.26	57.58	79.08	43.1%	28.55	29.78	33.84	18.5%	18.12	23.29	31.92	76.2%
Uruguay	108	98.85	101.6	-5.9%	67.83	85.29	94.85	39.8%	62.64	59.49	61.15	-2.4%	15.19	31.09	60.09	295.6%
Guyana	122	102.2	102.2	-16.2%	70.49	101.9	102.6	45.6%	11.22	20.82	29.71	164.8%	3.569	13.5	25.92	626.3%
Suriname	90.17	92.23	105.1	16.6%	55.26	79.32	99.44	79.9%	12.37	28.37	38.43	210.7%	10.98	25.8	41.59	278.8%
America-South	**102.7**	**110.1**	**106.5**	**3.7%**	**82.43**	**91.25**	**94.15**	**14.2%**	**41.8**	**44.03**	**45.23**	**8.2%**	**22.35**	**35.82**	**48.61**	**117.5%**

Education

Base Case: Countries in Descending Year 2060 Population Sequence	Lower Secondary Enrollment Rate, Gross				Upper Secondary Enrollment Rate, Gross				Tertiary Enrollment Rate, Gross				Knowledge Society Index			
	Total Enrolled as % of Nominal Age Population				Total Enrolled as % of Nominal Age Population				Total Enrolled as % of Nominal Age Population				Index: 0–100			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA																
China	92.31	106.1	99.91	8.2%	65.66	99.05	102.3	55.8%	24.53	37.13	53.27	117.2%	24.96	45.86	87.53	250.7%
Japan	101.7	97.88	99.24	-2.4%	100.1	100.2	102.6	2.5%	58.03	64.74	70.46	21.4%	74.45	99.84	112.5	51.1%
Korea, Rep. of	98.75	100	99.96	1.2%	95.55	99.95	99.97	4.6%	84.86	86.74	82.61	-2.7%	77.14	107.6	115.3	49.5%
Korea, Dem. People's Rep. of	39.31	75.76	90.85	131.1%	12.57	34.3	53.28	323.9%	2.683	14.92	22.15	725.6%	2.288	11.11	18.49	708.1%
Taiwan, China	113.6	98.55	98.3	-13.5%	113.3	96.97	97.17	-14.2%	53.96	59.36	61.55	14.1%	59.42	78.63	90.79	52.8%
Hong Kong SAR, China	96.09	103.5	100.5	4.6%	72.01	103.7	99.95	38.8%	56.62	68.01	66.46	17.4%	23.05	55.6	68.93	199.0%
Mongolia	95.26	121.4	100.9	5.9%	86.8	119	104.1	19.9%	52.69	57.27	57.76	9.6%	33.67	43.71	51.81	53.9%
Asia-East	**92.79**	**104.7**	**99.7**	**7.4%**	**69.33**	**98.16**	**101.3**	**46.1%**	**29.41**	**40.74**	**54.85**	**86.5%**	**56.09**	**62.66**	**91.33**	**62.8%**
India	76.76	99.2	99.57	29.7%	47.06	72.59	89.59	90.4%	13.48	28.08	38.76	187.5%	15.4	31.51	48.9	217.5%
Pakistan	43.68	66.57	88.98	103.7%	24.87	35.65	58.79	136.4%	6.405	17.78	25.75	302.0%	12.43	18.02	26.67	114.6%
Bangladesh	56.38	79.2	89.35	58.5%	31.48	52.43	81.85	160.0%	7.855	17.69	30.77	291.7%	11.44	20.38	33.97	196.9%
Afghanistan	52.37	71.79	87.63	67.3%	23.92	31.02	51.45	115.1%	3.597	12.53	22.16	516.1%	1.463	9.678	18.84	1187.8%
Iran, Islamic Rep. of	99.52	106.2	109.5	10.0%	73.47	92.05	97.57	32.8%	36.48	42.25	42.79	17.3%	26.75	39.07	43.57	62.9%
Nepal	67.09	85.7	94.91	41.5%	24.22	40.83	61.58	154.3%	5.547	12.43	19.47	251.0%	10.42	15.8	22.44	115.4%
Uzbekistan	96.53	108.9	106.3	10.1%	119.9	102	103.3	-13.8%	9.777	26.31	33.26	240.2%	10.37	22.3	31.23	201.2%
Sri Lanka	107.6	104.3	102.5	-4.7%	71.67	92.99	97.74	36.4%	5.325	19.96	32.4	508.5%	1.978	17.02	33.31	1584.0%
Kazakhstan	111.6	103.4	100.2	-10.2%	85.01	102.1	100.2	17.9%	40.14	50.57	53.21	32.6%	38.55	57.06	59.57	54.5%
Tajikistan	94.76	87.61	101.2	6.8%	58.87	51.04	77.8	32.2%	19.75	22.1	35.6	80.3%	10.95	14.5	25.68	134.5%
Kyrgyz Rep.	92.11	93.27	99.1	7.6%	64.93	72.06	84.41	30.0%	50.89	55.19	60.45	18.8%	41.45	41.95	47.13	13.7%
Turkmenistan	81.07	102.3	102	25.8%	69.28	96.88	98.25	41.8%	19.48	44.1	51.76	165.7%	15.57	61.79	71.07	356.5%
Bhutan	74.03	82.46	93.45	26.2%	38.42	58.38	86.19	124.3%	6.51	23.26	37.87	481.7%	3.895	21.34	40.41	937.5%
Maldives	122.4	133.9	141.4	15.5%	17.78	34.35	65.24	266.9%	20.72	25.63	33.01	59.3%	15.34	19.2	27.08	76.5%
Asia-South Central	**73.03**	**92.99**	**97.25**	**33.2%**	**45.67**	**66.32**	**83.47**	**82.8%**	**13.16**	**25.92**	**35.53**	**170.0%**	**16.34**	**31.45**	**47.27**	**189.3%**
Indonesia	89.25	87.8	91.57	2.6%	65.67	89.06	92.58	41.0%	21.26	28.95	32.8	54.3%	11.12	22.77	29.83	168.3%
Philippines	88.29	98.82	103.1	16.8%	64.56	78.77	90.84	40.7%	28.68	33.32	40.32	40.6%	22.66	28.25	37.57	65.8%
Vietnam	80.44	104.1	103.2	28.3%	47.32	68.48	75.35	59.2%	9.704	23.61	29.68	205.9%	9.786	18.88	26.57	171.5%
Thailand	90.22	117.6	116.8	29.5%	62.8	84.93	91.57	45.8%	45.03	45.92	45.38	0.8%	27.22	35.44	42.54	56.3%
Myanmar	60.17	72.83	92.72	54.1%	37.96	50.94	79.55	109.6%	10.72	17.54	28.74	168.1%	7.759	14.59	26.47	241.2%
Malaysia	92.66	106	103.9	12.1%	49.67	75.06	86.26	73.7%	36.44	40.46	46.7	28.2%	17.02	32.99	55.01	223.2%
Cambodia	58.24	71.21	87.83	50.8%	23.28	43.24	63.89	174.4%	7.023	17.85	27.92	297.6%	5.937	16.36	27.12	356.8%
Lao People's Democratic Rep.	52.79	78.99	89.62	69.8%	34.36	69.53	87.11	153.5%	13.37	25.14	34.15	155.4%	6.454	20.05	34.21	430.1%
Singapore	81.17	102.2	101.4	24.9%	111.3	101.2	100.4	-9.8%	43.81	62.2	67.09	53.1%	68.15	85.83	92.92	36.3%
Timor-Leste	59.83	72.06	88.17	47.4%	61.31	66.55	78.57	28.2%	15.18	20.99	27.52	81.3%	8.421	14.66	22.98	172.9%
Brunei Darussalam	115.9	99.02	98.1	-15.4%	84.89	92.93	93.45	10.1%	17.17	34.85	47.9	179.0%	14.03	38.78	53.45	281.0%
Asia-South Eastern	**84.26**	**94.31**	**98.33**	**16.7%**	**58.26**	**78.48**	**87.4**	**50.0%**	**23.01**	**30.16**	**35.47**	**54.2%**	**25.75**	**33.61**	**41.28**	**60.3%**

Education

Base Case: Countries in Descending Year 2060 Population Sequence	Lower Secondary Enrollment Rate, Gross: Total Enrolled as % of Nominal Age Population				Upper Secondary Enrollment Rate, Gross: Total Enrolled as % of Nominal Age Population				Tertiary Enrollment Rate, Gross: Total Enrolled as % of Nominal Age Population				Knowledge Society Index: Index: 0–100			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA continued																
Turkey	91.12	100.2	99.99	9.7%	72.48	86.29	91.48	26.2%	38.36	41.18	44.2	15.2%	33.35	40.82	50.26	50.7%
Iraq	63.33	86.36	100	57.9%	38.56	58.91	78.49	103.6%	15.53	25.79	33.97	118.7%	13.53	23.65	33.59	148.3%
Yemen, Rep. of	50.57	77.37	93.08	84.1%	39.74	59.91	80.39	102.3%	10.2	18.04	24.87	143.8%	6.917	14.13	21.06	204.5%
Saudi Arabia	102.3	101.4	99.56	-2.7%	91.37	100.2	98.03	7.3%	32.79	42.2	47.56	45.0%	11.35	36.82	50.77	347.3%
Syrian Arab Rep.	98.01	98.09	99.23	1.2%	36.08	48.87	66.7	84.9%	14.86	23.4	32.68	119.9%	10.9	19	31.34	187.5%
Jordan	94.88	96.03	102	7.5%	74.22	82.25	101.1	36.2%	40.64	40.68	49.59	22.0%	23.07	29.53	45.82	98.6%
Israel	72.6	90.45	99.93	37.6%	108	91.76	99.84	-7.6%	59.76	66.58	70.71	18.3%	90.31	121.1	129.1	43.0%
Palestine	89.01	90.56	105.1	18.1%	80.32	60.74	83.5	4.0%	45.69	37.35	34.91	-23.6%	16.09	17.44	23.62	46.8%
Azerbaijan	100.9	105.2	99.96	-0.9%	113.4	103.5	98.66	-13.0%	19.06	32.04	36.46	91.3%	18.88	29.83	35.23	86.6%
United Arab Emirates	101	101.4	100.2	-0.8%	86.68	98.66	99.77	15.1%	29.88	59.17	64.88	117.1%	59.75	83.12	93.65	56.7%
Kuwait	97.24	101.5	99.61	2.4%	79.51	102.3	99.46	25.1%	18.89	62.25	71.33	277.6%	17.24	57.16	71.47	314.6%
Lebanon	88.63	93.42	99.73	12.5%	75.37	91.76	101.9	35.2%	52.51	52.57	56.25	7.1%	38.16	46.09	55.27	44.8%
Oman	88.35	103.8	99.5	12.6%	91.04	116.5	107.6	18.2%	14.51	33.24	42.65	193.9%	28.18	55.95	63.49	125.3%
Armenia	98.35	105.4	100.2	1.9%	82.62	97.14	96.82	17.2%	50.07	49.05	48.67	-2.8%	30.2	35.45	43.03	42.5%
Georgia	95.54	98.72	99.32	4.0%	89.5	91.03	93.86	4.9%	25.51	35.56	39.74	55.8%	20.54	26.95	32.86	60.0%
Qatar	102.7	101.6	99.25	-3.4%	75.87	96.03	98.37	29.7%	10.78	41.79	60	456.6%	5.267	35.96	57.97	1000.6%
Bahrain	101.2	99.1	98.84	-2.3%	91.77	96.56	99.09	8.0%	51.21	59.75	58.04	13.3%	50.93	73.92	79.89	56.9%
Cyprus	101.3	99.85	99.85	-1.4%	95.44	99.88	100.3	5.1%	42.68	45.78	47.1	10.4%	35.49	43.95	48.01	35.3%
Asia-West	**85.26**	**93.92**	**98.86**	**16.0%**	**67.25**	**76.69**	**86.3**	**28.3%**	**28.92**	**34.73**	**39.33**	**36.0%**	**35.33**	**52.56**	**61.54**	**74.2%**
Australia	113.6	103.8	103.6	-8.8%	140	100.7	100.6	-28.1%	76.94	80.33	76.39	-0.7%	71.18	95.55	97.83	37.4%
Papua New Guinea	19.11	59.98	108	465.1%	16.83	32.66	71.89	327.2%	2.03	16.29	26.93	1226.6%	2.624	12.78	24.62	838.3%
New Zealand	103.9	97.07	98.53	-5.2%	134.8	100.7	102.8	-23.7%	78.41	73.3	77.18	-1.6%	54.38	63.31	93.59	72.1%
Solomon Islands	53.79	65.83	80.83	50.3%	19.12	25.26	37.78	97.6%	15.78	19.28	22.07	39.9%	8.549	14.01	18.18	112.7%
Fiji	93.86	108.4	104.6	11.4%	62.49	75.35	85.32	36.5%	15.42	21.81	29.75	92.9%	11.88	17.22	27.12	128.3%
Vanuatu	46.34	60.47	79.98	72.6%	45.84	58.8	83	81.1%	4.777	14.57	25.33	430.2%	3.355	11.9	22.88	582.0%
Micronesia (Federated States of)	99.52	104.6	128.2	28.8%	74.04	70.97	97.36	31.5%	14.1	18.16	25.45	80.5%	8.956	13.86	21.15	136.2%
Tonga	108.3	92.44	106.2	-1.9%	90.59	86.39	108.4	19.7%	6.411	14.33	27.73	332.5%	3.443	10.83	25.08	628.4%
Samoa	96.19	99.76	104.4	8.5%	67.34	75.01	96.49	43.3%	7.442	15.66	28.59	284.2%	9.11	16.39	29.31	221.7%
Oceania	**92.15**	**91.56**	**103.6**	**12.4%**	**110.5**	**81.91**	**91.27**	**-17.4%**	**58.98**	**60.69**	**60.25**	**2.2%**	**68.59**	**90.75**	**94.47**	**37.7%**

Education

Base Case: Countries in Descending Year 2060 Population Sequence	Lower Secondary Enrollment Rate, Gross				Upper Secondary Enrollment Rate, Gross				Tertiary Enrollment Rate, Gross				Knowledge Society Index			
	Total Enrolled as % of Nominal Age Population				Total Enrolled as % of Nominal Age Population				Total Enrolled as % of Nominal Age Population				Index: 0–100			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
EUROPE																
Russian Federation	85.15	107.4	105.2	23.5%	84.2	104.3	103.6	23.0%	74.2	73.05	67.27	-9.3%	61.78	75.08	78.19	26.6%
Ukraine	95.94	106.6	102.2	6.5%	91.47	98.75	95.56	4.5%	79.45	72.55	62.36	-21.5%	42.08	50.11	54.1	28.6%
Poland	99.57	97.7	98.03	-1.5%	99.57	97.12	97.8	-1.8%	69.45	67.71	65.74	-5.3%	47.27	59.73	73.17	54.8%
Romania	101.9	102.7	101.1	-0.8%	83.81	93.34	95.85	14.4%	65.56	61.22	57.2	-12.8%	45.13	49.12	54.25	20.2%
Czech Rep.	99.21	99.41	98.85	-0.4%	91.25	98.72	99.26	8.8%	58.22	55.84	55.91	-4.0%	51.49	57.97	66.29	28.7%
Belarus	95.68	101	100.7	5.2%	78.43	96.13	96.89	23.5%	73.65	69.05	63.35	-14.0%	28.61	41.16	55.28	93.2%
Hungary	99.24	101.5	99.02	-0.2%	95.77	105.3	102.1	6.6%	65.01	60.63	56.06	-13.8%	38.73	46.41	56.51	45.9%
Bulgaria	86.39	101.2	101.5	17.5%	90.43	88.92	96	6.2%	51.04	48.92	45.97	-9.9%	28.42	34.5	40.79	43.5%
Slovak Rep.	93.74	100.5	99.78	6.4%	90.42	95.49	97.71	8.1%	53.62	54.27	55.22	3.0%	35.98	48.69	60.7	68.7%
Moldova, Rep. of	89.29	99.88	100.1	12.1%	85.63	96.29	99.59	16.3%	38.22	36.84	37.91	-0.8%	28.74	32.59	39.29	36.7%
Europe-East	**91.5**	**104.5**	**102.6**	**12.1%**	**88.05**	**100.6**	**100.4**	**14.0%**	**71.45**	**68.77**	**63.62**	**-11.0%**	**51.33**	**64.79**	**70.97**	**38.3%**
United Kingdom	103.1	97.82	99.99	-3.0%	96.03	96.22	99.87	4.0%	57.35	60.58	68.51	19.5%	51.33	73.05	94.1	83.3%
Sweden	103.2	100.9	100.3	-2.8%	103.8	100.1	100.1	-3.6%	71.03	80.95	81.91	15.3%	73.03	104.1	111.3	52.4%
Denmark	117.5	98.65	99.55	-15.3%	119.7	98.96	99.63	-16.8%	78.04	79.96	79.54	1.9%	52.41	82.24	99.4	89.7%
Ireland	105.3	100.2	99.35	-5.7%	129	107.4	108	-16.3%	58.24	63.49	65.03	11.7%	59.07	81.05	85.3	44.4%
Norway	96.11	99.66	99.48	3.5%	127.5	99.84	99.79	-21.7%	73.13	77.55	73.54	0.6%	57.94	75.35	80.51	39.0%
Finland	102.4	98.61	99.56	-2.8%	118.2	98.84	99.61	-15.7%	89.64	89.43	86.42	-3.6%	78.95	101.5	110.3	39.7%
Lithuania	99.54	100.1	99.36	-0.2%	97.55	99.26	98.65	1.1%	77.36	71.16	66.52	-14.0%	49.18	54.09	64.64	31.4%
Latvia	101	99.8	99.11	-1.9%	95.69	98.82	99.06	3.5%	69.29	66.41	65.6	-5.3%	42.4	50.18	61.61	45.3%
Estonia	102.4	100.2	99.4	-2.9%	96.87	98.64	98.66	1.8%	63.7	65.39	71.4	12.1%	44.55	56.81	83.69	87.9%
Iceland	100.7	99.16	99.72	-1.0%	117.4	103.2	104.6	-10.9%	73.08	77.43	73.52	0.6%	69.72	99.05	103.6	48.6%
Europe-North	**103.5**	**98.54**	**99.88**	**-3.5%**	**102.4**	**97.82**	**100.3**	**-2.1%**	**63.45**	**66.61**	**71.28**	**12.3%**	**56.18**	**79.16**	**95.61**	**70.2%**
Italy	102.3	100.1	100	-2.2%	99.44	99.82	99.93	0.5%	67.42	64.65	66.36	-1.6%	46.19	53.92	73.18	58.4%
Spain	117.2	98.07	98.78	-15.7%	125	98.1	98.68	-21.1%	70.59	66.91	67.75	-4.0%	46.37	55.7	78.76	69.9%
Greece	104.3	97.06	99.82	-4.3%	99.33	93.55	99.64	0.3%	90.64	75.15	70.63	-22.1%	36.93	39.21	53.26	44.2%
Portugal	118.2	114.3	101.3	-14.3%	89.62	103.2	100.3	11.9%	60.19	58.16	59.25	-1.6%	58	56.54	66.74	15.1%
Serbia	99.3	107.4	105.9	6.6%	84.2	94.26	96.49	14.6%	49.85	48.62	45.08	-9.6%	28.21	37.9	45.95	62.9%
Croatia	101.9	101	100.1	-1.8%	87.05	100.3	100	14.9%	49.26	47.46	46.49	-5.6%	38.45	42.34	48.99	27.4%
Bosnia and Herzegovina	106.4	118.7	116.8	9.8%	77.3	88.66	92.39	19.5%	36.98	41.22	41.4	12.0%	21.58	32.32	38.84	80.0%
Albania	92.75	108.6	104.4	12.6%	52.92	81.06	84.77	60.2%	19.05	27.77	34.04	78.7%	13.62	26.57	36.34	166.8%
Macedonia, TFYR	91.94	101.8	99.35	8.1%	88.52	99.62	98.95	11.8%	16.77	29.55	33.8	101.6%	16.99	22.02	29.31	72.5%
Slovenia	95.51	101	100.6	5.3%	97.72	98.2	98.83	1.1%	82.61	78.15	72.16	-12.6%	52.49	63.37	75.73	44.3%
Montenegro	88.92	105.9	106.3	19.5%	93.1	84.86	87.27	-6.3%	37.08	37.14	37.63	1.5%	32.31	34.85	39.63	22.7%
Malta	99.1	105.2	106.4	7.4%	103	102	102	-1.0%	32.18	37.63	46.39	44.2%	18.73	32.66	50.34	168.8%
Europe-South	**107.6**	**101.3**	**100.5**	**-6.6%**	**103.7**	**98.02**	**98.78**	**-4.7%**	**65.79**	**62.64**	**63.35**	**-3.7%**	**45.84**	**53.12**	**72.31**	**57.7%**
Germany	100.2	103.3	99.12	-1.1%	104.4	106.7	106.1	1.6%	46.23	53.69	62.53	35.3%	58.43	75.5	95.94	64.2%
France	110	99.59	99.48	-9.6%	117.3	99.48	99.44	-15.2%	54.56	56.99	63.97	17.2%	64.96	76.25	96.23	48.1%
Netherlands	127.1	106.6	106.5	-16.2%	114.3	114.4	113.7	-0.5%	60.59	63.79	67.9	12.1%	58.78	75.16	88.13	49.9%
Belgium	109.8	102.7	102.4	-6.7%	107.6	100.8	100.7	-6.4%	62.97	63.21	67.58	7.3%	50.41	66.63	89.24	77.0%
Switzerland	111.5	102	101.2	-9.2%	84.75	100.8	100.6	18.7%	49.4	56.53	63.59	28.7%	63.17	83.02	95.05	50.5%
Austria	101.6	98.85	99.4	-2.2%	98.54	99.36	99.72	1.2%	54.71	67.75	76.65	40.1%	52.87	75.63	93	75.9%
Luxembourg	107.9	101.4	100.3	-7.0%	86.67	99.93	100.2	15.6%	9.958	32.27	55.88	461.2%	21.15	46.34	73.58	247.9%
Europe-West	**106.9**	**102**	**100.3**	**-6.2%**	**108.6**	**103.9**	**103.5**	**-4.7%**	**51.64**	**56.99**	**64.45**	**24.8%**	**59.87**	**75.4**	**94.61**	**58.0%**

Infrastructure

Base Case

Source: International Futures Model Version 6.61, Jan 2013

	Roads															
	Roads per Capita				Road Network Density				Population Living within 2 Km of an All-Season Road				Paved Roads			
	Kilometers per Million Persons				Km per 10 Sq Km Land Area				Percent of Rural Population				Percent of Total			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	5117	5226	5839	14.1%	2.709	3.468	4.339	60.2%	71.36	75.28	81.42	14.1%	58.73	70.89	77.92	32.7%
Africa	2287	2458	3186	39.3%	0.8	1.443	2.674	234.3%	44.29	52.7	63.66	43.7%	26.1	48.04	62.28	138.6%
Americas	12058	11606	12005	-0.4%	2.917	3.459	3.894	33.5%	70.74	81.57	88.37	24.9%	49.81	62.66	70.01	40.6%
Asia with Oceania	3362	3749	4497	33.8%	3.543	4.761	6.001	69.4%	77.01	82.3	89.42	16.1%	58.1	74.6	83.6	43.9%
Europe	10285	12229	15297	48.7%	3.393	3.864	4.35	28.2%	89.52	96.05	98.53	10.1%	83.35	86.83	89	6.8%
World	5117	5226	5839	14.1%	2.709	3.468	4.339	60.2%	71.36	75.28	81.42	14.1%	58.73	70.89	77.92	32.7%
Africa-Eastern	1817	1734	2416	33.0%	0.962	1.664	3.434	257.0%	39.65	49.65	64.72	63.2%	21.9	37.59	59.31	170.8%
Africa-Middle	2540	2526	2813	10.7%	0.504	0.919	1.592	215.9%	29.57	34.76	42.39	43.4%	5.812	25.35	46.09	693.0%
Africa-Northern	1818	3665	6880	278.4%	0.476	1.32	2.837	496.0%	57.02	77.63	90.16	58.1%	72.74	78.29	73.31	0.8%
Africa-Southern	8091	8592	9049	11.8%	1.749	2.069	2.363	35.1%	77.2	82.16	88.93	15.2%	20.23	45.29	58.67	190.0%
Africa-Western	1920	1852	2183	13.7%	0.97	1.672	2.981	207.3%	45.14	51.7	59.61	32.1%	15.62	41.48	62.22	298.3%
Africa	2287	2458	3186	39.3%	0.8	1.443	2.674	234.3%	44.29	52.7	63.66	43.7%	26.1	48.04	62.28	138.6%
America-Caribbean	2705	3778	5021	85.6%	5.023	8.384	11.65	131.9%	55.26	75.69	87.26	57.9%	65.96	73.62	78.69	19.3%
America-Central	2767	3643	4338	56.8%	2.313	4.535	6.628	186.6%	55.77	67.46	78.22	40.3%	24.75	55.45	68.27	175.8%
America-North	18455	16499	16236	-12.0%	4.136	4.502	4.864	17.6%	82.26	90.86	96.16	16.9%	61.3	68.71	73.35	19.7%
America-South	6665	7844	8863	33.0%	1.499	2.161	2.596	73.2%	63.84	76.01	82.78	29.7%	13.63	48.01	62.42	358.0%
Americas	12058	11606	12005	-0.4%	2.917	3.459	3.894	33.5%	70.74	81.57	88.37	24.9%	49.81	62.66	70.01	40.6%
Asia-East	3498	4242	5898	68.6%	4.78	6.016	7.498	56.9%	96.42	99.17	98.99	2.7%	59.8	78.12	85.99	43.8%
Asia-South Central	3109	3163	3404	9.5%	5.197	6.932	8.446	62.5%	65.17	76.93	88.02	35.1%	59.61	75.69	86.88	45.7%
Asia-South East	1989	2731	3600	81.0%	2.701	4.584	6.352	135.2%	76.37	85.01	92.18	20.7%	49.4	68.39	77.4	56.7%
Asia-West	4284	4934	5824	35.9%	2.067	3.474	5.053	144.5%	58.12	64.36	75.77	30.4%	63.45	78.78	85.42	34.6%
Oceania	26399	22133	20561	-22.1%	1.111	1.226	1.342	20.8%	76.28	80.89	88.02	15.4%	44.8	48.81	51.55	15.1%
Asia with Oceania	3362	3749	4497	33.8%	3.543	4.761	6.001	69.4%	77.01	82.3	89.42	16.1%	58.1	74.6	83.6	43.9%
Europe-East	7741	10372	15412	99.1%	1.26	1.505	1.885	49.6%	85.47	93.8	97.25	13.8%	75.81	83.68	87.41	15.3%
Europe-North	16491	19627	20854	26.5%	9.969	12.7	13.7	37.4%	92.1	98.36	99.87	8.4%	64.9	72.28	76.33	17.6%
Europe-South	10036	10943	13581	35.3%	11.84	12.33	13.26	12.0%	91.3	95.29	98.06	7.4%	94.99	95.65	95.98	1.0%
Europe-West	11015	11425	12784	16.1%	19.14	19.97	20.92	9.3%	94.45	99.19	100	5.9%	97.72	98.39	98.73	1.0%
Europe	10285	12229	15297	48.7%	3.393	3.864	4.35	28.2%	89.52	96.05	98.53	10.1%	83.35	86.83	89	6.8%

Infrastructure

Base Case: Countries in Year 2060 Descending Population Sequence	Roads: Roads per Capita (Kilometers per Million Persons) 2010	2035	2060	% Chg	Road Network Density (Km per 10 Sq Km Land Area) 2010	2035	2060	% Chg	Population Living within 2 Km of an All-Season Road (Percent of Rural Population) 2010	2035	2060	% Chg	Paved Roads (Percent of Total) 2010	2035	2060	% Chg
AFRICA																
Ethiopia	634.8	1384	2585	307.2%	0.489	1.753	4.341	787.7%	38.65	54.42	72.87	88.5%	13.67	36.66	64.01	368.3%
Tanzania, United Rep. of	1944	1725	2963	52.4%	0.988	1.712	4.538	359.3%	44.04	52.34	74.59	69.4%	6.67	33.17	66.25	893.3%
Uganda	2093	1444	1883	-10.0%	3.541	5.172	11.03	211.5%	30.41	42.45	62.75	106.3%	23	46.97	75.63	228.8%
Kenya	1516	1541	2001	32.0%	1.088	1.97	3.691	239.2%	45.88	51.88	62.39	36.0%	14.33	34.9	54.65	281.4%
Madagascar	2472	1546	1184	-52.1%	0.857	1.023	1.339	56.2%	24.89	27.88	32.45	30.4%	11.6	17.38	25.15	116.8%
Mozambique	1295	1868	3598	177.8%	0.386	0.97	2.643	584.7%	34.05	47.53	65.93	93.6%	20.78	29.34	52.46	152.5%
Malawi	984.6	968	1263	28.3%	1.639	3.308	7.139	335.6%	39.5	46.71	58.2	47.3%	45.02	58.02	64.19	42.6%
Zambia	5037	3663	3693	-26.7%	0.898	1.242	1.916	113.4%	67.39	73.08	79.86	18.5%	22	31.62	44.54	102.5%
Somalia	2365	1800	2725	15.2%	0.352	0.52	1.235	250.9%	34.03	38.49	52.37	53.9%	11.8	16.9	31.26	164.9%
Rwanda	1362	1178	1669	22.5%	5.678	8.74	18.28	221.9%	59	66.26	82.66	40.1%	19	52.27	76.61	303.2%
Zimbabwe	7730	6037	5336	-31.0%	2.514	2.879	3.168	26.0%	52.94	55.46	58.77	11.0%	47.4	56.28	59.97	26.5%
Burundi	1443	1037	912.7	-36.7%	4.798	5.677	7.155	49.1%	18.88	26.37	37.35	97.8%	10.44	25.12	44.82	329.3%
Eritrea	767.8	1321	2094	172.7%	0.397	1.216	2.759	595.0%	22.23	34.42	49.39	122.2%	21.8	26.69	38.99	78.9%
Comoros	1306	1193	1251	-4.2%	4.731	8.518	15.06	218.3%	72.96	75.86	82.86	13.6%	76.5	84.19	90.55	18.4%
Djibouti	3487	3672	4700	34.8%	1.322	1.819	2.591	96.0%	84.07	86.7	93.4	11.1%	45	54.6	57.28	27.3%
Mauritius	1625	4576	5844	259.6%	10.25	30.06	34.47	236.3%	73.54	100	100	36.0%	98	98.38	98.85	0.9%
Africa-Eastern	**1817**	**1734**	**2416**	**33.0%**	**0.962**	**1.664**	**3.434**	**257.0%**	**39.65**	**49.65**	**64.72**	**63.2%**	**21.9**	**37.59**	**59.31**	**170.8%**
Congo, Democratic Rep. of	2263	1555	1303	-42.4%	0.677	0.881	1.182	74.6%	29.64	33.37	40.17	35.5%	1.82	9.85	27.05	1386.3%
Angola	2708	4709	7195	165.7%	0.413	1.319	2.98	621.5%	50.09	69.48	85.39	70.5%	10.4	41.77	66.32	537.7%
Cameroon	1445	2045	2602	80.1%	0.61	1.449	2.649	334.3%	20.64	34.68	47.99	132.5%	17.04	33.08	47.18	176.9%
Chad	3476	2534	2772	-20.3%	0.318	0.462	0.884	178.0%	10.25	20.52	34.33	234.9%	1	12.09	27.1	2610.0%
Central African Rep.	5393	4082	3444	-36.1%	0.39	0.465	0.557	42.8%	37.45	39.96	44.12	17.8%	2.7	6.691	14.63	441.9%
Congo, Rep. of	4531	6089	8174	80.4%	0.498	1.072	1.834	268.3%	52.11	65.39	75.55	45.0%	9.7	30.61	46.87	383.2%
Gabon	6110	11615	14148	131.6%	0.356	1.014	1.519	326.7%	45.65	64.18	74.29	62.7%	11.97	35.3	45.2	277.6%
Equatorial Guinea	4156	12878	14605	251.4%	1.027	5.009	7.481	628.4%	73.19	100	100	36.6%	67.67	74.42	74.7	10.4%
São Tomé and Príncipe	1928	2336	2793	44.9%	3.333	6.888	11.55	246.5%	89.79	96.24	100	11.4%	68.1	80.54	86.66	27.3%
Africa-Middle	**2540**	**2526**	**2813**	**10.7%**	**0.504**	**0.919**	**1.592**	**215.9%**	**29.57**	**34.76**	**42.39**	**43.4%**	**5.812**	**25.35**	**46.09**	**693.0%**
Egypt, Arab Rep.	1192	2736	3776	216.8%	1.012	3.126	4.874	381.6%	81.88	95.81	100	22.1%	89.36	98.7	100	11.9%
Sudan	275.4	2751	11670	4137.5%	0.05	0.812	4.401	8702.0%	12.75	41.81	77.77	510.0%	36.3	45.76	55.27	52.3%
Algeria	3184	5639	6843	114.9%	0.474	1.087	1.419	199.4%	62.43	73.62	78.18	25.2%	74.03	80.21	82.35	11.2%
Morocco	1804	3102	4256	135.9%	1.309	2.831	4.138	216.1%	39.49	54.15	66.43	68.2%	70.32	83.18	86.74	23.4%
Tunisia	1841	4701	6718	264.9%	1.249	3.87	5.752	360.5%	43	65.1	79.37	84.6%	75.18	81.49	83.98	11.7%
Libya	12704	13488	15321	20.6%	0.473	0.692	0.903	90.9%	81.39	87.86	89.96	10.5%	57.2	66.96	69.75	21.9%
Africa-Northern	**1818**	**3665**	**6880**	**278.4%**	**0.476**	**1.32**	**2.837**	**496.0%**	**57.02**	**77.63**	**90.16**	**58.1%**	**72.74**	**78.29**	**73.31**	**0.8%**

Infrastructure

Base Case: Countries in Year 2060 Descending Population Sequence	Roads: Roads per Capita (Kilometers per Million Persons)				Roads: Road Network Density (Km per 10 Sq Km Land Area)				Roads: Population Living within 2 Km of an All-Season Road (Percent of Rural Population)				Roads: Paved Roads (Percent of Total)			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA continued																
South Africa	7263	7602	7882	8.5%	2.982	3.38	3.764	26.2%	78.95	84.73	91.74	16.2%	20.3	51.28	67.33	231.7%
Namibia	30035	25555	23845	-20.6%	0.807	0.999	1.121	38.9%	61.22	69.02	74.84	22.2%	14.72	18.74	27.09	84.0%
Lesotho	2849	2969	3848	35.1%	1.957	2.494	3.473	77.5%	72.24	77.27	84.66	17.2%	18.3	31.19	44.03	140.6%
Botswana	13036	17063	21219	62.8%	0.455	0.732	0.996	118.9%	83.16	93.7	100	20.3%	32.6	40.99	43.09	32.2%
Swaziland	2990	4142	5173	73.0%	2.09	4.027	5.947	184.5%	67.44	76.96	85.2	26.3%	29.99	46.58	57.42	91.5%
Africa-Southern	**8091**	**8592**	**9049**	**11.8%**	**1.749**	**2.069**	**2.363**	**35.1%**	**77.2**	**82.16**	**88.93**	**15.2%**	**20.23**	**45.29**	**58.67**	**190.0%**
Nigeria	1220	1547	2202	80.5%	2.121	4.644	9.542	349.9%	52.64	65.21	80.29	52.5%	15	56.59	79.53	430.2%
Niger	1214	1330	1354	11.5%	0.152	0.384	0.795	423.0%	37.67	42.69	47	24.8%	20.65	23.2	24.75	19.9%
Côte d'Ivoire	3896	2525	2087	-46.4%	2.643	3.072	3.848	45.6%	53.17	54.83	59.4	11.7%	7.93	29.58	50.96	542.6%
Burkina Faso	5675	3751	2727	-51.9%	3.381	4.36	5.125	51.6%	26.65	36.06	46.36	74.0%	16	24.53	42.27	164.2%
Ghana	2368	2083	2899	22.4%	2.532	3.465	6.042	138.6%	65.35	71.53	85.64	31.0%	12.59	40.56	65.89	423.4%
Mali	1761	2166	2641	50.0%	0.192	0.469	0.933	385.9%	14.13	26.45	38.6	173.2%	24.57	36.89	42.19	71.7%
Senegal	1169	1699	2036	74.2%	0.781	2.066	3.751	380.3%	30.9	42.23	51.95	68.1%	32	37.92	49.49	54.7%
Guinea	2958	1978	1750	-40.8%	1.241	1.517	2.223	79.1%	21.4	29.06	38.09	78.0%	16.5	22.43	36	118.2%
Benin	2061	1533	1843	-10.6%	1.718	2.518	4.888	184.5%	31.46	38	51.36	63.3%	20	33.76	53.45	167.3%
Togo	1109	1084	1063	-4.1%	1.383	2.333	3.424	147.6%	21.04	28.16	35.61	69.2%	31	34.39	36.89	19.0%
Sierra Leone	1937	1649	2549	31.6%	1.578	2.343	5.208	230.0%	68.3	73.81	88.9	30.2%	8	27.37	55.9	598.8%
Liberia	2570	1926	2239	-12.9%	1.1	1.528	2.64	140.0%	64.43	70.2	79.55	23.5%	6.2	16.51	39.38	535.2%
Mauritania	4216	4553	4573	8.5%	0.138	0.253	0.373	170.3%	32.75	38.15	42.25	29.0%	26.85	29.85	32.9	22.5%
Gambia	2137	1624	2076	-2.9%	3.312	4.887	9.363	182.7%	46.65	51.77	63.86	36.9%	19.32	38.96	59.68	208.9%
Guinea-Bissau	2670	1929	1723	-35.5%	1.565	1.911	2.713	73.4%	51.06	51.71	53.6	5.0%	27.94	33	35.57	27.3%
Cape Verde	2632	4267	6009	128.3%	3.35	6.967	10.62	217.0%	89.34	100	100	11.9%	78	92.43	96.88	24.2%
Africa-Western	**1920**	**1852**	**2183**	**13.7%**	**0.97**	**1.672**	**2.981**	**207.3%**	**45.14**	**51.7**	**59.61**	**32.1%**	**15.62**	**41.48**	**62.22**	**298.3%**

Infrastructure

Base Case: Countries in Year 2060 Descending Population Sequence	Roads: Roads per Capita (Kilometers per Million Persons)				Road Network Density (Km per 10 Sq Km Land Area)				Population Living within 2 Km of an All-Season Road (Percent of Rural Population)				Paved Roads (Percent of Total)			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS																
Haiti	408.2	1048	1503	268.2%	1.509	5.471	9.31	517.0%	24.77	41.6	53.69	116.8%	24.3	46.54	59.66	145.5%
Dominican Rep.	1232	3932	5865	376.1%	2.608	10.78	17.79	582.1%	68.83	97.01	100	45.3%	49.4	76.47	85.05	72.2%
Cuba	2507	3746	6666	165.9%	2.638	3.854	5.847	121.6%	57.69	71.43	89.76	55.6%	49	57.65	67.24	37.2%
Puerto Rico	6838	6983	7374	7.8%	30.67	34.31	35.53	15.8%	98	100	100	2.0%	95	100	100	5.3%
Jamaica	8162	7233	7616	-6.7%	20.45	20.94	22.19	8.5%	93	94.31	99.29	6.8%	73.28	75.88	76.55	4.5%
Trinidad and Tobago	6186	8473	11229	81.5%	16.22	22.8	26.38	62.6%	91	100	100	9.9%	51.1	80.86	86.45	69.2%
Bahamas	7783	13370	15665	101.3%	2.69	5.448	6.384	137.3%	87.88	100	100	13.8%	57.4	63.94	64.08	11.6%
Barbados	6226	6644	8503	36.6%	37.21	39.32	43.32	16.4%	100	100	100	0.0%	100	99.94	100	0.0%
Saint Lucia	6954	7030	8435	21.3%	19.84	21.44	23.56	18.8%	89.59	94.73	100	11.6%	66.82	69.97	74.1	10.9%
Grenada	10837	8965	9062	-16.4%	33.15	36.02	40.9	23.4%	98	99.9	100	2.0%	60.96	65.02	72.86	19.5%
Saint Vincent and the Grenadines	7606	6651	6943	-8.7%	21.26	22.89	25.39	19.4%	97	99.16	100	3.1%	70	72.58	75.37	7.7%
America-Caribbean	**2705**	**3778**	**5021**	**85.6%**	**5.023**	**8.384**	**11.65**	**131.9%**	**55.26**	**75.69**	**87.26**	**57.9%**	**65.96**	**73.62**	**78.69**	**19.3%**
Guatemala	980.5	2256	3164	222.7%	1.315	5.192	9.908	653.5%	56.18	73.34	87.19	55.2%	34.5	60.32	74.33	115.4%
Honduras	1786	2858	3533	97.8%	1.215	2.993	4.569	276.0%	43.71	56	64.72	48.1%	20.4	44.82	56.6	177.5%
Nicaragua	3901	3392	3465	-11.2%	1.887	2.346	2.794	48.1%	29.75	38.64	48.24	62.2%	11.62	30.41	43.2	271.8%
El Salvador	1620	3192	4109	153.6%	4.84	12.07	16.93	249.8%	69.2	85.03	95.06	37.4%	19.8	66.77	79.7	302.5%
Costa Rica	8645	8430	8844	2.3%	7.856	9.518	10.37	32.0%	85.04	92.27	98.09	15.3%	25.95	60.43	72.86	180.8%
Panama	4041	7950	10759	166.2%	1.908	4.77	6.983	266.0%	84.04	100	100	19.0%	41.96	65.7	73.97	76.3%
Belize	8349	8112	10344	23.9%	1.259	1.792	2.671	112.2%	80.84	85.88	95.78	18.5%	17	31.66	44.69	162.9%
America-Central	**2767**	**3643**	**4338**	**56.8%**	**2.313**	**4.535**	**6.628**	**186.6%**	**55.77**	**67.46**	**78.22**	**40.3%**	**24.75**	**55.45**	**68.27**	**175.8%**
United States of America	21212	18499	17641	-16.8%	7.181	7.604	8.128	13.2%	87.58	94.86	100	14.2%	67.37	74.66	79.04	17.3%
Mexico	3411	4844	5796	69.9%	1.904	3.337	4.126	116.7%	62.28	72.71	79.19	27.2%	35.28	64.19	71.17	101.7%
Canada	41250	36311	35215	-14.6%	1.55	1.63	1.739	12.2%	98.82	100	100	1.2%	39.87	42.76	47.73	19.7%
America-North	**18455**	**16499**	**16236**	**-12.0%**	**4.136**	**4.502**	**4.864**	**17.6%**	**82.26**	**90.86**	**96.16**	**16.9%**	**61.3**	**68.71**	**73.35**	**19.7%**
Brazil	8960	9105	9424	5.2%	2.071	2.474	2.62	26.5%	56.66	67.37	74.79	32.0%	9.6	46.14	62.19	547.8%
Colombia	2796	4873	6194	121.5%	1.167	2.6	3.589	207.5%	82.12	95.36	100	21.8%	14.4	53.55	66.61	362.6%
Argentina	5689	8839	11175	96.4%	0.845	1.565	2.131	152.2%	81.86	95.04	100	22.2%	30	53.47	63.16	110.5%
Peru	2692	5818	7958	195.6%	0.62	1.751	2.681	332.4%	49.78	68.34	78.47	57.6%	13.88	48.5	62.55	350.6%
Venezuela (Bolivarian Rep. of)	3334	5797	8144	144.3%	1.09	2.498	3.922	259.8%	80.19	94.18	100	24.7%	33.6	56.81	70.06	108.5%
Ecuador	3206	4471	5370	67.5%	1.778	3.292	4.443	149.9%	76.24	85.74	90.89	19.2%	14.82	51.23	63.47	328.3%
Chile	4576	8219	10248	124.0%	1.055	2.206	2.787	164.2%	79.2	94	99.28	25.4%	22.45	54.03	62.5	178.4%
Bolivia (Plurinational State of)	8386	7796	7764	-7.4%	0.777	1.062	1.276	64.2%	50.32	57.74	65.02	29.2%	7.885	24.19	40.83	417.8%
Paraguay	5179	5153	6232	20.3%	0.842	1.205	1.722	104.5%	56.11	61.72	69.08	23.1%	50.8	60.12	62.35	22.7%
Uruguay	23162	25988	27503	18.7%	4.441	5.435	5.831	31.3%	89.64	100	100	11.6%	9.96	40.57	55.7	459.2%
Guyana	10473	11824	15990	52.7%	0.405	0.461	0.524	29.4%	49.39	54.07	61.29	24.1%	7.4	11.52	19.17	159.1%
Suriname	8198	15381	23273	183.9%	0.276	0.527	0.7	153.6%	83.92	95.34	100	19.2%	26.25	31.37	33.7	28.4%
America-South	**6665**	**7844**	**8863**	**33.0%**	**1.499**	**2.161**	**2.596**	**73.2%**	**63.84**	**76.01**	**82.78**	**29.7%**	**13.63**	**48.01**	**62.42**	**358.0%**

Infrastructure

Base Case: Countries in Year 2060 Descending Population Sequence	Roads — Roads per Capita: Kilometers per Million Persons				Road Network Density: Km per 10 Sq Km Land Area				Population Living within 2 Km of an All-Season Road: Percent of Rural Population				Paved Roads: Percent of Total			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA																
China	2993	3763	5443	81.9%	4.294	5.67	7.409	72.5%	97	100	100	3.1%	53.5	76.23	85.95	60.7%
Japan	9508	10592	13098	37.8%	33.24	33.57	34.25	3.0%	99	100	100	1.0%	80.11	87.73	89.62	11.9%
Korea, Rep. of	2168	4159	5857	170.2%	10.91	20.92	24.19	121.7%	92.8	100	100	7.8%	79.25	91.46	93.22	17.6%
Korea, Dem. People's Rep. of	1300	1674	2334	79.5%	2.591	3.624	4.955	91.2%	43.97	52.26	60.85	38.4%	6.4	37.61	54.67	754.2%
Taiwan, China	3969	3900	4635	16.8%	25.4	25.54	25.37	-0.1%	97.26	100	100	2.8%	91.97	93.29	93.31	1.5%
Hong Kong SAR, China	294.9	675.5	762.4	158.5%	19.89	52.61	58.41	193.7%	100	100	100	0.0%	100	99.98	99.98	-0.0%
Mongolia	18234	17931	18981	4.1%	0.317	0.401	0.466	47.0%	41.73	51.43	59.91	43.6%	3.5	10.01	19.32	452.0%
Asia-East	**3498**	**4242**	**5898**	**68.6%**	**4.78**	**6.016**	**7.498**	**56.9%**	**96.42**	**99.17**	**98.99**	**2.7%**	**59.8**	**78.12**	**85.99**	**43.8%**
India	3616	3512	3587	-0.8%	14.24	17.66	20.01	40.5%	69.89	83.13	94.77	35.6%	59.54	74	87.56	47.1%
Pakistan	1494	1394	1712	14.6%	3.36	4.789	7.445	121.6%	63.41	67.51	75.59	19.2%	65.36	74.62	77.86	19.1%
Bangladesh	1455	1474	1565	7.6%	18.38	23.65	26.78	45.7%	43.34	57.04	71.66	65.3%	9.5	61.86	85.86	803.8%
Afghanistan	1377	1633	2091	51.9%	0.646	1.528	3.172	391.0%	31.17	42.24	54.33	74.3%	29.3	43.99	53.88	83.9%
Iran, Islamic Rep. of	2697	5407	8016	197.2%	1.223	2.902	4.308	252.2%	69.43	85.88	94.42	36.0%	73.3	84.22	86.87	18.5%
Nepal	726.4	1240	1708	135.1%	1.513	3.625	5.73	278.7%	19.39	34.45	48.12	148.2%	53.94	56.98	60.49	12.1%
Uzbekistan	2891	3270	4632	60.2%	1.918	2.864	4.478	133.5%	65.25	74.58	84.92	30.1%	87.3	100	100	14.5%
Sri Lanka	4757	5166	5853	23.0%	15.51	19.36	21.99	41.8%	92	100	100	8.7%	81	91.89	94.87	17.1%
Kazakhstan	6127	11877	18085	195.2%	0.365	0.733	1.041	185.2%	85.87	99.67	100	16.5%	88.49	100	100	13.0%
Tajikistan	3927	3244	3199	-18.5%	1.984	2.432	2.956	49.0%	79.9	81.87	85.01	6.4%	82.7	100	100	20.9%
Kyrgyz Rep.	6339	5373	5801	-8.5%	1.773	2.114	2.587	45.9%	81.78	82.81	87.27	6.7%	91.1	100	100	9.8%
Turkmenistan	4636	11457	18585	300.9%	0.511	1.653	3.05	496.9%	85.6	100	100	16.8%	81.2	100	100	23.2%
Bhutan	11386	12063	12274	7.8%	2.097	2.87	3.241	54.6%	53.9	67.54	78.54	45.7%	62	88.34	96.67	55.9%
Maldives	281.2	2429	3547	1161.4%	2.933	31.79	47.76	1528.4%	69.73	100	100	43.4%	100	98.06	97.4	-2.6%
Asia-South Central	**3109**	**3163**	**3404**	**9.5%**	**5.197**	**6.932**	**8.446**	**62.5%**	**65.17**	**76.93**	**88.02**	**35.1%**	**59.61**	**75.69**	**86.88**	**45.7%**
Indonesia	2182	2793	3496	60.2%	2.802	4.368	5.691	103.1%	94	100	100	6.4%	56.94	65.51	73.83	29.7%
Philippines	2136	1918	2484	16.3%	6.709	8.642	12.91	92.4%	83.38	88.73	99.53	19.4%	20	63.69	81.06	305.3%
Vietnam	2112	2359	3116	47.5%	6.017	8.219	11.15	85.3%	89.26	96.22	100	12.0%	47.62	63.95	75.31	58.1%
Thailand	948	3717	5584	489.0%	1.264	5.027	6.733	432.7%	38.2	65.12	78.55	105.6%	98.5	100	100	1.5%
Myanmar	534.9	1727	3183	495.1%	0.413	1.555	2.875	596.1%	36.73	51.72	66.98	82.4%	11.85	33.16	51.97	338.6%
Malaysia	3535	5464	6932	96.1%	3.005	6.166	8.798	192.8%	86.3	100	100	15.9%	81.32	87.01	88.56	8.9%
Cambodia	2542	2660	3800	49.5%	2.167	2.992	4.762	119.8%	87.33	94.23	100	14.5%	6.29	38.11	60.89	868.0%
Lao People's Democratic Rep.	6388	6356	6746	5.6%	1.782	2.454	3.01	68.9%	70.42	80.31	89.23	26.7%	13.68	29.77	51.97	279.9%
Singapore	658.9	675.8	687.4	4.3%	48.4	60.3	61.73	27.5%	100	100	100	0.0%	100	99.98	100	0.0%
Timor-Leste	1962	1639	2265	15.4%	1.545	2.428	5.161	234.0%	90	94.08	100	11.1%	16.92	27.57	46.2	173.0%
Brunei Darussalam	7285	13684	14893	104.4%	5.64	14.23	17.6	212.1%	80.66	100	100	24.0%	81.12	83.86	83.96	3.5%
Asia-South Eastern	**1989**	**2731**	**3600**	**81.0%**	**2.701**	**4.584**	**6.352**	**135.2%**	**76.37**	**85.01**	**92.18**	**20.7%**	**49.4**	**68.39**	**77.4**	**56.7%**

Infrastructure

	Roads															
	Roads per Capita				Road Network Density				Population Living within 2 Km of an All-Season Road				Paved Roads			
	Kilometers per Million Persons				Km per 10 Sq Km Land Area				Percent of Rural Population				Percent of Total			
Base Case: Countries in Year 2060 Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA continued																
Turkey	4849	4808	5867	21.0%	4.771	5.704	7.201	50.9%	73.02	79.35	88.22	20.8%	88.74	93.57	95.29	7.4%
Iraq	1280	2316	3438	168.6%	0.952	3.243	6.931	628.0%	51.17	67.75	82.48	61.2%	84.3	96.77	100	18.6%
Yemen, Rep. of	2939	2265	2564	-12.8%	1.35	2.048	3.557	163.5%	23.24	34.49	48.38	108.2%	8.7	36.19	56.16	545.5%
Saudi Arabia	8518	10446	12785	50.1%	1.03	1.775	2.504	143.1%	76.5	87.64	94.08	23.0%	21.47	54.69	68.53	219.2%
Syrian Arab Rep.	3451	3976	5644	63.5%	4.063	6.986	12.02	195.8%	50.93	62.96	80.53	58.1%	90.25	96.75	99.99	10.8%
Jordan	1303	3090	4657	257.4%	0.894	3.576	7.02	685.2%	82.19	98.74	100	21.7%	100	100	100	0.0%
Israel	2445	4642	4343	77.6%	8.559	23.01	26.32	207.5%	90.99	100	100	9.9%	100	100	100	0.0%
Palestine	1383	1280	1422	2.8%	9.541	17.32	29.62	210.4%	59.86	64.89	74.31	24.1%	91.73	99.27	99.99	9.0%
Azerbaijan	5960	6842	8023	34.6%	6.408	8.942	10.8	68.5%	84.07	94.09	99.91	18.8%	50.6	68.74	74.32	46.9%
United Arab Emirates	870.5	11832	21429	2361.7%	0.491	8.45	15.04	2963.1%	78	100	100	28.2%	100	100	99.99	-0.0%
Kuwait	2348	8005	7971	239.5%	3.773	19.75	25.48	575.3%	85.61	100	100	16.8%	85	90.87	93.34	9.8%
Lebanon	1638	4398	5868	258.2%	6.813	21.06	27.29	300.6%	91.65	100	100	9.1%	95	98.93	99.38	4.6%
Oman	21334	25825	25951	21.6%	2.003	3.26	3.605	80.0%	86.12	99.04	100	16.1%	46	56.67	59.66	29.7%
Armenia	2516	4280	6321	151.2%	2.729	4.856	6.684	144.9%	86.35	96.35	100	15.8%	93.56	99.14	100	6.9%
Georgia	4844	6055	8051	66.2%	2.937	3.024	3.41	16.1%	87.97	91.89	97.14	10.4%	94.07	100	100	6.3%
Qatar	5026	13506	15919	216.7%	6.721	21.34	22.76	238.6%	86.15	100	100	16.1%	90	95.85	95.91	6.6%
Bahrain	5187	4467	5066	-2.3%	55.01	65.13	79.24	44.0%	99	100	100	1.0%	82.12	93.11	95.01	15.7%
Cyprus	14106	13718	16393	16.2%	13.43	13.94	15.1	12.4%	90.5	96.63	100	10.5%	64.94	72.1	75.08	15.6%
Asia-West	**4284**	**4934**	**5824**	**35.9%**	**2.067**	**3.474**	**5.053**	**144.5%**	**58.12**	**64.36**	**75.77**	**30.4%**	**63.45**	**78.78**	**85.42**	**34.6%**
Australia	36654	31712	29355	-19.9%	1.065	1.151	1.219	14.5%	98.47	100	100	1.6%	43.45	47.82	50.13	15.4%
Papua New Guinea	2844	3683	5056	77.8%	0.433	0.902	1.62	274.1%	66.57	75.58	84.71	27.2%	3.5	22.68	40.52	1057.7%
New Zealand	21660	19698	20072	-7.3%	3.59	3.797	4.064	13.2%	83.14	87.93	97.37	17.1%	66.2	69.66	72.64	9.7%
Solomon Islands	2600	3799	4317	66.0%	0.497	1.288	2.195	341.6%	75.64	84.52	89.05	17.7%	2.44	21.59	34.48	1313.1%
Fiji	4028	4935	6898	71.3%	1.883	2.465	3.084	63.8%	74.49	78.89	87.32	17.2%	49.2	51.27	54.07	9.9%
Vanuatu	4350	5598	6316	45.2%	0.878	1.886	2.906	231.0%	78.72	86.45	92.29	17.2%	23.9	30.9	39.26	64.3%
Micronesia (Federated States of)	2143	2933	3693	72.3%	3.429	7.62	13.06	280.9%	81.92	91.53	99.91	22.0%	17.5	45.06	59.31	238.9%
Tonga	6538	4370	4523	-30.8%	9.444	10.35	14.7	55.7%	87.3	86.54	95.3	9.2%	27	47.81	63.86	136.5%
Samoa	4413	5465	7470	69.3%	2.792	4.062	5.624	101.4%	76.08	82.92	93.31	22.6%	14.21	37.06	49.81	250.5%
Oceania	**26399**	**22133**	**20561**	**-22.1%**	**1.111**	**1.226**	**1.342**	**20.8%**	**76.28**	**80.89**	**88.02**	**15.4%**	**44.8**	**48.81**	**51.55**	**15.1%**

Infrastructure

	Roads															
	Roads per Capita				Road Network Density				Population Living within 2 Km of an All-Season Road				Paved Roads			
Base Case: Countries in Year 2060	Kilometers per Million Persons				Km per 10 Sq Km Land Area				Percent of Rural Population				Percent of Total			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
EUROPE																
Russian Federation	7049	10653	17150	143.3%	0.61	0.83	1.139	86.7%	87.86	97.37	100	13.8%	80.06	86.9	90.47	13.0%
Ukraine	3707	4974	9328	151.6%	2.928	3.185	4.872	66.4%	59.5	68.02	80.65	35.5%	97.82	100	100	2.2%
Poland	10075	11306	14103	40.0%	12.64	13.22	13.89	9.9%	95	100	100	5.3%	69.87	75.44	77.75	11.3%
Romania	9269	10739	15271	64.8%	8.642	8.936	10.37	20.0%	94.79	98.92	100	5.5%	50.4	59.36	65.63	30.2%
Czech Rep.	12506	13356	15470	23.7%	17.09	17.75	18.54	8.5%	97	100	100	3.1%	100	100	100	0.0%
Belarus	9829	12927	15561	58.3%	4.674	5.675	5.971	27.7%	75.47	87.25	95.18	26.1%	98.64	100	100	1.4%
Hungary	19894	23929	30704	54.3%	21.99	23	24.03	9.3%	98	100	100	2.0%	37.97	63.17	68.47	80.3%
Bulgaria	5331	7519	9965	86.9%	3.706	4.216	4.527	22.2%	98	100	100	2.0%	98.4	100	100	1.6%
Slovak Rep.	8090	8779	10635	31.5%	9.133	9.487	9.649	5.6%	90.05	96.17	100	11.0%	87.06	88.63	88.78	2.0%
Moldova, Rep. of	3577	3937	6165	72.4%	3.889	4.003	5.239	34.7%	70.77	72.92	82.66	16.8%	85.8	91.39	95.66	11.5%
Europe-East	**7741**	**10372**	**15412**	**99.1%**	**1.26**	**1.505**	**1.885**	**49.6%**	**85.47**	**93.8**	**97.25**	**13.8%**	**75.81**	**83.68**	**87.41**	**15.3%**
United Kingdom	6873	7103	7008	2.0%	17.69	19.79	20.03	13.2%	96	100	100	4.2%	100	100	100	0.0%
Sweden	68327	100507	109297	60.0%	15.63	24.33	26.59	70.1%	87.48	100	100	14.3%	34.36	54.87	63.08	83.6%
Denmark	13238	13218	14439	9.1%	17.36	18.41	20.51	18.1%	99	100	100	1.0%	100	100	100	0.0%
Ireland	21604	19114	18237	-15.6%	14.03	15.01	15.71	12.0%	93	100	100	7.5%	100	100	100	0.0%
Norway	19269	18967	20119	4.4%	3.083	3.438	3.812	23.6%	83.74	93.08	98.08	17.1%	80.7	84.96	85.5	5.9%
Finland	14745	15570	18860	27.9%	2.602	2.817	3.296	26.7%	83.21	89.67	99.58	19.7%	65.47	67.91	69.52	6.2%
Lithuania	24619	28284	36440	48.0%	13.05	13.51	14.68	12.5%	97	100	100	3.1%	29.43	51.18	58.02	97.1%
Latvia	30815	35305	44981	46.0%	11.12	11.41	12.53	12.7%	90	100	100	11.1%	100	100	100	0.0%
Estonia	43944	58617	75729	72.3%	13.88	15.1	17.26	24.4%	88.89	100	100	12.5%	28.6	46.56	53.39	86.7%
Iceland	40153	39278	44897	11.8%	1.286	1.451	1.695	31.8%	82.2	90.67	99.48	21.0%	38.41	44.45	47.2	22.9%
Europe-North	**16491**	**19627**	**20854**	**26.5%**	**9.969**	**12.7**	**13.7**	**37.4%**	**92.1**	**98.36**	**99.87**	**8.4%**	**64.9**	**72.28**	**76.33**	**17.6%**
Italy	8046	8803	10831	34.6%	16.58	16.97	17.91	8.0%	98	100	100	2.0%	100	100	100	0.0%
Spain	14411	14891	18425	27.9%	13.4	13.67	14.91	11.3%	95	100	100	5.3%	99	100	100	1.0%
Greece	10330	10577	11716	13.4%	9.079	9.093	9.198	1.3%	90	92.82	97.97	8.9%	91.8	92.77	92.82	1.1%
Portugal	7790	10048	13370	71.6%	9.063	10.85	12.11	33.6%	88.78	95.75	100	12.6%	86	86.15	87.54	1.8%
Serbia	6338	8641	11353	79.1%	5.283	6.437	7.032	33.1%	79.57	88.38	95.48	20.0%	63.16	65.47	67.6	7.0%
Croatia	6666	8271	11189	67.9%	5.277	5.903	6.675	26.5%	86.04	91.11	98.26	14.2%	90.51	93.86	94.67	4.6%
Bosnia and Herzegovina	5809	6503	8918	53.5%	4.284	4.706	5.359	25.1%	87.31	93.82	100	14.5%	52.3	58.16	63.14	20.7%
Albania	5684	6624	8144	43.3%	6.569	7.688	8.554	30.2%	36.87	55.08	71.03	92.6%	39	61.05	68.89	76.6%
Macedonia, TFYR	6857	7301	9686	41.3%	5.555	5.765	6.571	18.3%	80.93	83.13	89.78	10.9%	67.56	70.44	74.07	9.6%
Slovenia	18910	20737	24883	31.6%	19.39	19.95	20.28	4.6%	95	100	100	5.3%	100	100	100	0.0%
Montenegro	8539	9105	10610	24.3%	3.974	4.262	4.599	15.7%	79.55	81.2	85.27	7.2%	49.23	51.96	55.13	12.0%
Malta	7656	7901	9414	23.0%	100	99.38	99.21	-0.8%	100	100	100	0.0%	87.53	90.04	90.74	3.7%
Europe-South	**10036**	**10943**	**13581**	**35.3%**	**11.84**	**12.33**	**13.26**	**12.0%**	**91.3**	**95.29**	**98.06**	**7.4%**	**94.99**	**95.65**	**95.98**	**1.0%**
Germany	7887	8489	10037	27.3%	18.47	18.92	19.82	7.3%	90.36	98.62	100	10.7%	100	100	100	0.0%
France	15251	15305	16222	6.4%	17.53	18.68	19.65	12.1%	99	100	100	1.0%	100	100	100	0.0%
Netherlands	8273	7991	8502	2.8%	40.75	41.54	42.8	5.0%	100	100	100	0.0%	90	90.73	92.01	2.2%
Belgium	14204	13779	14097	-0.8%	51	51.72	52.24	2.4%	100	100	100	0.0%	78.22	85.95	89.07	13.9%
Switzerland	9137	9384	11100	21.5%	17.29	17.7	18.34	6.1%	99.96	100	100	0.0%	100	100	100	0.0%
Austria	12768	13745	17612	37.9%	13	13.37	14.53	11.8%	95	100	100	5.3%	100	99.99	100	0.0%
Luxembourg	10310	10712	9720	-5.7%	20.18	26.87	29.35	45.4%	100	100	100	0.0%	100	99.99	100	0.0%
Europe-West	**11015**	**11425**	**12784**	**16.1%**	**19.14**	**19.97**	**20.92**	**9.3%**	**94.45**	**99.19**	**100**	**5.9%**	**97.72**	**98.39**	**98.73**	**1.0%**

Infrastructure

Base Case

Source: International Futures Model Version 6.61, Jan 2013

	Roads				Energy/Electricty											
	Cars, Buses, and Freight Vehicles				Population with Access to Electricity				Electricity Generation Capacity				Household Use of Modern Forms of Energy			
	Total per 1,000 Population				Percent				Kilowatts				Percent of Population			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	149.6	263.8	384	156.7%	78.23	89.01	94.62	21.0%	4986	8673	12818	157.1%	56.6	77.6	87.48	54.6%
Africa	36.01	107.2	259.2	619.8%	40.78	63.25	83.02	103.6%	132.1	332.1	852.9	545.6%	30.87	47.34	68.99	123.5%
Americas	404.7	531.9	649.9	60.6%	95.94	97.81	99.48	3.7%	1487	2131	2644	77.8%	86.71	93.44	96.81	11.6%
Asia with Oceania	68.39	212.8	345.3	404.9%	80.59	94.68	98.32	22.0%	2150	4683	7554	251.3%	49.8	81.63	92.55	85.8%
Europe	447.6	578	672.3	50.2%	95.09	97.8	99.65	4.8%	1211	1517	1758	45.2%	93.01	97.58	99.23	6.7%
World	149.6	263.8	384	156.7%	78.23	89.01	94.62	21.0%	4986	8673	12818	157.1%	56.6	77.6	87.48	54.6%
Africa-Eastern	15.54	54.56	234.2	1407.1%	15.33	49.51	81.87	434.1%	12.79	74.51	309.5	2319.9%	10.73	31.56	68.68	540.1%
Africa-Middle	14.63	66.31	115.3	688.1%	18.07	41.87	66.4	267.5%	5.517	28.48	87.31	1482.6%	15.92	30.16	46.4	191.5%
Africa-Northern	66.87	195.4	404.4	504.8%	86.37	95.21	99.59	15.3%	56.58	104	199.7	253.0%	77.46	87.69	96.4	24.5%
Africa-Southern	149.8	342.4	550.5	267.5%	71.95	89.54	97.8	35.9%	45.46	70.48	100.7	121.5%	77.36	91.52	97.43	25.9%
Africa-Western	24.07	107.2	266.4	1006.8%	39.94	67.16	83.69	109.5%	11.78	54.62	155.8	1222.6%	17.56	45.08	65.91	275.3%
Africa	36.01	107.2	259.2	619.8%	40.78	63.25	83.02	103.6%	132.1	332.1	852.9	545.6%	30.87	47.34	68.99	123.5%
America-Caribbean	136	268.9	369.8	171.9%	82.64	90.97	97.07	17.5%	17.64	37.3	57.91	228.3%	62.71	74.36	84.03	34.0%
America-Central	106.2	246.2	442.6	316.8%	82.47	91.2	97.49	18.2%	11.91	29.13	49.38	314.6%	54.33	68.59	83.07	52.9%
America-North	662.8	713.9	767.5	15.8%	98.58	98.7	99.82	1.3%	1233	1568	1789	45.1%	92.22	96.65	98.74	7.1%
America-South	167.7	387.7	570.1	240.0%	95.72	98.35	99.62	4.1%	225	495.9	747.7	232.3%	86.35	94.95	97.88	13.4%
Americas	404.7	531.9	649.9	60.6%	95.94	97.81	99.48	3.7%	1487	2131	2644	77.8%	86.71	93.44	96.81	11.6%
Asia-East	99.89	317.1	498.6	399.1%	98.25	99.15	99.63	1.4%	1400	2790	3870	176.4%	56.23	91.72	99	76.1%
Asia-South Central	21.22	115.3	213	903.8%	65.28	92.63	97.71	49.7%	331.4	1074	2511	657.7%	39.6	75.83	90.41	128.3%
Asia-South East	68.77	230.6	426.4	520.0%	74.62	91.98	98.32	31.8%	156.1	349.6	524.8	236.2%	45.82	71.79	85.81	87.3%
Asia-West	134.8	277.5	440.3	226.6%	90.51	94.14	98.16	8.5%	193.8	365.2	521.6	169.1%	88.4	93.07	95.83	8.4%
Oceania	526.8	542	587.1	11.4%	78.58	83.9	92.98	18.3%	69.03	104	126.2	82.8%	75.16	80.5	90.26	20.1%
Asia with Oceania	68.39	212.8	345.3	404.9%	80.59	94.68	98.32	22.0%	2150	4683	7554	251.3%	49.8	81.63	92.55	85.8%
Europe-East	278.9	487.9	628.6	125.4%	91.49	97.24	99.68	9.0%	386.9	509.8	652.7	68.7%	91.93	97.51	98.84	7.5%
Europe-North	525.6	602	667.1	26.9%	98.6	98.67	99.71	1.1%	206.6	269.6	300.7	45.5%	94.73	98.93	99.89	5.4%
Europe-South	568.5	646.7	721.4	26.9%	95.56	97.09	99.44	4.1%	264.4	318.4	336.9	27.4%	92.19	96.15	98.67	7.0%
Europe-West	566	629	690.2	21.9%	98.45	98.5	99.7	1.3%	358.2	428.6	477.4	33.3%	95	98.22	99.86	5.1%
Europe	447.6	578	672.3	50.2%	95.09	97.8	99.65	4.8%	1211	1517	1758	45.2%	93.01	97.58	99.23	6.7%

Infrastructure

	Roads				Energy/Electricty											
	Cars, Buses, and Freight Vehicles				Population with Access to Electricity				Electricity Generation Capacity				Household Use of Modern Forms of Energy			
Base Case: Countries in Year 2060	Total per 1,000 Population				Percent				Kilowatts				Percent of Population			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA																
Ethiopia	7.302	39.92	311.4	4164.6%	15.68	64.53	95.23	507.3%	1.252	12.38	54.46	4249.8%	5	39.36	82.98	1559.6%
Tanzania, United Rep. of	28.63	133.9	430	1401.9%	12.29	46.73	96.07	681.7%	0.972	9.416	95.98	9774.5%	5	27.06	91.6	1732.0%
Uganda	7	29.06	197.2	2717.1%	9.09	55.44	90.2	892.3%	0.574	3.404	8.712	1417.8%	5	32.92	76.85	1437.0%
Kenya	21	40.59	169.4	706.7%	15.7	51.95	87.52	457.5%	1.786	7.293	20.94	1072.5%	31.35	46.5	74.31	137.0%
Madagascar	20.08	20.94	24.1	20.0%	20.95	28.69	39.15	86.9%	0.433	0.582	0.583	34.6%	5	8.092	13.51	170.2%
Mozambique	13	94.87	405	3015.4%	12.99	59.74	93.55	620.2%	2.446	22.54	92.08	3664.5%	5	37.32	81.95	1539.0%
Malawi	9	15.09	42.43	371.4%	9.768	24.84	55.47	467.9%	0.297	0.861	1.746	487.9%	5	10.78	32.7	554.0%
Zambia	18	94.5	355.2	1873.3%	18.56	50.26	78.51	323.0%	1.674	11.4	26.9	1506.9%	14.35	35.92	67.79	372.4%
Somalia	2.671	5.683	45.39	1599.4%	7.498	22.73	62.07	727.8%	0.083	0.253	0.828	897.6%	5	10.45	43.12	762.4%
Rwanda	4.337	11.09	22.57	420.4%	5.947	30.1	75.99	1177.8%	0.058	0.207	0.458	689.7%	5	15.76	62.74	1154.8%
Zimbabwe	44.4	71.14	137.1	208.8%	44.62	55.86	68.68	53.9%	1.986	4.057	4.395	121.3%	28.81	37.51	50.15	74.1%
Burundi	6	6.448	10.13	68.8%	3.657	8.197	25.94	609.3%	0.055	0.074	0.096	74.5%	5	6.162	12.49	149.8%
Eritrea	11	19.36	86	681.8%	24.7	44.7	75.45	205.5%	0.137	0.222	0.242	76.6%	37.26	44.6	65.19	75.0%
Comoros	20.98	19.43	30.22	44.0%	15.7	19.62	38.28	143.8%	0.006	0.009	0.01	66.7%	23.99	25.21	33.71	40.5%
Djibouti	18.97	32.88	115.8	510.4%	51.8	71.67	92.57	78.7%	0.132	0.211	0.322	143.9%	86.68	90.03	94.65	9.2%
Mauritius	159	262.7	371.2	133.5%	100	99.53	100	0.0%	0.899	1.6	1.706	89.8%	95	97.98	99.32	4.5%
Africa-Eastern	**15.54**	**54.56**	**234.2**	**1407.1%**	**15.33**	**49.51**	**81.87**	**434.1%**	**12.79**	**74.51**	**309.5**	**2319.9%**	**10.73**	**31.56**	**68.68**	**540.1%**
Congo, Democratic Rep. of	5.454	7.502	20.24	271.1%	12.16	26.73	56.56	365.1%	2.481	8.156	31.53	1170.9%	5	10.05	29.43	488.6%
Angola	40	317.3	540	1250.0%	30.97	85.02	95.18	207.3%	1.22	13.71	39.85	3166.4%	52.26	93.78	98.87	89.2%
Cameroon	11	24.91	65.96	499.6%	30.17	61.97	90.25	199.1%	1.122	4.79	12.49	1013.2%	19.4	41.95	69.39	257.7%
Chad	6.083	12.37	30.97	409.1%	5.147	21.42	47.22	817.4%	0.031	0.061	0.082	164.5%	6.38	12.43	29.49	362.2%
Central African Rep.	7.949	12.62	33.71	324.1%	6.204	20.23	44.26	613.4%	0.047	0.097	0.137	191.5%	5	9.575	23.91	378.2%
Congo, Rep. of	26	213.7	445.7	1614.2%	37.67	88.67	99.69	164.6%	0.153	0.464	1.043	581.7%	16.08	78.76	91.8	470.9%
Gabon	127.4	323	505	296.4%	36.95	70.16	95.61	158.8%	0.415	1.113	2.07	398.8%	72.5	94.42	98.75	36.2%
Equatorial Guinea	205.2	378.8	536.1	161.3%	32.28	72.37	92.34	186.1%	0.033	0.061	0.058	75.8%	91.87	99.89	99.85	8.7%
São Tomé and Príncipe	2.718	6.969	22.53	728.9%	50.99	69.12	91.29	79.0%	0.014	0.027	0.043	207.1%	27.93	43.18	65.69	135.2%
Africa-Middle	**14.63**	**66.31**	**115.3**	**688.1%**	**18.07**	**41.87**	**66.4**	**267.5%**	**5.517**	**28.48**	**87.31**	**1482.6%**	**15.92**	**30.16**	**46.4**	**191.5%**
Egypt, Arab Rep.	43	128.2	324.8	655.3%	99.94	99.95	100	0.1%	25.73	44.65	71.92	179.5%	95	96.37	98.09	3.3%
Sudan	28	198.8	465.4	1562.1%	34.3	80.12	98.49	187.1%	2.604	10.4	65.32	2408.4%	10.09	60.32	92.35	815.3%
Algeria	112	253.1	388.6	247.0%	99.53	100	100	0.5%	11.01	16.58	19.34	75.7%	95	96.67	97.57	2.7%
Morocco	71	209.1	452.8	537.7%	99	99.99	100	1.0%	6.289	13.39	19.24	205.9%	93.17	95.06	97.19	4.3%
Tunisia	114	316.4	529.4	364.4%	99.61	100	100	0.4%	3.761	9.049	13.67	263.5%	95	97.45	99.1	4.3%
Libya	291	491.1	575.8	97.9%	100	100	100	0.0%	7.191	9.952	10.21	42.0%	95	98.39	98.11	3.3%
Africa-Northern	**66.87**	**195.4**	**404.4**	**504.8%**	**86.37**	**95.21**	**99.59**	**15.3%**	**56.58**	**104**	**199.7**	**253.0%**	**77.46**	**87.69**	**96.4**	**24.5%**

Infrastructure

Base Case: Countries in Year 2060 Descending Population Sequence	Roads: Cars, Buses, and Freight Vehicles (Total per 1,000 Population) 2010	2035	2060	% Chg	Energy/Electricty: Population with Access to Electricity (Percent) 2010	2035	2060	% Chg	Electricity Generation Capacity (Kilowatts) 2010	2035	2060	% Chg	Household Use of Modern Forms of Energy (Percent of Population) 2010	2035	2060	% Chg
AFRICA continued																
South Africa	159	359.3	572.4	260.0%	77.7	92.95	99.06	27.5%	44.73	68.3	97.04	116.9%	82.73	94.84	99.23	19.9%
Namibia	109	346.2	563.1	416.6%	35.35	81.13	98.03	177.3%	0.393	1.411	2.793	610.7%	41.5	85.2	96.09	131.5%
Lesotho	19.71	58.16	193.7	882.7%	18.24	55.92	82.88	354.4%	0.076	0.169	0.206	171.1%	27.91	47.32	71.26	155.3%
Botswana	136.6	362	533	290.2%	49.23	86.25	98.59	100.3%	0.132	0.386	0.396	200.0%	57.54	97.25	99.43	72.8%
Swaziland	89	192.9	400.2	349.7%	31.52	51.62	80.22	154.5%	0.13	0.214	0.266	104.6%	39.18	55.72	80.88	106.4%
Africa-Southern	**149.8**	**342.4**	**550.5**	**267.5%**	**71.95**	**89.54**	**97.8**	**35.9%**	**45.46**	**70.48**	**100.7**	**121.5%**	**77.36**	**91.52**	**97.43**	**25.9%**
Nigeria	31	176.7	450.6	1353.5%	49.21	84.84	100	103.2%	5.898	32.03	102.9	1644.7%	21.25	62.74	86.97	309.3%
Niger	5	6.596	8.667	73.3%	8.946	23.79	37.16	315.4%	0.145	0.353	0.406	180.0%	5	9.866	16.28	225.6%
Côte d'Ivoire	20	38.08	116.7	483.5%	45.51	62.37	83.06	82.5%	1.236	5.151	12.79	934.8%	22.8	37.15	60.82	166.8%
Burkina Faso	11	18.16	49.42	349.3%	11.31	29.6	61.44	443.2%	0.26	0.593	1.041	300.4%	5	12.67	37.69	653.8%
Ghana	32.91	127.4	417.2	1167.7%	59.14	87.78	98.81	67.1%	2.026	9.518	26.13	1189.7%	14.12	51.31	80.83	472.5%
Mali	9	18.95	48.07	434.1%	20.99	48.03	73.55	250.4%	0.309	0.932	1.686	445.6%	5	20.82	45.95	819.0%
Senegal	23	38.28	77.7	237.8%	44.72	60.42	76.1	70.2%	0.68	2.246	4.169	513.1%	44.32	53.62	65.73	48.3%
Guinea	14	24.16	39.51	182.2%	23.7	46.89	64.25	171.1%	0.404	0.944	1.377	240.8%	5	18.39	33.59	571.8%
Benin	21	34.01	107.5	411.9%	25.31	42.11	73.35	189.8%	0.06	0.2	0.473	688.3%	5.72	15.9	47.12	723.8%
Togo	3.836	3.962	4.827	25.8%	19.44	30.8	47.22	142.9%	0.09	0.111	0.111	23.3%	5	9.407	18.58	271.6%
Sierra Leone	6.063	16.67	140	2209.1%	5.518	38.62	83.18	1407.4%	0.054	0.231	0.567	950.0%	5	19.42	66.33	1226.6%
Liberia	3.881	9.659	47.27	1118.0%	4.574	40.69	76.72	1577.3%	0.198	1.394	2.917	1373.2%	6.76	20.99	54.2	701.8%
Mauritania	12.55	18.81	27.99	123.0%	21.13	51.39	79.67	277.0%	0.255	0.503	0.581	127.8%	39.45	51.22	67.59	71.3%
Gambia	7	13.61	46.42	563.1%	27.52	59.44	88.53	221.7%	0.056	0.156	0.301	437.5%	5.34	28	61.38	1049.4%
Guinea-Bissau	22.52	27.99	31.29	38.9%	11.5	22	44.89	290.3%	0.021	0.032	0.034	61.9%	5	8.73	20.03	300.6%
Cape Verde	94	358.5	572.3	508.8%	70.07	87.93	97.89	39.7%	0.092	0.233	0.351	281.5%	63.8	82.01	93.22	46.1%
Africa-Western	**24.07**	**107.2**	**266.4**	**1006.8%**	**39.94**	**67.16**	**83.69**	**109.5%**	**11.78**	**54.62**	**155.8**	**1222.6%**	**17.56**	**45.08**	**65.91**	**275.3%**

Infrastructure

	Roads				Energy/Electricty											
	Cars, Buses, and Freight Vehicles				Population with Access to Electricity				Electricity Generation Capacity				Household Use of Modern Forms of Energy			
Base Case: Countries in Year 2060	Total per 1,000 Population				Percent				Kilowatts				Percent of Population			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS																
Haiti	7.22	11.86	25.27	250.0%	40.33	73.07	92.65	129.7%	0.239	0.524	0.698	192.1%	6.96	34.49	56.93	718.0%
Dominican Rep.	123	322	485.8	295.0%	97.08	98.76	99.36	2.3%	2.487	9.398	20.88	739.6%	92.31	98.07	99.66	8.0%
Cuba	38	310.6	534.3	1306.1%	97.21	99.83	100	2.9%	5.837	9.768	13.44	130.3%	65.26	81.76	97.02	48.7%
Puerto Rico	642	747.9	804.5	25.3%	95.99	97.76	99.59	3.8%	5.547	12.25	16.59	199.1%	95	98.51	99.82	5.1%
Jamaica	188	291.1	493.9	162.7%	93.31	93	96.14	3.0%	1.204	1.833	2.287	90.0%	76.02	80.04	88.01	15.8%
Trinidad and Tobago	351	481.5	587.2	67.3%	99.14	100	100	0.9%	1.418	2.241	2.646	86.6%	95	99.45	99.54	4.8%
Bahamas	206.5	367.3	528.9	156.1%	97.66	97.72	99.53	1.9%	0.501	0.686	0.681	35.9%	95	94.9	96.88	2.0%
Barbados	406	471.8	545.6	34.4%	100	99.73	99.98	-0.0%	0.245	0.335	0.357	45.7%	95	96.49	98.83	4.0%
Saint Lucia	106.6	240.4	413.4	287.8%	98.92	99.86	100	1.1%	0.08	0.126	0.138	72.5%	95	96.97	98.45	3.6%
Grenada	152.7	227.1	372.9	144.2%	99.38	99.85	100	0.6%	0.033	0.059	0.077	133.3%	80.85	84.92	91.84	13.6%
Saint Vincent and the Grenadines	204	317.8	524	156.9%	98.7	100	100	1.3%	0.052	0.083	0.122	134.6%	81.95	86.9	93.64	14.3%
America-Caribbean	**136**	**268.9**	**369.8**	**171.9%**	**82.64**	**90.97**	**97.07**	**17.5%**	**17.64**	**37.3**	**57.91**	**228.3%**	**62.71**	**74.36**	**84.03**	**34.0%**
Guatemala	117	281.9	511.8	337.4%	81.64	92.79	99.5	21.9%	2.841	7.878	17.54	517.4%	33.98	58.52	82.62	143.1%
Honduras	97	201.9	406.2	318.8%	72.77	85.57	93.81	28.9%	1.775	3.632	4.901	176.1%	46.36	62.75	75.5	62.9%
Nicaragua	57	108.5	230.9	305.1%	73.13	83.77	93.79	28.3%	1.149	2.164	2.622	128.2%	42.91	55.82	68.79	60.3%
El Salvador	84	176.5	323.1	284.6%	88.38	92.67	97.23	10.0%	1.576	3.397	5.633	257.4%	77.15	84.84	92.9	20.4%
Costa Rica	163	374.7	565.8	247.1%	99.43	100	100	0.6%	2.602	6.035	8.742	236.0%	87.26	94.71	98.08	12.4%
Panama	120	363.9	538	348.3%	89.54	96.57	99.1	10.7%	1.861	5.783	9.543	412.8%	87.03	98.41	99.83	14.7%
Belize	178	375.5	584.5	228.4%	82.47	96.2	99.76	21.0%	0.106	0.244	0.403	280.2%	85.95	92.88	97.45	13.4%
America-Central	**106.2**	**246.2**	**442.6**	**316.8%**	**82.47**	**91.2**	**97.49**	**18.2%**	**11.91**	**29.13**	**49.38**	**314.6%**	**54.33**	**68.59**	**83.07**	**52.9%**
United States of America	809	821.5	832.1	2.9%	98.39	98.31	99.76	1.4%	1038	1302	1479	42.5%	95	98.63	99.8	5.1%
Mexico	264	424.4	581.7	120.3%	99.03	99.71	100	1.0%	60.96	101.7	134.6	120.8%	83.43	90.45	95.2	14.1%
Canada	605	673	734.1	21.3%	98.87	98.89	99.87	1.0%	133.7	164.9	174.9	30.8%	95	98.75	99.71	5.0%
America-North	**662.8**	**713.9**	**767.5**	**15.8%**	**98.58**	**98.7**	**99.82**	**1.3%**	**1233**	**1568**	**1789**	**45.1%**	**92.22**	**96.65**	**98.74**	**7.1%**
Brazil	198	445.6	629.7	218.0%	98.46	99.67	99.91	1.5%	109.3	229.5	315.2	188.4%	89.07	96.54	98.7	10.8%
Colombia	58	242.1	445.1	667.4%	94.82	99	99.88	5.3%	13.57	36.13	59.9	341.4%	86.91	94.61	97.33	12.0%
Argentina	314	537.2	675.8	115.2%	97.6	98.36	99.56	2.0%	32.83	67.77	90.52	175.7%	95	99.14	99.84	5.1%
Peru	55.75	280	488.2	775.7%	77.71	89.84	97.96	26.1%	8.375	33.17	61.47	634.0%	59.45	89.56	96.65	62.6%
Venezuela (Bolivarian Rep. of)	147	360.1	572.9	289.7%	99.11	99.91	100	0.9%	25.39	47.62	89.44	252.3%	87.26	95.28	99.36	13.9%
Ecuador	63	182.7	311.2	394.0%	93.7	98.55	99.73	6.4%	5.267	11.08	15.25	189.5%	95	97.04	97.82	3.0%
Chile	172	396.4	550.3	219.9%	98.99	99.36	99.3	0.3%	16.3	31.59	37.27	128.7%	95	98.69	99.26	4.5%
Bolivia (Plurinational State of)	68	275.5	507.5	646.3%	79.53	92.08	98.46	23.8%	1.561	4.282	9.371	500.3%	66.91	82.51	93.13	39.2%
Paraguay	82	220.2	450.7	449.6%	97.34	98.15	99.35	2.1%	9.096	28.31	60.23	562.2%	49.71	63.26	77.78	56.5%
Uruguay	176	415.1	587.1	233.6%	98.78	99.19	99.89	1.1%	2.585	5.066	7.293	182.1%	95	98.83	99.87	5.1%
Guyana	95	266	499.2	425.5%	77.37	91.12	98.95	27.9%	0.35	0.591	0.883	152.3%	90.62	93.98	96.94	7.0%
Suriname	238	485.7	654.1	174.8%	78.6	95.06	99.43	26.5%	0.389	0.761	0.878	125.7%	67.92	90.16	97.81	44.0%
America-South	**167.7**	**387.7**	**570.1**	**240.0%**	**95.72**	**98.35**	**99.62**	**4.1%**	**225**	**495.9**	**747.7**	**232.3%**	**86.35**	**94.95**	**97.88**	**13.4%**

Infrastructure

Base Case: Countries in Year 2060 Descending Population Sequence	Roads: Cars, Buses, and Freight Vehicles (Total per 1,000 Population) 2010	2035	2060	% Chg	Energy/Electricity: Population with Access to Electricity (Percent) 2010	2035	2060	% Chg	Energy/Electricity: Electricity Generation Capacity (Kilowatts) 2010	2035	2060	% Chg	Energy/Electricity: Household Use of Modern Forms of Energy (Percent of Population) 2010	2035	2060	% Chg
ASIA with OCEANIA																
China	37	286.9	490.3	1225.1%	99.51	100	100	0.5%	964.4	2275	3347	247.1%	50.97	91.78	99.7	95.6%
Japan	593	651.3	703.6	18.7%	97.94	98.06	99.49	1.6%	286.3	313	310.3	8.4%	95	99.17	99.96	5.2%
Korea, Rep. of	346	444.2	540.2	56.1%	100	100	100	0.0%	83.8	117.8	127	51.6%	95	99.55	99.96	5.2%
Korea, Dem. People's Rep. of	5.305	14.91	46.73	780.9%	28.32	58.13	81.58	188.1%	9.5	10.57	10.59	11.5%	14.51	34.69	59.74	311.7%
Taiwan, China	604	611.2	656.7	8.7%	98.59	98.72	98.84	0.3%	42.15	54.88	54.33	28.9%	99.34	99.82	99.94	0.6%
Hong Kong SAR, China	106.1	147.4	191.2	80.2%	100	99.78	100	0.0%	12.81	17.04	16.74	30.7%	99.86	99.99	99.99	0.1%
Mongolia	72	333.2	553	668.1%	68.54	90.19	99.13	44.6%	0.833	2.073	4.684	462.3%	23.25	66.73	88.13	279.1%
Asia-East	**99.89**	**317.1**	**498.6**	**399.1%**	**98.25**	**99.15**	**99.63**	**1.4%**	**1400**	**2790**	**3870**	**176.4%**	**56.23**	**91.72**	**99**	**76.1%**
India	15	129	240.7	1504.7%	68.43	100	100	46.1%	199.3	770.3	1875	840.8%	40.31	85.38	97.65	142.2%
Pakistan	11	23.9	75.28	584.4%	61.58	78.07	92.72	50.6%	20.36	44.21	82.39	304.7%	32.86	51.26	71.25	116.8%
Bangladesh	3.465	5.868	9.888	185.4%	44.09	77.79	100	126.8%	6.041	35.32	114.8	1800.3%	10.28	46.48	81.51	692.9%
Afghanistan	27	78.48	260.5	864.8%	17.8	43.89	74.5	318.5%	0.489	1.668	3.405	596.3%	13.71	28.44	58.19	324.4%
Iran, Islamic Rep. of	128	360.6	521.4	307.3%	98.64	99.87	99.99	1.4%	58.85	115.2	244.8	316.0%	95	98.39	98.94	4.1%
Nepal	5	9.201	25.38	407.6%	49.29	66.28	87.47	77.5%	0.734	2.597	4.768	549.6%	18.93	34.07	57.84	205.5%
Uzbekistan	21.7	135.7	359.3	1555.8%	35.87	83.14	98.39	174.3%	11.55	25.85	45.09	290.4%	83.88	93.66	97.45	16.2%
Sri Lanka	61	273.7	506.4	730.2%	77.04	91.01	98.74	28.2%	2.713	8.879	17.4	541.4%	26.16	67.78	91.18	248.5%
Kazakhstan	197	456.7	619.6	214.5%	90.5	97.11	99.78	10.3%	18.73	31.8	40.85	118.1%	88.73	98.08	98.81	11.4%
Tajikistan	38	81.94	197	418.4%	56.85	63.15	86.92	52.9%	4.423	11.31	21.69	390.4%	78.17	80.9	88.75	13.5%
Kyrgyz Rep.	52.9	89.73	255.8	383.6%	83.54	88.72	97.68	16.9%	3.624	4.784	5.101	40.8%	62.61	68.06	78.15	24.8%
Turkmenistan	106	414.5	610.2	475.7%	69.94	96.33	99.75	42.6%	2.801	17.4	47.71	1603.3%	95	99.96	99.97	5.2%
Bhutan	47	284.5	513.6	992.8%	71.71	95.28	99.8	39.2%	1.714	4.753	7.781	354.0%	54.66	86.86	97.19	77.8%
Maldives	23	37.69	59.5	158.7%	100	95.69	99.74	-0.3%	0.065	0.108	0.113	73.8%	90.42	91.68	94.33	4.3%
Asia-South Central	**21.22**	**115.3**	**213**	**903.8%**	**65.28**	**92.63**	**97.71**	**49.7%**	**331.4**	**1074**	**2511**	**657.7%**	**39.6**	**75.83**	**90.41**	**128.3%**
Indonesia	77	344.7	562	629.9%	68.21	95.43	99.34	45.6%	34.06	103.2	150.8	342.7%	41.64	80.66	89.13	114.0%
Philippines	33	118.5	360.2	991.5%	88.05	97	99.76	13.3%	15.58	52.27	110.5	609.2%	52.9	71.55	86.9	64.3%
Vietnam	13	56.89	170.4	1210.8%	93.92	100	100	6.5%	15.9	34.78	61.12	284.4%	39.73	60.19	72.96	83.6%
Thailand	105.7	313.3	516.8	388.9%	99.44	100	100	0.6%	49.22	68.01	68.32	38.8%	76.89	88.83	95.48	24.2%
Myanmar	7	20.07	185.7	2552.9%	13.66	42.59	86.36	532.2%	1.922	4.866	17.38	804.3%	5	20.98	71.86	1337.2%
Malaysia	334	538.1	668.2	100.1%	99.68	99.79	100	0.3%	25.4	46.8	61.35	141.5%	95	98.77	99.76	5.0%
Cambodia	20	110.6	387.9	1839.5%	25.29	69.21	92.04	263.9%	0.431	2.152	4.686	987.2%	9.03	48.29	80.92	796.1%
Lao People's Democratic Rep.	21	189.1	460.2	2091.4%	55.43	96.14	100	80.4%	2.081	7.737	14.54	598.7%	5	67.49	89.56	1691.2%
Singapore	150	193.9	238.7	59.1%	100	99.93	100	0.0%	10.65	28.21	33.96	218.9%	95	99.97	100	5.3%
Timor-Leste	4.258	9.677	40.21	844.3%	21.7	48.47	77.15	255.5%	0.102	0.375	0.91	792.2%	11.62	26.27	55.3	375.9%
Brunei Darussalam	696	726.3	757.2	8.8%	99.7	99.92	100	0.3%	0.736	1.201	1.271	72.7%	95	99.4	99.23	4.5%
Asia-South Eastern	**68.77**	**230.6**	**426.4**	**520.0%**	**74.62**	**91.98**	**98.32**	**31.8%**	**156.1**	**349.6**	**524.8**	**236.2%**	**45.82**	**71.79**	**85.81**	**87.3%**

Infrastructure

Base Case: Countries in Year 2060 Descending Population Sequence	Roads: Cars, Buses, and Freight Vehicles (Total per 1,000 Population) 2010	2035	2060	% Chg	Energy/Electricity: Population with Access to Electricity (Percent) 2010	2035	2060	% Chg	Electricity Generation Capacity (Kilowatts) 2010	2035	2060	% Chg	Household Use of Modern Forms of Energy (Percent of Population) 2010	2035	2060	% Chg
ASIA with OCEANIA continued																
Turkey	138	334	525.2	280.6%	100	100	100	0.0%	46.35	91.12	134.9	191.0%	89	95.52	98.65	10.8%
Iraq	51.47	258.7	497.3	866.2%	89.4	94.52	99.43	11.2%	9.559	15.72	33.99	255.6%	94.56	96.75	98.59	4.3%
Yemen, Rep. of	35	92.14	205.6	487.4%	39.94	69.29	90.66	127.0%	1.375	4.036	9.673	603.5%	64.1	76.27	86.66	35.2%
Saudi Arabia	187.7	373.9	534.8	184.9%	99.55	99.93	99.99	0.4%	47.25	84.46	114.6	142.5%	95	99.2	99.52	4.8%
Syrian Arab Rep.	62	155.6	402.8	549.7%	92.91	98.66	99.9	7.5%	8.306	14.04	24.55	195.6%	95	96.61	98.46	3.6%
Jordan	146	342.5	560.3	283.8%	100	97.9	99.9	-0.1%	2.758	6.898	15.18	450.4%	95	96.3	98.73	3.9%
Israel	313	401.1	464.5	48.4%	99.84	99.28	99.99	0.2%	12.5	25.26	41.29	230.3%	95	99.65	99.99	5.3%
Palestine	39	32.83	81.27	108.4%	99.69	95.93	98.35	-1.3%	0.14	0.268	0.454	224.3%	68.22	66.46	73.38	7.6%
Azerbaijan	89	292.7	458.2	414.8%	84.23	97	99.76	18.4%	5.815	17.87	29.02	399.1%	90.2	96.98	98.29	9.0%
United Arab Emirates	313	449.4	583.1	86.3%	100	100	100	0.0%	25.19	43.65	44.75	77.6%	95	99.98	100	5.3%
Kuwait	507	562.8	611.9	20.7%	100	100	100	0.0%	11.16	22.87	28.46	155.0%	95	99.99	99.99	5.3%
Lebanon	319.8	442.8	536.5	67.8%	100	99.31	100	0.0%	2.244	4.588	5.439	142.4%	95	98.44	99.38	4.6%
Oman	225	399.4	550.2	144.5%	98.18	99.92	100	1.9%	4.438	7.278	8.695	95.9%	95	99.32	99.35	4.6%
Armenia	105	254.8	490.4	367.0%	90.19	93.73	99.01	9.8%	3.173	3.645	3.694	16.4%	95	96.47	98.42	3.6%
Georgia	116	305.1	529.6	356.6%	86.37	95.03	99.42	15.1%	4.568	4.772	5.64	23.5%	57.25	73.24	83.83	46.4%
Qatar	724	741.1	770.3	6.4%	100	100	99.99	-0.0%	4.092	11.36	13.42	228.0%	95	100	100	5.3%
Bahrain	509	487.1	487.7	-4.2%	100	100	100	0.0%	3.432	5.507	5.981	74.3%	95	98.79	99.06	4.3%
Cyprus	659	713	754.9	14.6%	98.62	99.19	99.9	1.3%	1.471	1.83	1.851	25.8%	95	97.37	98	3.2%
Asia-West	**134.8**	**277.5**	**440.3**	**226.6%**	**90.51**	**94.14**	**98.16**	**8.5%**	**193.8**	**365.2**	**521.6**	**169.1%**	**88.4**	**93.07**	**95.83**	**8.4%**
Australia	687	736.1	775.6	12.9%	98.97	99.03	99.8	0.8%	58.37	89.1	105.7	81.1%	95	99.5	99.92	5.2%
Papua New Guinea	9	46.83	175.8	1853.3%	9.703	43.48	78.14	705.3%	0.716	1.853	2.108	194.4%	10	32.27	70.74	607.4%
New Zealand	733	787.6	822	12.1%	98.97	99.89	99.99	1.0%	9.63	12.61	17.83	85.2%	95	98.07	99.89	5.1%
Solomon Islands	17.54	41.92	65.79	275.1%	17.36	45.67	66.78	284.7%	0.014	0.035	0.04	185.7%	12.87	31	50.16	289.7%
Fiji	148.1	279.1	509.5	244.0%	60	78.1	93.69	56.2%	0.222	0.286	0.351	58.1%	52	67.25	85.28	64.0%
Vanuatu	34.7	70.33	164.3	373.5%	30.19	63.69	90.61	200.1%	0.012	0.025	0.032	166.7%	15.13	45.7	74.9	395.0%
Micronesia (Federated States of)	36	71.22	142.2	295.0%	54	66.48	81.91	51.7%	0.013	0.025	0.034	161.5%	58.38	67.06	78.2	33.9%
Tonga	19.71	41.36	163.8	731.1%	92.47	98.02	99.92	8.1%	0.012	0.023	0.041	241.7%	59.1	67.72	80.71	36.6%
Samoa	59	137.5	365.3	519.2%	34.84	64.5	91.47	162.5%	0.041	0.07	0.1	143.9%	24.49	52.48	84.65	245.7%
Oceania	**526.8**	**542**	**587.1**	**11.4%**	**78.58**	**83.9**	**92.98**	**18.3%**	**69.03**	**104**	**126.2**	**82.8%**	**75.16**	**80.5**	**90.26**	**20.1%**

Infrastructure

Base Case: Countries in Year 2060 Descending Population Sequence	Roads: Cars, Buses, and Freight Vehicles — Total per 1,000 Population				Energy/Electricity: Population with Access to Electricity — Percent				Electricity Generation Capacity — Kilowatts				Household Use of Modern Forms of Energy — Percent of Population			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
EUROPE																
Russian Federation	245	480.5	611.7	149.7%	91.36	98.29	99.87	9.3%	226.7	304.5	415.7	83.4%	92.19	98.96	99.36	7.8%
Ukraine	152	397.2	599.2	294.2%	87.66	95.4	99.59	13.6%	54.48	58.05	68.58	25.9%	94.56	97.58	98.67	4.3%
Poland	495	639.8	733.8	48.2%	95.96	97.02	99.47	3.7%	33.26	45.75	48.73	46.5%	95	98.94	99.69	4.9%
Romania	219	375.6	562	156.6%	89.84	94.43	99.23	10.5%	20.72	24.58	25.44	22.8%	77.1	86.83	94.6	22.7%
Czech Rep.	513	608	690.5	34.6%	97.34	97.72	99.64	2.4%	18.49	19.81	19.96	8.0%	95	97.48	98.87	4.1%
Belarus	282	508.9	667.9	136.8%	85	98.51	99.89	17.5%	8.047	21.94	34.2	325.0%	95	99.04	99.74	5.0%
Hungary	384	549.9	668	74.0%	96.25	97.31	99.66	3.5%	8.838	10.55	10.84	22.7%	95	98.17	99.39	4.6%
Bulgaria	353	535.7	679.3	92.4%	93.49	97.6	99.8	6.7%	8.826	13.18	16.97	92.3%	86.57	92.95	97.14	12.2%
Slovak Rep.	319	480.3	607.2	90.3%	96.23	96.99	99.11	3.0%	6.931	10.59	11.18	61.3%	95	98.69	99.48	4.7%
Moldova, Rep. of	84.49	145.3	381.3	351.3%	83.19	90.54	98.56	18.5%	0.582	0.857	1.062	82.5%	85.23	88.14	92.73	8.8%
Europe-East	**278.9**	**487.9**	**628.6**	**125.4%**	**91.49**	**97.24**	**99.68**	**9.0%**	**386.9**	**509.8**	**652.7**	**68.7%**	**91.93**	**97.51**	**98.84**	**7.5%**
United Kingdom	526	589.7	647.6	23.1%	98.73	98.51	99.77	1.1%	89.66	105.6	118.6	32.3%	95	98.84	99.92	5.2%
Sweden	521	612.5	693.7	33.1%	99.07	99.91	99.99	0.9%	35.61	44.75	49.58	39.2%	95	99.6	99.99	5.3%
Denmark	477	569.4	653.5	37.0%	99.21	99.38	99.94	0.7%	13.43	13.78	13.83	3.0%	95	99.14	99.96	5.2%
Ireland	534	615.6	689.8	29.2%	97.64	97.02	97.88	0.2%	7.72	11.47	12.26	58.8%	95	99.63	99.92	5.2%
Norway	575	647.6	716.6	24.6%	98.74	99.87	99.99	1.3%	31.55	60.37	72.41	129.5%	95	99.73	99.65	4.9%
Finland	534	624.7	702.4	31.5%	98.99	99.3	99.92	0.9%	16.27	18.6	18.66	14.7%	95	99.24	99.96	5.2%
Lithuania	546	687.2	772.9	41.6%	96.28	96.77	99.58	3.4%	4.741	5.382	5.397	13.8%	95	97.62	99.4	4.6%
Latvia	474	647	750.8	58.4%	96.26	97.12	99.65	3.5%	2.164	2.39	2.422	11.9%	89.73	96.01	99	10.3%
Estonia	477	648.9	751.4	57.5%	97.67	99.75	99.98	2.4%	2.714	3.271	3.412	25.7%	83.6	96.47	99.59	19.1%
Iceland	767	798.8	817.1	6.5%	98.78	98.67	99.86	1.1%	2.784	4.041	4.138	48.6%	95	99.68	99.98	5.2%
Europe-North	**525.6**	**602**	**667.1**	**26.9%**	**98.6**	**98.67**	**99.71**	**1.1%**	**206.6**	**269.6**	**300.7**	**45.5%**	**94.73**	**98.93**	**99.89**	**5.4%**
Italy	673	719.5	760	12.9%	95.65	96.98	99.54	4.1%	105.3	121.5	123.8	17.6%	95	97.58	99.44	4.7%
Spain	606	676.7	741.4	22.3%	97.41	98.02	99.81	2.5%	101.6	126.7	132.4	30.3%	95	97.77	99.57	4.8%
Greece	560	631	711.5	27.1%	95.25	95.7	97.38	2.2%	14.75	16.49	17.33	17.5%	95	96.25	98.45	3.6%
Portugal	509	598.1	700.4	37.6%	96.95	97.77	99.8	2.9%	18.33	23.79	25.94	41.5%	95	96.76	99	4.2%
Serbia	227	435.7	617.6	172.1%	90.88	96.75	99.72	9.7%	8.359	11.01	17.38	107.9%	82.66	92.68	97.03	17.4%
Croatia	388	525.5	656.4	69.2%	95.44	96.43	99.44	4.2%	4.025	4.454	4.515	12.2%	87.67	92.96	97.27	11.0%
Bosnia and Herzegovina	135	371.3	576.2	326.8%	84.78	92.26	98.16	15.8%	4.342	5.076	5.086	17.1%	50.81	80.47	90.97	79.0%
Albania	114	328.3	533.2	367.7%	89.31	96.22	99.44	11.3%	1.598	2.289	2.569	60.8%	76.01	90.32	95.39	25.5%
Macedonia, TFYR	144	228	406.6	182.4%	91.74	96.4	99.53	8.5%	1.543	1.543	1.545	0.1%	63.46	73.33	84.56	33.2%
Slovenia	565	655.8	728	28.8%	96.45	96.91	99.59	3.3%	3.117	3.752	4.332	39.0%	91.55	96.66	98.9	8.0%
Montenegro	313.9	358.6	496	58.0%	89.43	94.79	99.35	11.1%	0.868	1.077	1.327	52.9%	81.97	85.83	91.2	11.3%
Malta	674	722.2	766.9	13.8%	98.33	98.16	98.69	0.4%	0.572	0.735	0.717	25.3%	95	97.9	99.14	4.4%
Europe-South	**568.5**	**646.7**	**721.4**	**26.9%**	**95.56**	**97.09**	**99.44**	**4.1%**	**264.4**	**318.4**	**336.9**	**27.4%**	**92.19**	**96.15**	**98.67**	**7.0%**
Germany	554	620.9	686.9	24.0%	98.36	98.38	99.7	1.4%	151.3	174.9	174.5	15.3%	95	98.33	99.86	5.1%
France	598	662.9	722.3	20.8%	98.35	98.45	99.66	1.3%	119.5	149.8	190.7	59.6%	95	98.02	99.89	5.1%
Netherlands	515	551.9	598.7	16.3%	98.77	98.82	99.76	1.0%	26.82	31.15	30.99	15.5%	95	98.22	99.76	5.0%
Belgium	543	591.6	640.9	18.0%	98.92	98.82	99.84	0.9%	17.87	23.49	30.38	70.0%	95	98.17	99.83	5.1%
Switzerland	567	629.9	695.7	22.7%	98.8	98.72	99.65	0.9%	19.64	24.36	25.84	31.6%	95	98.55	99.85	5.1%
Austria	562	637.2	709.8	26.3%	98.68	98.71	99.86	1.2%	21.28	23.19	23.44	10.2%	95	98.54	99.84	5.1%
Luxembourg	747	740.2	733	-1.9%	98.73	98.53	99.79	1.1%	1.712	1.656	1.626	-5.0%	95	99.7	99.94	5.2%
Europe-West	**566**	**629**	**690.2**	**21.9%**	**98.45**	**98.5**	**99.7**	**1.3%**	**358.2**	**428.6**	**477.4**	**33.3%**	**95**	**98.22**	**99.86**	**5.1%**

Infrastructure

	Water and Sanitation															
	Access to Improved Drinking Water				Access to Improved Sanitation				Wastewater Collection Coverage				Land Area Equipped for Irrigation			
Base Case	Percent of Population				Percent of Population				Percent of Population				In Hectares (1000 hectares=10 sq km)			
Source: International Futures Model Version 6.61, Jan 2013	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	88.48	94.36	97.5	10.2%	74.1	86.76	94.21	27.1%	40.05	48.84	55.55	38.7%	313173	343580	373003	19.1%
Africa	66.14	78.96	91.57	38.4%	56.21	72.06	87.88	56.3%	20.14	23.73	34.02	68.9%	13730	15411	18190	32.5%
Americas	96.06	98.04	99.43	3.5%	91.06	94.69	97.97	7.6%	62.58	74.8	81.52	30.3%	44352	48767	54519	22.9%
Asia with Oceania	90.5	98.09	99.53	10.0%	71.07	88.38	95.63	34.6%	33.22	46.67	55.56	67.2%	227877	252224	272830	19.7%
Europe	98.88	99.7	100	1.1%	94.89	98.54	99.8	5.2%	78.39	84.01	88.61	13.0%	27299	27259	27541	0.9%
World	88.48	94.36	97.5	10.2%	74.1	86.76	94.21	27.1%	40.05	48.84	55.55	38.7%	313173	343580	373003	19.1%
Africa-Eastern	56.26	73.13	90.88	61.5%	42.13	64.01	85.51	103.0%	5.698	10.26	22.37	292.6%	2455	3135	4145	68.8%
Africa-Middle	54.01	71.41	84.52	56.5%	51.46	65.36	82.78	60.9%	14.38	20.01	30.77	114.0%	176.9	438.9	1177	565.3%
Africa-Northern	84.23	94.53	99.91	18.6%	82.02	92.32	98.59	20.2%	47.69	52.24	61.88	29.8%	8456	8638	8827	4.4%
Africa-Southern	90.42	95.41	99.47	10.0%	82.67	90.57	98.19	18.8%	59.93	73.12	80.15	33.7%	1561	1577	1603	2.7%
Africa-Western	64.65	78.29	91.39	41.4%	50.32	70.65	87.45	73.8%	11.35	18.89	32.66	187.8%	1082	1622	2438	125.3%
Africa	66.14	78.96	91.57	38.4%	56.21	72.06	87.88	56.3%	20.14	23.73	34.02	68.9%	13730	15411	18190	32.5%
America-Caribbean	86.31	89.2	90.87	5.3%	79.61	83	87.59	10.0%	32.54	45.3	53.95	65.8%	1303	1300	1302	-0.1%
America-Central	90.22	95.79	99.43	10.2%	83.74	91.55	97.33	16.2%	47.89	63.89	72.31	51.0%	541	539.5	540.5	-0.1%
America-North	98.3	98.87	100	1.7%	99.04	99.42	100	1.0%	70.71	83.02	88.48	25.1%	30155	31304	32362	7.3%
America-South	95.11	98.27	99.59	4.7%	83.85	90.86	96.7	15.3%	57.91	69.8	77.43	33.7%	12353	15624	20314	64.4%
Americas	96.06	98.04	99.43	3.5%	91.06	94.69	97.97	7.6%	62.58	74.8	81.52	30.3%	44352	48767	54519	22.9%
Asia-East	92.2	99.99	100	8.5%	85.21	99.94	99.98	17.3%	49.29	78.23	84.72	71.9%	69389	71574	71721	3.4%
Asia-South Central	90.21	97.15	99.24	10.0%	52.75	77.85	92.1	74.6%	14.39	21.98	36.48	153.5%	117415	132662	145743	24.1%
Asia-South East	87.61	97.82	99.69	13.8%	78.55	91.99	97.75	24.4%	32.79	42.63	54.76	67.0%	22548	26611	30188	33.9%
Asia-West	88.96	96.72	99.98	12.4%	90.15	95.04	98.22	9.0%	60.5	65.44	70.32	16.2%	15322	17155	18894	23.3%
Oceania	87.7	91.48	95.09	8.4%	87.18	90.86	95	9.0%	67.09	67.61	68.65	2.3%	3203	4222	6285	96.2%
Asia with Oceania	90.5	98.09	99.53	10.0%	71.07	88.38	95.63	34.6%	33.22	46.67	55.56	67.2%	227877	252224	272830	19.7%
Europe-East	97.45	99.57	100	2.6%	88.55	97.18	99.55	12.4%	60.16	68.79	76.35	26.9%	10505	10490	10501	-0.0%
Europe-North	99.69	99.55	99.97	0.3%	99.21	99.24	99.92	0.7%	92.24	94.58	96.47	4.6%	2456	2559	2649	7.9%
Europe-South	99.7	99.84	100	0.3%	98.11	98.74	99.87	1.8%	87.97	91.2	93.5	6.3%	10539	10502	10617	0.7%
Europe-West	100	99.86	100	0.0%	100	99.86	100	0.0%	90.9	92.86	95.1	4.6%	3714	3628	3697	-0.5%
Europe	98.88	99.7	100	1.1%	94.89	98.54	99.8	5.2%	78.39	84.01	88.61	13.0%	27299	27259	27541	0.9%

Infrastructure

	Water and Sanitation															
	Access to Improved Drinking Water				Access to Improved Sanitation				Wastewater Collection Coverage				Land Area Equipped for Irrigation			
Base Case: Countries in Year 2060	Percent of Population				Percent of Population				Percent of Population				In Hectares (1000 hectares=10 sq km)			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA																
Ethiopia	45	69.7	89.93	99.8%	33	60.16	87.09	163.9%	3.582	7.999	21.61	503.3%	290	468.3	739.3	154.9%
Tanzania, United Rep. of	53	70.03	92.85	75.2%	18	51.27	84.64	370.2%	2.345	9.411	25.95	1006.6%	184	320.9	521.8	183.6%
Uganda	72	76.93	93.66	30.1%	54	71.44	90.6	67.8%	6	8.138	19.25	220.8%	9	15.23	25.63	184.8%
Kenya	58.59	73.98	96.05	63.9%	59	68.81	86.54	46.7%	4.9	9.987	22.37	356.5%	103	143.8	206.4	100.4%
Madagascar	46	61.56	68.36	48.6%	33	41.39	46.57	41.1%	4.03	6.754	11.08	174.9%	1086	1143	1192	9.8%
Mozambique	48	72.48	91.94	91.5%	22	57.39	88.77	303.5%	5.984	15.02	33.69	463.0%	118	255	534.1	352.6%
Malawi	83	88.2	97.32	17.3%	84	100	100	19.0%	9.143	13.01	22.18	142.6%	59	75.96	86.1	45.9%
Zambia	60.4	78.81	88.68	46.8%	62	87.27	97.42	57.1%	14.64	18.86	25.41	73.6%	156	197	237.6	52.3%
Somalia	29	73.48	98.06	238.1%	38	58.93	93.19	145.2%	7.359	11.13	25.23	242.8%	200	205.4	210.5	5.3%
Rwanda	65	73.5	94.76	45.8%	63	82.14	100	58.7%	10.23	14.11	26.06	154.7%	9	18.26	33.77	275.2%
Zimbabwe	80	84.69	91.59	14.5%	67	74.28	80.07	19.5%	13.57	15.86	20.28	49.4%	174	195.8	219.2	26.0%
Burundi	72	71.29	85.17	18.3%	52	61.74	86.29	65.9%	6.134	8.134	15.2	147.8%	23	37.16	57.64	150.6%
Eritrea	61	70.04	87.32	43.1%	14	36.53	69.15	393.9%	2.755	6.72	19.71	615.4%	21	34.43	53.81	156.2%
Comoros	95	98.3	100	5.3%	38	50.21	70.58	85.7%	9.653	10.16	14.6	51.2%	0.13	0.15	0.17	30.8%
Djibouti	88	91.93	98.82	12.3%	54	65.71	83.35	54.4%	40.79	44.39	51.46	26.2%	1	1.149	1.335	33.5%
Mauritius	99.38	99.53	100	0.6%	98	100	100	2.0%	25	35.61	48.06	92.2%	21.5	23.65	25.06	16.6%
Africa-Eastern	**56.26**	**73.13**	**90.88**	**61.5%**	**42.13**	**64.01**	**85.51**	**103.0%**	**5.698**	**10.26**	**22.37**	**292.6%**	**2455**	**3135**	**4145**	**68.8%**
Congo, Democratic Rep. of	46	67.4	84.5	83.7%	51	63.13	84.89	66.5%	6.981	12.06	24.09	245.1%	11	70.66	349.6	3078.2%
Angola	51	77.99	88.63	73.8%	58	80.36	88.23	52.1%	33.76	43.94	56.44	67.2%	80	211.6	500.4	525.5%
Cameroon	77	81.1	86.46	12.3%	63	71.36	80.64	28.0%	26.29	31.3	39.85	51.6%	29	47.83	75.7	161.0%
Chad	51	62.25	75.13	47.3%	19	40.04	63.46	234.0%	3.095	7.455	17.26	457.7%	30	52.31	84.17	180.6%
Central African Rep.	67	68.66	75.62	12.9%	52	61.67	81.45	56.6%	11.14	13.51	21.32	91.4%	1	9.954	67.01	6601.0%
Congo, Rep. of	71	93.68	100	40.8%	52	84.4	100	92.3%	11.77	28.87	47.81	306.2%	2	8.857	30.01	1400.5%
Gabon	87.13	94.21	100	14.8%	67	78.4	93.61	39.7%	28.57	36.68	50.93	78.3%	4	14.92	45.49	1037.3%
Equatorial Guinea	52	69.92	83.8	61.2%	89	92.65	94.17	5.8%	56.75	64.98	71.35	25.7%	9.9	12.73	14.79	49.4%
São Tomé and Príncipe	88.12	92.07	100	13.5%	30	50.99	81.12	170.4%	15.14	20.71	36.94	144.0%	10	10.1	10.22	2.2%
Africa-Middle	**54.01**	**71.41**	**84.52**	**56.5%**	**51.46**	**65.36**	**82.78**	**60.9%**	**14.38**	**20.01**	**30.77**	**114.0%**	**176.9**	**438.9**	**1177**	**565.3%**
Egypt, Arab Rep.	99	100	100	1.0%	100	100	100	0.0%	38.33	39.66	49.1	28.1%	3650	3541	3542	-3.0%
Sudan	58	88.45	99.78	72.0%	33	74.84	95.2	188.5%	10.8	26.52	47.89	343.4%	1863	2077	2216	18.9%
Algeria	82.99	92.62	100	20.5%	95	99.49	100	5.3%	86	91.51	93.86	9.1%	570	573	575.4	0.9%
Morocco	82.18	92.02	100	21.7%	81	90.43	99.1	22.3%	70	76.46	83.02	18.6%	1458	1487	1528	4.8%
Tunisia	94	98.11	100	6.4%	89	94.69	99.86	12.2%	57.27	66	74.39	29.9%	445	486.3	490.4	10.2%
Libya	67.79	88.93	99.15	46.3%	97	100	100	3.1%	78.95	81.93	84.41	6.9%	470	473.6	474.6	1.0%
Africa-Northern	**84.23**	**94.53**	**99.91**	**18.6%**	**82.02**	**92.32**	**98.59**	**20.2%**	**47.69**	**52.24**	**61.88**	**29.8%**	**8456**	**8638**	**8827**	**4.4%**

Infrastructure

	Water and Sanitation															
	Access to Improved Drinking Water				Access to Improved Sanitation				Wastewater Collection Coverage				Land Area Equipped for Irrigation			
Base Case: Countries in Year 2060	Percent of Population				Percent of Population				Percent of Population				In Hectares (1000 hectares=10 sq km)			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA continued																
South Africa	91.09	95.77	100	9.8%	87	93.08	99.43	14.3%	66	81.11	87.17	32.1%	1498	1502	1511	0.9%
Namibia	93.07	100	100	7.4%	42	76	94.31	124.5%	12.56	26.66	44.95	257.9%	8	13.3	21.52	169.0%
Lesotho	78	87.11	93.45	19.8%	37	61.71	78.58	112.4%	6.489	14.95	29.46	354.0%	3	3.958	4.943	64.8%
Botswana	96	100	100	4.2%	70	85.74	96.51	37.9%	43.88	56.54	69.52	58.4%	1.5	2.499	4.948	229.9%
Swaziland	70	80.94	90.61	29.4%	78	88.74	98.88	26.8%	14.37	17.63	27.67	92.6%	50	55.26	60.42	20.8%
Africa-Southern	**90.42**	**95.41**	**99.47**	**10.0%**	**82.67**	**90.57**	**98.19**	**18.8%**	**59.93**	**73.12**	**80.15**	**33.7%**	**1561**	**1577**	**1603**	**2.7%**
Nigeria	58	76.39	91.85	58.4%	56	82.28	100	78.6%	14.25	24.24	41.54	191.5%	293	462	683.6	133.3%
Niger	49.49	59.93	70.28	42.0%	15	31.33	49.82	232.1%	1.476	3.382	6.864	365.0%	74	93.78	115.6	56.2%
Côte d'Ivoire	79.8	86.75	100	25.3%	42	55.01	77.51	84.5%	9.91	13.87	27.71	179.6%	73	108.2	159.1	117.9%
Burkina Faso	78.22	85.89	100	27.8%	34	52.05	77.56	128.1%	3.288	7.758	20.36	519.2%	30	49.58	63.41	111.4%
Ghana	85.86	92.36	100	16.5%	72	88.2	100	38.9%	6.607	18.6	41.38	526.3%	34	105.1	283.6	734.1%
Mali	64	76.42	90.72	41.8%	41	63.56	87.7	113.9%	7.359	14.03	30.6	315.8%	236	274.7	314.7	33.3%
Senegal	71	81.31	96.84	36.4%	66	74.06	85.31	29.3%	23	24.73	30.63	33.2%	120	150	184.3	53.6%
Guinea	74	80.84	85.94	16.1%	36	53.05	65.98	83.3%	11	16.01	20.57	87.0%	95	135.9	182.1	91.7%
Benin	74.75	80.54	93.68	25.3%	35	52.01	77.15	120.4%	4.622	9.989	24.57	431.6%	12	27.68	56.68	372.3%
Togo	62	73.6	81.71	31.8%	35	42.25	53.81	53.7%	4.343	8.211	15.74	262.4%	7	15.94	31.81	354.4%
Sierra Leone	55	71.31	91.04	65.5%	40	60.28	88.28	120.7%	4.346	9.712	26.14	501.5%	30	69.25	143.3	377.7%
Liberia	73.74	89.61	100	35.6%	43	83.78	100	132.6%	9.777	25.93	43.47	344.6%	3	12.78	45.27	1409.0%
Mauritania	49.5	72.98	94.19	90.3%	36	52.15	72.86	102.4%	9.93	14.59	24.97	151.5%	45	64.57	88.91	97.6%
Gambia	89	97.36	100	12.4%	89	100	100	12.4%	35.97	42.61	55.07	53.1%	2	5.228	12.2	510.0%
Guinea-Bissau	64.65	69.24	85.92	32.9%	26	38.22	58.3	124.2%	4.845	6.451	10.95	126.0%	25	43.99	70.77	183.1%
Cape Verde	88	95.92	100	13.6%	61	79.91	94.67	55.2%	34.83	41.21	56.07	61.0%	3	3.015	3.038	1.3%
Africa-Western	**64.65**	**78.29**	**91.39**	**41.4%**	**50.32**	**70.65**	**87.45**	**73.8%**	**11.35**	**18.89**	**32.66**	**187.8%**	**1082**	**1622**	**2438**	**125.3%**

Infrastructure

	Water and Sanitation															
	Access to Improved Drinking Water				Access to Improved Sanitation				Wastewater Collection Coverage				Land Area Equipped for Irrigation			
Base Case: Countries in Year 2060	Percent of Population				Percent of Population				Percent of Population				In Hectares (1000 hectares=10 sq km)			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS																
Haiti	69	72.67	77.69	12.6%	32	44.91	63.22	97.6%	7.396	14.08	25.88	249.9%	92	91.57	91.94	-0.1%
Dominican Rep.	86	91.88	95.36	10.9%	94	99.82	100	6.4%	31.4	55.43	66.86	112.9%	275	273.3	273.6	-0.5%
Cuba	94	100	100	6.4%	98	99.86	100	2.0%	35.9	58.93	70.27	95.7%	870	868.7	870	0.0%
Puerto Rico	100	100	100	0.0%	91.09	95.63	99.75	9.5%	78.76	81.66	87.22	10.7%	22	21.96	22	0.0%
Jamaica	93	93.93	95.31	2.5%	97	98.28	100	3.1%	43.89	44.7	48.67	10.9%	25	24.68	24.9	-0.4%
Trinidad and Tobago	93.68	97.85	100	6.7%	99	100	100	1.0%	25.2	39.92	52.38	107.9%	7	7	7	0.0%
Bahamas	95.88	96.38	100	4.3%	100	99.55	100	0.0%	91.86	91.64	92.73	0.9%	1	0.997	1	0.0%
Barbados	100	100	100	0.0%	100	99.86	100	0.0%	56.23	60.52	70.6	25.6%	5	4.993	5	0.0%
Saint Lucia	95.98	100	100	4.2%	69	81.28	93.34	35.3%	20.29	24.64	37.24	83.5%	3	3.096	3.251	8.4%
Grenada	94.22	97.21	100	6.1%	97	99.85	100	3.1%	31.88	31.99	37.27	16.9%	2	2.198	2.2	10.0%
Saint Vincent and the Grenadines	100	100	100	0.0%	88.02	93.51	99.67	13.2%	42.03	44.89	52.47	24.8%	1	1.036	1.09	9.0%
America-Caribbean	**86.31**	**89.2**	**90.87**	**5.3%**	**79.61**	**83**	**87.59**	**10.0%**	**32.54**	**45.3**	**53.95**	**65.8%**	**1303**	**1300**	**1302**	**-0.1%**
Guatemala	92	97.33	100	8.7%	86	96.59	100	16.3%	65.2	89.63	94.69	45.2%	200	198.8	199.5	-0.3%
Honduras	87	95.84	100	14.9%	82	88.4	96.24	17.4%	35.68	39.59	47.48	33.1%	80	79.87	80	0.0%
Nicaragua	85	92.68	100	17.6%	60	72.39	86.6	44.3%	27.96	31.03	40.59	45.2%	61	60.99	61	0.0%
El Salvador	87.88	91.26	95.55	8.7%	94	96.94	100	6.4%	54.88	55.91	60.03	9.4%	45	44.9	45	0.0%
Costa Rica	97	98.99	100	3.1%	99	100	100	1.0%	24.78	59.64	73	194.6%	108	108	108	0.0%
Panama	93	96.3	98.76	6.2%	78	86.35	95.22	22.1%	58	67.76	76.45	31.8%	43	42.91	43	0.0%
Belize	98.02	100	100	2.0%	97	100	100	3.1%	15.1	49.99	66.67	341.5%	4	4	4	0.0%
America-Central	**90.22**	**95.79**	**99.43**	**10.2%**	**83.74**	**91.55**	**97.33**	**16.2%**	**47.89**	**63.89**	**72.31**	**51.0%**	**541**	**539.5**	**540.5**	**-0.1%**
United States of America	98.94	99.21	100	1.1%	100	99.68	100	0.0%	71.4	86.21	91.08	27.6%	23000	23983	24686	7.3%
Mexico	96	97.57	100	4.2%	96	98.56	100	4.2%	67.6	73.03	79.72	17.9%	6300	6289	6300	0.0%
Canada	99.81	100	100	0.2%	100	99.94	100	0.0%	74.3	86.34	91.1	22.6%	855	1032	1376	60.9%
America-North	**98.3**	**98.87**	**100**	**1.7%**	**99.04**	**99.42**	**100**	**1.0%**	**70.71**	**83.02**	**88.48**	**25.1%**	**30155**	**31304**	**32362**	**7.3%**
Brazil	98	100	100	2.0%	80	88.34	95.87	19.8%	53.4	66.81	75.65	41.7%	4500	7244	11345	152.1%
Colombia	92.08	96.83	100	8.6%	90	96.19	100	11.1%	58.71	64.04	74.31	26.6%	900	900	900	0.0%
Argentina	97	98.72	100	3.1%	90	93.17	96.85	7.6%	42.5	69.57	77.72	82.9%	1650	1645	1650	0.0%
Peru	85	92.39	96.38	13.4%	79	87.03	91.63	16.0%	71	78.83	82.13	15.7%	1196	1192	1195	-0.1%
Venezuela (Bolivarian Rep. of)	92.93	96.91	100	7.6%	91	96.58	100	9.9%	86.5	91.96	94.76	9.5%	580	579.9	580	0.0%
Ecuador	93	97.07	100	7.5%	95	99.35	100	5.3%	65.84	70.19	77.31	17.4%	960	1311	1621	68.9%
Chile	96	98.8	98.79	2.9%	96	98.92	99.85	4.0%	95.9	96.1	96.1	0.2%	1900	1899	1899	-0.1%
Bolivia (Plurinational State of)	87	99.91	100	14.9%	63	79.08	97.42	54.6%	27	43	56	107.4%	175	360.6	631.4	260.8%
Paraguay	86.14	90.05	97.58	13.3%	74	79.66	87.07	17.7%	17.97	34.68	45.21	151.6%	67	66.41	66.67	-0.5%
Uruguay	100	99.9	100	0.0%	100	99.9	100	0.0%	89.03	90.18	92.15	3.5%	218	217.8	218	0.0%
Guyana	94.06	100	100	6.3%	93	100	100	7.5%	7.2	26.83	33.35	363.2%	150	150	150	0.0%
Suriname	92	98.64	100	8.7%	93	100	100	7.5%	62.87	70.06	79.46	26.4%	57	58.78	58.78	3.1%
America-South	**95.11**	**98.27**	**99.59**	**4.7%**	**83.85**	**90.86**	**96.7**	**15.3%**	**57.91**	**69.8**	**77.43**	**33.7%**	**12353**	**15624**	**20314**	**64.4%**

Infrastructure

	Water and Sanitation															
	Access to Improved Drinking Water				Access to Improved Sanitation				Wastewater Collection Coverage				Land Area Equipped for Irrigation			
Base Case: Countries in Year 2060	Percent of Population				Percent of Population				Percent of Population				In Hectares (1000 hectares=10 sq km)			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA																
China	91	100	100	9.9%	83	100	100	20.5%	45.67	77.9	84.75	85.6%	64504	66702	66702	3.4%
Japan	100	100	100	0.0%	100	99.71	100	0.0%	67	80.71	87.13	30.0%	2506	2447	2492	-0.6%
Korea, Rep. of	97.96	100	100	2.1%	100	100	100	0.0%	78.8	88.8	91.78	16.5%	806	806	806	0.0%
Korea, Dem. People's Rep. of	97.03	99.88	100	3.1%	85	99.9	100	17.6%	47.81	52.96	58.48	22.3%	1460	1459	1460	0.0%
Taiwan, China	100	100	100	0.0%	97.6	98.45	98.87	1.3%	89.68	92.15	92.71	3.4%	28.51	30.83	32.3	13.3%
Hong Kong SAR, China	100	99.79	100	0.0%	98.02	99.41	100	2.0%	93.2	94.42	95.21	2.2%	0.025	0.027	0.029	16.0%
Mongolia	82	95.82	100	22.0%	79	93.03	100	26.6%	28.79	38.81	52.95	83.9%	84	129.3	228.6	172.1%
Asia-East	**92.2**	**99.99**	**100**	**8.5%**	**85.21**	**99.94**	**99.98**	**17.3%**	**49.29**	**78.23**	**84.72**	**71.9%**	**69389**	**71574**	**71721**	**3.4%**
India	92	100	100	8.7%	43	75.42	92.79	115.8%	9.558	18.89	36.03	277.0%	66700	79080	91401	37.0%
Pakistan	92	95.84	100	8.7%	54	66.87	85.44	58.2%	16.11	20.59	32.12	99.4%	20200	20640	20640	2.2%
Bangladesh	81.82	86.7	100	22.2%	81	98.72	100	23.5%	12.79	18.35	32.97	157.8%	5100	5535	5718	12.1%
Afghanistan	50.5	67.39	80.2	58.8%	37	58.47	76.15	105.8%	9.119	12.45	21.85	139.6%	3199	3179	3199	0.0%
Iran, Islamic Rep. of	96	100	100	4.2%	100	100	100	0.0%	73.49	78.84	83.33	13.4%	9133	11038	11444	25.3%
Nepal	89	93.6	100	12.4%	45	59.11	77.96	73.2%	5.526	9.575	23.37	322.9%	1168	1292	1419	21.5%
Uzbekistan	87	100	100	14.9%	100	100	100	0.0%	33.68	39.29	44.3	31.5%	4223	4223	4223	0.0%
Sri Lanka	91	100	100	9.9%	96	100	100	4.2%	16.87	21.31	26.92	59.6%	570	573.2	575.3	0.9%
Kazakhstan	95	100	100	5.3%	99	100	100	1.0%	62.87	74.29	81.33	29.4%	3556	3556	3556	0.0%
Tajikistan	64	71.68	100	56.3%	97	93.19	100	3.1%	22.12	22.31	27.02	22.2%	719	697.6	719	0.0%
Kyrgyz Rep.	90	99.7	100	11.1%	96	100	100	4.2%	23.1	29.24	33.98	47.1%	1018	1016	1018	0.0%
Turkmenistan	84	98.83	100	19.0%	98	100	100	2.0%	48.56	63.53	73.31	51.0%	1800	1800	1800	0.0%
Bhutan	96	100	100	4.2%	70	86.14	100	42.9%	16.16	29.65	51.65	219.6%	28	30.36	30.78	9.9%
Maldives	98.1	100	100	1.9%	99	96.65	99.74	0.7%	97	97.09	96.82	-0.2%	0.297	0.315	0.336	13.1%
Asia-South Central	**90.21**	**97.15**	**99.24**	**10.0%**	**52.75**	**77.85**	**92.1**	**74.6%**	**14.39**	**21.98**	**36.48**	**153.5%**	**117415**	**132662**	**145743**	**24.1%**
Indonesia	82	100	100	22.0%	65	84.98	95.59	47.1%	29.16	42.09	55.58	90.6%	6722	7529	8141	21.1%
Philippines	92.08	96.3	100	8.6%	90	98.38	100	11.1%	47.39	53.94	63.28	33.5%	1540	1919	2035	32.1%
Vietnam	94.95	100	100	5.3%	80	95.19	100	25.0%	19.97	28.52	40.98	105.2%	4600	5546	6356	38.2%
Thailand	96	100	100	4.2%	100	100	100	0.0%	34.88	42.17	53.35	53.0%	6415	7374	8371	30.5%
Myanmar	83	89.55	100	20.5%	89	100	100	12.4%	21.33	27.71	41.37	94.0%	2275	3156	4142	82.1%
Malaysia	99.72	99.79	100	0.3%	100	99.8	100	0.0%	75.58	81.14	86.22	14.1%	365	371.2	381	4.4%
Cambodia	64	78.37	89.43	39.7%	36	62.47	80.94	124.8%	6.307	12.59	26.7	323.3%	285	293.5	301.8	5.9%
Lao People's Democratic Rep.	67	98.79	100	49.3%	65	94.27	100	53.8%	18.13	33.63	51.28	182.8%	310	386.1	421.3	35.9%
Singapore	100	99.93	100	0.0%	100	99.93	100	0.0%	100	97.68	97.69	-2.3%	0.231	0.255	0.275	19.0%
Timor-Leste	68.69	87.22	99.95	45.5%	53	81.46	100	88.7%	11.06	16.25	25.17	127.6%	35	35.47	36.98	5.7%
Brunei Darussalam	100	100	100	0.0%	98	99.66	100	2.0%	91.21	92.52	94.01	3.1%	1	1.279	1.702	70.2%
Asia-South Eastern	**87.61**	**97.82**	**99.69**	**13.8%**	**78.55**	**91.99**	**97.75**	**24.4%**	**32.79**	**42.63**	**54.76**	**67.0%**	**22548**	**26611**	**30188**	**33.9%**

Infrastructure

	Water and Sanitation															
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Base Case: Countries in Year 2060	Percent of Population				Percent of Population				Percent of Population				In Hectares (1000 hectares=10 sq km)			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA continued																
Turkey	100	100	100	0.0%	92	95.41	99.4	8.0%	74	79.63	84.53	14.2%	5215	5636	6333	21.4%
Iraq	79	99.28	100	26.6%	90	100	100	11.1%	26.2	39.64	52.67	101.0%	3525	3871	4273	21.2%
Yemen, Rep. of	55	83.03	100	81.8%	56	75.39	90.78	62.1%	34.5	42.48	52.56	52.3%	680	734.4	800.6	17.7%
Saudi Arabia	89.86	96.72	100	11.3%	95.58	99.81	100	4.6%	85.1	89.66	91.63	7.7%	1731	2689	3233	86.8%
Syrian Arab Rep.	90	100	100	11.1%	99	100	100	1.0%	48.01	55.65	63.04	31.3%	1238	1247	1250	1.0%
Jordan	96.73	97.75	100	3.4%	100	97.91	100	0.0%	61	68.72	73.17	20.0%	94.8	94.96	95.7	0.9%
Israel	100	99.37	100	0.0%	100	99.37	100	0.0%	96.72	97.85	98.29	1.6%	225	224.3	225	0.0%
Palestine	84.75	87.52	99.49	17.4%	98	96.16	99.09	1.1%	58.7	76.5	78.06	33.0%	21	26.59	33.45	59.3%
Azerbaijan	80	100	100	25.0%	89	99.24	100	12.4%	31.6	46.76	58.25	84.3%	1433	1433	1433	0.0%
United Arab Emirates	100	100	100	0.0%	100	100	100	0.0%	78.3	90.76	93.55	19.5%	230	232.1	232.3	1.0%
Kuwait	99.01	100	100	1.0%	100	100	100	0.0%	96.84	97.78	97.89	1.1%	10	15.11	15.93	59.3%
Lebanon	100	99.3	100	0.0%	98	99.31	100	2.0%	67.4	78.59	82.8	22.8%	90	100.1	112.5	25.0%
Oman	88.96	100	100	12.4%	99	100	100	1.0%	81.9	87.88	90.31	10.3%	59	69.42	70.91	20.2%
Armenia	98.3	100	100	1.7%	94	98	100	6.4%	67.2	68.92	73.53	9.4%	274	274	274	0.0%
Georgia	98	100	100	2.0%	97	100	100	3.1%	52.25	59.48	67.79	29.7%	433	433	433	0.0%
Qatar	100	100	100	0.0%	100	100	100	0.0%	99.48	98.75	98.46	-1.0%	13	25.04	28.35	118.1%
Bahrain	100	100	100	0.0%	97.27	100	100	2.8%	91	96.41	96.5	6.0%	4	4.083	4.091	2.3%
Cyprus	100	100	100	0.0%	100	100	100	0.0%	40	64.15	75.65	89.1%	46	46	46	0.0%
Asia-West	**88.96**	**96.72**	**99.98**	**12.4%**	**90.15**	**95.04**	**98.22**	**9.0%**	**60.5**	**65.44**	**70.32**	**16.2%**	**15322**	**17155**	**18894**	**23.3%**
Australia	100	100	100	0.0%	100	99.99	100	0.0%	87	92.01	94.35	8.4%	2550	3511	5568	118.4%
Papua New Guinea	39.6	66.09	82.84	109.2%	45	67.73	84.66	88.1%	6.798	8.265	13.14	93.3%	11.88	15.27	17.81	49.9%
New Zealand	100	100	100	0.0%	97.27	100	100	2.8%	80	87.2	90.7	13.4%	619	670.8	670.8	8.4%
Solomon Islands	70	78.88	84.36	20.5%	32	52.62	68.89	115.3%	6.075	9.797	17.91	194.8%	2.772	2.944	3.106	12.0%
Fiji	98	99.97	100	2.0%	83	91.43	100	20.5%	43	47.39	59.82	39.1%	3	4.003	5.626	87.5%
Vanuatu	90	93.48	100	11.1%	77	82.12	94.4	22.6%	14.04	18.2	32.21	129.4%	6.171	6.663	7.137	15.7%
Micronesia (Federated States of)	93.31	97.52	99.96	7.1%	25	49.14	73.93	195.7%	5.454	7.918	12.64	131.8%	7.425	7.886	8.377	12.8%
Tonga	100	100	100	0.0%	96	97.01	100	4.2%	23.89	23.86	24.77	3.7%	1.023	1.097	1.16	13.4%
Samoa	96	100	100	4.2%	98	99.59	100	2.0%	23.29	24.87	31.98	37.3%	2.178	2.35	2.518	15.6%
Oceania	**87.7**	**91.48**	**95.09**	**8.4%**	**87.18**	**90.86**	**95**	**9.0%**	**67.09**	**67.61**	**68.65**	**2.3%**	**3203**	**4222**	**6285**	**96.2%**

Infrastructure

	Water and Sanitation															
	Access to Improved Drinking Water				Access to Improved Sanitation				Wastewater Collection Coverage				Land Area Equipped for Irrigation			
Base Case: Countries in Year 2060	Percent of Population				Percent of Population				Percent of Population				In Hectares (1000 hectares=10 sq km)			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
EUROPE																
Russian Federation	97.12	100	100	3.0%	84	98.54	100	19.0%	55.2	66.23	74.73	35.4%	4300	4300	4300	0.0%
Ukraine	98	100	100	2.0%	97	100	100	3.1%	64.42	70.7	76.84	19.3%	2175	2175	2175	0.0%
Poland	100	100	100	0.0%	90	93.42	98.75	9.7%	63	69.56	76.99	22.2%	116	114.6	115.7	-0.3%
Romania	89.18	94.08	100	12.1%	75	84.15	96.01	28.0%	43	47.21	58.99	37.2%	3157	3157	3157	0.0%
Czech Rep.	100	100	100	0.0%	100	99.86	100	0.0%	81	83.43	87.06	7.5%	21	20.56	20.91	-0.4%
Belarus	99.75	100	100	0.3%	99	100	100	1.0%	91.3	95.44	97.08	6.3%	131	131	131	0.0%
Hungary	100	100	100	0.0%	100	99.89	100	0.0%	77	93.46	95.39	23.9%	140	133.9	139	-0.7%
Bulgaria	100	100	100	0.0%	100	100	100	0.0%	70	75.08	81.66	16.7%	102	100.7	101.9	-0.1%
Slovak Rep.	100	100	100	0.0%	100	99.78	100	0.0%	61	69.92	77.14	26.5%	135	129.3	132.4	-1.9%
Moldova, Rep. of	95.84	100	100	4.3%	91	96.42	100	9.9%	60	67.4	72.74	21.2%	228.3	228.3	228.3	0.0%
Europe-East	**97.45**	**99.57**	**100**	**2.6%**	**88.55**	**97.18**	**99.55**	**12.4%**	**60.16**	**68.79**	**76.35**	**26.9%**	**10505**	**10490**	**10501**	**-0.0%**
United Kingdom	100	99.63	100	0.0%	100	99.63	100	0.0%	97.7	98.01	98.77	1.1%	213	212.3	213	0.0%
Sweden	100	100	100	0.0%	100	100	100	0.0%	86	90.85	93.66	8.9%	160	160	160	0.0%
Denmark	100	100	100	0.0%	100	100	100	0.0%	87.9	92.63	94.87	7.9%	435	433.8	434.9	-0.0%
Ireland	100	98.82	99.51	-0.5%	99	98.52	99.42	0.4%	95	98.47	98.54	3.7%	1386	1485	1564	12.8%
Norway	100	100	100	0.0%	100	100	100	0.0%	83	89.64	92.78	11.8%	104	104	104	0.0%
Finland	100	99.99	100	0.0%	100	99.99	100	0.0%	81	86.36	90.96	12.3%	77	76.93	76.99	-0.0%
Lithuania	92.42	94.56	100	8.2%	86	89.97	98.15	14.1%	62	64.97	74.4	20.0%	1.34	1.293	1.333	-0.5%
Latvia	98.71	100	100	1.3%	88	91.43	100	13.6%	71	73.91	80.64	13.6%	0.8	0.799	0.8	0.0%
Estonia	98.35	100	100	1.7%	100	100	100	0.0%	81	95.3	97.05	19.8%	4	4	4	0.0%
Iceland	100	99.87	100	0.0%	100	99.87	100	0.0%	90	91.81	94.32	4.8%	75.27	81.36	89.47	18.9%
Europe-North	**99.69**	**99.55**	**99.97**	**0.3%**	**99.21**	**99.24**	**99.92**	**0.7%**	**92.24**	**94.58**	**96.47**	**4.6%**	**2456**	**2559**	**2649**	**7.9%**
Italy	100	99.86	100	0.0%	96.8	97.47	99.88	3.2%	94	95.69	97.26	3.5%	3950	3930	3948	-0.1%
Spain	100	99.96	100	0.0%	100	99.96	100	0.0%	100	98.38	98.7	-1.3%	3818	3785	3815	-0.1%
Greece	99.61	99.2	100	0.4%	98	97.83	98.98	1.0%	88	93.6	95.15	8.1%	1555	1517	1539	-1.0%
Portugal	99.39	99.81	100	0.6%	100	100	100	0.0%	86	98.5	98.96	15.1%	584	583.1	583.9	-0.0%
Serbia	99	100	100	1.0%	95	98.94	100	5.3%	55	69.9	74.6	35.6%	89	108.4	128.2	44.0%
Croatia	98.73	99.53	100	1.3%	100	99.98	100	0.0%	46	57.14	68.33	48.5%	31	40.77	40.78	31.5%
Bosnia and Herzegovina	99	100	100	1.0%	96	99.9	100	4.2%	38	47.54	59.99	57.9%	3	6.121	13.44	348.0%
Albania	95	100	100	5.3%	99	100	100	1.0%	47.6	54.95	67.01	40.8%	365	382.2	398.1	9.1%
Macedonia, TFYR	99.61	100	100	0.4%	94	98.2	100	6.4%	49	61.3	71.75	46.4%	128	128	128	0.0%
Slovenia	99.51	99.88	100	0.5%	100	99.88	100	0.0%	63	65.49	72.79	15.5%	10	14.01	14.03	40.3%
Montenegro	98	100	100	2.0%	93	96.25	99.8	7.3%	35	52.29	60.11	71.7%	2.3	3.735	6.406	178.5%
Malta	100	99.56	100	0.0%	100	99.56	99.95	-0.0%	98	98.09	97.82	-0.2%	3.2	3.186	3.198	-0.1%
Europe-South	**99.7**	**99.84**	**100**	**0.3%**	**98.11**	**98.74**	**99.87**	**1.8%**	**87.97**	**91.2**	**93.5**	**6.3%**	**10539**	**10502**	**10617**	**0.7%**
Germany	100	99.87	100	0.0%	100	99.87	100	0.0%	94.5	95.87	97.22	2.9%	485	484.3	485	0.0%
France	100	99.86	100	0.0%	100	99.86	100	0.0%	82	85.64	90.59	10.5%	2600	2516	2582	-0.7%
Netherlands	100	99.87	100	0.0%	100	99.87	100	0.0%	99	98.8	98.87	-0.1%	460	459.4	460	0.0%
Belgium	100	99.86	100	0.0%	100	99.86	100	0.0%	95	98.68	98.87	4.1%	23	22.97	23	0.0%
Switzerland	100	99.74	100	0.0%	100	99.74	100	0.0%	98.5	97.94	98.12	-0.4%	25	24.93	25	0.0%
Austria	100	99.9	100	0.0%	100	99.9	100	0.0%	94	97.38	98.61	4.9%	117	115.8	116.8	-0.2%
Luxembourg	100	99.54	100	0.0%	100	99.53	100	0.0%	95	97.08	97.78	2.9%	4.29	4.625	5.063	18.0%
Europe-West	**100**	**99.86**	**100**	**0.0%**	**100**	**99.86**	**100**	**0.0%**	**90.9**	**92.86**	**95.1**	**4.6%**	**3714**	**3628**	**3697**	**-0.5%**

Infrastructure

Base Case

Source: International Futures Model Version 6.61, Jan 2013

	Information & Communication Technology								Spending on Infrastructure							
	Telephone Network Density				Mobile Phone Usage				Spending on Core Infrastructure				Total (Core + Other) Infrastructure Spending			
	Lines per 100 persons				Subscriptions per 100 persons				Billions in 2000 dollars				Billions in 2000 dollars			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	17.29	5.338	3.355	-80.6%	77.88	153.3	154.7	98.6%	1052	1310	1606	52.7%	1770	2991	5681	221.0%
Africa	3.058	2.608	2.95	-3.5%	52.82	149.5	153.4	190.4%	57.54	174.5	306.4	432.5%	73.83	237.7	611	727.6%
Americas	29.5	6.828	3.466	-88.3%	94.47	154.1	154.1	63.1%	190.6	263.2	268.1	40.7%	424.9	650.2	1091	156.8%
Asia with Oceania	14.1	5.589	3.497	-75.2%	71.17	153.8	155.2	118.1%	595.2	719.6	844.4	41.9%	850.6	1648	3260	283.3%
Europe	39.92	7.848	3.536	-91.1%	129.9	157.1	156.9	20.8%	207.2	151.8	186.1	-10.2%	418.2	451.9	714.5	70.9%
World	17.29	5.338	3.355	-80.6%	77.88	153.3	154.7	98.6%	1052	1310	1606	52.7%	1770	2991	5681	221.0%
Africa-Eastern	1.056	2.154	3.043	188.2%	31.84	149.3	152.8	379.9%	10.02	50.36	113.7	1034.7%	11.74	58.62	190.1	1519.3%
Africa-Middle	0.757	2.079	2.705	257.3%	29.64	132.1	151.8	412.1%	3.3	18.74	30.83	834.2%	4.43	24.32	48.55	995.9%
Africa-Northern	9.253	4.568	3.33	-64.0%	84.04	155.5	155.5	85.0%	21.66	38.85	63.32	192.3%	28.73	64.83	168.9	487.9%
Africa-Southern	7.965	4.392	3.258	-59.1%	96.49	153.1	153.7	59.3%	8.114	14.52	16.28	100.6%	12.07	24.47	52.13	331.9%
Africa-Western	0.937	2.073	2.781	196.8%	55.05	153.6	153.8	179.4%	14.45	52.03	82.26	469.3%	16.86	65.42	151.3	797.4%
Africa	3.058	2.608	2.95	-3.5%	52.82	149.5	153.4	190.4%	57.54	174.5	306.4	432.5%	73.83	237.7	611	727.6%
America-Caribbean	10.09	4.589	3.234	-67.9%	57.85	153.7	152.4	163.4%	3.564	7.484	8.04	125.6%	7.204	15.01	24.68	242.6%
America-Central	12.92	5.03	3.39	-73.8%	114.8	157	155.8	35.7%	4.86	9.452	11.03	127.0%	6.802	14.46	24.52	260.5%
America-North	41.33	7.534	3.453	-91.6%	86.17	152.7	153.2	77.8%	127.1	137.2	155.6	22.4%	320.8	412.1	735.2	129.2%
America-South	19.68	6.481	3.516	-82.1%	105.6	155.4	155.1	46.9%	55.06	109	93.41	69.7%	90.12	208.7	306.7	240.3%
Americas	29.5	6.828	3.466	-88.3%	94.47	154.1	154.1	63.1%	190.6	263.2	268.1	40.7%	424.9	650.2	1091	156.8%
Asia-East	24.52	8.042	3.871	-84.2%	68.35	153.6	154.5	126.0%	362.8	308.3	321.3	-11.4%	549	932.9	1765	221.5%
Asia-South Central	4.442	3.608	3.264	-26.5%	61.43	154.7	154.6	151.7%	123	255.5	342.2	178.2%	141.5	399.9	951.8	572.7%
Asia-South East	12.68	6.239	3.635	-71.3%	97.21	150.4	157.5	62.0%	55.31	83.06	88.99	60.9%	71.93	145.2	223.7	211.0%
Asia-West	16.42	5.496	3.381	-79.4%	94.22	157	157.7	67.4%	39.94	58.22	74.68	87.0%	61.25	129.7	245	300.0%
Oceania	30.6	6.409	3.338	-89.1%	87.2	152.3	153.4	75.9%	14.06	14.6	17.28	22.9%	26.92	40.7	74.15	175.4%
Asia with Oceania	14.1	5.589	3.497	-75.2%	71.17	153.8	155.2	118.1%	595.2	719.6	844.4	41.9%	850.6	1648	3260	283.3%
Europe-East	29.04	7.398	3.543	-87.8%	141.9	160.7	160.8	13.3%	55.52	54.61	75.32	35.7%	73.34	109.7	170.3	132.2%
Europe-North	48.48	8.219	3.524	-92.7%	127.6	155.2	154.8	21.3%	44.32	31.02	33.99	-23.3%	98.85	106.4	178	80.1%
Europe-South	38.77	7.615	3.529	-90.9%	124.7	155.1	154.9	24.2%	53.48	28.2	33.35	-37.6%	97.85	82.34	125.5	28.3%
Europe-West	53.23	8.438	3.547	-93.3%	116.9	154.8	154.6	32.2%	55.15	39.27	44.72	-18.9%	150.6	156.5	245.2	62.8%
Europe	39.92	7.848	3.536	-91.1%	129.9	157.1	156.9	20.8%	207.2	151.8	186.1	-10.2%	418.2	451.9	714.5	70.9%

Infrastructure

Base Case: Countries in Year 2060 Descending Population Sequence	Information & Communication Technology								Spending on Infrastructure							
	Telephone Network Density				Mobile Phone Usage				Spending on Core Infrastructure				Total (Core + Other) Infrastructure Spending			
	Lines per 100 persons				Subscriptions per 100 persons				Billions in 2000 dollars				Billions in 2000 dollars			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA																
Ethiopia	1.096	2.361	3.321	203.0%	7.857	152.5	152.4	1839.7%	1.136	10.2	21.05	1753.0%	1.328	11.49	36.81	2671.8%
Tanzania, United Rep. of	0.389	1.634	3.169	714.7%	46.8	153.5	151.7	224.1%	1.796	10.31	35.13	1856.0%	2.159	12.33	60.98	2724.5%
Uganda	0.979	2.629	3.267	233.7%	38.38	154.5	154.5	302.6%	1.276	5.687	12.23	858.5%	1.435	7.16	24.94	1638.0%
Kenya	1.136	2.375	2.951	159.8%	61.63	153.7	153.4	148.9%	2.115	6.922	12.66	498.6%	2.461	7.831	19.85	706.6%
Madagascar	0.831	1.824	2.365	184.6%	39.79	153.6	153.6	286.0%	0.469	1.372	3.035	547.1%	0.511	1.46	3.247	535.4%
Mozambique	0.376	1.709	3.012	701.1%	30.89	153.3	151.5	390.4%	0.65	6.748	12.05	1753.8%	0.781	7.44	18.29	2241.9%
Malawi	1.074	2.099	2.841	164.5%	20.39	153.6	153.4	652.3%	0.277	1.46	3.444	1143.3%	0.308	1.606	4.267	1285.4%
Zambia	0.688	2.002	2.794	306.1%	37.8	153.9	153.4	305.8%	0.587	2.815	4.003	581.9%	0.659	3.461	6.186	838.7%
Somalia	1.072	1.989	3.109	190.0%	6.947	63.67	150.8	2070.7%	0.25	1.07	3.09	1136.0%	0.334	1.362	5.141	1439.2%
Rwanda	0.373	1.86	2.943	689.0%	33.4	154.1	153.6	359.9%	0.363	1.227	2.624	622.9%	0.412	1.467	4.447	979.4%
Zimbabwe	3.015	2.957	2.86	-5.1%	59.66	153.6	152.4	155.4%	0.637	1.028	1.564	145.5%	0.709	1.163	1.986	180.1%
Burundi	0.389	1.319	2.402	517.5%	13.72	147.8	151.4	1003.5%	0.16	0.632	1.148	617.5%	0.177	0.654	1.248	605.1%
Eritrea	1.032	2.142	3.004	191.1%	3.527	75.39	151.3	4189.8%	0.066	0.466	1.138	1624.2%	0.076	0.521	1.646	2065.8%
Comoros	2.863	2.788	2.874	0.4%	22.49	153.2	153.3	581.6%	0.02	0.081	0.185	825.0%	0.024	0.087	0.224	833.3%
Djibouti	2.079	2.966	3.048	46.6%	18.64	139.7	152.2	716.5%	0.073	0.102	0.15	105.5%	0.089	0.119	0.223	150.6%
Mauritius	29.84	7.308	3.635	-87.8%	91.67	154.5	154.1	68.1%	0.145	0.249	0.168	15.9%	0.273	0.475	0.643	135.5%
Africa-Eastern	**1.056**	**2.154**	**3.043**	**188.2%**	**31.84**	**149.3**	**152.8**	**379.9%**	**10.02**	**50.36**	**113.7**	**1034.7%**	**11.74**	**58.62**	**190.1**	**1519.3%**
Congo, Democratic Rep. of	0.064	1.6	2.609	3976.6%	17.21	114	151.3	779.1%	0.567	4.268	11.62	1949.4%	0.63	4.428	12.54	1890.5%
Angola	1.589	3.072	2.928	84.3%	46.69	153.4	151.2	223.8%	1.256	8.131	9.319	642.0%	1.726	11.2	19.93	1054.7%
Cameroon	2.533	3.219	3.036	19.9%	41.61	153.3	151.5	264.1%	0.636	3.011	4.726	643.1%	0.864	3.434	6.331	632.8%
Chad	0.456	1.746	2.588	467.5%	23.29	153.9	153.7	559.9%	0.189	1.097	2.56	1254.5%	0.217	1.226	3.221	1384.3%
Central African Rep.	0.273	1.547	2.568	840.7%	23.18	154.2	154.2	565.2%	0.113	0.35	0.679	500.9%	0.125	0.386	0.826	560.8%
Congo, Rep. of	0.243	1.755	2.544	946.9%	93.96	155.5	155.5	65.5%	0.324	0.989	1.067	229.3%	0.42	1.903	3.247	673.1%
Gabon	2.018	2.547	2.635	30.6%	106.9	155.8	155.8	45.7%	0.11	0.554	0.606	450.9%	0.234	0.952	1.597	582.5%
Equatorial Guinea	1.933	2.561	2.534	31.1%	57.01	154.4	152.4	167.3%	0.093	0.317	0.212	128.0%	0.201	0.764	0.79	293.0%
São Tomé and Príncipe	4.629	3.504	3.073	-33.6%	61.97	154.6	154.6	149.5%	0.013	0.026	0.042	223.1%	0.014	0.03	0.062	342.9%
Africa-Middle	**0.757**	**2.079**	**2.705**	**257.3%**	**29.64**	**132.1**	**151.8**	**412.1%**	**3.3**	**18.74**	**30.83**	**834.2%**	**4.43**	**24.32**	**48.55**	**995.9%**
Egypt, Arab Rep.	11.86	5.244	3.458	-70.8%	87.11	155.1	155.1	78.1%	10.43	16.32	19.4	86.0%	13.49	23.97	45.11	234.4%
Sudan	0.86	2.218	3.096	260.0%	40.54	154.4	154.4	280.9%	1.196	7.256	29.45	2362.4%	1.448	13.87	86.92	5902.8%
Algeria	8.24	4.369	3.071	-62.7%	92.42	155.1	155.1	67.8%	2.788	5.24	4.705	68.8%	3.81	8.345	9.97	161.7%
Morocco	11.73	6.192	3.675	-68.7%	100.1	155.7	155.7	55.5%	3.251	5.29	5.426	66.9%	4.383	8.363	13.42	206.2%
Tunisia	12.3	5.397	3.451	-71.9%	106	155.8	155.8	47.0%	1.109	2.563	2.238	101.8%	1.696	4.353	7.2	324.5%
Libya	19.33	6.825	3.393	-82.4%	171.5	171.5	171.5	0.0%	2.887	2.183	2.102	-27.2%	3.902	5.924	6.286	61.1%
Africa-Northern	**9.253**	**4.568**	**3.33**	**-64.0%**	**84.04**	**155.5**	**155.5**	**85.0%**	**21.66**	**38.85**	**63.32**	**192.3%**	**28.73**	**64.83**	**168.9**	**487.9%**

Infrastructure

	Information & Communication Technology								Spending on Infrastructure							
	Telephone Network Density				Mobile Phone Usage				Spending on Core Infrastructure				Total (Core + Other) Infrastructure Spending			
Base Case: Countries in Year 2060	Lines per 100 persons				Subscriptions per 100 persons				Billions in 2000 dollars				Billions in 2000 dollars			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA continued																
South Africa	8.428	4.519	3.299	-60.9%	100.5	153.7	153.7	52.9%	7.072	12.87	14.44	104.2%	10.71	21.37	46.73	336.3%
Namibia	6.657	4.299	3.24	-51.3%	67.21	154.8	154.8	130.3%	0.469	0.761	0.861	83.6%	0.575	1.377	2.412	319.5%
Lesotho	1.787	2.591	2.827	58.2%	32.18	134.9	151.4	370.5%	0.097	0.221	0.248	155.7%	0.116	0.27	0.325	180.2%
Botswana	6.847	4.294	3.035	-55.7%	117.8	156.1	156.1	32.5%	0.401	0.476	0.497	23.9%	0.555	1.18	2.238	303.2%
Swaziland	3.71	3.34	2.991	-19.4%	61.78	154.3	154.1	149.4%	0.076	0.191	0.236	210.5%	0.112	0.27	0.431	284.8%
Africa-Southern	**7.965**	**4.392**	**3.258**	**-59.1%**	**96.49**	**153.1**	**153.7**	**59.3%**	**8.114**	**14.52**	**16.28**	**100.6%**	**12.07**	**24.47**	**52.13**	**331.9%**
Nigeria	0.663	1.942	2.835	327.6%	55.1	154.3	154.1	179.7%	7.689	31.78	44.55	479.4%	9.263	42.07	93.33	907.6%
Niger	0.539	1.718	2.348	335.6%	24.53	153.5	151.3	516.8%	0.319	2.033	4.502	1311.3%	0.359	2.127	4.761	1226.2%
Côte d'Ivoire	1.131	2.07	2.743	142.5%	75.54	153.9	153.7	103.5%	1.242	3.602	6.468	420.8%	1.455	4.141	9.496	552.6%
Burkina Faso	0.874	2.131	2.765	216.4%	34.66	154.3	154.3	345.2%	0.708	1.836	3.82	439.5%	0.788	2.129	5.281	570.2%
Ghana	1.139	2.351	3.149	176.5%	71.49	154.9	154.9	116.7%	1.629	4.442	6.993	329.3%	1.781	5.392	16.86	846.7%
Mali	0.744	1.983	2.682	260.5%	47.66	154.4	154.4	224.0%	0.434	1.556	3.243	647.2%	0.476	1.749	4.143	770.4%
Senegal	2.749	2.822	2.861	4.1%	67.11	153.5	152.7	127.5%	0.389	1.296	2.331	499.2%	0.459	1.457	2.975	548.1%
Guinea	0.18	1.58	2.406	1236.7%	40.07	154.5	154.5	285.6%	0.463	1.229	2.254	386.8%	0.526	1.458	2.725	418.1%
Benin	1.508	2.699	3.001	99.0%	79.94	155.1	155.1	94.0%	0.637	1.385	2.812	341.4%	0.698	1.581	4.025	476.6%
Togo	3.546	3.512	2.874	-19.0%	40.69	153.3	153.3	276.8%	0.207	0.593	0.995	380.7%	0.233	0.633	1.086	366.1%
Sierra Leone	0.239	1.708	2.957	1137.2%	34.09	120.5	152.1	346.2%	0.135	0.808	1.643	1117.0%	0.163	0.967	3.06	1777.3%
Liberia	0.147	1.638	2.687	1727.9%	39.34	153.4	151.3	284.6%	0.123	0.572	1.094	789.4%	0.133	0.619	1.29	869.9%
Mauritania	2.069	2.922	2.771	33.9%	79.34	155	155	95.4%	0.265	0.43	0.731	175.8%	0.294	0.51	0.94	219.7%
Gambia	2.822	3.036	3.13	10.9%	85.53	154.5	154.4	80.5%	0.113	0.282	0.493	336.3%	0.125	0.325	0.755	504.0%
Guinea-Bissau	0.33	1.475	2.227	574.8%	39.21	154	154	292.8%	0.023	0.087	0.215	834.8%	0.026	0.095	0.238	815.4%
Cape Verde	14.51	6.191	3.741	-74.2%	74.97	155	155	106.7%	0.068	0.099	0.115	69.1%	0.086	0.16	0.338	293.0%
Africa-Western	**0.937**	**2.073**	**2.781**	**196.8%**	**55.05**	**153.6**	**153.8**	**179.4%**	**14.45**	**52.03**	**82.26**	**469.3%**	**16.86**	**65.42**	**151.3**	**797.4%**

Infrastructure

Base Case: Countries in Year 2060 Descending Population Sequence	Information & Communication Technology								Spending on Infrastructure							
	Telephone Network Density				Mobile Phone Usage				Spending on Core Infrastructure				Total (Core + Other) Infrastructure Spending			
	Lines per 100 persons				Subscriptions per 100 persons				Billions in 2000 dollars				Billions in 2000 dollars			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS																
Haiti	0.5	1.514	2.473	394.6%	40.03	153.6	152.4	280.7%	0.28	0.982	1.125	301.8%	0.347	1.109	1.45	317.9%
Dominican Rep.	10.17	5.137	3.365	-66.9%	89.58	154.2	151.4	69.0%	0.804	2.991	3.183	295.9%	1.583	5.361	8.832	457.9%
Cuba	10.34	6.645	4.21	-59.3%	8.909	153.1	153.2	1619.6%	1.02	1.127	1.673	64.0%	1.698	2.761	6.38	275.7%
Puerto Rico	23.79	6.874	3.677	-84.5%	78.26	153.4	153.2	95.8%	0.79	1.341	1.14	44.3%	2.231	3.585	5.274	136.4%
Jamaica	9.597	4.323	3.136	-67.3%	113.2	153.5	151.4	33.7%	0.305	0.465	0.433	42.0%	0.494	0.63	0.792	60.3%
Trinidad and Tobago	21.86	6.373	3.29	-84.9%	141.2	156.8	156.8	11.0%	0.169	0.388	0.275	62.7%	0.452	1.134	1.214	168.6%
Bahamas	37.71	7.301	3.429	-90.9%	124.9	155.1	154.8	23.9%	0.088	0.088	0.088	0.0%	0.204	0.213	0.329	61.3%
Barbados	50.3	8.314	3.711	-92.6%	128.1	156	155.9	21.7%	0.045	0.036	0.044	-2.2%	0.097	0.097	0.176	81.4%
Saint Lucia	23.58	6.549	3.53	-85.0%	102.9	153.6	153.5	49.2%	0.028	0.025	0.028	0.0%	0.044	0.051	0.089	102.3%
Grenada	27.15	6.62	3.603	-86.7%	116.7	155.9	155.9	33.6%	0.017	0.023	0.026	52.9%	0.026	0.037	0.07	169.2%
Saint Vincent and the Grenadines	19.85	6.026	3.508	-82.3%	120.5	156.2	156.2	29.6%	0.019	0.018	0.024	26.3%	0.028	0.036	0.078	178.6%
America-Caribbean	**10.09**	**4.589**	**3.234**	**-67.9%**	**57.85**	**153.7**	**152.4**	**163.4%**	**3.564**	**7.484**	**8.04**	**125.6%**	**7.204**	**15.01**	**24.68**	**242.6%**
Guatemala	10.41	4.782	3.483	-66.5%	125.6	154.7	152.7	21.6%	1.406	3.327	4.625	228.9%	1.852	4.346	8.542	361.2%
Honduras	8.809	4.731	3.28	-62.8%	125.1	155.8	155.6	24.4%	0.925	1.493	1.626	75.8%	1.125	1.937	2.717	141.5%
Nicaragua	4.457	3.47	2.995	-32.8%	65.14	154.2	154.2	136.7%	0.367	0.738	0.831	126.4%	0.447	0.914	1.275	185.2%
El Salvador	16.16	5.474	3.438	-78.7%	124.3	155.6	155.3	24.9%	0.623	1.186	1.117	79.3%	0.93	1.757	2.533	172.4%
Costa Rica	31.8	7.647	3.706	-88.3%	65.14	154.6	154.6	137.3%	0.851	1.295	1.179	38.5%	1.32	2.57	4.093	210.1%
Panama	15.73	5.965	3.394	-78.4%	184.7	183.9	183.6	-0.6%	0.641	1.327	1.536	139.6%	1.059	2.789	5.027	374.7%
Belize	9.719	4.765	3.425	-64.8%	62.32	152.1	153	145.5%	0.046	0.087	0.115	150.0%	0.069	0.144	0.332	381.2%
America-Central	**12.92**	**5.03**	**3.39**	**-73.8%**	**114.8**	**157**	**155.8**	**35.7%**	**4.86**	**9.452**	**11.03**	**127.0%**	**6.802**	**14.46**	**24.52**	**260.5%**
United States of America	48.71	8.104	3.491	-92.8%	89.86	152.8	153	70.3%	97.07	97.95	116.7	20.2%	260.4	321.9	598	129.6%
Mexico	17.54	5.69	3.32	-81.1%	80.55	154.1	153.9	91.1%	12.31	21.2	20.07	63.0%	24.97	43.24	63.7	155.1%
Canada	50.04	8.342	3.517	-93.0%	70.66	147.7	152.8	116.2%	17.75	18.06	18.84	6.1%	35.43	46.94	73.55	107.6%
America-North	**41.33**	**7.534**	**3.453**	**-91.6%**	**86.17**	**152.7**	**153.2**	**77.8%**	**127.1**	**137.2**	**155.6**	**22.4%**	**320.8**	**412.1**	**735.2**	**129.2%**
Brazil	21.62	6.695	3.543	-83.6%	104.1	155.8	155.8	49.7%	31.36	56.75	40.27	28.4%	49.22	110.5	145.8	196.2%
Colombia	14.71	5.762	3.402	-76.9%	93.76	154.4	154.4	64.7%	3.305	10.66	9.325	182.1%	5.93	19.18	27.16	358.0%
Argentina	24.75	6.839	3.507	-85.8%	141.8	155.9	155.5	9.7%	6.634	10.53	10.26	54.7%	13.79	26.41	41.28	199.3%
Peru	10.87	5.503	3.366	-69.0%	100.1	154.8	153.8	53.6%	2.727	8.462	7.609	179.0%	4.229	13.53	18.51	337.7%
Venezuela (Bolivarian Rep. of)	24.44	8.298	3.931	-83.9%	96.2	154.4	154.4	60.5%	4.086	9.701	11.7	186.3%	7.153	18.38	44.7	524.9%
Ecuador	14.42	5.626	3.311	-77.0%	102.2	155.4	155.4	52.1%	1.773	3.097	2.678	51.0%	2.253	4.345	5.379	138.7%
Chile	20.2	6.474	3.389	-83.2%	116	156	155.3	33.9%	2.471	4.047	2.964	20.0%	3.938	8.095	8.784	123.1%
Bolivia (Plurinational State of)	8.542	5.057	3.535	-58.6%	72.3	154.9	154.9	114.2%	0.762	1.746	2.343	207.5%	0.908	2.499	5.108	462.6%
Paraguay	6.275	4.081	3.154	-49.7%	91.64	153.6	151.4	65.2%	0.737	2.307	4.735	542.5%	0.839	2.52	5.349	537.5%
Uruguay	28.56	7.498	3.678	-87.1%	131.7	156.2	156.1	18.5%	1.003	1.465	1.217	21.3%	1.617	2.816	3.927	142.9%
Guyana	19.86	7.033	3.902	-80.4%	73.61	152.2	153	107.9%	0.104	0.128	0.176	69.2%	0.121	0.173	0.297	145.5%
Suriname	16.19	5.911	3.586	-77.9%	169.6	169.1	169.1	-0.3%	0.104	0.137	0.138	32.7%	0.132	0.223	0.385	191.7%
America-South	**19.68**	**6.481**	**3.516**	**-82.1%**	**105.6**	**155.4**	**155.1**	**46.9%**	**55.06**	**109**	**93.41**	**69.7%**	**90.12**	**208.7**	**306.7**	**240.3%**

Infrastructure

	Information & Communication Technology								Spending on Infrastructure							
	Telephone Network Density				Mobile Phone Usage				Spending on Core Infrastructure				Total (Core + Other) Infrastructure Spending			
Base Case: Countries in Year 2060	Lines per 100 persons				Subscriptions per 100 persons				Billions in 2000 dollars				Billions in 2000 dollars			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA																
China	21.95	8.09	3.928	-82.1%	64.04	154.4	154.4	141.1%	310.3	270.4	282.2	-9.1%	366.1	739.2	1515	313.8%
Japan	31.94	6.908	3.342	-89.5%	95.39	153.5	153.1	60.5%	30.31	22.68	23.67	-21.9%	132.5	120.9	160.5	21.1%
Korea, Rep. of	59.24	10.21	3.738	-93.7%	105.4	154.6	154.6	46.7%	14.37	9.524	9.102	-36.7%	30.43	47.43	59.6	95.9%
Korea, Dem. People's Rep. of	4.847	4.628	3.459	-28.6%	1.774	93.75	151.6	8445.7%	0.025	0.594	1.25	4900.0%	0.038	0.728	1.764	4542.1%
Taiwan, China	70.78	10.06	3.711	-94.8%	119.9	155.6	155.2	29.4%	6.102	3.527	3.161	-48.2%	13.17	15.03	16.29	23.7%
Hong Kong SAR, China	61.61	9.193	3.666	-94.0%	190.2	190	189.4	-0.4%	1.463	1.059	1.012	-30.8%	6.558	8.975	9.895	50.9%
Mongolia	7.012	4.742	3.485	-50.3%	91.09	155.4	155.4	70.6%	0.209	0.496	0.869	315.8%	0.234	0.694	1.802	670.1%
Asia-East	**24.52**	**8.042**	**3.871**	**-84.2%**	**68.35**	**153.6**	**154.5**	**126.0%**	**362.8**	**308.3**	**321.3**	**-11.4%**	**549**	**932.9**	**1765**	**221.5%**
India	2.865	3.666	3.397	18.6%	61.42	154.8	154.8	152.0%	76.92	170.2	220.7	186.9%	87.93	268.8	712.2	710.0%
Pakistan	1.97	2.573	2.852	44.8%	59.21	154.6	154.6	161.1%	10.98	21.17	31.02	182.5%	12.72	26.72	50.87	299.9%
Bangladesh	0.605	1.864	2.929	384.1%	46.17	154	154	233.5%	6.227	17.48	23.54	278.0%	7.309	21.91	47.53	550.3%
Afghanistan	0.446	1.696	2.564	474.9%	41.39	153.4	151.1	265.1%	1.991	4.935	8.509	327.4%	2.24	5.693	11.16	398.2%
Iran, Islamic Rep. of	36.29	8.698	3.735	-89.7%	91.25	155.4	155.4	70.3%	14.54	21.19	29.93	105.8%	17.12	40.07	63.61	271.6%
Nepal	2.809	3.252	3.099	10.3%	30.69	154.2	154.2	402.4%	0.808	2.093	2.971	267.7%	0.887	2.33	3.994	350.3%
Uzbekistan	6.79	4.721	3.432	-49.5%	76.34	155	155	103.0%	4.25	5.591	7.714	81.5%	4.745	10.35	18.82	296.6%
Sri Lanka	17.16	7.606	3.982	-76.8%	83.22	155.2	155.2	86.5%	2.984	2.912	3.599	20.6%	3.414	5.08	11.41	234.2%
Kazakhstan	25.03	8.155	3.626	-85.5%	123.3	156.2	156.2	26.7%	2.515	3.874	5.454	116.9%	2.993	6.549	10.72	258.2%
Tajikistan	5.345	3.642	3.183	-40.4%	86.37	153.4	152.5	76.6%	0.168	0.746	1.404	735.7%	0.189	0.793	1.737	819.0%
Kyrgyz Rep.	9.415	4.528	3.338	-64.5%	91.86	155.5	155.5	69.3%	0.176	0.378	0.809	359.7%	0.199	0.446	1.092	448.7%
Turkmenistan	10.31	6.381	3.379	-67.2%	63.42	154.8	154.8	144.1%	1.345	4.615	6.206	361.4%	1.523	10.88	17.77	1066.8%
Bhutan	3.622	3.656	3.245	-10.4%	54.32	153.8	153.6	182.8%	0.123	0.213	0.349	183.7%	0.141	0.288	0.747	429.8%
Maldives	15.2	6.293	3.462	-77.2%	156.5	154.4	151.4	-3.3%	0.034	0.05	0.031	-8.8%	0.055	0.069	0.075	36.4%
Asia-South Central	**4.442**	**3.608**	**3.264**	**-26.5%**	**61.43**	**154.7**	**154.6**	**151.7%**	**123**	**255.5**	**342.2**	**178.2%**	**141.5**	**399.9**	**951.8**	**572.7%**
Indonesia	15.82	7.538	3.76	-76.2%	91.72	155.4	155.4	69.4%	20.14	28.19	25.46	26.4%	23.65	51.24	65.04	175.0%
Philippines	7.274	5.224	3.618	-50.3%	85.67	154.5	153.4	79.1%	7.186	17.36	20.74	188.6%	9.444	23.71	41.4	338.4%
Vietnam	18.67	7.761	3.896	-79.1%	175.3	175.3	175.3	0.0%	10.97	9.104	12.8	16.7%	11.79	13.73	26.74	126.8%
Thailand	10.14	4.989	3.329	-67.2%	100.8	155.7	155.7	54.5%	8.86	10.67	8.957	1.1%	12.08	20.01	26.62	120.4%
Myanmar	1.261	2.521	3.286	160.6%	1.238	58.02	149.9	12008.2%	1.189	4.705	7.881	562.8%	1.458	5.688	13.65	836.2%
Malaysia	16.1	5.995	3.413	-78.8%	121.3	156	155.8	28.4%	4.604	7.736	7.485	62.6%	7.494	16.87	29.84	298.2%
Cambodia	2.538	3.703	3.398	33.9%	57.65	154.2	154.1	167.3%	0.613	1.566	1.99	224.6%	0.707	2.03	3.724	426.7%
Lao People's Democratic Rep.	1.663	2.8	3.187	91.6%	64.56	154.8	154.8	139.8%	0.31	0.928	1.567	405.5%	0.349	1.422	3.497	902.0%
Singapore	39	7.752	3.442	-91.2%	143.7	156.9	156.9	9.2%	1.298	2.444	1.589	22.4%	4.665	9.817	12.14	160.2%
Timor-Leste	0.213	1.512	2.675	1155.9%	53.42	153.4	151.4	183.4%	0.061	0.154	0.394	545.9%	0.066	0.167	0.476	621.2%
Brunei Darussalam	20.03	5.704	3.196	-84.0%	109.1	155.7	155.7	42.7%	0.081	0.201	0.135	66.7%	0.224	0.553	0.593	164.7%
Asia-South Eastern	**12.68**	**6.239**	**3.635**	**-71.3%**	**97.21**	**150.4**	**157.5**	**62.0%**	**55.31**	**83.06**	**88.99**	**60.9%**	**71.93**	**145.2**	**223.7**	**211.0%**

Infrastructure

Base Case: Countries in Year 2060 Descending Population Sequence	Information & Communication Technology: Telephone Network Density, Lines per 100 persons 2010	2035	2060	% Chg	Mobile Phone Usage, Subscriptions per 100 persons 2010	2035	2060	% Chg	Spending on Infrastructure: Spending on Core Infrastructure, Billions in 2000 dollars 2010	2035	2060	% Chg	Total (Core + Other) Infrastructure Spending, Billions in 2000 dollars 2010	2035	2060	% Chg
ASIA with OCEANIA continued																
Turkey	22.27	6.581	3.531	-84.1%	84.9	149.2	152.8	80.0%	11.57	15.28	16.28	40.7%	18.43	32.37	56.37	205.9%
Iraq	5.052	4.148	3.377	-33.2%	75.78	155	155	104.5%	1.96	6.978	10.78	450.0%	2.244	10.01	28.47	1168.7%
Yemen, Rep. of	4.35	3.625	3.071	-29.4%	46.09	154.5	154.5	235.2%	1.253	4.623	7.438	493.6%	1.5	5.773	11.8	686.7%
Saudi Arabia	15.18	5.512	3.167	-79.1%	187.9	187.9	187.9	0.0%	7.934	9.732	13.76	73.4%	11.66	25.63	54.44	366.9%
Syrian Arab Rep.	19.94	6.668	3.866	-80.6%	57.31	154.5	154.5	169.6%	3.111	3.813	6.858	120.4%	3.537	6.221	17.36	390.8%
Jordan	7.839	4.406	3.484	-55.6%	107	154.1	152.3	42.3%	0.724	2.217	2.949	307.3%	1.016	2.845	5.908	481.5%
Israel	44.16	8.309	3.532	-92.0%	133.1	155	154.5	16.1%	2.14	3.437	3.612	68.8%	5.551	10.67	22.23	300.5%
Palestine	9.368	4.421	3.206	-65.8%	45.79	153.4	151.4	230.6%	0.292	0.71	1.061	263.4%	0.363	0.794	1.368	276.9%
Azerbaijan	16.33	6.359	3.409	-79.1%	99.04	155.6	155.6	57.1%	1.458	1.86	2.889	98.1%	1.717	3.386	5.954	246.8%
United Arab Emirates	19.7	5.803	3.166	-83.9%	145.5	157.1	157.1	8.0%	2.647	2.614	2.718	2.7%	3.993	8.25	10.96	174.5%
Kuwait	20.69	5.932	3.185	-84.6%	160.8	160.8	160.8	0.0%	1.142	2.578	2.004	75.5%	2.413	8.497	12.31	410.2%
Lebanon	21	7.134	3.567	-83.0%	68	154	153.3	125.4%	0.406	0.938	0.66	62.6%	0.97	2.087	2.818	190.5%
Oman	10.2	4.741	3.013	-70.5%	165.5	165.5	165.5	0.0%	2.567	1.152	1.297	-49.5%	3.158	3.702	4.519	43.1%
Armenia	19.08	6.27	3.694	-80.6%	125	156.3	156.3	25.0%	0.302	0.397	0.462	53.0%	0.358	0.536	0.897	150.6%
Georgia	13.72	5.568	3.43	-75.0%	73.36	154.8	154.8	111.0%	0.36	0.353	0.528	46.7%	0.417	0.48	0.807	93.5%
Qatar	16.95	5.759	3.16	-81.4%	132.4	156.5	156.5	18.2%	0.989	1.019	0.817	-17.4%	2.297	6.736	6.663	190.1%
Bahrain	18.07	5.765	3.172	-82.4%	124.2	154.8	154.8	24.6%	0.739	0.321	0.35	-52.6%	1.024	1.122	1.382	35.0%
Cyprus	37.58	7.54	3.451	-90.8%	93.7	152.1	153	63.3%	0.351	0.196	0.211	-39.9%	0.598	0.564	0.708	18.4%
Asia-West	**16.42**	**5.496**	**3.381**	**-79.4%**	**94.22**	**157**	**157.7**	**67.4%**	**39.94**	**58.22**	**74.68**	**87.0%**	**61.25**	**129.7**	**245**	**300.0%**
Australia	38.89	7.635	3.426	-91.2%	101	153	153.2	51.7%	11.74	11.46	13.1	11.6%	23.14	34.34	61.54	165.9%
Papua New Guinea	1.767	3.162	3.122	76.7%	27.84	153.8	153.1	449.9%	0.35	1.28	1.652	372.0%	0.443	1.682	2.911	557.1%
New Zealand	42.81	7.904	3.565	-91.7%	114.9	155.9	155.9	35.7%	1.82	1.571	2.119	16.4%	3.112	4.294	8.985	188.7%
Solomon Islands	1.561	2.405	2.565	64.3%	5.575	95.51	151.3	2613.9%	0.013	0.088	0.129	892.3%	0.024	0.105	0.165	587.5%
Fiji	15.92	5.836	3.698	-76.8%	116.2	155.7	155.7	34.0%	0.083	0.089	0.114	37.3%	0.118	0.134	0.241	104.2%
Vanuatu	2.086	2.555	2.734	31.1%	119	155.5	155.4	30.6%	0.037	0.046	0.073	97.3%	0.044	0.062	0.137	211.4%
Micronesia (Federated States of)	7.611	4.36	3.178	-58.2%	24.78	105.6	151.4	511.0%	0.004	0.02	0.026	550.0%	0.008	0.024	0.038	375.0%
Tonga	29.79	8.381	4.054	-86.4%	52.18	149.8	152.1	191.5%	0.007	0.02	0.031	342.9%	0.011	0.025	0.054	390.9%
Samoa	19.28	7.331	3.94	-79.6%	91.43	154.7	154.6	69.1%	0.013	0.026	0.035	169.2%	0.02	0.036	0.071	255.0%
Oceania	**30.6**	**6.409**	**3.338**	**-89.1%**	**87.2**	**152.3**	**153.4**	**75.9%**	**14.06**	**14.6**	**17.28**	**22.9%**	**26.92**	**40.7**	**74.15**	**175.4%**

Infrastructure

Base Case: Countries in Year 2060 Descending Population Sequence	Information & Communication Technology: Telephone Network Density, Lines per 100 persons 2010	2035	2060	% Chg	Mobile Phone Usage, Subscriptions per 100 persons 2010	2035	2060	% Chg	Spending on Infrastructure: Spending on Core Infrastructure, Billions in 2000 dollars 2010	2035	2060	% Chg	Total (Core + Other) Infrastructure Spending, Billions in 2000 dollars 2010	2035	2060	% Chg
EUROPE																
Russian Federation	31.45	7.67	3.53	-88.8%	166.3	166.3	166.3	0.0%	30.43	30.87	47.26	55.3%	37.13	63.44	100.2	169.9%
Ukraine	28.48	7.698	3.705	-87.0%	118.7	154.5	154.5	30.2%	3.865	5.48	7.762	100.8%	4.552	8.226	12.86	182.5%
Poland	24.69	6.862	3.452	-86.0%	120.2	155.9	155.8	29.6%	7.349	6.218	6.159	-16.2%	12.32	16.3	24.49	98.8%
Romania	20.94	6.272	3.47	-83.4%	114.7	156	156	36.0%	3.533	3.263	4.123	16.7%	4.572	5.064	8.195	79.2%
Czech Rep.	20.95	5.962	3.275	-84.4%	136.6	156.2	156.1	14.3%	2.916	1.976	2.156	-26.1%	4.466	4.185	5.967	33.6%
Belarus	43.13	9.543	3.884	-91.0%	107.7	155.9	155.9	44.8%	2.962	2.019	2.888	-2.5%	3.37	3.685	6.322	87.6%
Hungary	29.82	7.106	3.509	-88.2%	120.3	155.5	155.5	29.3%	2.06	2.423	2.068	0.4%	3.233	4.262	5.331	64.9%
Bulgaria	29.36	7.071	3.584	-87.8%	141.2	156.8	156.8	11.0%	1.232	1.131	1.598	29.7%	1.59	1.775	3.1	95.0%
Slovak Rep.	20.12	6.117	3.307	-83.6%	108.5	153.9	153.7	41.7%	0.885	0.96	0.922	4.2%	1.788	2.464	3.233	80.8%
Moldova, Rep. of	32.5	7.868	3.982	-87.7%	88.58	155.3	155.3	75.3%	0.291	0.265	0.39	34.0%	0.322	0.326	0.587	82.3%
Europe-East	**29.04**	**7.398**	**3.543**	**-87.8%**	**141.9**	**160.7**	**160.8**	**13.3%**	**55.52**	**54.61**	**75.32**	**35.7%**	**73.34**	**109.7**	**170.3**	**132.2%**
United Kingdom	53.71	8.566	3.559	-93.4%	130.2	155.3	154.9	19.0%	16.65	10.72	11.54	-30.7%	51.14	53.05	99.79	95.1%
Sweden	53.46	8.598	3.544	-93.4%	113.5	153.7	153.7	35.4%	16.64	9.312	10.52	-36.8%	22.78	20.01	30.63	34.5%
Denmark	47.26	8.162	3.493	-92.6%	124.4	156	156	25.4%	1.508	1.324	1.574	4.4%	4.994	6.361	11.1	122.3%
Ireland	46.49	8.082	3.462	-92.6%	105.2	152.8	151.4	43.9%	1.87	1.693	1.57	-16.0%	4.414	4.933	6.824	54.6%
Norway	34.85	7.122	3.433	-90.1%	113.1	153.9	153.9	36.1%	3.28	4.227	4.513	37.6%	7.287	12.4	14.45	98.3%
Finland	23.3	6.21	3.232	-86.1%	156.4	158.5	158.5	1.3%	1.587	1.495	1.615	1.8%	4.532	5.818	8.942	97.3%
Lithuania	22.08	6.246	3.451	-84.4%	147.2	156.7	156.6	6.4%	0.831	0.904	0.923	11.1%	1.175	1.423	2.172	84.9%
Latvia	23.63	6.644	3.537	-85.0%	102.4	152.8	153.1	49.5%	0.617	0.644	0.826	33.9%	0.837	1.008	1.781	112.8%
Estonia	35.96	7.979	3.654	-89.8%	123.2	154.9	154.9	25.7%	0.706	0.475	0.619	-12.3%	0.84	0.809	1.391	65.6%
Iceland	63.72	9.111	3.608	-94.3%	108.7	153.6	153.6	41.3%	0.639	0.235	0.284	-55.6%	0.858	0.599	0.927	8.0%
Europe-North	**48.48**	**8.219**	**3.524**	**-92.7%**	**127.6**	**155.2**	**154.8**	**21.3%**	**44.32**	**31.02**	**33.99**	**-23.3%**	**98.85**	**106.4**	**178**	**80.1%**
Italy	35.67	7.246	3.458	-90.3%	135.4	155.8	155.7	15.0%	19.39	9.914	11.21	-42.2%	42.04	35.68	51.35	22.1%
Spain	43.2	7.959	3.546	-91.8%	111.8	153.4	153.4	37.2%	22.07	11.04	13.18	-40.3%	36.39	30.79	48.64	33.7%
Greece	45.81	7.962	3.562	-92.2%	108.2	153	152.4	40.9%	3.098	1.768	1.947	-37.2%	6.305	4.463	6.878	9.1%
Portugal	42.01	7.901	3.607	-91.4%	142.3	156.9	156.9	10.3%	4.921	1.944	2.511	-49.0%	7.414	4.95	8.232	11.0%
Serbia	40.53	8.736	3.829	-90.6%	129.2	156.4	156.4	21.1%	1.118	1.065	1.799	60.9%	1.262	1.523	3.07	143.3%
Croatia	42.37	7.957	3.641	-91.4%	144.5	156.9	156.9	8.6%	0.781	0.59	0.687	-12.0%	1.336	1.349	2.16	61.7%
Bosnia and Herzegovina	26.56	7.212	3.631	-86.3%	80.15	154.6	154.5	92.8%	0.456	0.538	0.546	19.7%	0.614	0.936	1.317	114.5%
Albania	10.35	5.525	3.366	-67.5%	141.9	156.9	156.9	10.6%	0.488	0.449	0.434	-11.1%	0.59	0.764	1.069	81.2%
Macedonia, TFYR	20.05	5.898	3.404	-83.0%	104.5	155.7	155.7	49.0%	0.306	0.25	0.281	-8.2%	0.392	0.391	0.543	38.5%
Slovenia	45.01	8.302	3.599	-92.0%	104.5	153.5	153.5	46.9%	0.562	0.482	0.555	-1.2%	1.082	1.189	1.752	61.9%
Montenegro	26.84	6.39	3.408	-87.3%	185.3	184.8	184.8	-0.3%	0.126	0.1	0.149	18.3%	0.152	0.141	0.244	60.5%
Malta	59.38	9.672	3.776	-93.6%	109.3	154.9	154.2	41.1%	0.177	0.058	0.057	-67.8%	0.269	0.17	0.222	-17.5%
Europe-South	**38.77**	**7.615**	**3.529**	**-90.9%**	**124.7**	**155.1**	**154.9**	**24.2%**	**53.48**	**28.2**	**33.35**	**-37.6%**	**97.85**	**82.34**	**125.5**	**28.3%**
Germany	55.4	8.603	3.556	-93.6%	127	156	155.9	22.8%	24.04	13.56	14.65	-39.1%	65.89	63.08	91.73	39.2%
France	56.06	8.618	3.59	-93.6%	99.7	153.5	153.3	53.8%	18.89	17.06	20.27	7.3%	49.02	55.72	97.11	98.1%
Netherlands	43.15	7.771	3.447	-92.0%	116.2	153.7	153.6	32.2%	4.574	2.706	2.946	-35.6%	13.48	14.08	20.89	55.0%
Belgium	43.31	7.814	3.464	-92.0%	113.5	154.5	154.4	36.0%	3.178	2.713	3.036	-4.5%	8.556	9.697	15.16	77.2%
Switzerland	58.56	8.705	3.565	-93.9%	123.6	155.6	155.1	25.5%	1.333	1.257	1.491	11.9%	5.415	5.687	7.982	47.4%
Austria	38.66	7.445	3.404	-91.2%	145.8	156.9	156.8	7.5%	2.974	1.826	2.18	-26.7%	7.486	7.299	10.69	42.8%
Luxembourg	53.68	8.243	3.509	-93.5%	143.3	156	155.5	8.5%	0.158	0.144	0.157	-0.6%	0.716	0.945	1.68	134.6%
Europe-West	**53.23**	**8.438**	**3.547**	**-93.3%**	**116.9**	**154.8**	**154.6**	**32.2%**	**55.15**	**39.27**	**44.72**	**-18.9%**	**150.6**	**156.5**	**245.2**	**62.8%**

Infrastructure

Base Case Source: International Futures Model Version 6.61, Jan 2013	Spending on Infrastructure															
	Spending on Roads				Spending on Electricity				Spending on Water and Sanitation				Spending on ICT			
	Percent of Core Spending				Percent of Core Spending				Percent of Core Spending				Percent of Core Spending			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	**29.26**	**27.64**	**28.33**	**-3.2%**	**44.46**	**41.98**	**43.55**	**-2.0%**	**8.652**	**9.671**	**9.911**	**14.6%**	**17.62**	**20.7**	**18.21**	**3.3%**
Africa	**27.37**	**27**	**29.55**	**8.0%**	**25.56**	**27.93**	**31.59**	**23.6%**	**14.48**	**11.15**	**11.88**	**-18.0%**	**32.59**	**33.92**	**26.98**	**-17.2%**
Americas	**35.25**	**36.47**	**36.22**	**2.8%**	**42.02**	**41.6**	**41.82**	**-0.5%**	**7.032**	**7.154**	**7.944**	**13.0%**	**15.71**	**14.77**	**14.02**	**-10.8%**
Asia with Oceania	**24.88**	**22.46**	**22.77**	**-8.5%**	**48.18**	**45.8**	**48.42**	**0.5%**	**9.751**	**10.77**	**10.73**	**10.0%**	**17.2**	**20.98**	**18.07**	**5.1%**
Europe	**36.84**	**37.62**	**40.06**	**8.7%**	**41.45**	**40.76**	**43.75**	**5.5%**	**5.346**	**7.152**	**5.764**	**7.8%**	**16.36**	**14.48**	**10.43**	**-36.2%**
World	**29.26**	**27.64**	**28.33**	**-3.2%**	**44.46**	**41.98**	**43.55**	**-2.0%**	**8.652**	**9.671**	**9.911**	**14.6%**	**17.62**	**20.7**	**18.21**	**3.3%**
Africa-Eastern	**33.15**	**19.01**	**24.45**	**-26.2%**	**13.51**	**31.75**	**37.68**	**178.9%**	**15.92**	**11.17**	**12.35**	**-22.4%**	**37.42**	**38.06**	**25.52**	**-31.8%**
Africa-Middle	**33.21**	**29.79**	**28.45**	**-14.3%**	**17.61**	**26.96**	**24.25**	**37.7%**	**17.51**	**8.926**	**11.6**	**-33.8%**	**31.67**	**34.33**	**35.7**	**12.7%**
Africa-Northern	**21.12**	**38.33**	**44.59**	**111.1%**	**36.1**	**23.97**	**30.58**	**-15.3%**	**13.72**	**11.52**	**8.79**	**-35.9%**	**29.06**	**26.17**	**16.04**	**-44.8%**
Africa-Southern	**37.49**	**33.28**	**29.15**	**-22.2%**	**34.83**	**43.65**	**49.71**	**42.7%**	**11.22**	**7.48**	**7.185**	**-36.0%**	**16.46**	**15.58**	**13.95**	**-15.2%**
Africa-Western	**25.72**	**23.51**	**25.5**	**-0.9%**	**14.72**	**23.15**	**23.14**	**57.2%**	**15.76**	**12.67**	**14.65**	**-7.0%**	**43.8**	**40.67**	**36.72**	**-16.2%**
Africa	**27.37**	**27**	**29.55**	**8.0%**	**25.56**	**27.93**	**31.59**	**23.6%**	**14.48**	**11.15**	**11.88**	**-18.0%**	**32.59**	**33.92**	**26.98**	**-17.2%**
America-Caribbean	**28.76**	**27.95**	**27.81**	**-3.3%**	**39.03**	**41.47**	**43.85**	**12.3%**	**11.13**	**8.319**	**8.319**	**-25.3%**	**21.08**	**22.27**	**20.02**	**-5.0%**
America-Central	**18.3**	**31.18**	**29.36**	**60.4%**	**34.59**	**33.66**	**36.02**	**4.1%**	**11.88**	**9.824**	**11.13**	**-6.3%**	**35.23**	**25.34**	**23.49**	**-33.3%**
America-North	**39.3**	**35.69**	**39.45**	**0.4%**	**44.33**	**45.36**	**42.76**	**-3.5%**	**5.143**	**6.462**	**6.483**	**26.1%**	**11.23**	**12.49**	**11.31**	**0.7%**
America-South	**27.81**	**38.49**	**32.36**	**16.4%**	**37.52**	**37.57**	**40.77**	**8.7%**	**10.7**	**7.714**	**9.969**	**-6.8%**	**23.97**	**16.22**	**16.9**	**-29.5%**
Americas	**35.25**	**36.47**	**36.22**	**2.8%**	**42.02**	**41.6**	**41.82**	**-0.5%**	**7.032**	**7.154**	**7.944**	**13.0%**	**15.71**	**14.77**	**14.02**	**-10.8%**
Asia-East	**21.5**	**18.7**	**23.59**	**9.7%**	**58.59**	**54.74**	**54.8**	**-6.5%**	**8.039**	**9.276**	**7.925**	**-1.4%**	**11.88**	**17.28**	**13.69**	**15.2%**
Asia-South Central	**31.36**	**23.1**	**18.27**	**-41.7%**	**28.3**	**40.86**	**48.21**	**70.4%**	**14.81**	**12.04**	**12.79**	**-13.6%**	**25.54**	**23.99**	**20.73**	**-18.8%**
Asia-South East	**25.25**	**24.58**	**26.17**	**3.6%**	**27.35**	**34.4**	**34.25**	**25.2%**	**12.06**	**13.73**	**14.13**	**17.2%**	**35.35**	**27.29**	**25.45**	**-28.0%**
Asia-West	**29.34**	**31.83**	**32.04**	**9.2%**	**46.49**	**38.17**	**40.67**	**-12.5%**	**7.924**	**9.341**	**9.658**	**21.9%**	**16.24**	**20.66**	**17.63**	**8.6%**
Oceania	**41.2**	**40.97**	**39.27**	**-4.7%**	**40.21**	**38.52**	**40.26**	**0.1%**	**5.817**	**8.728**	**9.533**	**63.9%**	**12.78**	**11.78**	**10.94**	**-14.4%**
Asia with Oceania	**24.88**	**22.46**	**22.77**	**-8.5%**	**48.18**	**45.8**	**48.42**	**0.5%**	**9.751**	**10.77**	**10.73**	**10.0%**	**17.2**	**20.98**	**18.07**	**5.1%**
Europe-East	**39.76**	**36.98**	**41.01**	**3.1%**	**29.47**	**40.44**	**44.78**	**52.0%**	**6.414**	**8.101**	**5.418**	**-15.5%**	**24.36**	**14.48**	**8.797**	**-63.9%**
Europe-North	**54.44**	**45.78**	**45.64**	**-16.2%**	**31.05**	**37.9**	**39.66**	**27.7%**	**3.689**	**5.013**	**4.663**	**26.4%**	**10.82**	**11.31**	**10.04**	**-7.2%**
Europe-South	**24.51**	**33.99**	**38.55**	**57.3%**	**56.47**	**40.46**	**41.88**	**-25.8%**	**6.023**	**8.785**	**7.599**	**26.2%**	**13.01**	**16.76**	**11.97**	**-8.0%**
Europe-West	**31.74**	**34.46**	**35.41**	**11.6%**	**46.79**	**43.58**	**46.18**	**-1.3%**	**5.102**	**6.387**	**5.908**	**15.8%**	**16.37**	**15.57**	**12.51**	**-23.6%**
Europe	**36.84**	**37.62**	**40.06**	**8.7%**	**41.45**	**40.76**	**43.75**	**5.5%**	**5.346**	**7.152**	**5.764**	**7.8%**	**16.36**	**14.48**	**10.43**	**-36.2%**

Infrastructure

	Spending on Infrastructure															
	Spending on Roads				Spending on Electricity				Spending on Water and Sanitation				Spending on ICT			
Base Case: Countries in Year 2060	Percent of Core Spending				Percent of Core Spending				Percent of Core Spending				Percent of Core Spending			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA																
Ethiopia	27.33	21.36	28.87	5.6%	19.63	30.91	33.03	68.3%	32.51	11.08	12.29	-62.2%	20.52	36.65	25.82	25.8%
Tanzania, United Rep. of	30.65	21.16	23.45	-23.5%	9.833	31.53	54.06	449.8%	9.398	10.55	7.723	-17.8%	50.12	36.75	14.77	-70.5%
Uganda	38.71	19.49	25.95	-33.0%	8.09	23.95	23.52	190.7%	15.14	13.36	18.3	20.9%	38.06	43.21	32.23	-15.3%
Kenya	16.61	18.52	22.33	34.4%	15.63	26.59	28.88	84.8%	14.64	10.63	17.75	21.2%	53.13	44.26	31.05	-41.6%
Madagascar	26.26	12.45	13.57	-48.3%	14.84	6.428	8.323	-43.9%	17.78	13.89	13.44	-24.4%	41.12	67.23	64.67	57.3%
Mozambique	30.45	12.17	21.51	-29.4%	22.32	59.17	54.09	142.3%	13.61	8.071	8.408	-38.2%	33.61	20.58	15.99	-52.4%
Malawi	40.19	17.78	18.65	-53.6%	7.963	10.84	18.27	129.4%	27.36	15.23	17.86	-34.7%	24.48	56.15	45.22	84.7%
Zambia	65.66	14.71	27.13	-58.7%	7.241	51.51	32.03	342.3%	9.993	9.308	11.6	16.1%	17.11	24.47	29.24	70.9%
Somalia	63.86	20.36	30.26	-52.6%	9.006	10.19	14.99	66.4%	23.11	18.67	16.34	-29.3%	4.028	50.78	38.41	853.6%
Rwanda	26.69	22.12	25.75	-3.5%	8.494	13.82	20.31	139.1%	20.5	16.92	19.32	-5.8%	44.31	47.14	34.63	-21.8%
Zimbabwe	61.41	34.43	33.32	-45.7%	10.08	21.02	18.1	79.6%	4.175	10.25	13.94	233.9%	24.34	34.3	34.64	42.3%
Burundi	33.18	12.92	13.89	-58.1%	9.661	2.883	8.346	-13.6%	30.79	12.57	20.79	-32.5%	26.37	71.62	56.98	116.1%
Eritrea	31.98	20.79	27.29	-14.7%	33.78	13.55	14.64	-56.7%	25.16	14.33	19.09	-24.1%	9.074	51.33	38.98	329.6%
Comoros	45.6	23.1	23.37	-48.8%	8.22	4.978	13.43	63.4%	19.1	13.63	18.73	-1.9%	27.08	58.3	44.46	64.2%
Djibouti	64.97	31.14	36.71	-43.5%	16.52	18.78	23.18	40.3%	8	8.49	12.01	50.1%	10.51	41.59	28.1	167.4%
Mauritius	13.07	35.37	26.36	101.7%	50.08	39.71	40.52	-19.1%	9.229	6.102	10.55	14.3%	27.63	18.82	22.58	-18.3%
Africa-Eastern	**33.15**	**19.01**	**24.45**	**-26.2%**	**13.51**	**31.75**	**37.68**	**178.9%**	**15.92**	**11.17**	**12.35**	**-22.4%**	**37.42**	**38.06**	**25.52**	**-31.8%**
Congo, Democratic Rep. of	42.63	13.01	15.02	-64.8%	11.17	19.24	26.17	134.3%	24.38	10.17	12.33	-49.4%	21.82	57.59	46.47	113.0%
Angola	29.23	36.56	42.91	46.8%	25.14	36.74	27.04	7.6%	17.02	7.51	9.343	-45.1%	28.61	19.19	20.7	-27.6%
Cameroon	23.27	23.1	25.71	10.5%	15.18	27.73	26.83	76.7%	21.08	9.184	11.45	-45.7%	40.47	39.98	36.01	-11.0%
Chad	45.43	24.44	28.33	-37.6%	7.789	7.551	9.098	16.8%	12.67	11.27	13.99	10.4%	34.11	56.74	48.58	42.4%
Central African Rep.	47.15	24.97	24.45	-48.1%	5.586	6.886	12.62	125.9%	16.07	13.02	18.21	13.3%	31.19	55.12	44.72	43.4%
Congo, Rep. of	30.45	44.81	47.79	56.9%	16.06	16.13	12.6	-21.5%	8.03	13.17	14.73	83.4%	45.47	25.9	24.88	-45.3%
Gabon	35.03	55.99	45.51	29.9%	19.63	22.42	28.13	43.3%	10.73	6.057	10.17	-5.2%	34.61	15.53	16.18	-53.3%
Equatorial Guinea	61.47	76.53	56.86	-7.5%	10.92	4.702	7.972	-27.0%	11.21	4.891	10.94	-2.4%	16.4	13.88	24.23	47.7%
São Tomé and Príncipe	44.95	31.83	32.68	-27.3%	7.25	15.25	16.42	126.5%	12.07	13	18.38	52.3%	35.74	39.91	32.53	-9.0%
Africa-Middle	**33.21**	**29.79**	**28.45**	**-14.3%**	**17.61**	**26.96**	**24.25**	**37.7%**	**17.51**	**8.926**	**11.6**	**-33.8%**	**31.67**	**34.33**	**35.7**	**12.7%**
Egypt, Arab Rep.	13.43	35.89	27.23	102.8%	36.69	26.68	38.41	4.7%	15.73	10.88	12.62	-19.8%	34.15	26.55	21.73	-36.4%
Sudan	8.315	35.29	58.13	599.1%	38.14	20.62	28.6	-25.0%	17.77	14.85	4.869	-72.6%	35.77	29.24	8.4	-76.5%
Algeria	28.5	47.8	43.01	50.9%	41.75	16.5	18	-56.9%	11.84	9.67	11.19	-5.5%	17.91	26.03	27.8	55.2%
Morocco	27.51	33.64	34.27	24.6%	26.35	25.11	26.55	0.8%	14.51	12.66	13.56	-6.5%	31.62	28.6	25.62	-19.0%
Tunisia	17.96	37.35	35.98	100.3%	39.51	32.84	34.54	-12.6%	18.37	10.67	10.65	-42.0%	24.16	19.14	18.83	-22.1%
Libya	41.11	56.56	54.58	32.8%	37.35	19.57	20.23	-45.8%	3.884	7.972	8.686	123.6%	17.66	15.9	16.51	-6.5%
Africa-Northern	**21.12**	**38.33**	**44.59**	**111.1%**	**36.1**	**23.97**	**30.58**	**-15.3%**	**13.72**	**11.52**	**8.79**	**-35.9%**	**29.06**	**26.17**	**16.04**	**-44.8%**

Infrastructure

	Spending on Infrastructure															
	Spending on Roads				Spending on Electricity				Spending on Water and Sanitation				Spending on ICT			
Base Case: Countries in Year 2060	Percent of Core Spending				Percent of Core Spending				Percent of Core Spending				Percent of Core Spending			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA continued																
South Africa	32.56	31.18	26.05	-20.0%	39.09	46.88	53.83	37.7%	11.91	7.27	6.887	-42.2%	16.44	14.68	13.23	-19.5%
Namibia	82.96	49.73	54.44	-34.4%	3.808	26.09	23.03	504.8%	3.088	7.516	7.915	156.3%	10.14	16.66	14.62	44.2%
Lesotho	51.04	26.12	35.01	-31.4%	15.37	17.06	16.78	9.2%	13.99	13.01	13.02	-6.9%	19.6	43.82	35.19	79.5%
Botswana	68.62	64.22	68.2	-0.6%	4.898	8.573	6.681	36.4%	6.634	8.59	8.752	31.9%	19.84	18.62	16.36	-17.5%
Swaziland	34.53	40.81	38.17	10.5%	12.44	14.61	19.93	60.2%	17.55	12.32	13.29	-24.3%	35.47	32.26	28.6	-19.4%
Africa-Southern	**37.49**	**33.28**	**29.15**	**-22.2%**	**34.83**	**43.65**	**49.71**	**42.7%**	**11.22**	**7.48**	**7.185**	**-36.0%**	**16.46**	**15.58**	**13.95**	**-15.2%**
Nigeria	19.61	24.58	26.97	37.5%	17.1	25.52	25.12	46.9%	18.58	13.68	14.51	-21.9%	44.71	36.22	33.4	-25.3%
Niger	22.63	16.61	14.22	-37.2%	8.415	7.843	9.686	15.1%	15.59	9.088	11.69	-25.0%	53.37	66.46	64.41	20.7%
Côte d'Ivoire	27.48	24.21	21.63	-21.3%	8.791	24.78	29.31	233.4%	10.52	7.766	13.82	31.4%	53.2	43.24	35.24	-33.8%
Burkina Faso	60.99	30.03	25.97	-57.4%	4.913	7.602	14.26	190.3%	10.26	10.95	16.63	62.1%	23.84	51.43	43.14	81.0%
Ghana	25.85	19.45	28.48	10.2%	21.33	34.09	33.9	58.9%	13.69	13.14	14.6	6.6%	39.13	33.32	23.02	-41.2%
Mali	44.22	26.67	25.84	-41.6%	5.636	12.26	14.84	163.3%	13.22	12.7	17.75	34.3%	36.92	48.37	41.58	12.6%
Senegal	16.6	21.84	24.14	45.4%	24.06	19.63	16.92	-29.7%	17.28	9.68	13.51	-21.8%	42.06	48.85	45.43	8.0%
Guinea	31.89	16.89	20.11	-36.9%	9.039	13.27	14.64	62.0%	13.01	12.96	13.36	2.7%	46.06	56.88	51.89	12.7%
Benin	22.23	20.56	25.1	12.9%	6.549	11.08	14.48	121.1%	10.18	12.86	18.72	83.9%	61.04	55.5	41.7	-31.7%
Togo	25.22	13.07	12.84	-49.1%	13.5	6.767	9.715	-28.0%	13.12	11.17	14.44	10.1%	48.16	69	63.01	30.8%
Sierra Leone	50.97	23.98	34.49	-32.3%	11.59	13.14	15.54	34.1%	22.59	13.06	16.49	-27.0%	14.85	49.83	33.49	125.5%
Liberia	35.04	12.8	22.19	-36.7%	7.67	34.1	35.46	362.3%	17.67	10.39	10.97	-37.9%	39.62	42.7	31.38	-20.8%
Mauritania	61.06	31.56	29.21	-52.2%	5.964	14.1	15.83	165.4%	6.403	11.02	16.4	156.1%	26.57	43.31	38.56	45.1%
Gambia	22.97	23.84	29.16	26.9%	8.671	13	14.85	71.3%	14.67	12.65	16.98	15.7%	53.69	50.51	39.01	-27.3%
Guinea-Bissau	48.02	18.11	15.73	-67.2%	4.328	5.818	11.53	166.4%	13.38	14.43	18.41	37.6%	34.27	61.64	54.34	58.6%
Cape Verde	46.64	42.59	41.89	-10.2%	17.07	22.82	27.89	63.4%	9.89	8.566	10.49	6.1%	26.41	26.02	19.73	-25.3%
Africa-Western	**25.72**	**23.51**	**25.5**	**-0.9%**	**14.72**	**23.15**	**23.14**	**57.2%**	**15.76**	**12.67**	**14.65**	**-7.0%**	**43.8**	**40.67**	**36.72**	**-16.2%**

Infrastructure

Base Case: Countries in Year 2060 Descending Population Sequence	Spending on Infrastructure															
	Spending on Roads				Spending on Electricity				Spending on Water and Sanitation				Spending on ICT			
	Percent of Core Spending				Percent of Core Spending				Percent of Core Spending				Percent of Core Spending			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS																
Haiti	7.501	21.88	22.06	194.1%	21.92	14.91	13.07	-40.4%	14.95	10.25	13.61	-9.0%	55.63	52.95	51.26	-7.9%
Dominican Rep.	23.4	32.57	27.3	16.7%	25.76	41.81	51.53	100.0%	16.58	8.191	6.567	-60.4%	34.26	17.43	14.6	-57.4%
Cuba	21.28	27.78	35.99	69.1%	61.87	36.47	38.06	-38.5%	11.39	12.76	10.33	-9.3%	5.46	22.99	15.61	185.9%
Puerto Rico	43.11	16.59	16.47	-61.8%	34.64	67.31	66.21	91.1%	6.817	4.2	5.491	-19.5%	15.43	11.91	11.82	-23.4%
Jamaica	45.55	30.48	33.34	-26.8%	26.2	35.9	36.21	38.2%	8.453	8.892	7.703	-8.9%	19.8	24.73	22.75	14.9%
Trinidad and Tobago	29.88	38.1	33.93	13.6%	34.58	43.88	44.98	30.1%	7.71	5.366	7.119	-7.7%	27.83	12.65	13.97	-49.8%
Bahamas	39.82	51.31	49.84	25.2%	38.95	25.87	28.93	-25.7%	5.678	5.727	6.526	14.9%	15.56	17.09	14.71	-5.5%
Barbados	22.79	29.13	36.97	62.2%	48.86	37.17	38.22	-21.8%	7.234	8.706	9.005	24.5%	21.11	24.99	15.8	-25.2%
Saint Lucia	35.76	32.89	40.55	13.4%	43.45	29.79	28.18	-35.1%	6.94	8.925	11.76	69.5%	13.85	28.39	19.5	40.8%
Grenada	46.59	36.23	47.98	3.0%	15.2	29.58	21.56	41.8%	10.02	10.42	10.99	9.7%	28.2	23.78	19.47	-31.0%
Saint Vincent and the Grenadines	31.33	30.07	30.79	-1.7%	46.91	29.46	40.58	-13.5%	4.272	10.47	9.896	131.6%	17.5	30	18.74	7.1%
America-Caribbean	**28.76**	**27.95**	**27.81**	**-3.3%**	**39.03**	**41.47**	**43.85**	**12.3%**	**11.13**	**8.319**	**8.319**	**-25.3%**	**21.08**	**22.27**	**20.02**	**-5.0%**
Guatemala	7.303	26.77	28.1	284.8%	34.95	32.31	35.21	0.7%	18.21	12.48	12.27	-32.6%	39.54	28.44	24.42	-38.2%
Honduras	9.427	28.13	28.21	199.2%	30.95	30.01	25.5	-17.6%	11.54	10.82	14.76	27.9%	48.08	31.04	31.53	-34.4%
Nicaragua	30.33	25.18	27.29	-10.0%	34.82	27.28	20.63	-40.8%	9.22	10.87	15.87	72.1%	25.63	36.67	36.21	41.3%
El Salvador	11.6	34.75	28.94	149.5%	40.18	31.04	36.12	-10.1%	10.31	8.975	10.26	-0.5%	37.9	25.23	24.68	-34.9%
Costa Rica	40.06	37.63	31.33	-21.8%	39.04	38.91	44.9	15.0%	6.538	7.256	7.735	18.3%	14.36	16.2	16.03	11.6%
Panama	24.07	38.94	32.81	36.3%	27.96	42.3	51.81	85.3%	8.598	4.783	4.755	-44.7%	39.38	13.99	10.63	-73.0%
Belize	45.19	39.75	48.57	7.5%	29.69	27.49	25.89	-12.8%	11.74	8.86	8.586	-26.9%	13.38	23.9	16.96	26.8%
America-Central	**18.3**	**31.18**	**29.36**	**60.4%**	**34.59**	**33.66**	**36.02**	**4.1%**	**11.88**	**9.824**	**11.13**	**-6.3%**	**35.23**	**25.34**	**23.49**	**-33.3%**
United States of America	41.65	34.76	39.39	-5.4%	43.24	48.39	44.44	2.8%	4.523	6.06	5.979	32.2%	10.59	10.8	10.19	-3.8%
Mexico	18.64	33.69	28.36	52.1%	44.19	32.83	39.01	-11.7%	13.31	10.35	11.62	-12.7%	23.86	23.13	21.01	-11.9%
Canada	40.78	43.12	51.65	26.7%	50.37	43.64	36.33	-27.9%	2.871	4.085	4.131	43.9%	5.98	9.164	7.894	32.0%
America-North	**39.3**	**35.69**	**39.45**	**0.4%**	**44.33**	**45.36**	**42.76**	**-3.5%**	**5.143**	**6.462**	**6.483**	**26.1%**	**11.23**	**12.49**	**11.31**	**0.7%**
Brazil	30.86	40.49	33.1	7.3%	35.47	35.92	35.75	0.8%	10.25	7.929	12.65	23.4%	23.42	15.66	18.5	-21.0%
Colombia	22.85	37.48	31.08	36.0%	27.86	32.91	37.47	34.5%	18.43	8.691	10.37	-43.7%	30.86	20.92	21.07	-31.7%
Argentina	33.26	40.27	41.29	24.1%	35.49	37.82	36.69	3.4%	7.629	6.187	7.012	-8.1%	23.62	15.72	15.01	-36.5%
Peru	9.318	36.7	31.11	233.9%	37.84	41.18	44.65	18.0%	14.33	6.446	7.277	-49.2%	38.51	15.68	16.96	-56.0%
Venezuela (Bolivarian Rep. of)	15.6	32.21	31.03	98.9%	50.51	46.07	51.85	2.7%	8.969	6.562	5.285	-41.1%	24.92	15.16	11.84	-52.5%
Ecuador	10.56	36.49	26.91	154.8%	50.37	27	29.22	-42.0%	17.94	13.69	18.36	2.3%	21.13	22.82	25.52	20.8%
Chile	15.07	38.82	32.22	113.8%	58.59	38.98	38.73	-33.9%	10.58	7.674	10.85	2.6%	15.76	14.53	18.2	15.5%
Bolivia (Plurinational State of)	49.65	34.68	37.36	-24.8%	16.16	27.16	26.12	61.6%	13.19	13.96	14.96	13.4%	21	24.2	21.56	2.7%
Paraguay	31.24	11.1	8.826	-71.7%	55.22	76.83	83.37	51.0%	4.255	3.097	1.968	-53.7%	9.292	8.969	5.835	-37.2%
Uruguay	52.9	59.61	55.01	4.0%	24.87	26.37	29.57	18.9%	6.243	4.404	5.751	-7.9%	15.98	9.617	9.667	-39.5%
Guyana	38.96	28.12	34.5	-11.4%	29.84	30.1	40.19	34.7%	17.93	19.84	13.64	-23.9%	13.28	21.94	11.67	-12.1%
Suriname	40.77	39.83	49.99	22.6%	15.68	37.11	30.9	97.1%	12.29	8.218	7.962	-35.2%	31.26	14.85	11.15	-64.3%
America-South	**27.81**	**38.49**	**32.36**	**16.4%**	**37.52**	**37.57**	**40.77**	**8.7%**	**10.7**	**7.714**	**9.969**	**-6.8%**	**23.97**	**16.22**	**16.9**	**-29.5%**

Infrastructure

	Spending on Infrastructure															
	Spending on Roads				Spending on Electricity				Spending on Water and Sanitation				Spending on ICT			
Base Case: Countries in Year 2060	Percent of Core Spending				Percent of Core Spending				Percent of Core Spending				Percent of Core Spending			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA																
China	21.58	17.49	22.94	6.3%	59.55	55.64	55.47	-6.9%	8.535	9.613	8.035	-5.9%	10.33	17.25	13.55	31.2%
Japan	30	32.52	33.77	12.6%	45.79	45.55	47.1	2.9%	5.147	5.773	6.388	24.1%	19.07	16.16	12.75	-33.1%
Korea, Rep. of	8.089	21.41	20.75	156.5%	64.41	53.54	58.08	-9.8%	4.456	8.266	7.121	59.8%	23.04	16.79	14.05	-39.0%
Korea, Dem. People's Rep. of	12.67	23.65	21.9	72.8%	40.04	23.93	23.56	-41.2%	41.93	17.16	20.24	-51.7%	5.365	35.27	34.3	539.3%
Taiwan, China	10.24	14.92	16.06	56.8%	61.38	56.38	57.8	-5.8%	5.623	6.648	6.349	12.9%	22.75	22.05	19.79	-13.0%
Hong Kong SAR, China	1.524	6.396	4.328	184.0%	57.39	55.93	59.48	3.6%	7.42	10.09	9.315	25.5%	33.66	27.58	26.88	-20.1%
Mongolia	57.1	39.7	38.02	-33.4%	10.83	29.84	42.42	291.7%	7.951	12.21	8.908	12.0%	24.12	18.25	10.64	-55.9%
Asia-East	**21.5**	**18.7**	**23.59**	**9.7%**	**58.59**	**54.74**	**54.8**	**-6.5%**	**8.039**	**9.276**	**7.925**	**-1.4%**	**11.88**	**17.28**	**13.69**	**15.2%**
India	31.33	22.56	16.25	-48.1%	30.28	43.64	51.17	69.0%	12.4	11.55	12.91	4.1%	25.99	22.25	19.67	-24.3%
Pakistan	21.03	17.47	18.48	-12.1%	17.6	24.15	27.52	56.4%	33.93	17.39	19.78	-41.7%	27.44	41	34.22	24.7%
Bangladesh	16.69	21.57	9.908	-40.6%	25.96	34.18	49.81	91.9%	22.55	13.41	13.64	-39.5%	34.8	30.84	26.64	-23.4%
Afghanistan	41.35	22.62	28.48	-31.1%	7.393	12.02	12.9	74.5%	21.19	14.43	12.47	-41.2%	30.06	50.92	46.15	53.5%
Iran, Islamic Rep. of	25.7	26.72	23.68	-7.9%	42.2	49.86	61.43	45.6%	12.13	9.856	6.377	-47.4%	19.97	13.57	8.511	-57.4%
Nepal	21.3	17.87	19.02	-10.7%	24.01	19.83	19.15	-20.2%	19.89	14.9	20.01	0.6%	34.8	47.4	41.81	20.1%
Uzbekistan	55.06	23.95	29.61	-46.2%	10.02	38.92	42.84	327.5%	10.97	15.01	12.26	11.8%	23.95	22.13	15.29	-36.2%
Sri Lanka	59.27	28.7	31.42	-47.0%	10.95	32.95	38.59	252.4%	6.918	11.84	10.96	58.4%	22.86	26.51	19.03	-16.8%
Kazakhstan	48.98	50.82	49.03	0.1%	19.49	27.43	35.73	83.3%	12.27	10.32	7.925	-35.4%	19.27	11.43	7.322	-62.0%
Tajikistan	60.52	13.54	16.61	-72.6%	13.76	59.87	53.21	286.7%	8.93	7.989	12.07	35.2%	16.79	18.6	18.1	7.8%
Kyrgyz Rep.	63	28.31	40.96	-35.0%	11.79	25.18	22.23	88.5%	9.535	18.47	16.89	77.1%	15.67	28.04	19.93	27.2%
Turkmenistan	60.4	34.14	29.02	-52.0%	10.47	55.36	62.96	501.3%	13.74	5.474	4.186	-69.5%	15.39	5.021	3.834	-75.1%
Bhutan	34.08	19.38	17.2	-49.5%	61.86	72	73.82	19.3%	1.378	2.56	3.447	150.1%	2.675	6.06	5.531	106.8%
Maldives	4.841	47.73	29.86	516.8%	28.21	17.99	17.59	-37.6%	12.9	7.963	12.16	-5.7%	54.05	26.31	40.4	-25.3%
Asia-South Central	**31.36**	**23.1**	**18.27**	**-41.7%**	**28.3**	**40.86**	**48.21**	**70.4%**	**14.81**	**12.04**	**12.79**	**-13.6%**	**25.54**	**23.99**	**20.73**	**-18.8%**
Indonesia	36.72	22.25	25.44	-30.7%	19.45	32.99	26.17	34.6%	9.077	15.25	17.5	92.8%	34.76	29.52	30.89	-11.1%
Philippines	20.64	20.62	21.99	6.5%	19.31	38.4	43.15	123.5%	20.71	10.92	10	-51.7%	39.33	30.06	24.86	-36.8%
Vietnam	19.64	17.65	25.48	29.7%	18.88	29.92	35.54	88.2%	7.541	19.03	15.38	104.0%	53.94	33.4	23.6	-56.2%
Thailand	10.02	38.52	31.1	210.4%	56.87	25.61	29.32	-48.4%	14.18	14.5	18.89	33.2%	18.93	21.37	20.7	9.4%
Myanmar	15.02	25.65	27.68	84.3%	24.43	21.79	27.36	12.0%	57.91	21.89	16.78	-71.0%	2.65	30.67	28.18	963.4%
Malaysia	34.15	35.29	36.13	5.8%	29.86	39.98	37.68	26.2%	8.646	7.077	7.937	-8.2%	27.35	17.66	18.25	-33.3%
Cambodia	21.72	32.68	38.16	75.7%	16.87	22.74	20.35	20.6%	13.82	10.06	10.53	-23.8%	47.59	34.51	30.97	-34.9%
Lao People's Democratic Rep.	26.4	25.97	24.57	-6.9%	48.38	46.48	52.66	8.8%	8.73	10.73	8.655	-0.9%	16.49	16.82	14.11	-14.4%
Singapore	2.635	1.261	1.62	-38.5%	57.93	87.11	81.53	40.7%	4.48	2.935	4.306	-3.9%	34.95	8.697	12.54	-64.1%
Timor-Leste	22.19	17.57	22.71	2.3%	20.72	26.94	37.46	80.8%	13.94	12.48	11.94	-14.3%	43.14	43.01	27.89	-35.4%
Brunei Darussalam	37.58	50.3	44.73	19.0%	34.14	36.2	34.41	0.8%	5.749	3.442	5.697	-0.9%	22.54	10.06	15.16	-32.7%
Asia-South Eastern	**25.25**	**24.58**	**26.17**	**3.6%**	**27.35**	**34.4**	**34.25**	**25.2%**	**12.06**	**13.73**	**14.13**	**17.2%**	**35.35**	**27.29**	**25.45**	**-28.0%**

Infrastructure

	Spending on Infrastructure															
	Spending on Roads				Spending on Electricity				Spending on Water and Sanitation				Spending on ICT			
Base Case: Countries in Year 2060	Percent of Core Spending				Percent of Core Spending				Percent of Core Spending				Percent of Core Spending			
Descending Population Sequence	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA continued																
Turkey	35.8	26.17	28.55	-20.3%	40.4	41.83	43.49	7.6%	11.38	9.611	10.57	-7.1%	12.41	22.4	17.39	40.1%
Iraq	15.88	37.89	35.26	122.0%	39.93	17.79	25.79	-35.4%	17.86	14.11	14.57	-18.4%	26.33	30.2	24.38	-7.4%
Yemen, Rep. of	30.29	27.78	25.89	-14.5%	17.94	18.13	21.01	17.1%	16.61	12.97	16.82	1.3%	35.15	41.11	36.28	3.2%
Saudi Arabia	12.8	41.47	38.34	199.5%	62.49	38.96	47.08	-24.7%	4.102	7.66	5.289	28.9%	20.61	11.91	9.29	-54.9%
Syrian Arab Rep.	64.93	31.85	42.79	-34.1%	15.37	27.5	31.27	103.4%	8.697	13.79	9.524	9.5%	11	26.86	16.42	49.3%
Jordan	10.34	32.36	30.11	191.2%	57.3	40.35	46.81	-18.3%	12.85	7.792	7.204	-43.9%	19.52	19.49	15.87	-18.7%
Israel	9.311	18.7	10.12	8.7%	61.17	63.41	71.09	16.2%	5.328	5.973	6.224	16.8%	24.2	11.92	12.56	-48.1%
Palestine	42.71	22.93	23.85	-44.2%	9.588	13.71	14.46	50.8%	17.62	14.21	15.74	-10.7%	30.08	49.15	45.95	52.8%
Azerbaijan	55.86	20.73	22.19	-60.3%	16.44	51.18	59.04	259.1%	9.471	12.53	8.808	-7.0%	18.23	15.56	9.96	-45.4%
United Arab Emirates	0.725	50.3	46.99	6381.4%	91.79	42.12	45.36	-50.6%	1.48	2.372	2.314	56.4%	6.003	5.209	5.329	-11.2%
Kuwait	9.947	22.64	18.94	90.4%	69.91	67.75	66.87	-4.3%	3.337	2.74	4.087	22.5%	16.81	6.866	10.1	-39.9%
Lebanon	35.11	37.56	27.35	-22.1%	25.46	36.76	40.27	58.2%	10.6	6.767	9.61	-9.3%	28.82	18.91	22.77	-21.0%
Oman	66.34	52.43	52.86	-20.3%	22.06	30.83	32.58	47.7%	1.886	4.763	4.214	123.4%	9.708	11.97	10.34	6.5%
Armenia	23.79	34.06	41.25	73.4%	28.23	29.72	27.98	-0.9%	11.73	12.34	12.86	9.6%	36.25	23.88	17.92	-50.6%
Georgia	37.42	25.21	30.16	-19.4%	35.01	37.27	43.9	25.4%	9.349	15.06	12.21	30.6%	18.23	22.45	13.72	-24.7%
Qatar	32.08	23.83	20.38	-36.5%	54.29	68.27	71.39	31.5%	3.528	1.835	1.755	-50.3%	10.1	6.073	6.48	-35.8%
Bahrain	8.652	13.19	15.92	84.0%	82.63	70.23	69.59	-15.8%	1.543	4.34	3.772	144.5%	7.179	12.25	10.72	49.3%
Cyprus	21.11	40.5	46.82	121.8%	58.37	35.04	32.66	-44.0%	3.742	8.291	7.78	107.9%	16.78	16.17	12.74	-24.1%
Asia-West	**29.34**	**31.83**	**32.04**	**9.2%**	**46.49**	**38.17**	**40.67**	**-12.5%**	**7.924**	**9.341**	**9.658**	**21.9%**	**16.24**	**20.66**	**17.63**	**8.6%**
Australia	42.53	42	40.32	-5.2%	41.83	40.44	41.69	-0.3%	4.674	8.501	9.785	109.3%	10.97	9.059	8.198	-25.3%
Papua New Guinea	28.6	35.53	39.68	38.7%	22.82	21.49	17.38	-23.8%	9.751	11.12	11.53	18.2%	38.83	31.86	31.4	-19.1%
New Zealand	36.06	38.15	32.74	-9.2%	35.31	42.44	53.1	50.4%	12.17	8.424	6.107	-49.8%	16.45	10.98	8.05	-51.1%
Solomon Islands	50.03	43.53	35.73	-28.6%	16.62	10.64	11.37	-31.6%	21.16	8.14	10.48	-50.5%	12.19	37.69	42.42	248.0%
Fiji	25.25	35.9	36.4	44.2%	18.33	20.61	30.67	67.3%	5.815	8.171	9.795	68.4%	50.6	35.32	23.13	-54.3%
Vanuatu	29.38	40.59	41.79	42.2%	5.376	12.95	14.59	171.4%	10.44	11.36	15.58	49.2%	54.81	35.11	28.04	-48.8%
Micronesia (Federated States of)	25.56	37.95	34.71	35.8%	28.62	18.64	17.1	-40.3%	25.97	10.88	13.08	-49.6%	19.85	32.53	35.11	76.9%
Tonga	47.82	32.03	41.55	-13.1%	13.13	21.97	20.85	58.8%	7.419	9.725	9.89	33.3%	31.63	36.27	27.71	-12.4%
Samoa	21.03	43.22	41.58	97.7%	16.68	21.27	29.89	79.2%	6.534	6.535	8.529	30.5%	55.76	28.97	20	-64.1%
Oceania	**41.2**	**40.97**	**39.27**	**-4.7%**	**40.21**	**38.52**	**40.26**	**0.1%**	**5.817**	**8.728**	**9.533**	**63.9%**	**12.78**	**11.78**	**10.94**	**-14.4%**

Infrastructure

Base Case: Countries in Year 2060 Descending Population Sequence	Spending on Infrastructure															
	Spending on Roads				Spending on Electricity				Spending on Water and Sanitation				Spending on ICT			
	Percent of Core Spending				Percent of Core Spending				Percent of Core Spending				Percent of Core Spending			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
EUROPE																
Russian Federation	37.16	36.91	40.52	9.0%	30.26	43.39	48.52	60.3%	4.908	7.574	4.118	-16.1%	27.68	12.12	6.849	-75.3%
Ukraine	21.92	28.26	41.88	91.1%	46.25	39.55	39.43	-14.7%	12.61	11.98	7.76	-38.5%	19.21	20.21	10.93	-43.1%
Poland	46.96	39.56	43.1	-8.2%	26.09	35.61	34.08	30.6%	5.594	6.137	7.317	30.8%	21.36	18.69	15.5	-27.4%
Romania	34.15	35.45	49.1	43.8%	27	29.96	25.73	-4.7%	12.59	15.96	13.28	5.5%	26.26	18.63	11.89	-54.7%
Czech Rep.	43.57	42.29	45.71	4.9%	36.32	35.2	34.76	-4.3%	5.713	5.65	5.88	2.9%	14.39	16.87	13.65	-5.1%
Belarus	70.2	28.97	24.25	-65.5%	9.462	55.34	65.44	591.6%	6.388	4.689	3.076	-51.8%	13.95	11	7.233	-48.2%
Hungary	53.27	64.98	62.94	18.2%	20.93	18.99	20.91	-0.1%	7.396	4.331	5.227	-29.3%	18.41	11.7	10.93	-40.6%
Bulgaria	37.89	25.13	23.02	-39.2%	28.54	49.37	62.55	119.2%	6.917	8.338	4.82	-30.3%	26.65	17.16	9.607	-64.0%
Slovak Rep.	30	29.62	28.54	-4.9%	34.34	45.77	47.93	39.6%	10.17	7.171	8.51	-16.3%	25.48	17.44	15.02	-41.1%
Moldova, Rep. of	28.36	25.11	49.22	73.6%	24.64	21.2	17.3	-29.8%	14.02	19.65	14.12	0.7%	32.98	34.05	19.36	-41.3%
Europe-East	**39.76**	**36.98**	**41.01**	**3.1%**	**29.47**	**40.44**	**44.78**	**52.0%**	**6.414**	**8.101**	**5.418**	**-15.5%**	**24.36**	**14.48**	**8.797**	**-63.9%**
United Kingdom	36.7	28.5	25.23	-31.3%	39.85	43.05	48.42	21.5%	5.762	7.785	7.389	28.2%	17.7	20.67	18.96	7.1%
Sweden	84.06	76.14	74.31	-11.6%	11.37	18.74	21.34	87.7%	0.865	1.649	1.359	57.1%	3.699	3.47	2.987	-19.2%
Denmark	39.06	39.07	48.36	23.8%	35.06	37.76	32.11	-8.4%	7.146	8.521	7.26	1.6%	18.74	14.65	12.27	-34.5%
Ireland	34.35	42.9	44.07	28.3%	48.58	32.85	29.64	-39.0%	10.03	12.88	14.19	41.5%	7.043	11.37	12.09	71.7%
Norway	23.88	19.19	17.77	-25.6%	67.16	74.42	76.31	13.6%	2.365	2	1.848	-21.9%	6.592	4.384	4.074	-38.2%
Finland	31	37.92	43.85	41.5%	38.12	45.04	40.92	7.3%	4.902	4.809	4.768	-2.7%	25.98	12.23	10.46	-59.7%
Lithuania	56.04	63.49	65.16	16.3%	29.86	21.6	21.78	-27.1%	3.967	3.34	4.318	8.8%	10.14	11.57	8.738	-13.8%
Latvia	71.86	71.78	78.07	8.6%	14.6	13.98	11.98	-17.9%	3.607	3.613	3.312	-8.2%	9.936	10.63	6.637	-33.2%
Estonia	70.34	68.55	74.42	5.8%	22.5	22.28	19.33	-14.1%	1.966	2.783	1.779	-9.5%	5.196	6.383	4.473	-13.9%
Iceland	19.16	32.14	38.08	98.7%	77.32	56.29	53.03	-31.4%	1.876	5.693	4.685	149.7%	1.641	5.868	4.204	156.2%
Europe-North	**54.44**	**45.78**	**45.64**	**-16.2%**	**31.05**	**37.9**	**39.66**	**27.7%**	**3.689**	**5.013**	**4.663**	**26.4%**	**10.82**	**11.31**	**10.04**	**-7.2%**
Italy	19.84	29.93	34.69	74.8%	59.87	42.04	42.84	-28.4%	8.377	9.389	8.649	3.2%	11.92	18.64	13.82	15.9%
Spain	22.02	38.15	44.16	100.5%	62.86	40.94	39.86	-36.6%	4.018	7.431	6.264	55.9%	11.1	13.49	9.715	-12.5%
Greece	25.58	37.49	37.69	47.3%	42.03	29.28	33.47	-20.4%	9.033	13.6	12.44	37.7%	23.36	19.63	16.4	-29.8%
Portugal	36.26	29.29	36.41	0.4%	49.57	45.38	46.89	-5.4%	3.407	8.402	6.136	80.1%	10.76	16.93	10.56	-1.9%
Serbia	53.23	24.62	20.61	-61.3%	23.03	48.58	66.19	187.4%	4.719	8.888	4.727	0.2%	19.02	17.92	8.472	-55.5%
Croatia	41.78	37.01	47.9	14.6%	24.12	31.95	27.72	14.9%	8.823	9.032	8.854	0.4%	25.28	22	15.53	-38.6%
Bosnia and Herzegovina	32.39	32.74	36.9	13.9%	39.73	35.94	36.1	-9.1%	5.695	6.403	9.122	60.2%	22.18	24.92	17.88	-19.4%
Albania	34.59	33.28	36.49	5.5%	16.1	29.86	26.89	67.0%	10.66	15.85	16.93	58.8%	38.65	21.01	19.7	-49.0%
Macedonia, TFYR	38.43	32.45	45.58	18.6%	22.96	26.84	22.22	-3.2%	7.851	14.64	12.83	63.4%	30.76	26.06	19.37	-37.0%
Slovenia	51.85	50.51	46.29	-10.7%	27.01	32.53	39.92	47.8%	5.099	4.015	4.415	-13.4%	16.04	12.95	9.372	-41.6%
Montenegro	41.43	26.37	26.95	-35.0%	25.35	43.2	53.64	111.6%	4.122	8.404	6.406	55.4%	29.1	22.03	13	-55.3%
Malta	71.27	31.85	30.54	-57.1%	12.84	38.75	43.92	242.1%	3.219	7.332	6.667	107.1%	12.67	22.07	18.88	49.0%
Europe-South	**24.51**	**33.99**	**38.55**	**57.3%**	**56.47**	**40.46**	**41.88**	**-25.8%**	**6.023**	**8.785**	**7.599**	**26.2%**	**13.01**	**16.76**	**11.97**	**-8.0%**
Germany	19.52	29.38	34.42	76.3%	58.56	44.78	44.08	-24.7%	4.667	7.283	6.566	40.7%	17.25	18.56	14.94	-13.4%
France	50.92	39.27	36.14	-29.0%	28.69	42.29	48.13	67.8%	5.273	5.641	5.417	2.7%	15.11	12.79	10.31	-31.8%
Netherlands	22.69	29.97	34.18	50.6%	56.88	39.98	39.02	-31.4%	6.583	8.995	8.649	31.4%	13.85	21.05	18.16	31.1%
Belgium	32.14	36.49	32.69	1.7%	43.61	45.14	51.15	17.3%	6.136	4.862	4.509	-26.5%	18.12	13.51	11.66	-35.7%
Switzerland	23.3	26.7	28.4	21.9%	47.56	52.72	53.98	13.5%	5.601	5.295	5.322	-5.0%	23.54	15.28	12.3	-47.7%
Austria	26.31	35.83	45.39	72.5%	53.76	44.02	40.08	-25.4%	3.973	5.771	4.575	15.2%	15.95	14.38	9.962	-37.5%
Luxembourg	25.87	40.11	36.48	41.0%	52.06	36.19	38.45	-26.1%	4.224	7.303	7.575	79.3%	17.85	16.4	17.5	-2.0%
Europe-West	**31.74**	**34.46**	**35.41**	**11.6%**	**46.79**	**43.58**	**46.18**	**-1.3%**	**5.102**	**6.387**	**5.908**	**15.8%**	**16.37**	**15.57**	**12.51**	**-23.6%**

Governance

Base Case	Freedom House Index (Inverted)				Polity Democracy/Autocracy Index				Economic Freedom Index				Government Corruption Perceptions Index			
Source: International Futures	Index Range: 2–4				Index Range: 0–20				Index Range: 1–10				Index Range: 1–10			
Model Version 6.61, Jan 2013	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	**8.258**	**9.386**	**10.06**	**21.8%**	**13.95**	**15.17**	**16.08**	**15.3%**	**7.396**	**7.431**	**7.617**	**3.0%**	**3.665**	**4.426**	**5.372**	**46.6%**
Africa	6.694	8.002	9.212	37.6%	11.78	12.93	14.19	20.5%	6.354	6.642	7.238	13.9%	2.689	3.033	3.657	36.0%
Americas	11.85	12.41	12.78	7.8%	16.69	18.06	18.66	11.8%	7.724	7.7	7.752	0.4%	4.856	5.959	7.188	48.0%
Asia with Oceania	7.255	8.805	9.547	31.6%	11.28	12.98	14.24	26.2%	7.089	7.303	7.597	7.2%	3.375	4.276	5.466	62.0%
Europe	11.55	11.99	12.23	5.9%	18.51	18.94	19.12	3.3%	7.417	7.51	7.686	3.6%	5.185	6.439	7.747	49.4%
World	8.258	9.386	10.06	21.8%	13.95	15.17	16.08	15.3%	7.396	7.431	7.617	3.0%	3.665	4.426	5.372	46.6%
Africa-Eastern	6.736	8.538	10.07	49.5%	12.19	13.36	14.71	20.7%	6.273	6.907	7.654	22.0%	2.613	3.037	3.891	48.9%
Africa-Middle	4.168	5.158	6.318	51.6%	8.962	10.46	12	33.9%	5.033	5.214	5.359	6.5%	2.006	2.439	2.856	42.4%
Africa-Northern	4.553	4.939	5.325	17.0%	6.667	8.726	10.72	60.8%	6.302	6.599	7.034	11.6%	2.839	3.274	3.994	40.7%
Africa-Southern	11.73	12.85	13.66	16.5%	14.4	16.23	17.39	20.8%	7.045	7.348	7.649	8.6%	4.477	5.35	6.725	50.2%
Africa-Western	8.256	9.721	10.79	30.7%	14.06	14.44	15.2	8.1%	6.185	6.796	7.504	21.3%	2.62	2.885	3.372	28.7%
Africa	6.694	8.002	9.212	37.6%	11.78	12.93	14.19	20.5%	6.354	6.642	7.238	13.9%	2.689	3.033	3.657	36.0%
America-Caribbean	8.441	9.661	10.49	24.3%	15.32	16.99	17.72	15.7%	6.49	6.835	7.108	9.5%	3.399	4.155	5.119	50.6%
America-Central	9.546	10.04	10.67	11.8%	17.84	19.08	19.45	9.0%	7.441	7.779	8.042	8.1%	3.279	3.92	4.672	42.5%
America-North	13.04	13.15	13.31	2.1%	19.33	19.87	19.99	3.4%	7.987	8.084	8.204	2.7%	6.276	7.428	8.907	41.9%
America-South	11.08	12.16	12.7	14.6%	16.61	18	18.73	12.8%	6.069	6.38	6.449	6.3%	3.541	4.728	5.743	62.2%
Americas	11.85	12.41	12.78	7.8%	16.69	18.06	18.66	11.8%	7.724	7.7	7.752	0.4%	4.856	5.959	7.188	48.0%
Asia-East	4.296	4.775	5.085	18.4%	14.39	15.39	16.19	12.5%	7.19	7.388	7.702	7.1%	3.924	5.435	7.728	96.9%
Asia-South Central	9.613	11.68	12.13	26.2%	10.18	12.28	13.69	34.5%	6.324	7.012	7.515	18.8%	2.968	3.589	4.576	54.2%
Asia-South East	8.133	9.477	10.37	27.5%	12	13.99	15.14	26.2%	6.955	7.234	7.362	5.9%	2.791	3.583	4.3	54.1%
Asia-West	6.684	7.01	7.302	9.2%	8.996	10.9	12.52	39.2%	6.892	7.199	7.178	4.1%	3.591	4.296	4.838	34.7%
Oceania	12.73	12.95	13.28	4.3%	14.26	15.16	15.94	11.8%	7.914	8.067	8.193	3.5%	7.201	7.749	7.805	8.4%
Asia with Oceania	7.255	8.805	9.547	31.6%	11.28	12.98	14.24	26.2%	7.089	7.303	7.597	7.2%	3.375	4.276	5.466	62.0%
Europe-East	8.429	8.943	9.137	8.4%	16.7	17.53	17.95	7.5%	6.703	6.874	6.973	4.0%	2.959	4.505	5.404	82.6%
Europe-North	13.95	13.98	13.99	0.3%	19.51	19.72	19.85	1.7%	7.767	7.938	8.123	4.6%	7.827	8.862	9.852	25.9%
Europe-South	13.13	13.51	13.79	5.0%	18.79	19.36	19.43	3.4%	7.081	7.172	7.318	3.3%	4.682	5.629	6.978	49.0%
Europe-West	14	14	14	0.0%	19.53	19.6	19.64	0.6%	7.517	7.618	7.803	3.8%	7.601	8.308	9.863	29.8%
Europe	11.55	11.99	12.23	5.9%	18.51	18.94	19.12	3.3%	7.417	7.51	7.686	3.6%	5.185	6.439	7.747	49.4%

Governance

Base Case: Countries in Descending Year 2060 Population Sequence	Freedom House Index (Inverted)				Polity Democracy/Autocracy Index				Economic Freedom Index				Government Corruption Perceptions Index			
	Index Range: 2–4				Index Range: 0–20				Index Range: 1–10				Index Range: 1–10			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA																
Ethiopia	4	5.496	6.955	73.9%	11	13.33	15.69	42.6%	5.71	6.523	7.256	27.1%	2.7	3.357	4.475	65.7%
Tanzania, United Rep. of	10	12.5	14	40.0%	9	10.44	13.32	48.0%	6.32	6.95	7.87	24.5%	2.7	3.164	4.824	78.7%
Uganda	7	8.919	10.88	55.4%	9	10.68	13.51	50.1%	6.9	7.707	8.529	23.6%	2.5	2.977	4.064	62.6%
Kenya	9	10.05	11.67	29.7%	18	18.55	17.98	-0.1%	7.09	7.452	7.933	11.9%	2.1	2.516	3.044	45.0%
Madagascar	6	6.211	6.608	10.1%	10	11.31	12.5	25.0%	6.29	6.362	6.491	3.2%	2.6	2.792	2.975	14.4%
Mozambique	9	13.03	14	55.6%	15	15.5	17.46	16.4%	5.74	6.618	7.175	25.0%	2.7	3.137	4.071	50.8%
Malawi	9	10.94	13.18	46.4%	16	15.81	16.85	5.3%	5.93	6.324	6.788	14.5%	3.4	3.302	3.415	0.4%
Zambia	9	11.34	12.76	41.8%	17	17.09	18.58	9.3%	7.13	7.812	8.246	15.7%	3	3.337	3.922	30.7%
Somalia	2	2.655	3.553	77.7%	3	4.574	6.744	124.8%	4.963	5.5	6.177	24.5%	1.1	1.457	2.084	89.5%
Rwanda	5	6.117	7.572	51.4%	6	7.603	9.563	59.4%	6.2	6.796	7.473	20.5%	4	3.865	4.063	1.6%
Zimbabwe	4	4.317	4.658	16.5%	11	13.75	15.56	41.5%	2.89	2.995	3.102	7.3%	2.4	2.907	3.338	39.1%
Burundi	6	6.938	8.902	48.4%	16	17.94	17.8	11.3%	5.54	5.905	6.381	15.2%	1.8	2.318	2.599	44.4%
Eritrea	2	2.565	3.34	67.0%	3	5.233	7.954	165.1%	4.957	5.387	5.968	20.4%	2.6	2.848	3.363	29.3%
Comoros	9	9.454	11.09	23.2%	19	18.71	17.78	-6.4%	5.393	5.438	5.696	5.6%	2.1	2.347	2.675	27.4%
Djibouti	5	5.417	6.23	24.6%	12	13.59	14.44	20.3%	5.809	6.048	6.387	10.0%	3.2	3.389	3.631	13.5%
Mauritius	13	14	14	7.7%	20	19.71	19.64	-1.8%	7.62	7.873	8.059	5.8%	5.4	6.01	6.633	22.8%
Africa-Eastern	**6.736**	**8.538**	**10.07**	**49.5%**	**12.19**	**13.36**	**14.71**	**20.7%**	**6.273**	**6.907**	**7.654**	**22.0%**	**2.613**	**3.037**	**3.891**	**48.9%**
Congo, Democratic Rep. of	4	5.24	6.91	72.8%	15	15.17	15.4	2.7%	5	5.433	6.01	20.2%	2	2.141	2.315	15.8%
Angola	5	6.131	6.699	34.0%	8	9.57	11.59	44.9%	4.04	4.793	5.024	24.4%	1.9	3.416	4.858	155.7%
Cameroon	4	4.438	4.933	23.3%	6	7.709	9.619	60.3%	5.79	6.028	6.29	8.6%	2.2	2.55	3.022	37.4%
Chad	3	3.483	3.971	32.4%	8	9.075	10.41	30.1%	5.09	5.454	5.733	12.6%	1.7	2.065	2.485	46.2%
Central African Rep.	6	7.089	8.575	42.9%	9	10.17	11.25	25.0%	4.79	5.129	5.531	15.5%	2.1	2.341	2.639	25.7%
Congo, Rep. of	5	5.96	6.491	29.8%	6	7.41	9.485	58.1%	4.44	4.933	5.252	18.3%	2.1	2.91	3.722	77.2%
Gabon	5	5.351	5.634	12.7%	13	14.92	16.35	25.8%	5.8	6.049	6.012	3.7%	2.8	4.04	5.045	80.2%
Equatorial Guinea	2	2.175	2.171	8.5%	5	7.349	9.882	97.6%	7.341	7.97	7.932	8.1%	1.9	5.306	5.782	204.3%
São Tomé and Príncipe	12	13.07	14	16.7%	10.66	12.76	14.06	31.9%	5.664	5.815	6.065	7.1%	3	3.203	3.408	13.6%
Africa-Middle	**4.168**	**5.158**	**6.318**	**51.6%**	**8.962**	**10.46**	**12**	**33.9%**	**5.033**	**5.214**	**5.359**	**6.5%**	**2.006**	**2.439**	**2.856**	**42.4%**
Egypt, Arab Rep.	5	5.511	6.022	20.4%	7	8.917	10.86	55.1%	6.68	6.995	7.352	10.1%	3.1	3.455	4.083	31.7%
Sudan	2	2.53	3.03	51.5%	8	9.414	11.41	42.6%	5.771	6.538	7.175	24.3%	1.6	2.255	3.594	124.6%
Algeria	5	5.349	5.588	11.8%	12	14.1	15.31	27.6%	5.34	5.612	5.892	10.3%	2.9	3.515	3.936	35.7%
Morocco	7	7.805	8.615	23.1%	4	6.391	8.678	117.0%	6.16	6.462	6.768	9.9%	3.4	3.726	4.189	23.2%
Tunisia	4	4.42	4.801	20.0%	6	8.075	9.861	64.4%	6.39	6.674	6.947	8.7%	4.3	4.657	5.219	21.4%
Libya	2	2.165	2.184	9.2%	3	5.465	8.176	172.5%	6.96	6.972	7.105	2.1%	2.2	3.685	4.228	92.2%
Africa-Northern	**4.553**	**4.939**	**5.325**	**17.0%**	**6.667**	**8.726**	**10.72**	**60.8%**	**6.302**	**6.599**	**7.034**	**11.6%**	**2.839**	**3.274**	**3.994**	**40.7%**

Governance

Base Case: Countries in Descending Year 2060 Population Sequence	Freedom House Index (Inverted) Index Range: 2–4				Polity Democracy/Autocracy Index Index Range: 0–20				Economic Freedom Index Index Range: 1–10				Government Corruption Perceptions Index Index Range: 1–10			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA continued																
South Africa	12	13.14	14	16.7%	19	19.8	20	5.3%	7.06	7.356	7.666	8.6%	4.5	5.392	6.906	53.5%
Namibia	12	13.72	14	16.7%	16	18.28	20	25.0%	6.83	7.252	7.512	10.0%	4.4	5.216	6.044	37.4%
Lesotho	10	11.8	13.28	32.8%	18	19.6	19.93	10.7%	6.36	6.798	7.135	12.2%	3.5	3.983	4.463	27.5%
Botswana	11	12.15	12.7	15.5%	18	19.61	19.9	10.6%	7.12	7.482	7.625	7.1%	5.8	7.139	7.906	36.3%
Swaziland	4	4.341	4.7	17.5%	1	3.831	7.113	611.3%	6.253	6.498	6.755	8.0%	3.2	3.716	4.296	34.3%
Africa-Southern	**11.73**	**12.85**	**13.66**	**16.5%**	**14.4**	**16.23**	**17.39**	**20.8%**	**7.045**	**7.348**	**7.649**	**8.6%**	**4.477**	**5.35**	**6.725**	**50.2%**
Nigeria	8	9.819	11.39	42.4%	14	14.15	15.4	10.0%	6.31	6.927	7.652	21.3%	2.4	2.85	3.626	51.1%
Niger	7	7.987	8.929	27.6%	13	12.43	13.29	2.2%	5.11	5.285	5.458	6.8%	2.6	2.565	2.74	5.4%
Côte d'Ivoire	3	3.373	3.909	30.3%	14	14.44	14.86	6.1%	6.09	6.273	6.531	7.2%	2.2	2.406	2.721	23.7%
Burkina Faso	8	9.138	10.71	33.9%	10	11.16	12.49	24.9%	5.87	6.151	6.522	11.1%	3.1	3.147	3.308	6.7%
Ghana	13	14	14	7.7%	18	18.33	18.31	1.7%	6.8	7.332	7.958	17.0%	4.1	4.073	4.52	10.2%
Mali	11	13.4	14	27.3%	17	16.89	17.59	3.5%	6.28	6.709	7.108	13.2%	2.7	2.837	3.143	16.4%
Senegal	10	10.91	12.09	20.9%	17	17.48	17.77	4.5%	5.72	5.936	6.167	7.8%	2.9	3.027	3.195	10.2%
Guinea	6	7.074	7.86	31.0%	15	15.18	15.88	5.9%	5.28	5.592	5.782	9.5%	2	2.323	2.644	32.2%
Benin	12	13.49	14	16.7%	17	17.01	17.58	3.4%	5.89	6.085	6.434	9.2%	2.8	2.91	3.197	14.2%
Togo	7	7.193	7.775	11.1%	8	9.506	10.57	32.1%	5.9	5.951	6.112	3.6%	2.4	2.482	2.543	6.0%
Sierra Leone	10	12.94	14	40.0%	17	16.74	17.66	3.9%	5.97	6.58	7.291	22.1%	2.4	2.621	3.251	35.5%
Liberia	9	13.15	14	55.6%	16	16.02	17.02	6.4%	4.742	5.423	5.967	25.8%	3.3	3.247	3.495	5.9%
Mauritania	5	5.391	5.791	15.8%	8	9.154	10.2	27.5%	6.05	6.224	6.366	5.2%	2.3	2.439	2.575	12.0%
Gambia	6	7.067	8.412	40.2%	5	6.926	9.113	82.3%	5.45	5.779	6.171	13.2%	3.2	3.293	3.539	10.6%
Guinea-Bissau	8	8.643	9.09	13.6%	16	16.48	16.65	4.1%	4.84	4.977	4.985	3.0%	2.1	2.446	2.703	28.7%
Cape Verde	14	14	14	0.0%	20	19.17	18.76	-6.2%	6.084	6.455	6.741	10.8%	5.1	5.176	5.37	5.3%
Africa-Western	**8.256**	**9.721**	**10.79**	**30.7%**	**14.06**	**14.44**	**15.2**	**8.1%**	**6.185**	**6.796**	**7.504**	**21.3%**	**2.62**	**2.885**	**3.372**	**28.7%**

Governance

Base Case: Countries in Descending Year 2060 Population Sequence	Freedom House Index (Inverted) Index Range: 2–4				Polity Democracy/Autocracy Index Index Range: 0–20				Economic Freedom Index Index Range: 1–10				Government Corruption Perceptions Index Index Range: 1–10			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS																
Haiti	7	8.062	9.248	32.1%	15	16.85	17.72	18.1%	6.44	6.812	7.148	11.0%	2.2	2.659	3.067	39.4%
Dominican Rep.	12	13.77	14	16.7%	18	19.6	19.85	10.3%	6.27	6.681	6.931	10.5%	3	4.552	6.265	108.8%
Cuba	3	3.698	4.305	43.5%	3	6.123	8.921	197.4%	5.876	6.532	7.1	20.8%	3.7	4.38	5.839	57.8%
Puerto Rico	14	14	14	0.0%	15.29	16.64	17.36	13.5%	6.755	7.082	7.369	9.1%	5.8	6.33	7.416	27.9%
Jamaica	11	11.45	12.19	10.8%	19	19.51	19.37	1.9%	7.19	7.321	7.511	4.5%	3.3	3.755	4.348	31.8%
Trinidad and Tobago	12	12.97	13.21	10.1%	20	20	20	0.0%	7.07	7.461	7.419	4.9%	3.6	6.124	6.977	93.8%
Bahamas	14	14	14	0.0%	17.87	19.53	19.62	9.8%	7.1	7.128	7.176	1.1%	7.3	7.325	7.541	3.3%
Barbados	14	14	14	0.0%	16.61	18.21	18.87	13.6%	6.75	6.845	7.011	3.9%	7.8	7.568	7.779	-0.3%
Saint Lucia	14	14	14	0.0%	14.79	17.35	18.68	26.3%	6.636	6.864	7.053	6.3%	7	6.952	6.9	-1.4%
Grenada	13	13.73	14	7.7%	14.38	16.84	17.74	23.4%	6.54	6.69	6.888	5.3%	3.5	3.933	4.52	29.1%
Saint Vincent and the Grenadines	14	14	14	0.0%	14.59	16.24	16.83	15.4%	6.589	6.743	6.968	5.8%	5.8	5.621	5.696	-1.8%
America-Caribbean	**8.441**	**9.661**	**10.49**	**24.3%**	**15.32**	**16.99**	**17.72**	**15.7%**	**6.49**	**6.835**	**7.108**	**9.5%**	**3.399**	**4.155**	**5.119**	**50.6%**
Guatemala	8	8.864	9.971	24.6%	18	19.02	18.78	4.3%	7.25	7.559	7.945	9.6%	3.2	3.644	4.424	38.3%
Honduras	8	8.64	9.295	16.2%	17	19.3	19.83	16.6%	7.48	7.742	7.973	6.6%	2.4	3.183	3.912	63.0%
Nicaragua	8	8.781	9.497	18.7%	19	19.59	19.77	4.1%	6.96	7.187	7.408	6.4%	2.5	3.138	3.724	49.0%
El Salvador	11	11.74	12.64	14.9%	18	19.63	19.71	9.5%	7.48	7.729	7.973	6.6%	3.6	4.275	4.989	38.6%
Costa Rica	14	14	14	0.0%	20	20	20	0.0%	7.56	7.84	8.043	6.4%	5.3	6.063	6.758	27.5%
Panama	13	14	14	7.7%	19	19.75	20	5.3%	7.65	8.084	8.345	9.1%	3.6	5.472	7.42	106.1%
Belize	13	14	14	7.7%	13.88	16.26	18.06	30.1%	6.87	7.141	7.476	8.8%	2.9	3.686	4.809	65.8%
America-Central	**9.546**	**10.04**	**10.67**	**11.8%**	**17.84**	**19.08**	**19.45**	**9.0%**	**7.441**	**7.779**	**8.042**	**8.1%**	**3.279**	**3.92**	**4.672**	**42.5%**
United States of America	14	14	14	0.0%	20	20	20	0.0%	8.06	8.166	8.29	2.9%	7.1	8.351	10	40.8%
Mexico	10	10.51	11	10.0%	18	19.61	19.96	10.9%	6.85	7.065	7.216	5.3%	3.1	4.17	5.224	68.5%
Canada	14	14	14	0.0%	20	20	20	0.0%	7.91	8.028	8.165	3.2%	8.9	9.615	10	12.4%
America-North	**13.04**	**13.15**	**13.31**	**2.1%**	**19.33**	**19.87**	**19.99**	**3.4%**	**7.987**	**8.084**	**8.204**	**2.7%**	**6.276**	**7.428**	**8.907**	**41.9%**
Brazil	12	13.4	14	16.7%	18	19.62	19.54	8.6%	6	6.3	6.443	7.4%	3.7	4.903	5.806	56.9%
Colombia	9	9.946	10.47	16.3%	17	18.59	19.43	14.3%	5.81	6.107	6.361	9.5%	3.5	4.373	5.045	44.1%
Argentina	12	13.26	14	16.7%	18	19.71	19.88	10.4%	6.1	6.412	6.576	7.8%	2.9	4.948	6.777	133.7%
Peru	11	12.37	13.06	18.7%	19	19.84	20	5.3%	7.26	7.705	7.882	8.6%	3.5	4.838	5.841	66.9%
Venezuela (Bolivarian Rep. of)	6	6.598	7.224	20.4%	7	9.572	12.23	74.7%	4.33	4.488	4.491	3.7%	2	3.531	5.711	185.6%
Ecuador	10	10.75	11.18	11.8%	15	17.12	18.62	24.1%	5.83	6.086	6.217	6.6%	2.5	3.501	4.286	71.4%
Chile	14	14	14	0.0%	20	19.65	19.5	-2.5%	8.14	8.456	8.551	5.0%	7.2	7.642	7.47	3.7%
Bolivia (Plurinational State of)	10	11.26	12.4	24.0%	17	18.31	19.37	13.9%	6.18	6.52	6.949	12.4%	2.8	3.533	4.542	62.2%
Paraguay	10	10.9	11.76	17.6%	18	19.45	19.43	7.9%	6.38	6.661	6.875	7.8%	2.2	3.054	3.939	79.0%
Uruguay	14	14	14	0.0%	20	19.66	19.64	-1.8%	6.95	7.251	7.506	8.0%	6.9	7.474	8.516	23.4%
Guyana	11	12.28	13.7	24.5%	16	18.32	19.34	20.9%	5.98	6.272	6.554	9.6%	2.7	3.411	4.207	55.8%
Suriname	12	13.45	14	16.7%	14.31	16.2	17.72	23.8%	6.524	6.88	7.093	8.7%	3	4.118	5.536	84.5%
America-South	**11.08**	**12.16**	**12.7**	**14.6%**	**16.61**	**18**	**18.73**	**12.8%**	**6.069**	**6.38**	**6.449**	**6.3%**	**3.541**	**4.728**	**5.743**	**62.2%**

Governance

Base Case: Countries in Descending Year 2060 Population Sequence	Freedom House Index (Inverted) Index Range: 2–4				Polity Democracy/Autocracy Index Index Range: 0–20				Economic Freedom Index Index Range: 1–10				Government Corruption Perceptions Index Index Range: 1–10			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA																
China	3	3.571	3.986	32.9%	3	6.008	9.103	203.4%	6.54	7.222	7.66	17.1%	3.5	5.113	7.606	117.3%
Japan	13	13.67	14	7.7%	20	19.79	19.8	-1.0%	7.46	7.633	7.831	5.0%	7.8	8.774	10	28.2%
Korea, Rep. of	13	13.93	14	7.7%	18	19.72	19.88	10.4%	7.45	7.737	7.913	6.2%	5.4	7.432	9.316	72.5%
Korea, Dem. People's Rep. of	2	2.468	2.846	42.3%	1	3.644	6.234	523.4%	5.347	5.787	6.171	15.4%	1	1.648	2.371	137.1%
Taiwan, China	13	13.55	13.95	7.3%	20	19.89	19.89	-0.5%	7.62	7.754	7.842	2.9%	5.8	7.078	8.053	38.8%
Hong Kong SAR, China	9	9.521	9.682	7.6%	18.75	19.44	19.55	4.3%	8.97	9.21	9.216	2.7%	8.4	10	10	19.0%
Mongolia	12	14	14	16.7%	20	19.21	18.86	-5.7%	6.91	7.26	7.298	5.6%	2.7	3.419	4.294	59.0%
Asia-East	**4.296**	**4.775**	**5.085**	**18.4%**	**14.39**	**15.39**	**16.19**	**12.5%**	**7.19**	**7.388**	**7.702**	**7.1%**	**3.924**	**5.435**	**7.728**	**96.9%**
India	11	13.72	14	27.3%	19	18.88	18.23	-4.1%	6.45	7.146	7.631	18.3%	3.3	3.93	5.179	56.9%
Pakistan	7	7.647	8.551	22.2%	16	17.83	18.67	16.7%	6.01	6.304	6.627	10.3%	2.3	2.842	3.382	47.0%
Bangladesh	9	11.05	13.25	47.2%	15	17.06	17.52	16.8%	5.93	6.496	7.024	18.4%	2.4	2.9	3.603	50.1%
Afghanistan	4	4.834	5.542	38.6%	3	4.462	6.043	101.4%	5.479	5.974	6.328	15.5%	1.4	1.717	2.044	46.0%
Iran, Islamic Rep. of	4	4.42	4.57	14.3%	3	5.723	8.142	171.4%	5.99	6.136	6.207	3.6%	2.2	3.62	4.335	97.0%
Nepal	8	9.243	10.65	33.1%	16	18.44	19.47	21.7%	5.58	5.963	6.336	13.5%	2.2	2.871	3.449	56.8%
Uzbekistan	2	2.413	2.655	32.8%	1	3.52	6.287	528.7%	5.949	6.67	7.023	18.1%	1.6	2.497	3.371	110.7%
Sri Lanka	7	7.955	8.79	25.6%	14	14.88	15.93	13.8%	6.1	6.511	6.881	12.8%	3.2	3.717	4.611	44.1%
Kazakhstan	5	5.613	5.767	15.3%	4	6.334	9.027	125.7%	7.12	7.454	7.203	1.2%	2.9	4.479	5.171	78.3%
Tajikistan	5	5.514	6.021	20.4%	7	9.089	10.77	53.9%	5.716	6.015	6.124	7.1%	2.1	2.499	2.899	38.0%
Kyrgyz Rep.	6	6.511	7.243	20.7%	17	18.62	19.59	15.2%	6.8	7.004	7.288	7.2%	2	2.676	3.416	70.8%
Turkmenistan	2	2.603	2.668	33.4%	1	3.731	6.553	555.3%	6.504	7.374	7.281	11.9%	1.6	5.383	6.108	281.8%
Bhutan	7	8.175	9.133	30.5%	13	15.82	16.98	30.6%	6.294	6.78	7.129	13.3%	5.7	5.981	6.532	14.6%
Maldives	9	9.638	10.23	13.7%	13.54	17.48	18.39	35.8%	6.341	6.584	6.732	6.2%	2.3	3.253	3.879	68.7%
Asia-South Central	**9.613**	**11.68**	**12.13**	**26.2%**	**10.18**	**12.28**	**13.69**	**34.5%**	**6.324**	**7.012**	**7.515**	**18.8%**	**2.968**	**3.589**	**4.576**	**54.2%**
Indonesia	11	12.92	13.79	25.4%	18	19.35	18.99	5.5%	6.35	6.864	7.065	11.3%	2.8	3.659	4.191	49.7%
Philippines	10	11.24	12.47	24.7%	18	19.53	19.62	9.0%	6.83	7.275	7.685	12.5%	2.4	3.152	4.118	71.6%
Vietnam	4	4.615	5.066	26.7%	3	6.081	8.979	199.3%	6.22	6.691	6.938	11.5%	2.7	3.422	4.041	49.7%
Thailand	7	7.773	8.361	19.4%	14	15.65	16.54	18.1%	7.04	7.42	7.684	9.1%	3.5	4.343	5.176	47.9%
Myanmar	2	2.457	3.05	52.5%	4	6.267	8.235	105.9%	3.69	4.026	4.459	20.8%	1.4	1.898	2.582	84.4%
Malaysia	8	8.746	9.322	16.5%	16	17.72	19.06	19.1%	6.88	7.241	7.495	8.9%	4.4	5.666	7.007	59.2%
Cambodia	5	6.093	6.989	39.8%	12	15.04	16.67	38.9%	5.691	6.243	6.646	16.8%	2.1	3	3.921	86.7%
Lao People's Democratic Rep.	3	3.781	4.371	45.7%	3	5.604	8.17	172.3%	5.801	6.433	6.907	19.1%	2.1	2.924	4.062	93.4%
Singapore	7	7.559	7.771	11.0%	8	10.15	12.14	51.8%	8.66	9.007	9.105	5.1%	9.3	10	10	7.5%
Timor-Leste	9	11.69	14	55.6%	17	18.51	18.12	6.6%	5.134	5.597	5.993	16.7%	2.5	2.86	3.243	29.7%
Brunei Darussalam	5	5.263	5.328	6.6%	19	20	20	5.3%	7.628	7.754	7.961	4.4%	5.5	7.972	8.609	56.5%
Asia-South Eastern	**8.133**	**9.477**	**10.37**	**27.5%**	**12**	**13.99**	**15.14**	**26.2%**	**6.955**	**7.234**	**7.362**	**5.9%**	**2.791**	**3.583**	**4.3**	**54.1%**

Governance

Base Case: Countries in Descending Year 2060 Population Sequence	Freedom House Index (Inverted) Index Range: 2–4				Polity Democracy/Autocracy Index Index Range: 0–20				Economic Freedom Index Index Range: 1–10				Government Corruption Perceptions Index Index Range: 1–10			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA continued																
Turkey	10	10.82	11.49	14.9%	17	18.54	18.9	11.2%	6.42	6.7	6.907	7.6%	4.4	5.128	5.922	34.6%
Iraq	5	5.917	6.626	32.5%	13	13.93	15.65	20.4%	6.012	6.283	6.57	9.3%	1.5	2.364	3.497	133.1%
Yemen, Rep. of	5	5.714	6.297	25.9%	8	9.511	10.94	36.8%	5.848	6.214	6.526	11.6%	2.2	2.495	2.846	29.4%
Saudi Arabia	3	3.25	3.337	11.2%	1	3.383	5.902	490.2%	7.177	7.418	7.311	1.9%	4.7	6.046	6.425	36.7%
Syrian Arab Rep.	3	3.328	3.741	24.7%	3	5.651	8.477	182.6%	5.76	6.076	6.458	12.1%	2.5	3.137	4.108	64.3%
Jordan	5	5.533	6.208	24.2%	7	8.773	10.62	51.7%	7.4	7.747	8.212	11.0%	4.7	4.635	5.07	7.9%
Israel	13	14	14	7.7%	20	19.88	20	0.0%	6.69	6.952	7.188	7.4%	6.1	8.038	10	63.9%
Palestine	5	5.25	5.824	16.5%	11.92	13.45	14.64	22.8%	5.961	6.038	6.284	5.4%	2.7	2.927	3.268	21.0%
Azerbaijan	5	5.553	5.807	16.1%	3	5.382	7.938	164.6%	6.46	6.787	6.962	7.8%	2.4	3.484	4.208	75.3%
United Arab Emirates	5	5.381	5.532	10.6%	2	5.385	8.331	316.6%	7.58	7.863	7.766	2.5%	6.3	10	10	58.7%
Kuwait	7	7.822	7.991	14.2%	3	5.411	7.412	147.1%	7.46	7.823	7.781	4.3%	4.5	9.727	10	122.2%
Lebanon	8	8.814	9.253	15.7%	17	18.41	18.15	6.8%	6.8	7.128	7.264	6.8%	2.5	3.818	4.764	90.6%
Oman	5	5.36	5.424	8.5%	2	5.21	8.044	302.2%	7.36	7.896	7.97	8.3%	5.3	7.004	7.102	34.0%
Armenia	6	6.469	7.07	17.8%	15	16.43	17.14	14.3%	7.17	7.438	7.773	8.4%	2.6	3.193	4.015	54.4%
Georgia	9	9.99	10.79	19.9%	16	17.21	17.59	9.9%	7.25	7.579	7.822	7.9%	3.8	4.127	4.406	15.9%
Qatar	5	5.612	5.683	13.7%	1	4.58	7.556	655.6%	7.95	8.396	8.355	5.1%	7.7	10	10	29.9%
Bahrain	5	5.214	5.313	6.3%	2	5.175	8.175	308.8%	7.56	7.926	8.019	6.1%	4.9	6.503	7.098	44.9%
Cyprus	14	14	14	0.0%	20	19.86	19.92	-0.4%	7.36	7.438	7.469	1.5%	6.3	6.838	7.014	11.3%
Asia-West	**6.684**	**7.01**	**7.302**	**9.2%**	**8.996**	**10.9**	**12.52**	**39.2%**	**6.892**	**7.199**	**7.178**	**4.1%**	**3.591**	**4.296**	**4.838**	**34.7%**
Australia	14	14	14	0.0%	20	20	20	0.0%	7.89	8.063	8.162	3.4%	8.7	10	10	14.9%
Papua New Guinea	9	10.63	12.04	33.8%	14	14.44	15.42	10.1%	6.71	7.035	7.65	14.0%	2.1	2.455	3.151	50.0%
New Zealand	14	14	14	0.0%	20	20	20	0.0%	8.3	8.424	8.675	4.5%	9.3	9.303	10	7.5%
Solomon Islands	9	9.959	10.51	16.8%	18	18.35	18	0.0%	5.871	6.115	6.205	5.7%	2.8	3.076	3.272	16.9%
Fiji	6	6.382	7.103	18.4%	6	7.928	10.09	68.2%	6.64	6.85	7.244	9.1%	4	3.977	4.285	7.1%
Vanuatu	12	12.76	13.84	15.3%	12.87	14.11	15.15	17.7%	6.183	6.346	6.533	5.7%	3.6	3.721	3.931	9.2%
Micronesia (Federated States of)	14	14	14	0.0%	11.89	14.22	14.97	25.9%	5.954	6.167	6.329	6.3%	2.694	3.103	3.39	25.8%
Tonga	10	10.49	11.61	16.1%	12.83	13.56	14.58	13.6%	6.176	6.294	6.593	6.8%	3	3.208	3.743	24.8%
Samoa	12	13.14	14	16.7%	12.79	13.85	15.21	18.9%	6.166	6.387	6.722	9.0%	4.1	4.189	4.654	13.5%
Oceania	**12.73**	**12.95**	**13.28**	**4.3%**	**14.26**	**15.16**	**15.94**	**11.8%**	**7.914**	**8.067**	**8.193**	**3.5%**	**7.201**	**7.749**	**7.805**	**8.4%**

Governance

Base Case: Countries in Descending Year 2060 Population Sequence	Freedom House Index (Inverted) Index Range: 2–4				Polity Democracy/Autocracy Index Index Range: 0–20				Economic Freedom Index Index Range: 1–10				Government Corruption Perceptions Index Index Range: 1–10			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
EUROPE																
Russian Federation	5	5.54	5.678	13.6%	14	15.57	16.51	17.9%	6.5	6.73	6.792	4.5%	2.1	4.181	5.124	144.0%
Ukraine	10	11.14	11.68	16.8%	16	16.89	17.27	7.9%	5.68	5.92	6.029	6.1%	2.4	3.347	4.067	69.5%
Poland	14	14	14	0.0%	20	19.94	20	0.0%	6.78	7.026	7.157	5.6%	5.3	6.537	7.423	40.1%
Romania	12	12.69	13.45	12.1%	19	19.63	19.42	2.2%	6.79	6.934	7.059	4.0%	3.7	4.293	5.035	36.1%
Czech Rep.	14	14	14	0.0%	18	18.78	19.35	7.5%	7.09	7.218	7.328	3.4%	4.6	5.484	6.376	38.6%
Belarus	3	3.303	3.495	16.5%	3	5.509	7.949	165.0%	6.87	7.175	7.326	6.6%	2.5	3.938	5.256	110.2%
Hungary	14	14	14	0.0%	20	19.78	19.73	-1.3%	7.33	7.517	7.663	4.5%	4.7	5.593	6.483	37.9%
Bulgaria	12	12.72	13.45	12.1%	19	19.54	19.7	3.7%	6.74	6.861	6.946	3.1%	3.6	4.347	5.251	45.9%
Slovak Rep.	14	14	14	0.0%	20	20	20	0.0%	7.52	7.735	7.845	4.3%	4.3	5.731	6.727	56.4%
Moldova, Rep. of	10	10.79	12.03	20.3%	18	19.7	19.62	9.0%	6.34	6.536	6.853	8.1%	2.9	3.384	3.897	34.4%
Europe-East	**8.429**	**8.943**	**9.137**	**8.4%**	**16.7**	**17.53**	**17.95**	**7.5%**	**6.703**	**6.874**	**6.973**	**4.0%**	**2.959**	**4.505**	**5.404**	**82.6%**
United Kingdom	14	14	14	0.0%	20	20	20	0.0%	7.89	8.047	8.246	4.5%	7.6	8.602	10	31.6%
Sweden	14	14	14	0.0%	20	20	20	0.0%	7.28	7.49	7.68	5.5%	9.2	10	10	8.7%
Denmark	14	14	14	0.0%	20	20	20	0.0%	7.74	7.918	8.118	4.9%	9.3	10	10	7.5%
Ireland	14	14	14	0.0%	20	20	20	0.0%	7.98	8.207	8.3	4.0%	8	9.782	10	25.0%
Norway	14	14	14	0.0%	20	20	20	0.0%	7.53	7.719	7.69	2.1%	8.6	10	10	16.3%
Finland	14	14	14	0.0%	20	20	20	0.0%	7.62	7.808	8.017	5.2%	9.2	10	10	8.7%
Lithuania	14	14	14	0.0%	20	19.85	19.94	-0.3%	7.38	7.516	7.728	4.7%	5	5.65	6.65	33.0%
Latvia	12	12.87	13.66	13.8%	18	19.08	19.8	10.0%	7.22	7.459	7.678	6.3%	4.3	5.259	6.428	49.5%
Estonia	14	14	14	0.0%	19	19.8	20	5.3%	7.81	8.121	8.385	7.4%	6.5	7.348	8.63	32.8%
Iceland	14	14	14	0.0%	18.13	18.45	18.76	3.5%	7.53	7.71	7.837	4.1%	8.5	10	10	17.6%
Europe-North	**13.95**	**13.98**	**13.99**	**0.3%**	**19.51**	**19.72**	**19.85**	**1.7%**	**7.767**	**7.938**	**8.123**	**4.6%**	**7.827**	**8.862**	**9.852**	**25.9%**
Italy	13	13.58	14	7.7%	20	20	20	0.0%	6.95	7.03	7.16	3.0%	3.9	5.102	6.77	73.6%
Spain	14	14	14	0.0%	20	20	20	0.0%	7.32	7.417	7.569	3.4%	6.1	6.88	8.237	35.0%
Greece	13	13.27	13.7	5.4%	20	19.91	19.95	-0.3%	7.11	7.145	7.248	1.9%	3.5	4.427	5.722	63.5%
Portugal	14	14	14	0.0%	20	20	20	0.0%	7.19	7.257	7.402	2.9%	6	6.368	7.215	20.3%
Serbia	12	13.06	13.82	15.2%	18	19.4	19.95	10.8%	6.47	6.742	6.872	6.2%	3.5	4.484	5.396	54.2%
Croatia	13	13.76	14	7.7%	19	19.77	19.83	4.4%	6.33	6.46	6.596	4.2%	4.1	4.849	5.735	39.9%
Bosnia and Herzegovina	9	10.09	10.7	18.9%	14.32	15.84	16.32	14.0%	6.1	6.456	6.619	8.5%	3.2	4.06	4.622	44.4%
Albania	10	10.99	11.6	16.0%	19	19.35	18.94	-0.3%	7.06	7.398	7.56	7.1%	3.3	4.153	4.753	44.0%
Macedonia, TFYR	10	10.6	11.29	12.9%	19	19.94	20	5.3%	6.4	6.511	6.672	4.2%	4.1	4.518	5.016	22.3%
Slovenia	14	14	14	0.0%	20	19.89	19.94	-0.3%	6.9	7.017	7.126	3.3%	6.4	7.007	7.671	19.9%
Montenegro	11	11.4	11.96	8.7%	19	19.51	19.19	1.0%	6.58	6.631	6.736	2.4%	3.7	4	4.429	19.7%
Malta	14	14	14	0.0%	17.2	18.65	19.07	10.9%	7.54	7.694	7.804	3.5%	5.6	6.352	6.999	25.0%
Europe-South	**13.13**	**13.51**	**13.79**	**5.0%**	**18.79**	**19.36**	**19.43**	**3.4%**	**7.081**	**7.172**	**7.318**	**3.3%**	**4.682**	**5.629**	**6.978**	**49.0%**
Germany	14	14	14	0.0%	20	20	20	0.0%	7.5	7.607	7.789	3.9%	7.9	8.631	10	26.6%
France	14	14	14	0.0%	19	19.17	19.34	1.8%	7.43	7.535	7.769	4.6%	6.8	7.522	9.672	42.2%
Netherlands	14	14	14	0.0%	20	20	20	0.0%	7.56	7.669	7.828	3.5%	8.8	9.343	10	13.6%
Belgium	14	14	14	0.0%	18	18.35	18.68	3.8%	7.18	7.283	7.465	4.0%	7.1	7.944	9.773	37.6%
Switzerland	14	14	14	0.0%	20	20	20	0.0%	8.19	8.306	8.47	3.4%	8.7	9.442	10	14.9%
Austria	14	14	14	0.0%	20	20	20	0.0%	7.67	7.787	7.946	3.6%	7.9	8.736	10	26.6%
Luxembourg	14	14	14	0.0%	19.69	19.67	19.45	-1.2%	7.65	7.773	7.826	2.3%	8.5	10	10	17.6%
Europe-West	**14**	**14**	**14**	**0.0%**	**19.53**	**19.6**	**19.64**	**0.6%**	**7.517**	**7.618**	**7.803**	**3.8%**	**7.601**	**8.308**	**9.863**	**29.8%**

Governance

Base Case

Source: International Futures Model Version 6.61, Jan 2013

	Economic Integration Index				Globalization Index				Gender Empowerment Measure			
	Index Range: 0–100				Index Range: 0–100				Index: 1 = Equality			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
World	**13.59**	**15.93**	**17.28**	**27.2%**	**33.92**	**38.57**	**39.18**	**15.5%**	**0.455**	**0.496**	**0.531**	**16.7%**
Africa	**11.39**	**15.55**	**14.43**	**26.7%**	**43.15**	**47.39**	**44.89**	**4.0%**	**0.327**	**0.364**	**0.418**	**27.8%**
Americas	**9.547**	**13.52**	**16.88**	**76.8%**	**36.95**	**40.15**	**40.76**	**10.3%**	**0.638**	**0.703**	**0.755**	**18.3%**
Asia with Oceania	**9.768**	**12.77**	**15.25**	**56.1%**	**28.65**	**33.34**	**34.39**	**20.0%**	**0.403**	**0.459**	**0.498**	**23.6%**
Europe	**24.72**	**28.73**	**29.08**	**17.6%**	**47.18**	**51.79**	**53.88**	**14.2%**	**0.694**	**0.749**	**0.798**	**15.0%**
World	**13.59**	**15.93**	**17.28**	**27.2%**	**33.92**	**38.57**	**39.18**	**15.5%**	**0.455**	**0.496**	**0.531**	**16.7%**
Africa-Eastern	**7.866**	**11.07**	**11.21**	**42.5%**	**41.35**	**49.3**	**50.6**	**22.4%**	**0.423**	**0.483**	**0.573**	**35.5%**
Africa-Middle	**21.4**	**22.97**	**22.54**	**5.3%**	**39.73**	**47.06**	**47.31**	**19.1%**	**0.246**	**0.273**	**0.305**	**24.0%**
Africa-Northern	**11.7**	**15.31**	**13.42**	**14.7%**	**48.49**	**44.59**	**37.48**	**-22.7%**	**0.285**	**0.329**	**0.37**	**29.8%**
Africa-Southern	**7.628**	**9.897**	**15.01**	**96.8%**	**44.07**	**41.11**	**40.63**	**-7.8%**	**0.672**	**0.763**	**0.87**	**29.5%**
Africa-Western	**14.12**	**19.66**	**15.94**	**12.9%**	**42.61**	**47.69**	**41.13**	**-3.5%**	**0.225**	**0.246**	**0.287**	**27.6%**
Africa	**11.39**	**15.55**	**14.43**	**26.7%**	**43.15**	**47.39**	**44.89**	**4.0%**	**0.327**	**0.364**	**0.418**	**27.8%**
America-Caribbean	**8.111**	**10.25**	**12.72**	**56.8%**	**36.29**	**40.68**	**44.64**	**23.0%**	**0.526**	**0.584**	**0.629**	**19.6%**
America-Central	**14.51**	**16.9**	**18.42**	**26.9%**	**52.08**	**54.24**	**45.37**	**-12.9%**	**0.519**	**0.594**	**0.655**	**26.2%**
America-North	**9.725**	**14.46**	**18**	**85.1%**	**46.49**	**48.83**	**49.61**	**6.7%**	**0.739**	**0.789**	**0.839**	**13.5%**
America-South	**8.206**	**10.2**	**13.86**	**68.9%**	**24.39**	**28.29**	**29.21**	**19.8%**	**0.547**	**0.632**	**0.684**	**25.0%**
Americas	**9.547**	**13.52**	**16.88**	**76.8%**	**36.95**	**40.15**	**40.76**	**10.3%**	**0.638**	**0.703**	**0.755**	**18.3%**
Asia-East	**8.113**	**11.57**	**15.85**	**95.4%**	**23.4**	**29.76**	**38.82**	**65.9%**	**0.536**	**0.625**	**0.703**	**31.2%**
Asia-South Central	**5.723**	**8.417**	**10.88**	**90.1%**	**30.35**	**32.94**	**30.55**	**0.7%**	**0.26**	**0.314**	**0.358**	**37.7%**
Asia-South East	**25.76**	**25.08**	**20.55**	**-20.2%**	**33.09**	**36.41**	**33.9**	**2.4%**	**0.465**	**0.542**	**0.586**	**26.0%**
Asia-West	**13.43**	**19.79**	**24.83**	**84.9%**	**36.22**	**43.03**	**40.2**	**11.0%**	**0.36**	**0.409**	**0.444**	**23.3%**
Oceania	**12.27**	**17.06**	**21.64**	**76.4%**	**54.3**	**59.14**	**57.81**	**6.5%**	**0.713**	**0.743**	**0.772**	**8.3%**
Asia with Oceania	**9.768**	**12.77**	**15.25**	**56.1%**	**28.65**	**33.34**	**34.39**	**20.0%**	**0.403**	**0.459**	**0.498**	**23.6%**
Europe-East	**18.79**	**24.65**	**26.42**	**40.6%**	**32.4**	**35.45**	**35.81**	**10.5%**	**0.551**	**0.61**	**0.634**	**15.1%**
Europe-North	**32.07**	**35.55**	**34.7**	**8.2%**	**66.25**	**70.19**	**70.5**	**6.4%**	**0.806**	**0.863**	**0.92**	**14.1%**
Europe-South	**13.67**	**17.48**	**19.36**	**41.6%**	**42.52**	**48.61**	**51.31**	**20.7%**	**0.734**	**0.767**	**0.804**	**9.5%**
Europe-West	**26.78**	**30.77**	**30.3**	**13.1%**	**63.25**	**65.47**	**67.01**	**5.9%**	**0.825**	**0.864**	**0.925**	**12.1%**
Europe	**24.72**	**28.73**	**29.08**	**17.6%**	**47.18**	**51.79**	**53.88**	**14.2%**	**0.694**	**0.749**	**0.798**	**15.0%**

Governance

Base Case: Countries in Descending Year 2060 Population Sequence	Economic Integration Index				Globalization Index				Gender Empowerment Measure			
	Index Range: 0–100				Index Range: 0–100				Index: 1 = Equality			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA												
Ethiopia	3.696	6.589	7.798	111.0%	46.45	47.86	51.07	9.9%	0.464	0.575	0.691	48.9%
Tanzania, United Rep. of	7.436	11.48	12.43	67.2%	36.41	47.92	54.98	51.0%	0.539	0.575	0.716	32.8%
Uganda	8.726	10.83	10.66	22.2%	50.3	61.06	54.67	8.7%	0.591	0.644	0.773	30.8%
Kenya	4.676	9.778	10.46	123.7%	35.84	47.14	45.91	28.1%	0.287	0.321	0.36	25.4%
Madagascar	14.46	20.39	27.48	90.0%	39.87	50.28	52.94	32.8%	0.398	0.438	0.469	17.8%
Mozambique	12.42	12.45	13.86	11.6%	46.74	49.22	52.87	13.1%	0.35	0.391	0.496	41.7%
Malawi	7.079	15.96	13.39	89.2%	36.73	48.67	49.09	33.7%	0.255	0.27	0.316	23.9%
Zambia	17.76	21.38	16.07	-9.5%	40.09	51.58	51.97	29.6%	0.426	0.454	0.534	25.4%
Somalia	3.223	11.74	8.792	172.8%	14.22	26.11	19.61	37.9%	0.277	0.28	0.335	20.9%
Rwanda	2.455	9.396	11.45	366.4%	34.68	46.83	50.29	45.0%	0.283	0.32	0.373	31.8%
Zimbabwe	10.9	17.33	17	56.0%	43.39	52.41	51.92	19.7%	0.398	0.496	0.555	39.4%
Burundi	3.888	9.433	13.25	240.8%	37.48	46.84	48.26	28.8%	0.337	0.417	0.439	30.3%
Eritrea	8.975	13.42	14.15	57.7%	40.99	48.49	49.64	21.1%	0.404	0.469	0.557	37.9%
Comoros	4.586	9.14	18.68	307.3%	49.62	54.6	52.54	5.9%	0.283	0.306	0.335	18.4%
Djibouti	19.09	19.93	18.81	-1.5%	41.08	51.27	52.3	27.3%	0.295	0.347	0.378	28.1%
Mauritius	12.46	15.11	18.2	46.1%	65.5	56.85	41.05	-37.3%	0.538	0.611	0.646	20.1%
Africa-Eastern	**7.866**	**11.07**	**11.21**	**42.5%**	**41.35**	**49.3**	**50.6**	**22.4%**	**0.423**	**0.483**	**0.573**	**35.5%**
Congo, Democratic Rep. of	12.76	19.51	19.33	51.5%	40.06	49.29	50.41	25.8%	0.201	0.222	0.247	22.9%
Angola	28.15	22.97	22.66	-19.5%	36.7	31.99	32.29	-12.0%	0.278	0.328	0.393	41.4%
Cameroon	5.814	8.898	14.22	144.6%	36.74	47.55	42.32	15.2%	0.339	0.376	0.417	23.0%
Chad	23.75	27.42	27.12	14.2%	42.43	52.77	53.87	27.0%	0.284	0.307	0.342	20.4%
Central African Rep.	4.86	9.812	11.04	127.2%	37.69	46.27	47.89	27.1%	0.205	0.233	0.257	25.4%
Congo, Rep. of	43	40.39	32.4	-24.7%	53.09	61.11	61.55	15.9%	0.206	0.232	0.274	33.0%
Gabon	13.62	17.4	27.35	100.8%	52.8	50.53	48.37	-8.4%	0.42	0.487	0.54	28.6%
Equatorial Guinea	32.44	31.53	28.14	-13.3%	43.47	51.52	43.46	-0.0%	0.579	0.656	0.681	17.6%
São Tomé and Príncipe	21.38	23	21.84	2.2%	44.54	52.12	52.49	17.8%	0.29	0.363	0.406	40.0%
Africa-Middle	**21.4**	**22.97**	**22.54**	**5.3%**	**39.73**	**47.06**	**47.31**	**19.1%**	**0.246**	**0.273**	**0.305**	**24.0%**
Egypt, Arab Rep.	10.47	11.69	13	24.2%	60.55	43.67	34.42	-43.2%	0.287	0.33	0.37	28.9%
Sudan	11.29	9.641	12.16	7.7%	37.9	48.72	48.39	27.7%	0.219	0.254	0.317	44.7%
Algeria	12.31	17.44	11.12	-9.7%	30.05	29.14	23.81	-20.8%	0.315	0.373	0.403	27.9%
Morocco	8.522	11.06	12.71	49.1%	54.54	56.17	40.82	-25.2%	0.318	0.381	0.419	31.8%
Tunisia	15.25	17.51	18.73	22.8%	57.84	55.49	40.03	-30.8%	0.254	0.297	0.324	27.6%
Libya	16.35	33.22	23.28	42.4%	17.72	35.06	29	63.7%	0.434	0.499	0.535	23.3%
Africa-Northern	**11.7**	**15.31**	**13.42**	**14.7%**	**48.49**	**44.59**	**37.48**	**-22.7%**	**0.285**	**0.329**	**0.37**	**29.8%**

Governance

Base Case: Countries in Descending Year 2060 Population Sequence	Economic Integration Index (Index Range: 0–100)				Globalization Index (Index Range: 0–100)				Gender Empowerment Measure (Index: 1 = Equality)			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AFRICA continued												
South Africa	6.829	8.965	14.69	115.1%	42.52	37.09	38.64	-9.1%	0.687	0.777	0.888	29.3%
Namibia	12.32	10.87	12.85	4.3%	42.26	53.15	40.26	-4.7%	0.62	0.727	0.828	33.5%
Lesotho	38.64	37.4	29.03	-24.9%	60.83	70.3	68.83	13.2%	0.591	0.712	0.806	36.4%
Botswana	14.6	17.89	20.46	40.1%	59.83	65.25	50.53	-15.5%	0.55	0.674	0.757	37.6%
Swaziland	23.49	24.63	21.25	-9.5%	56.72	67.97	47.37	-16.5%	0.492	0.601	0.681	38.4%
Africa-Southern	**7.628**	**9.897**	**15.01**	**96.8%**	**44.07**	**41.11**	**40.63**	**-7.8%**	**0.672**	**0.763**	**0.87**	**29.5%**
Nigeria	16.76	21.36	16.15	-3.6%	40.37	42.17	29.33	-27.3%	0.198	0.217	0.259	30.8%
Niger	11.78	20.46	23.57	100.1%	48.79	52.93	52.52	7.6%	0.279	0.267	0.304	9.0%
Côte d'Ivoire	9.836	14.97	18.75	90.6%	37.58	48.82	45.59	21.3%	0.157	0.177	0.2	27.4%
Burkina Faso	5.99	13.78	11.24	87.6%	40.7	49.56	48.91	20.2%	0.28	0.317	0.36	28.6%
Ghana	9.344	11.28	11.87	27.0%	42.92	49.28	51.73	20.5%	0.313	0.344	0.401	28.1%
Mali	8.291	15.51	14.58	75.9%	50.06	58.55	54.55	9.0%	0.237	0.261	0.306	29.1%
Senegal	7.636	10.52	12.98	70.0%	37.51	47.59	49.26	31.3%	0.265	0.298	0.329	24.2%
Guinea	10.34	17.54	15.17	46.7%	50.51	59.11	53.07	5.1%	0.25	0.272	0.309	23.6%
Benin	7.438	15.19	21.29	186.2%	50.09	58.63	54.81	9.4%	0.271	0.295	0.336	24.0%
Togo	11.68	16.11	22.13	89.5%	53.1	62.18	64.27	21.0%	0.182	0.212	0.227	24.7%
Sierra Leone	4.046	6.622	9.424	132.9%	48.39	55.37	50.74	4.9%	0.28	0.298	0.353	26.1%
Liberia	42.54	41.25	40.16	-5.6%	61.46	63.12	59.67	-2.9%	0.276	0.296	0.343	24.3%
Mauritania	23.87	22.92	20.35	-14.7%	43.21	53.96	52.3	21.0%	0.163	0.182	0.197	20.9%
Gambia	16.49	17.17	15.54	-5.8%	43.03	49.78	50.58	17.5%	0.315	0.368	0.426	35.2%
Guinea-Bissau	8.327	10.61	13.41	61.0%	49.94	59.74	61.24	22.6%	0.327	0.361	0.388	18.7%
Cape Verde	17.81	16.55	18.54	4.1%	59.25	66.66	69.53	17.4%	0.309	0.404	0.449	45.3%
Africa-Western	**14.12**	**19.66**	**15.94**	**12.9%**	**42.61**	**47.69**	**41.13**	**-3.5%**	**0.225**	**0.246**	**0.287**	**27.6%**

Governance

Base Case: Countries in Descending Year 2060 Population Sequence	Economic Integration Index				Globalization Index				Gender Empowerment Measure			
	Index Range: 0–100				Index Range: 0–100				Index: 1 = Equality			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
AMERICAS												
Haiti	3.899	7.997	12.67	225.0%	48.49	59.11	61.74	27.3%	0.349	0.422	0.468	34.1%
Dominican Rep.	9.617	10.8	15.37	59.8%	47.97	41.65	43.48	-9.4%	0.55	0.64	0.729	32.5%
Cuba	0.063	1.703	5.347	8387.3%	15.5	18.24	23.1	49.0%	0.676	0.739	0.79	16.9%
Puerto Rico	4.248	8.107	12.6	196.6%	14.35	22.74	30.53	112.8%	0.387	0.437	0.48	24.0%
Jamaica	23.08	24.28	23.11	0.1%	59.69	50.23	40.99	-31.3%	0.526	0.569	0.606	15.2%
Trinidad and Tobago	31.77	33.92	28.66	-9.8%	28.25	43.31	40.76	44.3%	0.801	0.95	0.981	22.5%
Bahamas	21.22	24.3	25.25	19.0%	56.95	41.17	39.29	-31.0%	0.73	0.794	0.823	12.7%
Barbados	17.6	19.88	21.4	21.6%	63.24	48.48	46.3	-26.8%	0.632	0.685	0.713	12.8%
Saint Lucia	39.73	37.61	33.19	-16.5%	66.34	65.06	47.53	-28.4%	0.591	0.695	0.748	26.6%
Grenada	36.1	33.58	30.96	-14.2%	58.15	60.49	55.49	-4.6%	0.352	0.429	0.469	33.2%
Saint Vincent and the Grenadines	37.15	35.28	32.07	-13.7%	55.21	61.42	60.35	9.3%	0.359	0.41	0.439	22.3%
America-Caribbean	**8.111**	**10.25**	**12.72**	**56.8%**	**36.29**	**40.68**	**44.64**	**23.0%**	**0.526**	**0.584**	**0.629**	**19.6%**
Guatemala	6.883	9.365	11.68	69.7%	53.48	51.47	37.47	-29.9%	0.39	0.448	0.526	34.9%
Honduras	18.32	20.68	19.13	4.4%	56.84	66.34	55.87	-1.7%	0.589	0.689	0.76	29.0%
Nicaragua	20.25	21.12	19.8	-2.2%	55.89	65.23	65.47	17.1%	0.542	0.65	0.722	33.2%
El Salvador	7.337	9.844	11.89	62.1%	56	51.36	40.29	-28.1%	0.539	0.639	0.696	29.1%
Costa Rica	15.89	16.6	17.58	10.6%	50.04	43.01	40.89	-18.3%	0.685	0.806	0.86	25.5%
Panama	24.03	25.3	31.51	31.1%	24.54	35.1	42.69	74.0%	0.604	0.691	0.771	27.6%
Belize	24.25	24.66	24.77	2.1%	61.42	69.83	47.32	-23.0%	0.507	0.593	0.665	31.2%
America-Central	**14.51**	**16.9**	**18.42**	**26.9%**	**52.08**	**54.24**	**45.37**	**-12.9%**	**0.519**	**0.594**	**0.655**	**26.2%**
United States of America	8.79	13.68	17.88	103.4%	51.56	51.42	51.84	0.5%	0.767	0.81	0.858	11.9%
Mexico	11.05	12.95	12.45	12.7%	25.75	36.41	37.62	46.1%	0.629	0.699	0.754	19.9%
Canada	21.2	25.09	24.89	17.4%	66.32	65.83	65.61	-1.1%	0.83	0.886	0.923	11.2%
America-North	**9.725**	**14.46**	**18**	**85.1%**	**46.49**	**48.83**	**49.61**	**6.7%**	**0.739**	**0.789**	**0.839**	**13.5%**
Brazil	5.742	7.326	10.36	80.4%	12.59	22.35	25.56	103.0%	0.504	0.591	0.63	25.0%
Colombia	10.72	12.61	11.08	3.4%	47.6	33.41	27.3	-42.6%	0.508	0.579	0.624	22.8%
Argentina	7.354	10.27	14.12	92.0%	20.3	30.38	35.46	74.7%	0.699	0.788	0.855	22.3%
Peru	8.861	8.876	10.99	24.0%	34.84	29.25	28.11	-19.3%	0.64	0.744	0.809	26.4%
Venezuela (Bolivarian Rep. of)	9.385	14.55	27.99	198.2%	36.14	32.34	39.58	9.5%	0.581	0.668	0.762	31.2%
Ecuador	10.92	12.22	11.77	7.8%	34.75	26.84	21.97	-36.8%	0.622	0.706	0.758	21.9%
Chile	24.71	25.12	23.68	-4.2%	26.93	31.63	31.35	16.4%	0.526	0.595	0.618	17.5%
Bolivia (Plurinational State of)	16.39	20.25	13.19	-19.5%	56.33	66.94	48.14	-14.5%	0.511	0.571	0.642	25.6%
Paraguay	10.85	11.67	12.59	16.0%	53.27	40.33	26.98	-49.4%	0.51	0.584	0.643	26.1%
Uruguay	8.47	10.87	15.44	82.3%	29.25	29.75	35.29	20.6%	0.551	0.608	0.663	20.3%
Guyana	27.91	24.81	26.47	-5.2%	66.36	68.8	70.33	6.0%	0.59	0.681	0.726	23.1%
Suriname	3.861	6.129	12.66	227.9%	42.82	53.36	47.58	11.1%	0.56	0.639	0.708	26.4%
America-South	**8.206**	**10.2**	**13.86**	**68.9%**	**24.39**	**28.29**	**29.21**	**19.8%**	**0.547**	**0.632**	**0.684**	**25.0%**

Governance

Base Case: Countries in Descending Year 2060 Population Sequence	Economic Integration Index Index Range: 0–100				Globalization Index Index Range: 0–100				Gender Empowerment Measure Index: 1 = Equality			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA												
China	8.364	10.18	15.23	82.1%	20.69	27.94	38.34	85.3%	0.533	0.628	0.713	33.8%
Japan	3.264	7.86	14.2	335.0%	33.35	43.52	45.61	36.8%	0.567	0.607	0.654	15.3%
Korea, Rep. of	9.955	14.82	19.44	95.3%	53.93	44.8	44.55	-17.4%	0.554	0.631	0.675	21.8%
Korea, Dem. People's Rep. of	3.253	4.474	9.134	180.8%	4.978	12.17	14.32	187.7%	0.38	0.423	0.438	15.3%
Taiwan, China	6.41	11.76	16.55	158.2%	53.34	36.4	37.78	-29.2%	0.613	0.672	0.694	13.2%
Hong Kong SAR, China	100	106.8	85.15	-14.9%	99.75	82.12	74.2	-25.6%	0.722	0.813	0.813	12.6%
Mongolia	23.78	26.56	33.96	42.8%	58.19	64.5	64.37	10.6%	0.41	0.47	0.524	27.8%
Asia-East	**8.113**	**11.57**	**15.85**	**95.4%**	**23.4**	**29.76**	**38.82**	**65.9%**	**0.536**	**0.625**	**0.703**	**31.2%**
India	4.289	6.712	10.44	143.4%	25.59	26.34	28.45	11.2%	0.226	0.271	0.319	41.2%
Pakistan	3.335	6.37	7.648	129.3%	35.65	39.79	23.32	-34.6%	0.386	0.459	0.508	31.6%
Bangladesh	2.066	4.855	4.693	127.2%	47.84	57.85	38.84	-18.8%	0.264	0.322	0.353	33.7%
Afghanistan	4.764	11.2	9.124	91.5%	38.16	47.49	48.52	27.1%	0.111	0.127	0.143	28.8%
Iran, Islamic Rep. of	10.68	22.31	25.14	135.4%	28.18	28.38	28.82	2.3%	0.331	0.423	0.452	36.6%
Nepal	1.192	7.33	10.51	781.7%	48.44	59.66	61.54	27.0%	0.486	0.595	0.661	36.0%
Uzbekistan	9.963	11.44	11.08	11.2%	39.87	28.42	22.35	-43.9%	0.301	0.375	0.422	40.2%
Sri Lanka	5.016	7.334	9.349	86.4%	55.4	62.3	43.41	-21.6%	0.389	0.419	0.457	17.5%
Kazakhstan	27.91	27.69	37.28	33.6%	35.46	36.76	36.87	4.0%	0.532	0.58	0.63	18.4%
Tajikistan	12.99	14.58	18.4	41.6%	53.37	62.83	64.94	21.7%	0.292	0.339	0.368	26.0%
Kyrgyz Rep.	19.12	20.25	21.77	13.9%	60.24	65.06	66.2	9.9%	0.575	0.642	0.705	22.6%
Turkmenistan	24.37	30.86	37.36	53.3%	24.68	42.35	43.1	74.6%	0.347	0.487	0.522	50.4%
Bhutan	9.563	13.65	14.37	50.3%	38.46	53.49	59.06	53.6%	0.325	0.42	0.474	45.8%
Maldives	19.68	19.18	20.09	2.1%	47.68	54.84	40.82	-14.4%	0.429	0.572	0.609	42.0%
Asia-South Central	**5.723**	**8.417**	**10.88**	**90.1%**	**30.35**	**32.94**	**30.55**	**0.7%**	**0.26**	**0.314**	**0.358**	**37.7%**
Indonesia	5.839	9.408	9.096	55.8%	31.46	30.46	28.57	-9.2%	0.408	0.479	0.51	25.0%
Philippines	8.045	9.928	11.53	43.3%	33.07	33.54	33.73	2.0%	0.56	0.631	0.7	25.0%
Vietnam	24.41	24.22	22.14	-9.3%	66.12	69.01	52.7	-20.3%	0.554	0.66	0.702	26.7%
Thailand	18.93	21.52	20.78	9.8%	11.41	23.7	26.22	129.8%	0.514	0.57	0.598	16.3%
Myanmar	0	9.587	3.025		0	13.16	13.76		0.284	0.33	0.351	23.6%
Malaysia	28.7	32.35	29.26	2.0%	34.66	35.99	37.77	9.0%	0.542	0.616	0.679	25.3%
Cambodia	18.09	19.32	20.27	12.1%	54.04	56.52	56.23	4.1%	0.427	0.544	0.606	41.9%
Lao People's Democratic Rep.	10.57	15.67	13.71	29.7%	41.39	51.44	55.27	33.5%	0.295	0.387	0.444	50.5%
Singapore	81.09	89.71	80.92	-0.2%	67.51	75.32	70.66	4.7%	0.786	0.956	0.998	27.0%
Timor-Leste	13.02	17.54	16.18	24.3%	40.49	49.1	50.45	24.6%	0.279	0.349	0.397	42.3%
Brunei Darussalam	16.09	25.51	26.93	67.4%	60.01	54.55	53.48	-10.9%	0.768	0.878	0.897	16.8%
Asia-South Eastern	**25.76**	**25.08**	**20.55**	**-20.2%**	**33.09**	**36.41**	**33.9**	**2.4%**	**0.465**	**0.542**	**0.586**	**26.0%**

Governance

Base Case: Countries in Descending Year 2060 Population Sequence	Economic Integration Index Index Range: 0–100				Globalization Index Index Range: 0–100				Gender Empowerment Measure Index: 1 = Equality			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
ASIA with OCEANIA continued												
Turkey	4.73	8.016	11	132.6%	22.46	26.18	28.2	25.6%	0.379	0.44	0.479	26.4%
Iraq	7.105	17.22	21.74	206.0%	42.03	52.55	57.05	35.7%	0.386	0.433	0.508	31.6%
Yemen, Rep. of	7.931	9.326	13.01	64.0%	54.7	56.88	30.52	-44.2%	0.135	0.169	0.199	47.4%
Saudi Arabia	18.96	24.92	36.73	93.7%	25.85	48.48	53.85	108.3%	0.299	0.347	0.372	24.4%
Syrian Arab Rep.	6.897	9.047	9.878	43.2%	43.72	25.88	21.93	-49.8%	0.415	0.5	0.567	36.6%
Jordan	24.41	22.86	21.87	-10.4%	46.04	55.08	45.12	-2.0%	0.23	0.265	0.303	31.7%
Israel	16.86	20.34	25.71	52.5%	43.63	52.71	50.66	16.1%	0.705	0.774	0.886	25.7%
Palestine	15.45	19.85	17.87	15.7%	25.37	30.74	25.9	2.1%	0.302	0.352	0.393	30.1%
Azerbaijan	22.84	29.65	33.98	48.8%	60.96	47.71	40.04	-34.3%	0.385	0.438	0.477	23.9%
United Arab Emirates	17.36	26.37	41.53	139.2%	36.84	54.99	59.3	61.0%	0.691	0.929	0.976	41.2%
Kuwait	15.55	27.4	39.78	155.8%	28.73	55.1	58.71	104.4%	0.241	0.327	0.332	37.8%
Lebanon	20.26	19.98	23.93	18.1%	65.55	74.69	59.38	-9.4%	0.212	0.251	0.267	25.9%
Oman	16.69	18.01	19.92	19.4%	38.38	51.82	45.97	19.8%	0.453	0.6	0.622	37.3%
Armenia	13.35	15.58	15.01	12.4%	45.95	53.31	44.68	-2.8%	0.412	0.454	0.481	16.7%
Georgia	18.69	19.03	18.63	-0.3%	58.67	67.36	68.04	16.0%	0.408	0.451	0.472	15.7%
Qatar	11.99	35.92	53.88	349.4%	25.32	58.29	63.51	150.8%	0.445	0.736	0.72	61.8%
Bahrain	33.61	34.3	30.74	-8.5%	33.67	55.38	54.38	61.5%	0.605	0.7	0.721	19.2%
Cyprus	34.15	35.09	34.02	-0.4%	40.99	42.71	40.66	-0.8%	0.603	0.674	0.695	15.3%
Asia-West	**13.43**	**19.79**	**24.83**	**84.9%**	**36.22**	**43.03**	**40.2**	**11.0%**	**0.36**	**0.409**	**0.444**	**23.3%**
Australia	11.84	16.88	22.11	86.7%	58.42	63.35	63.32	8.4%	0.87	0.95	1	14.9%
Papua New Guinea	17.4	23.54	12.57	-27.8%	41.84	53.49	47.63	13.8%	0.228	0.253	0.289	26.8%
New Zealand	15.08	17.21	20.69	37.2%	51.38	46.79	54.58	6.2%	0.841	0.884	0.968	15.1%
Solomon Islands	24.9	23.93	23.18	-6.9%	56.17	60.24	56.84	1.2%	0.298	0.331	0.359	20.5%
Fiji	25.72	26.13	24.16	-6.1%	62.34	68.72	47.14	-24.4%	0.381	0.409	0.445	16.8%
Vanuatu	29.54	28.7	25.86	-12.5%	54.11	60.2	58.9	8.9%	0.316	0.357	0.394	24.7%
Micronesia (Federated States of)	3.463	7.323	10.04	189.9%	41.55	47.93	49.43	19.0%	0.302	0.379	0.406	34.4%
Tonga	8.613	11.07	13.59	57.8%	48.98	51.27	52.72	7.6%	0.363	0.382	0.412	13.5%
Samoa	10.42	11.56	13.4	28.6%	58.02	64.74	66.77	15.1%	0.431	0.466	0.518	20.2%
Oceania	**12.27**	**17.06**	**21.64**	**76.4%**	**54.3**	**59.14**	**57.81**	**6.5%**	**0.713**	**0.743**	**0.772**	**8.3%**

Governance

Base Case: Countries in Descending Year 2060 Population Sequence	Economic Integration Index				Globalization Index				Gender Empowerment Measure			
	Index Range: 0–100				Index Range: 0–100				Index: 1 = Equality			
	2010	2035	2060	% Chg	2010	2035	2060	% Chg	2010	2035	2060	% Chg
EUROPE												
Russian Federation	17.44	27.39	30.67	75.9%	29.4	33.64	34.82	18.4%	0.556	0.621	0.642	15.5%
Ukraine	16.91	21.77	24.37	44.1%	43.13	31.77	27.63	-35.9%	0.461	0.494	0.51	10.6%
Poland	13.03	16.25	18.5	42.0%	29.55	39.26	39.16	32.5%	0.631	0.708	0.746	18.2%
Romania	12.74	13.82	16.16	26.8%	26.51	35.15	37.09	39.9%	0.512	0.548	0.57	11.3%
Czech Rep.	23.74	26.86	24.93	5.0%	21.71	38.29	41.65	91.8%	0.664	0.693	0.717	8.0%
Belarus	11.49	16.99	22.71	97.7%	39.1	33.8	40.75	4.2%	0.411	0.456	0.484	17.8%
Hungary	52.61	52.44	42.68	-18.9%	44.28	48.23	44.06	-0.5%	0.59	0.628	0.653	10.7%
Bulgaria	31.53	32.08	31.5	-0.1%	36.84	42.52	44.02	19.5%	0.613	0.642	0.666	8.6%
Slovak Rep.	18.53	22.73	22.26	20.1%	30.57	36.94	35.15	15.0%	0.663	0.737	0.767	15.7%
Moldova, Rep. of	19.92	20.76	19.51	-2.1%	53.37	53.85	52.39	-1.8%	0.547	0.611	0.638	16.6%
Europe-East	**18.79**	**24.65**	**26.42**	**40.6%**	**32.4**	**35.45**	**35.81**	**10.5%**	**0.551**	**0.61**	**0.634**	**15.1%**
United Kingdom	32.83	35.66	33.58	2.3%	65.97	69.56	69.54	5.4%	0.79	0.839	0.91	15.2%
Sweden	38.46	41.53	40.3	4.8%	89.1	85.35	83	-6.8%	0.909	0.986	1	10.0%
Denmark	26.77	30.37	33.48	25.1%	78.73	80.73	81.1	3.0%	0.896	0.949	1	11.6%
Ireland	42.74	47	47.34	10.8%	62.08	71.06	70.75	14.0%	0.722	0.789	0.832	15.2%
Norway	21.05	28.22	32.11	52.5%	73.38	79.36	80	9.0%	0.906	0.989	0.987	8.9%
Finland	23.25	26.92	28.53	22.7%	56.18	64.15	66.18	17.8%	0.902	0.966	1	10.9%
Lithuania	17.53	19.78	21.43	22.2%	29.21	36.85	39.07	33.8%	0.628	0.679	0.718	14.3%
Latvia	17.63	19.71	20.84	18.2%	30.28	40.34	44.05	45.5%	0.648	0.695	0.736	13.6%
Estonia	37.96	38.05	36.09	-4.9%	48.07	45.81	46.71	-2.8%	0.665	0.711	0.766	15.2%
Iceland	48.93	52.18	52.05	6.4%	66.63	52.78	50.41	-24.3%	0.859	0.963	1	16.4%
Europe-North	**32.07**	**35.55**	**34.7**	**8.2%**	**66.25**	**70.19**	**70.5**	**6.4%**	**0.806**	**0.863**	**0.92**	**14.1%**
Italy	9.094	13.01	15.75	73.2%	31.86	38.78	44.42	39.4%	0.741	0.766	0.799	7.8%
Spain	21.6	24.47	24.38	12.9%	46.62	56.72	63.84	36.9%	0.835	0.869	0.919	10.1%
Greece	6.459	10.05	14.49	124.3%	33.47	41.04	45.98	37.4%	0.677	0.694	0.715	5.6%
Portugal	16.23	19.5	19.5	20.1%	55.31	48.92	46.49	-15.9%	0.753	0.792	0.827	9.8%
Serbia	17.81	19.44	23.76	33.4%	77.47	72.93	52.97	-31.6%	0.621	0.681	0.712	14.7%
Croatia	16.83	18.87	19.97	18.7%	43.1	33.12	31.1	-27.8%	0.618	0.654	0.679	9.9%
Bosnia and Herzegovina	14.78	15.6	15.46	4.6%	62.46	69.92	53.14	-14.9%	0.35	0.397	0.413	18.0%
Albania	14.05	15.16	18.81	33.9%	55.65	69.18	55.14	-0.9%	0.354	0.417	0.438	23.7%
Macedonia, TFYR	16.76	18.51	18.48	10.3%	68.04	68.74	46.94	-31.0%	0.641	0.709	0.739	15.3%
Slovenia	15.46	20.4	20.68	33.8%	34.4	38.95	40.9	18.9%	0.641	0.68	0.707	10.3%
Montenegro	24.09	27.71	21.48	-10.8%	61.19	59.35	36.88	-39.7%	0.485	0.516	0.535	10.3%
Malta	40.12	41.09	42.08	4.9%	45.53	42.81	43.09	-5.4%	0.531	0.584	0.607	14.3%
Europe-South	**13.67**	**17.48**	**19.36**	**41.6%**	**42.52**	**48.61**	**51.31**	**20.7%**	**0.734**	**0.767**	**0.804**	**9.5%**
Germany	17.3	21.8	24.5	41.6%	60.13	61.44	63.67	5.9%	0.852	0.897	0.954	12.0%
France	21.88	25.23	25.53	16.7%	58.53	61.35	64.06	9.4%	0.779	0.811	0.883	13.4%
Netherlands	54.27	56.14	47.62	-12.3%	88.66	88.65	85.9	-3.1%	0.882	0.924	0.971	10.1%
Belgium	62.14	63.38	54.07	-13.0%	77.36	81.12	79.59	2.9%	0.874	0.907	0.969	10.9%
Switzerland	39.36	43.46	40.34	2.5%	67.65	68.3	65.06	-3.8%	0.822	0.88	0.939	14.2%
Austria	27.36	31.93	32.62	19.2%	53.95	59.9	59.25	9.8%	0.744	0.805	0.859	15.5%
Luxembourg	88.39	94.27	90.82	2.7%	100	107.1	105	5.0%	0.542	0.59	0.612	12.9%
Europe-West	**26.78**	**30.77**	**30.3**	**13.1%**	**63.25**	**65.47**	**67.01**	**5.9%**	**0.825**	**0.864**	**0.925**	**12.1%**

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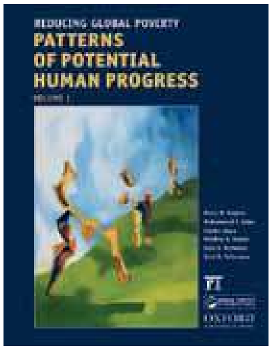
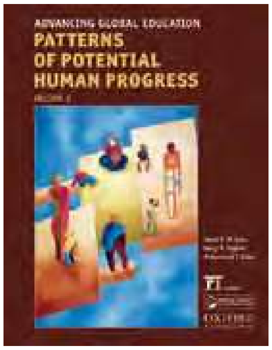
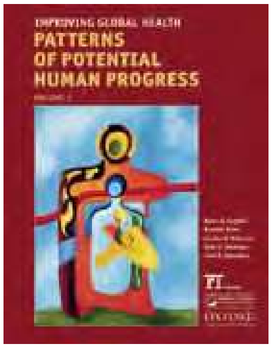
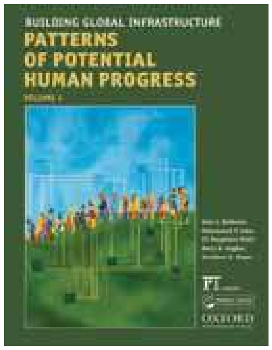
Patterns of Potential Human Progress









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BUILDING GLOBAL INFRASTRUCTURE : FORECASTING THE NEXT 50 YEARS

Dale S. Rothman, Mohammod T. Irfan, Eli Margolese-Malin,
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"This study provides an extensive and immensely valuable review of literature on, data about, and future prospects for the development of infrastructure over the 21st century. It is likely to provide a standard reference point for anyone wishing to update or extend it in the future."

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Barry B. Hughes, series editor, is Director of the Frederick S. Pardee Center for International Futures and Professor at the University of Denver's Josef Korbel School of International Studies. He is coauthor of numerous books and founder of the International Futures computer model accessible at www.ifs.du.edu.

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