

## THE BOTTOM LINE

Some 4.3 million deaths each year in the developing world are traceable to household air pollution caused by the inefficient use of solid fuels for household cooking and other purposes. Although 1.6 billion people gained access to nonsolid fuels between 1990 and 2010, reliance on solid fuels expanded in Sub-Saharan Africa and Southern Asia. Future efforts to increase access to nonsolid fuels could focus on 20 countries that account for 85 percent of the global deficit.



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# Tracking Access to Nonsolid Fuel for Cooking

## Why is this issue important?

### Traditional home cooking practices are a major health risk across the developing world

The World Health Organization estimates that in 2012 about 4.3 million deaths occurred because of exposure to household air pollution caused by smoke from the incomplete combustion of fuels such as wood, coal, and kerosene. Inefficient energy use in the home also poses substantial risks to safety, causing burns and injuries across the developing world.

Achieving universal access to modern energy services, including cooking fuel, is one of the three complementary objectives of the Sustainable Energy for All (SE4ALL) initiative. Formally launched in the UN General Assembly in September 2012 and co-chaired by the president of the World Bank Group and the UN Secretary-General, SE4ALL calls governments, businesses, and civil society to address urgent energy challenges by 2030 (SE4ALL 2012).

To support the achievement of these goals, a starting point must be set, indicators developed, and a framework established to track those indicators until 2030. The World Bank and International Energy Agency have led a consortium of 15 international agencies to produce data on access to nonsolid fuel for the SE4ALL Global Tracking Framework. Launched in 2013, the framework defines access to modern cooking solutions as the use of nonsolid fuels for the primary method of cooking. Nonsolid fuels include (i) liquid fuels (for example, kerosene, ethanol, or other biofuels), (ii) gaseous fuels (such as natural gas, LPG, and biogas), and (iii) electricity. These are in contrast to solid fuels such as (i) traditional biomass (wood, charcoal, agricultural residues, and dung), (ii) processed biomass (pellets, briquettes); and (iii) other solid fuels (such as coal and lignite). The measurement of access to nonsolid fuels is underpinned by several databases, including the WHO Global Household Energy Database (box 1).

### Box 1. Assembling the data on access to modern cooking fuels

To arrive at the figures quoted here, various household data sources were leveraged to establish a historical series of data on primary fuel use between 1990 and 2010. For the WHO Global Household Energy Database, data were collected from nationally representative household surveys as well as Demographic and Health Surveys (DHS) and Living Standards Measurement Surveys (LSMS), Multi-Indicator Cluster Surveys (MICS), and the World Health Survey (WHS). Surveys such as the DHS and the LSMS/income-expenditure surveys are typically conducted every 3–4 years, while most censuses are held every 10 years. Given the infrequency and the regional distribution of some surveys, some countries have gaps in available data. A mixed model was used to obtain a set of annual access rates to nonsolid fuel for each country between

1990 and 2010 (Bonjour and others 2012). This model derived solid fuel use estimates for 193 countries. For cooking solutions, data are primarily from the DHS, national censuses or national household surveys, and MICS.

The mixed model used here was developed by the WHO to track progress toward the United Nations Millennium Development Goals—to gauge, for example, the rates of child malnutrition and access to water and sanitation access—and for WHO reporting on household solid fuel use. This model accounts for regions, countries, and time as spline functions only. Spline function estimates are restricted to values ranging from zero to one.

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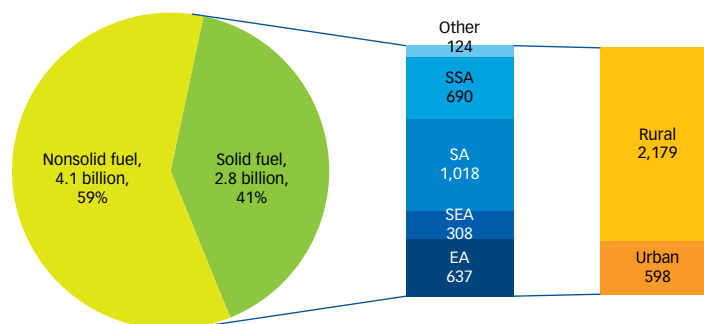
### What is the current level of access?

#### The global rate of access—at 59 percent—masks stark differences between regions

The share of the global population using primarily nonsolid fuels for cooking was 59 percent in 2010; the other 2.8 billion people on the planet still relied mainly on solid fuels. About 78 percent of that population lived in rural areas, and 96 percent was geographically concentrated in Sub-Saharan Africa, Eastern Asia, Southern Asia, and Southeastern Asia (figure 1).

Within the developing world, the rate of access to nonsolid fuel varies from 19 percent in Sub-Saharan Africa to about 95 percent in Western Asia and 100 percent in Northern Africa. Except in Western Asia, the Caucasus and Central Asia, and Northern Africa, more than two-thirds of the rural population in the developing world depends on solid fuels. The situation is particularly stark in Sub-Saharan Africa (94 percent), Oceania (79 percent), Southeastern Asia (77 percent), and Southern Asia (73 percent). These four regions together account for three-quarters of the total rural use of solid fuel in the world. In urban areas, more than 70 percent of the population has access to nonsolid fuels, except in Sub-Saharan Africa, where the rate is just 42 percent.

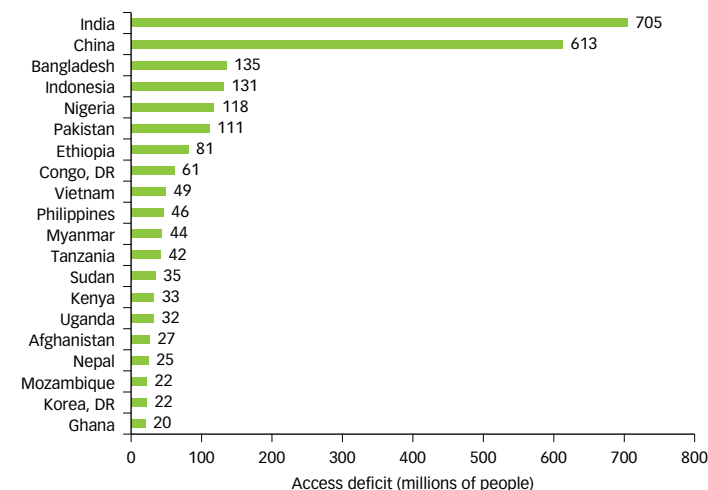
**Figure 1.** Deficit in access to nonsolid fuel, 2010 (in millions)



Source: WHO Global Household Energy Database, 2012

Note: The regional groupings used in this figure, and in this note generally, are those used by the United Nations. SSA = Sub-Saharan Africa; SA = Southern Asia; SEA = Southeast Asia; EA = East Asia.

**Figure 2a.** Top 20 high-impact countries: home to 2.4 billion of the 2.8 billion people who use solid fuel



Source: WHO Global Household Energy Database, 2012

Efforts to increase access to nonsolid fuel should focus on 20 “high-impact” countries. These account for 85 percent (2.4 billion people) of the absolute global access deficit (figure 2a). Eleven of the 20 countries are in Asia and nine in Sub-Saharan Africa. India and China together account for 1.3 billion users of solid fuel. Among another group of 20 low-access countries (figure 2b), 18 are in Sub-Saharan Africa.

The rate of access to nonsolid fuel spans a wide range. In Sub-Saharan Africa 21 countries show less than 10 percent access to nonsolid fuel. By contrast, near-universal access (greater than 95 percent) is found in 73 countries of the world (37 of which are developing countries).

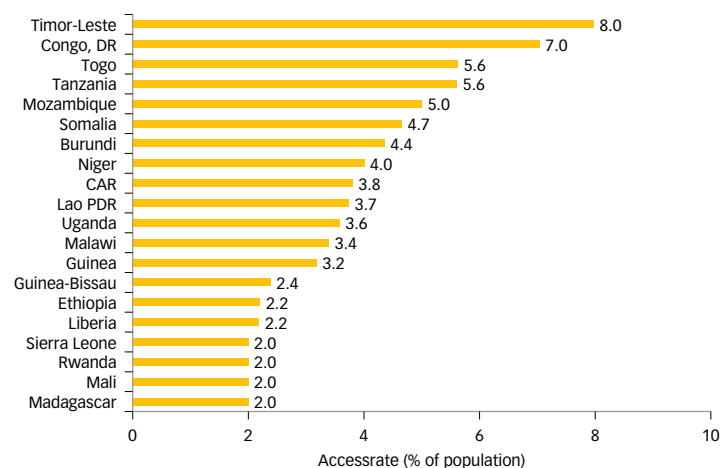
### How has access evolved historically?

#### Gains in access to nonsolid cooking fuel between 1990 and 2010 were tempered by population growth

The share of the global population with access to nonsolid fuel rose from 47 percent (2.5 billion people) in 1990 to approximately

“The share of the global population with access to nonsolid fuel rose from 47 percent (2.5 billion people) in 1990 to approximately 59 percent (4.1 billion people) in 2010.”

**Figure 2b.** Top 20 low-access countries: home to 369 million of the 2.8 billion people who use solid fuel



Source: WHO Global Household Energy Database, 2012

59 percent (4.1 billion people) in 2010. The access rate in rural areas increased over the same period from 26 percent to 35 percent; in urban areas, from 77 percent to 84 percent. Dramatic progress was made in the Caucasus and Central Asia and in Southern Asia, which registered increases of 27 and 24 percentage points, respectively, over the two decades. Sub-Saharan Africa followed far behind, with an increase from 14 to 19 percent during the same period (table 1).

Although the *absolute* number of people with access to nonsolid fuels increased by 1.6 billion between 1990 and 2010, the global population over this period grew by the same amount. Hence the increase in the *share* of the population with access was only modest.

In Sub-Saharan Africa and Southern Asia, despite modest increases from 1990 in the share of the population relying on nonsolid fuels, the number of people still using solid fuels actually increased in both urban and rural areas—because of growth in the population. In Southern Asia, while an additional 490 million people gained access to nonsolid fuel as their primary cooking fuel, the population over the same period grew by 508 million. Similarly, nonsolid fuel use in Sub-Saharan Africa increased by only 92 million people during a period when population grew by 340 million people (figure 3).

**Table 1.** Regional trends in access to nonsolid fuel, 1990–2010

	% of total population with access to nonsolid fuel		
	1990	2000	2010
Sub-Saharan Africa	14	17	19
Oceania	14	24	31
Southern Asia	16	30	40
Southeast Asia	29	40	48
East Asia	37	48	55
Caucasus and Central Asia	58	73	85
Latin America and Caribbean	73	81	86
Western Asia	83	90	95
Northern Africa	88	96	100
Industrialized world	95	98	99
World	47	54	59

Source: WHO Global Household Energy Database, 2012

The growth rate of access to nonsolid fuel in urban areas, at 1.7 percent, far outpaced the rural growth rate of 0.6 percent. Nevertheless, the rapid pace of urban population growth over this period made it difficult for nonsolid fuel access in urban areas to keep up, with the expansion of access falling short of population growth by 51 million people over the two decades.<sup>1</sup> In rural areas, by contrast, access grew faster than the population by 67 million people.

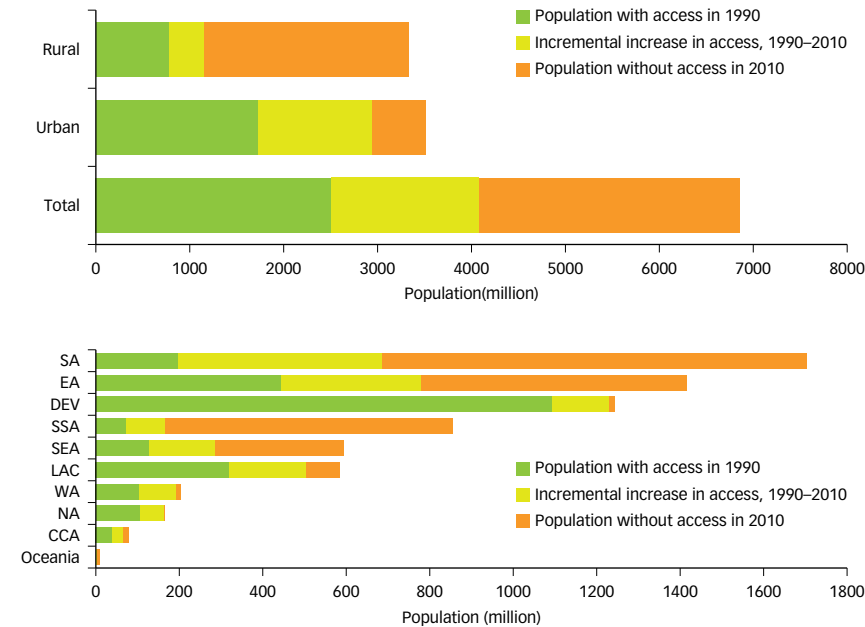
The remarkable urban growth story has occurred for the most part in the Asian regions (Eastern Asia, Western Asia, Southern Asia, and Southeastern Asia), which together managed to provide 760 million people—or 38 million people annually—with access to nonsolid fuel in urban areas. The rural increment was highest in Western Asia, Southern Asia, and the Caucasus and Central Asia, where 334 million people—or 17 million annually—began to use primarily nonsolid fuel for cooking.

Most of the 20 countries in which the largest numbers of people have transitioned to primary use of nonsolid fuels are in Asia (figure 4). As a whole, the 20 countries moved an additional 1.2 billion

<sup>1</sup> Between 1990 and 2010 the rapid rate of urbanization added 1.2 billion people to urban populations; populations living in rural areas increased by only 0.4 billion over the same period.

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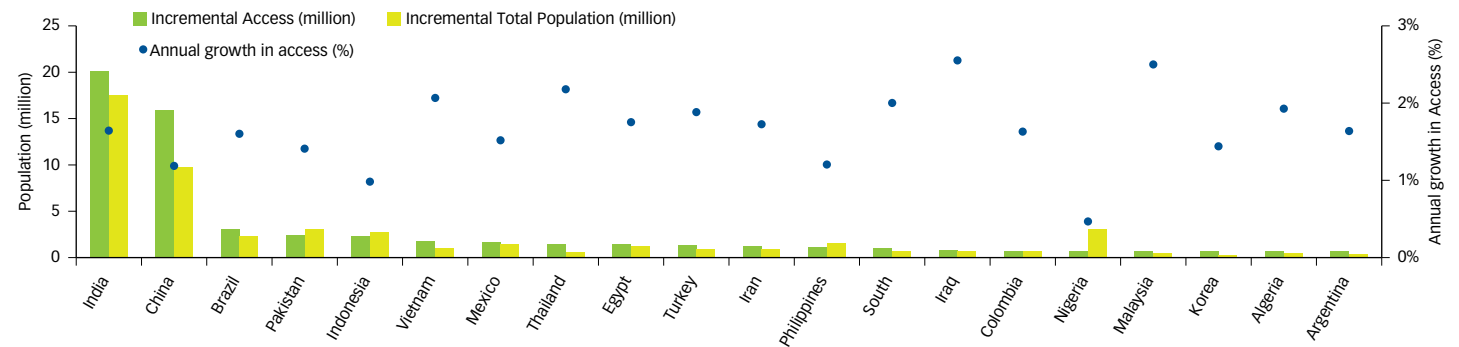
**Figure 3.** Global and regional progress in access to nonsolid fuel, 1990–2010



Source: WHO Global Household Energy Database, 2012

Note: SA = Southern Asia; EA = East Asia; DEV = industrialized world; SSA = Sub-Saharan Africa; SEA = Southeast Asia; LAC = Latin America and Caribbean; WA = Western Asia; NA = Northern Africa; CCA = Caucasus and Central Asia.

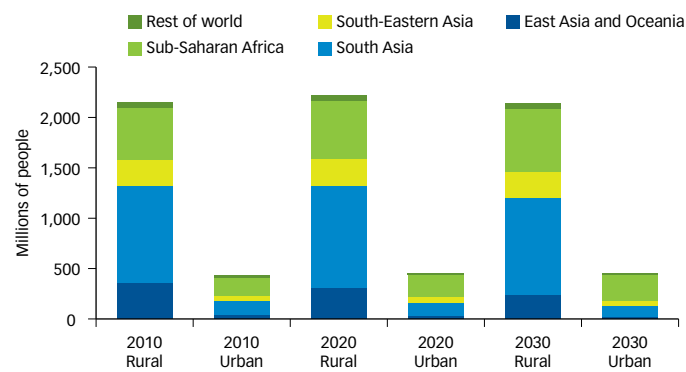
**Figure 4.** The 20 countries with the greatest annual increases in access to nonsolid cooking fuel, 1990–2010



Source: WHO Global Household Energy Database, 2012

“In Sub-Saharan Africa, projections by the International Energy Agency (2012) reveal a worsening situation over time, with the number of people without modern cooking solutions reaching around 880 million by 2030.”

**Figure 5.** Number of people without access to modern cooking solutions in rural and urban areas by region, 2010–2030



Source: Based on the “New Policies Scenario” from IEA (2012).

people to nonsolid fuel in 1990–2010, but that figure was 200 million less than their overall increase in population. The greatest growth occurred in India, China, and Brazil, where a total of 783 million people secured access to nonsolid fuel as their primary cooking fuel during this period. India charted a remarkable trajectory, providing access to nonsolid fuel to 402 million people over two decades. However, none of the group of fast-moving countries was able to expand access to nonsolid fuels by more than three percentage points of population annually, and most remained at around two percentage points.

### What will access look like in 2030?

#### Population growth and urbanization will continue to shape the evolution of access

The future is increasingly urban. The world population is expected to increase by 2.3 billion between 2011 and 2050, reaching 9 billion in 2050. By then, about 6.3 billion people will live in urban areas. The rural population is expected to start slowing in about a decade, and

fewer people will be living in rural areas than today. The urban populations of Asia and Africa will increase dramatically—by 1.6 billion and 0.9 billion, respectively (UN 2011).

Because of population growth, under the “New Policies Scenario” of the IEA’s World Energy Outlook (2012) the number of people lacking access to modern cooking solutions is projected to remain almost unchanged at around 2.6 billion in 2030—more than 30 percent of the projected global population in that year (figure 5). This scenario takes into account the future implementation of new energy policies to which nations are already committed.

In developing Asia, China is projected to show the single biggest improvement, with almost 150 million people gaining access to modern cooking solutions by 2030. That improvement will come from economic growth, urbanization, and deliberate policy interventions, such as actions to expand natural gas networks. India will see a small improvement but is still expected to account for nearly 30 percent of the world’s total access deficit in 2030. The rest of developing Asia is also projected to see only a marginal improvement by 2030, with half of its population still lacking access to modern cooking solutions at that time.

In Sub-Saharan Africa, IEA projections reveal a worsening situation over time, with the number of people without modern cooking solutions increasing by more than a quarter, reaching around 880 million in 2030. While more than 310 million people will achieve access to modern cooking solutions by 2030, their number will not keep pace with the growth in population expected over the period. As in all regions, the lack of access will continue to be concentrated in rural areas.

The number of people lacking access to modern cooking solutions is much smaller in Latin America and the Middle East. There, IEA projections show a slight improvement over time, primarily in urban areas. In rural areas, the size of the population without access to modern cooking solutions will remain essentially unchanged, as population growth will offset positive efforts. In Latin America, 11 percent of the population is projected still to be without access to modern cooking solutions in 2030, while the figure is less than 3 percent in the Middle East.

## MAKE FURTHER CONNECTIONS

Live Wire 2014/7. "Understanding Differences Between Cookstoves," by Koffi Ekouevi, Kate Kennedy Freeman, and Ruchi Soni.

Live Wire 2014/9. "Tracking Access to Electricity," by Sudeshna Ghosh Banerjee and Elisa Portale.

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*This note is based on chapter 2 of the Global Tracking Framework prepared by the Sustainable Energy for All Initiative and published by the World Bank in 2013. The GTF underwent Bankwide peer review; reviewers included Dana Rysankova, Jeff Chelsky, Mohua Mukherjee, and Todd Johnson. <http://documents.worldbank.org/curated/en/2013/05/17765643/global-tracking-framework-vol-3-3-main-report>*



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