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THE BOTTOM LINE

Where does the region stand on the quest for sustainable energy for all? The 2010 electrification rate in South Asia was 74 percent, and 38 percent of the population had access to nonsolid fuel for cooking. The share of renewables in the energy mix is dominated by biomass and declining. Energy intensity is on par with the global average but declining more rapidly than elsewhere. India and Bangladesh have far to go on access, and, throughout the region, growth in renewables lags behind growth in energy demand.

Elisa Portale is an energy economist in the Energy Sector Management Assistance Program (ESMAP) of the World Bank's Energy and Extractives Global Practice.

Joeri de Wit is an energy economist in the Bank's Energy and Extractives Global Practice.

Tracking Progress Toward Sustainable Energy for All in South Asia

Why is this important?

Tracking regional trends is critical to monitoring the progress of the Sustainable Energy for All (SE4ALL) initiative

In declaring 2012 the "International Year of Sustainable Energy for All," the UN General Assembly established three global objectives to be accomplished by 2030: to ensure universal access to modern energy services,[1] to double the 2010 share of renewable energy in the global energy mix, and to double the global rate of improvement in energy efficiency relative to the period 1990–2010 (SE4ALL 2012).

The SE4ALL objectives are global, with individual countries setting their own national targets in a way that is consistent with the overall spirit of the initiative. Because countries differ greatly in their ability to pursue the three objectives, some will make more rapid progress in one area while others will excel elsewhere, depending on their respective starting points and comparative advantages as well as on the resources and support that they are able to marshal.

To sustain momentum for the achievement of the SE4ALL objectives, a means of charting global progress to 2030 is needed. The World Bank and the International Energy Agency led a consortium of 15 international agencies to establish the SE4ALL Global Tracking Framework (GTF), which provides a system for regular global reporting, based on rigorous—yet practical, given available databases—technical measures. This note is based on that framework (World Bank 2014). SE4ALL will publish an updated version of the GTF in 2015.

The primary indicators and data sources that the GTF uses to track progress toward the three SE4ALL goals are summarized below.

- **Energy access.** Access to modern energy services is measured by the percentage of the population with an electricity connection and the percentage of the population with access to nonsolid fuels.[2] These data are collected using household surveys and reported in the World Bank's Global Electrification Database and the World Health Organization's Household Energy Database.
- **Renewable energy.** The share of renewable energy in the energy mix is measured by the percentage of total final energy consumption that is derived from renewable energy resources. Data used to calculate this indicator are obtained from energy balances published by the International Energy Agency and the United Nations.
- **Energy efficiency.** The rate of improvement of energy efficiency is approximated by the compound annual growth rate (CAGR) of energy intensity, where energy intensity is the ratio of total primary energy consumption to gross domestic product (GDP) measured in purchasing power parity (PPP) terms. Data used to calculate energy intensity are obtained from energy balances published by the International Energy Agency and the United Nations.

[1] The universal access goal will be achieved when every person on the planet has access to modern energy services provided through electricity, clean cooking fuels, clean heating fuels, and energy for productive use and community services. The term "modern cooking solutions" refers to solutions that involve electricity or gaseous fuels (including liquefied petroleum gas), or solid/liquid fuels paired with stoves exhibiting overall emissions rates at or near those of liquefied petroleum gas (www.sustainableenergyforall.org).

[2] Solid fuels are defined to include both traditional biomass (wood, charcoal, agricultural and forest residues, dung, and so on), processed biomass (such as pellets and briquettes), and other solid fuels (such as coal and lignite).

"The challenge of electrification remains significant in most of the region's countries, and particularly in India, where 306 million people lack access to electricity. Some countries of the region have relatively high rates of electrification—Sri Lanka, 85 percent; Pakistan, 91 percent; and Maldives, 100 percent."

This note uses GTF data to provide a regional and country perspective on the three SE4ALL goals in South Asia (SAS).[3] The first section considers energy access. The following sections look at the renewable energy and energy efficiency goals. All data underlying the information in this note can be found online at http://data.worldbank.org/data-catalog/sustainable-energy-for-all.

What progress has been made toward universal access to energy services?

The 2010 electrification rate in South Asia was 74 percent, and 38 percent of the population had access to nonsolid fuel for cooking

Achieving universal access to modern energy services is the "first among equals" of the three complementary goals of SE4ALL. Despite progress in this region, a huge energy access deficit remains.

Electricity. Access to electricity in flexible, reliable, and sustainable forms brings a range of social and economic benefits, enabling people to leap from poverty to a better future, enhancing the quality of household life, and stimulating the broader economy. In 2010 the SAS region had an overall electrification rate of 74 percent, meaning that fully a quarter of the region's people lack access to electricity. That is roughly 417 million people, more than a third of the 1.2 billion people worldwide who lack access, with the bulk of them living in India. Around 92 percent of people without electricity live in rural areas (383 million) (figure 1).

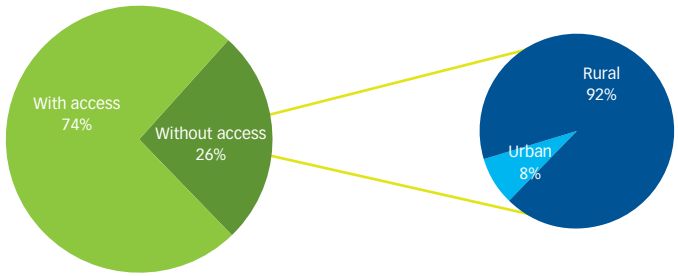
The challenge of electrification remains significant in most of the region's countries, and particularly in India, where 306 million people lack access to electricity (figure 2). Some countries of the region have relatively high rates of electrification—Sri Lanka, 85 percent; Pakistan, 91 percent; and Maldives, 100 percent.

The share of region's population with access to electricity rose from 50 percent (566 million people) in 1990 to approximately 74 percent (1.2 billion people) in 2010, the fastest rate of growth over the period of any world region. Globally, the number of people gaining access to electricity services increased by 1.7 billion over the 20 years, with SAS accounting for 38 percent of that figure Still, the level of access to electricity in SAS is well below the global average, which increased from 76 percent to 83 percent over the same 20 years.

Between 1990 and 2010, 647 million people gained access to electricity. During this time, the SAS population expanded by 489 million. Thus, growth in access to electricity outpaced population growth by about 158 million people.

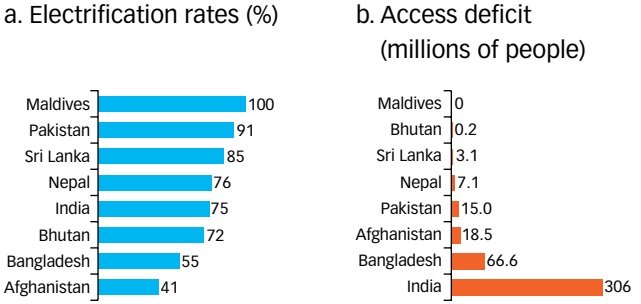
Most of the incremental electrification in the region over the period 1990–2010 occurred in rural areas, where electrification increased by 439 million, more than twice the increase in urban areas (209 million people). The urban electrification rate rose from 86 to 93 percent; the rural rate, more steeply, from 36 to 66 percent (figure 3).

Figure 1. The electricity access deficit in the region in 2010



Source: World Bank 2014.

Figure 2. Electrification rates and deficits by country, 2010

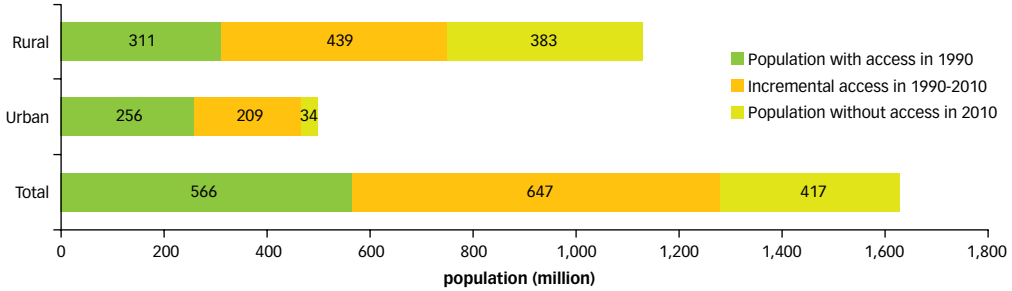


Source: World Bank 2014.

[3] For a list of countries that fall under South Asia according to the World Bank regional classification system, see http://data.worldbank.org/about/country-and-lending-groups

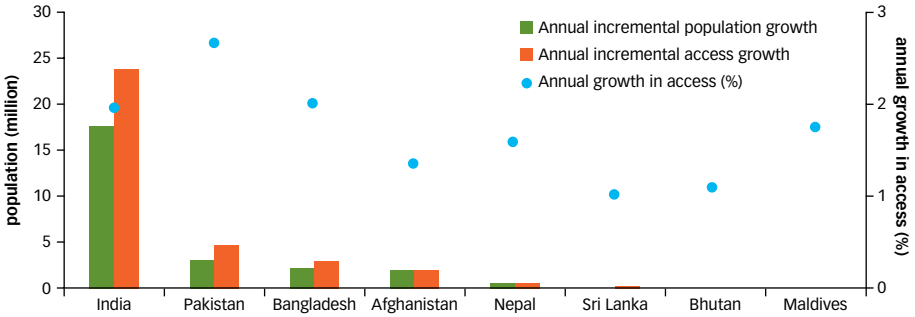
"Between 1990 and 2010, 647 million people gained access to electricity. During this time, the SAS population expanded by 489 million. Thus, growth in access to electricity outpaced population growth by about 158 million people."

Figure 3. Progress in access to electricity in urban and rural areas, 1990–2010



Source: World Bank 2014.

Figure 4. Annual increases in access to electricity, 1990–2010



Source: World Bank 2014.

India made particularly rapid progress over the period, electrifying an average of 23 million people every year after 1990, for an annual growth rate of 1.9 percent (compared with the global average of 1.3 percent). Nevertheless, in 2010, India still had the region's largest access deficit (figure 4). Pakistan stands out as having made the most progress relative to its size, electrifying 2.6 percent of its population annually. In all SAS countries, the expansion of the population with access to electricity has at least kept pace with population growth.

Cooking fuels. The World Health Organization estimates that in 2012 about 4.3 million deaths occurred worldwide because of exposure to household air pollution caused by smoke from the incomplete combustion of fuels such as wood, coal, and kerosene. Use of such fuels for cooking also poses substantial risks to safety, causing burns and injuries.

In 2010, just 38 percent of the region's population had access to nonsolid fuel for cooking.[4] More than 1 billion people still used solid fuel for cooking, a very substantial share of the 2.8 billion people globally who do so.

The challenge of access to nonsolid fuel remains particularly significant in most countries of the region. Six of the eight SAS countries have an access rate that is below 50 percent of the population (figure 5), making SAS the world region with the lowest access rate. Maldives (92 percent) and Bhutan (60 percent) have the highest levels of access in the region.

4 Solid fuels are defined to include both traditional biomass (wood, charcoal, agricultural and forest residues, dung, and so on), processed biomass (such as pellets and briquettes), and other solid fuels (such as coal and lignite).

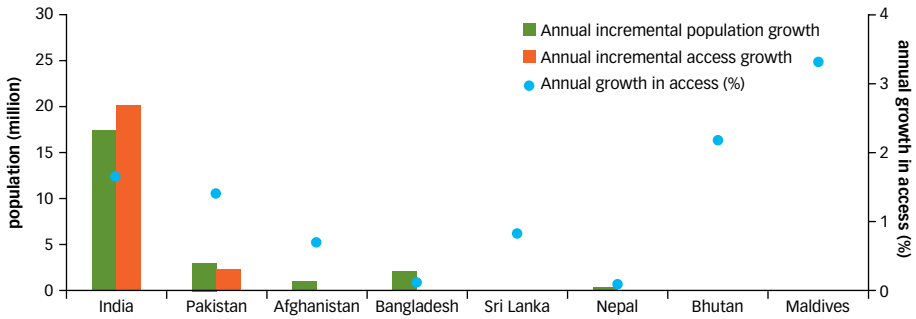
"In 2010, just 38 percent of the region's population had access to nonsolid fuel for cooking. More than 1 billion people still used solid fuel for cooking, a very substantial share of the 2.8 billion people globally who do so."

The share of the region's population with access to nonsolid fuel for cooking rose from 13 percent (148 million people) in 1990 to approximately 38 percent (612 million people) in 2010, well below the global access rate, which rose from 47 percent (2.5 billion people) in 1990 to approximately 59 percent (4.1 billion people) in 2010.

Between 1990 and 2010, 464 million people gained access to nonsolid fuel, while the region's population increased by 489 million. Thus population growth outstripped growth in access by approximately 25 million people. The global population with access to nonsolid fuel increased by 1.6 billion people over the period 1990–2010, and SAS represented 30 percent of that increase

India has made impressive progress in access to nonsolid fuel, providing access to 20 million people annually since 1990, for an annual growth rate of 1.6 percent (figure 6), compared with the global average annual increase of 1.1 percent over the period. High annual growth rates were also achieved by Pakistan (1.4 percent) and Bhutan (2.2 percent).

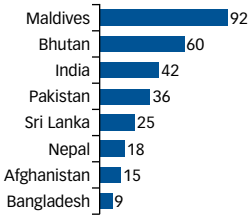
Figure 6. Annual increases in access to nonsolid fuels, 1990–2010



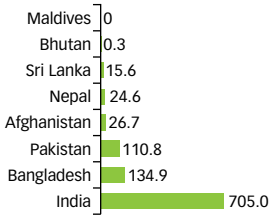
Source: World Bank 2014.

Figure 5. Access to nonsolid fuels by country, 2010

a. Access to nonsolid fuel (%)



b. Deficit in access to nonsolid fuel (millions of people without access)



Source: World Bank 2014.

How has the share of renewable energy evolved?

The share of renewables in the energy mix is dominated by biomass and declining

Global consumption of renewable energy grew from 40 exajoules (EJ) in 1990 to almost 60 EJ in 2010. Meanwhile, global total final energy consumption (TFEC) grew at a comparable pace of 1.1 percent during 1990–2000 and 2.0 percent during 2000–10. As a result, the share of renewable energy in the global energy mix remained relatively stable, rising from 16.6 percent in 1990 to 18 percent in 2010.

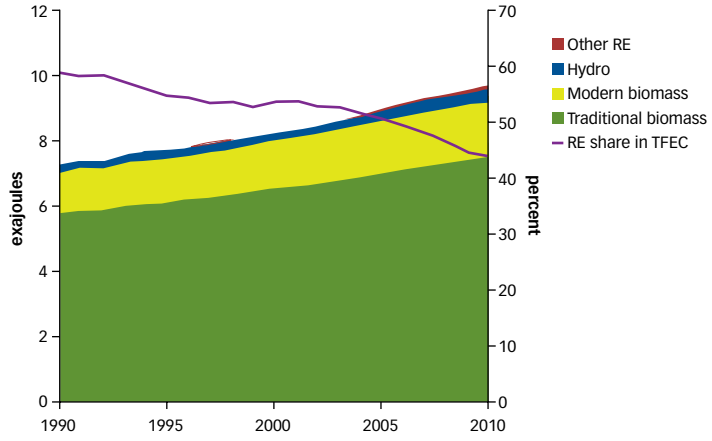
In SAS, the levels of penetration of renewable energy are much higher, although renewables' share in TFEC declined from just over 60 percent in 1990 to under 50 percent in 2010 (figure 7). Traditional biomass accounts for 78 percent of the total 9.7 terajoules (TJ) of renewable energy that is consumed. The remainder is derived primarily from modern biomass and hydropower.[5] Other renewables such as biogas, solar, and wind account for less than 1 percent of TFEC.

Renewable energy accounts for 42–46 percent of TFEC in Bangladesh, India, and Pakistan; 62 percent in Sri Lanka; and 88

[5] The UN Food and Agriculture Organization defines traditional biomass as "woodfuels, agricultural by-products, and dung burned for cooking and heating purposes." In developing countries, traditional biomass is still widely harvested and used in an unsustainable and unsafe way. It is mostly traded informally and noncommercially. So-called modern biomass, by contrast, is produced in a sustainable manner from solid wastes and residues from agriculture and forestry. The informal term "modern renewables" as used in this note denotes all renewables except for traditional biomass.

"Traditional biomass accounts for 78 percent of the total 9.7 terajoules (TJ) of renewable energy that is consumed. The remainder is derived primarily from modern biomass and hydropower. Other renewables such as biogas, solar, and wind account for less than 1 percent of TFEC."

Figure 7. Total final consumption of renewable energy by technology, 1990–2010



Source: World Bank 2014.

percent of TFEC in Nepal (figure 8). Traditional biomass dominates in Bangladesh, whereas Sri Lanka derives about 20 percent of TFEC from modern biomass. All of the region's countries derive a small share of their energy from hydropower.

Modern renewables grew very quickly in CAGR terms between 1990 and 2010, especially wind (38 percent) and solar (20 percent) (figure 9). Modern biomass grew considerably more slowly, at 1.6 percent, and only marginally faster than traditional biomass, at 1.3 percent. No significant consumption of other renewable resources was registered.

Although renewables' share in TFEC decreased between 1990 and 2010 in all countries of the region, the story is more varied when one focuses solely on modern renewables (figure 10). As a percentage of TFEC, modern renewables increased in Sri Lanka and Nepal, held steady in Bangladesh, and decreased in Pakistan and India. Modern biomass accounted for the bulk of these shifts, except in Nepal where hydropower and biogas consumption accounted for the 2 percent increase in the penetration of modern renewables.

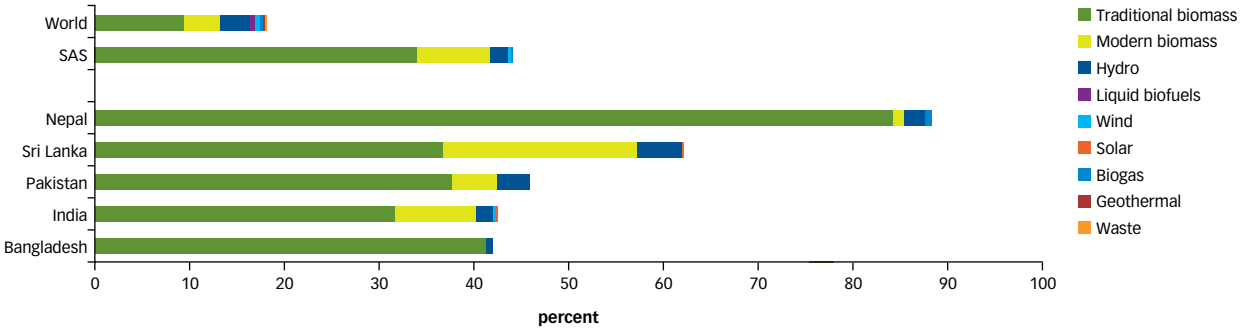
How does the region fare on energy efficiency?

Energy intensity is on par with the global average but declining more rapidly

Energy intensity. Globally, energy intensity decreased by –1.3 percent annually (in CAGR terms) over the 20 years between 1990 and 2010. With this as the starting point for measuring future progress in global energy efficiency, the SE4ALL global objective is therefore an annual reduction in energy intensity of -2.6 percent for the period 2010–30.

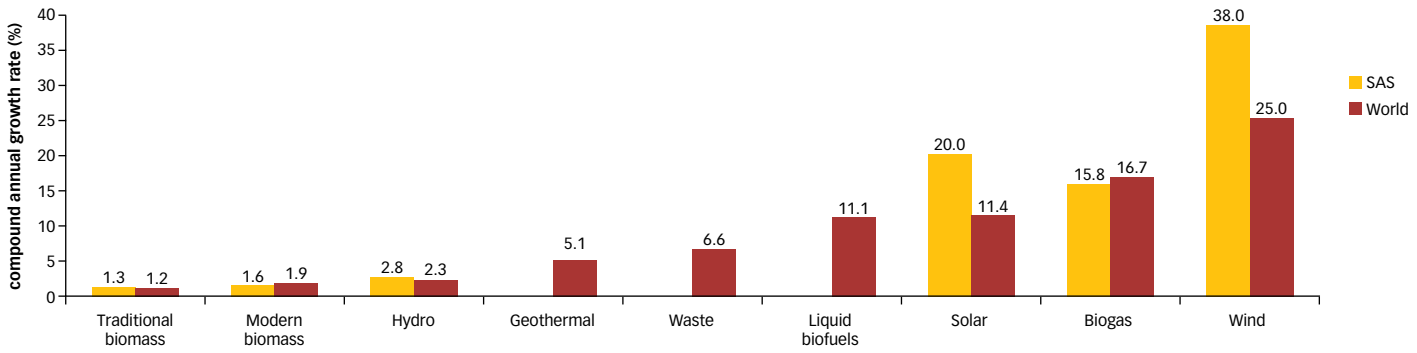
In SAS, the CAGR of energy intensity averaged -2.1 percent between 1990 and 2010. By 2010, energy intensity in the region stood at 7.8 MJ/$2005, just slightly below the global average of

Figure 8. Renewable energy's share of total final energy consumption, 2010



Source: World Bank 2014.

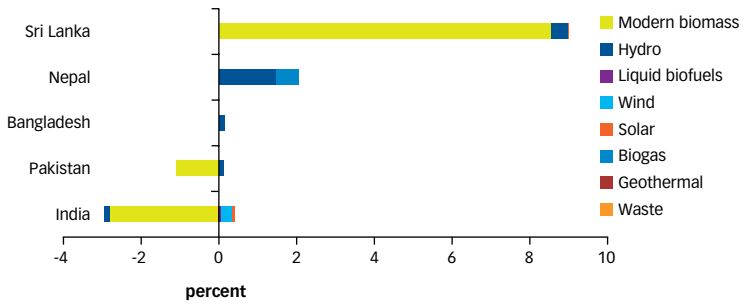
Figure 9. Annual regional and world growth in renewable energy consumption by technology, 1990–2010



Source: World Bank 2014.

"Maldives is the only country in which energy intensity increased—and at the dramatic rate of 6.5 percent per year. Afghanistan and Bhutan experienced the most rapid reductions in energy intensity while representing, respectively, the least and most energy intensive countries of the region in 2010."

Figure 10. Change in consumption of modern forms of renewable energy in selected countries as a percentage of TFEC, 1990–2000



Source: World Bank 2014.

7.9 MJ/$2005 (figure 14). Within the region, Maldives is the only country in which energy intensity increased—and at the dramatic rate of 6.5 percent per year. Afghanistan and Bhutan experienced the most rapid reductions in energy intensity while representing, respectively, the least and most energy intensive countries of the region in 2010.

Energy intensity is an imperfect proxy for energy efficiency. This is because energy intensity is affected by other factors, such as shifts in the structure of the economy over time, typically from less energy-intensive agriculture to higher energy-intensive industry and then back toward lower energy-intensive services. In SAS, improvements in energy efficiency between 1990 and 2010 were substantially offset by a shift toward more energy intensive sectors. It appears that energy intensity in industry and "other sectors"[6] converged to global average levels, while energy intensity in the agricultural sector remains less than half the global average (figure 12).

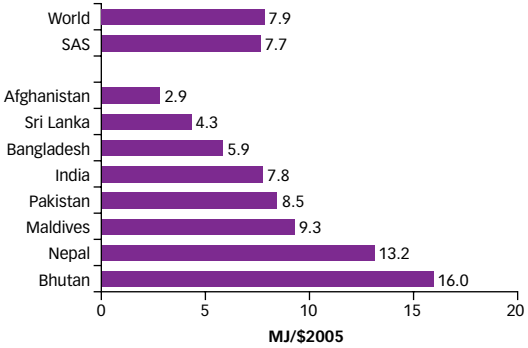
Energy savings. Energy savings in a given year are calculated as the difference between (i) the energy that would have been consumed in that year given the GDP and the level of energy intensity in 1990, and (ii) actual energy consumption in that year. As a result of a steady reduction in energy intensity since 1990, SAS saved 19 exajoules of energy in 2010 alone, or 55 percent of the energy the region consumed in that year (figure 13).

6 Final energy consumption can be broadly divided among the following major economic sectors: agriculture, industry, residential, transport, and services. For the purpose of the Global Tracking Framework, residential, transport, and services are aggregated into a single category of "other sectors" (due to data limitations). Using the Logarithmic Mean Divisia Index decomposition approach, we control for changes in economy wide energy intensity that are due to shifts in the relative weights of the industrial, agricultural and other sectors (in $2005 PPP terms).

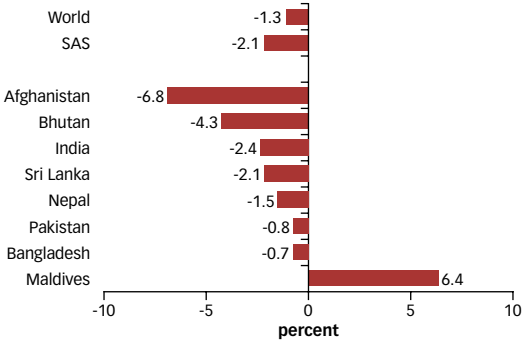
"As a result of a steady reduction in energy intensity since 1990, SAS saved 19 exajoules of energy in 2010 alone, or 55 percent of the energy the region consumed in that year.

Figure 11. Level of energy intensity in 2010 and change in level, 1990–2010

a. Primary energy intensity, 2010

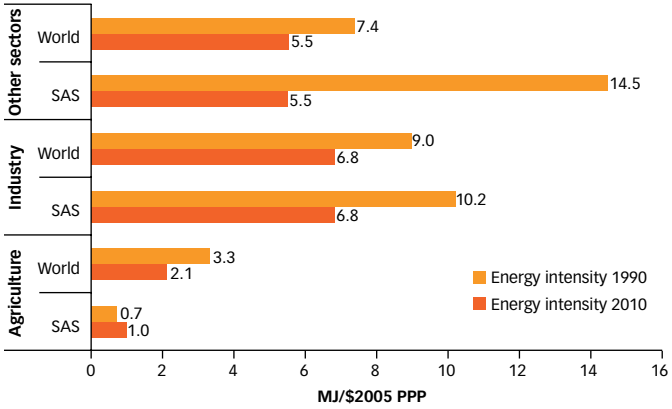


b. Energy intensity CAGR, 1990–2010



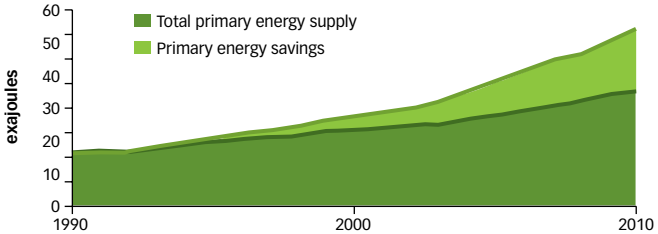
Source: World Bank 2014.

Figure 12. Energy intensity by sector, 1990 and 2010



Source: World Bank 2014.

Figure 13. Energy savings owing to realized improvements in energy intensity, 1990–2010



Source: World Bank 2014.

Much of the region's achievements, in terms of savings, were driven by India. The scale of the Indian economy is apparent from its primary energy supply, which, at 413 EJ, dwarfs the next largest market, Pakistan, at 56 EJ. However, in savings the difference is even more extreme, with energy savings in India amounting to 114 EJ between 1990 and 2010, or 92 percent of the region's energy savings.

Where is the region headed?

India and Bangladesh have much to do on access, and, throughout the region, growth in renewables lags behind growth in energy demand

Monitoring progress at the regional and country level provides a much clearer picture of how the region is moving toward the SE4All goals.

With respect to access to modern energy supplies, SAS is making rapid progress toward universal access. Gains in access rates between 1990 and 2010 were on the order of 24 percent

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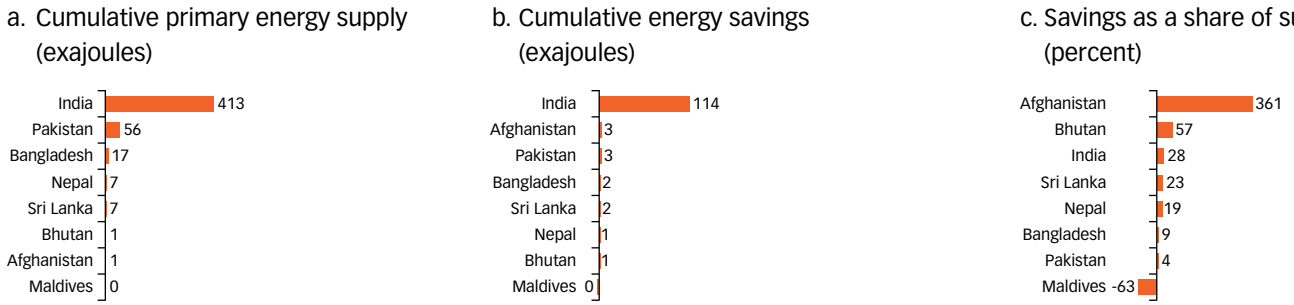
Figure 14. Cumulative primary energy supply, cumulative energy savings, and cumulative energy savings as a share of cumulative primary energy supply, 1990–2010



for electricity and 25 percent for nonsolid fuels. However, despite impressive recent gains, the scale of the access challenge in India and Bangladesh remains daunting. Half a billion people in the region still lack access to electricity, and one billion people lack access to nonsolid cooking fuels.

Increasing the share of renewable energy in TFEC will also present a challenge for the region. If current trends were to continue, the expansion of renewable energy in the region would not even keep pace with the projected expansion of energy demand. A transition from traditional to modern biomass is critical, but the share of modern biomass in TFEC actually decreased between 1990 and 2010 in the region's two largest economies, India and Pakistan.

With respect to energy efficiency, the region performed well. With a 2010 energy-intensity level that was slightly below the global average, the region rapidly reduced its energy intensity between 1990 and 2010 despite a transition toward more energy-intensive sectors.

Given the scale of the challenge inherent in meeting the three SE4ALL goals, it is clear that a combination of bold policy measures coupled with a supportive regulatory and institutional environment is required to support the requisite ramping up of delivery capacity and financial flows to the energy sector.

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The peer reviewer for this note was Sheoli Pargal, an economic adviser in the World Bank's Energy and Extractives Global Practice. Preparation of this note benefitted from comments by Morgan Bazilian, lead energy specialist in the World Bank's Energy and Extractives Global Practice, and Vivien Foster, a manager in that practice.