**The Bottom Line**

Where does the region stand on the quest for sustainable energy for all? In 2010, the region had an electrification rate of 94 percent, and 97 percent of the population had access to nonsolid fuel for cooking. The penetration of renewable energy is very low. Energy intensity lies below the global average but is increasing rather than declining. Access to modern energy services is not a problem, but the SE4ALL goals for renewable energy and energy efficiency pose serious challenges.

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**Tracking Progress Toward Sustainable Energy for All in the Middle East and North Africa**

**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 based on 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.

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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 particularly significant in the Republic of Yemen and Djibouti, where less than half of the population has access to electricity. Yemen is also the MNA country with the largest absolute access deficit: More than 13 million Yemenis lacked access to electricity in 2010.

This note uses GTF data to provide a regional and country perspective on the three SE4ALL goals in the Middle East and North Africa (MNA) region. 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?

In 2010, the region had an electrification rate of 94 percent, and 97 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 MNA region had an electrification rate of 94 percent (figure 1), nearly two-thirds of whom live in urban areas. The 6 percent of the population who lack access to electricity constitute 18 million (1.5 percent) of the 1.2 billion people worldwide who lack access to electricity. Eighteen million people is close to the entire population of the Syrian Arab Republic or the combined populations of Jordan, Libya, and Lebanon.

The challenge of electrification remains particularly significant in the Republic of Yemen and Djibouti, where less than half of the population has access to electricity. Yemen is also the MNA country with the largest absolute access deficit: More than 13 million Yemenis lacked access to electricity in 2010 (figure 2).
“Most of the incremental electrification in the region over the period 1990–2010 occurred in urban areas, where an additional 81 million people gained access to electricity, about twice the increase in rural areas.”

106 million. Access thus outpaced population growth by about 14 million people.

Most of the incremental electrification in the region over the period 1990–2010 occurred in urban areas, where an additional 81 million people gained access to electricity, about twice the increase in rural areas (39 million people). The region’s urban electrification rate grew from 96 to 99 percent during the same period. More modest growth in rural populations allowed the rural electrification rate to increase more steeply, from 74 to 88 percent, despite a much lower level of electrification effort overall in the rural space (figure 3).

The Arab Republic of Egypt made particularly rapid progress, electrifying an average of 1.3 million annually in the 20 years after 1990, for an annual growth rate of 1.6 percent (figure 4). The global average annual increase in access was 1.3 percent for the period.
The challenge of access to nonsolid fuel remains particularly significant in Yemen, where only two out of three people have access to nonsolid fuel (figure 5).

In 2010, 97 percent of the region’s population had access to nonsolid fuel for cooking. But nine million people still lack it (eight million of them in Yemen). Although a small fraction (0.3 percent) of the 2.8 billion who lack access globally, the region’s deficit is equal to the entire population of Tunisia.

The share of the region’s population with access to nonsolid fuel for cooking rose from 86 percent (192 million people) in 1990 to approximately 97 percent (318 million people) in 2010. Access is far above the global level, 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, as 126 million people gained access to nonsolid fuel, the region’s population grew by 106 million. Access thus outpaced population growth by about 20 million people. The MNA region represents 8 percent of the global increase in population with access to nonsolid fuel for the period 1990–2010.

Egypt made particularly rapid progress, providing access to nonsolid fuel to an average of 1.4 million new users each year after 1990, for an annual growth rate of 1.8 percent (figure 6). The global average annual increase in access was 1.1 percent for the same period.
How has the share of renewable energy evolved?

The penetration of renewable energy is very low

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.

The penetration of renewable energy in the MNA region is much lower. In fact, the share of renewables in the region’s TFEC declined from 3.5 percent in 1990 to 2.3 percent in 2010 (figure 7). Traditional biomass and hydropower each account for about 40 percent of the 0.3 exajoules of renewable energy consumed, while modern biomass accounts for most of the rest, except for the small share of wind and solar power.4

4 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 non-commercially. 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 traditional biomass.

The low penetration of renewable energy is a regional phenomenon but varies somewhat across countries (figure 8). Countries that source at least 2 percent of their energy needs from renewables do so with traditional biomass and hydropower. Jordan is a distinct exception, as it derives 3 percent of TFEC from solar power.

Wind power grew at a remarkable average annual rate of 43 percent between 1990 and 2010, double the global rate in CAGR terms (figure 9). Wind power has a significant presence in Morocco and Egypt. Solar power grew in MNA at half the global rate, while biomass and hydro were on par with global rates. No significant consumption of other renewable resources was registered.
“Modern biomass and hydropower account for the bulk of the shifts in penetration of modern renewables; in Lebanon and Jordan, however, solar energy is important as well.”

Between 1990 and 2010, Morocco achieved the largest net gain in modern renewables as a share of TFEC, at around 1.4 percent. At the other extreme, the share of modern renewables in Egypt declined by 2 percent (figure 10). With the penetration of all renewables in the region averaging around 2.3 percent, these shifts are significant. Modern biomass and hydropower account for the bulk of the shifts in penetration of modern renewables; in Lebanon and Jordan, however, solar energy is important as well.

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

<table>
<thead>
<tr>
<th>Technology</th>
<th>Annual Growth Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional biomass</td>
<td>0.0</td>
</tr>
<tr>
<td>Modern biomass</td>
<td>2.5</td>
</tr>
<tr>
<td>Hydro</td>
<td>4.6</td>
</tr>
<tr>
<td>Geothermal</td>
<td>11.1</td>
</tr>
<tr>
<td>Waste</td>
<td>11.4</td>
</tr>
<tr>
<td>Liquid biofuels</td>
<td>4.5</td>
</tr>
<tr>
<td>Solar</td>
<td>16.7</td>
</tr>
<tr>
<td>Biogas</td>
<td>48.3</td>
</tr>
<tr>
<td>Wind</td>
<td>25.0</td>
</tr>
</tbody>
</table>


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

Between 1990 and 2010, Morocco achieved the largest net gain in modern renewables as a share of TFEC, at around 1.4 percent. At the other extreme, the share of modern renewables in Egypt declined by 2 percent (figure 10). With the penetration of all renewables in the region averaging around 2.3 percent, these shifts are significant. Modern biomass and hydropower account for the bulk of the shifts in penetration of modern renewables; in Lebanon and Jordan, however, solar energy is important as well.

**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.

The MNA region has an average energy intensity of 6.7 MJ/$2005, below the global average of 7.9 MJ/$2005 (figure 11). However, MNA is the only region in which average energy intensity increased between 1990 and 2010—at an annual rate of 0.9 percent per year. Furthermore, the rate of increase has accelerated over time, from 0.7 percent per year between 1990 and 2000 to 1 percent per year between 2000 and 2010. At the country level, energy intensity increased most rapidly in the Islamic Republic of Iran and decreased most rapidly in Iraq. In 2010, Iran and Iraq were the region’s two most energy-intensive countries, consuming 11.6 MJ/$2005 and 15.5 MJ/$2005 respectively. Tunisia was the least energy-intensive country, consuming 4.5 MJ/$2005.
The MNA region has an average energy intensity of 6.7 MJ/$2005, below the global average of 7.9 MJ/$2005. However, MNA is the only region in which average energy intensity increased between 1990 and 2010—at an annual rate of 0.9 percent per year.

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 MNA, a shift toward more energy intensive sectors, particularly between 2000 and 2010, contributed to the observed increase in energy intensity. Within sectors, energy intensity increased in agriculture and “other sectors” but not in industry (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 discussed above and (ii) the actual energy consumed in that year. The energy savings are calculated as a percentage of the energy that would have been consumed.

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

Figure 12. Energy intensity by sector, 1990 and 2010

“Energy savings in Jordan, Syria, and Tunisia amounted to at least 10 percent of energy consumption.”

At the country level, the largest energy savings, both in absolute terms and as a percentage of energy supply over the last two decades, were registered in Iraq, undoubtedly as a consequence of the unique political and economic climate in that country (figure 14). Energy savings in Jordan, Syria, and Tunisia amounted to at least 10 percent of energy consumption and those in Egypt, 4 percent of energy consumption. Other countries of the region saw negative energy savings relative to 1990 levels of energy intensity.

Where is the region headed?

Access to modern energy services is not a problem, but the SE4ALL goals for renewable energy and energy efficiency pose serious challenges

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 services, the region did not present major challenges in 2010. Yemen was the only country registering a significant deficit in access to both electricity and non-solid fuel.

The very low penetration of renewable energy in 2010 presents an opportunity for the region to meet the SE4ALL goal by doubling its...
low current level. However, unless current trends are changed, the expansion of renewable energy will not keep pace with the projected expansion of energy demand in the region.

With regard to energy efficiency, although the region’s energy-intensity levels were below the global average in 2010, it is still the only one in which energy intensity increased between 1990 and 2010.

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.

References


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.
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