Tracking Progress Toward Providing Sustainable Energy for All in Eastern Europe and Central 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, 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. 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.

This note uses data from the GTF to provide a regional and country perspective on the three pillars of SE4ALL for Eastern
Europe and Central Asia (ECA). 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 region has near universal access to electricity, and 93 percent of the population has 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 the region, deficits remain.

**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 ECA region as a whole had an electrification rate of close to 100 percent. No country had an access rate lower than 98 percent (figure 1).

The share of the population with access to electricity rose from 98 percent (386 million people) in 1990 to approximately 100 percent (406 million people) in 2010. Access to electricity in the region is thus well above the global rate, which increased from 76 percent to 83 percent over the period.

**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, 93 percent of population (378 million people) of the ECA region had access to nonsolid fuel for cooking, whereas 7 percent (28 million people) were still using solid fuel for cooking.

The challenge of providing access to nonsolid fuel remains significant in countries such as Romania, Serbia, and Uzbekistan, which have access deficits of around 3–4 million people (figure 2).

The share of the region’s population with access to nonsolid fuel for cooking rose from 77 percent (304 million people) in 1990 to approximately 93 percent (378 million people) in 2010. Regional access to nonsolid fuel is greater than 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, 74 million people in the region gained access to nonsolid fuels, representing 5 percent of the global increase in access to nonsolid fuels.

Turkey made rapid progress by extending access to nonsolid fuels to an average of 1.4 million people each year between 1990 and 2010, an annual growth rate of 1.9 percent (figure 3). Over the same period, Azerbaijan and Tajikistan achieved the highest annual growth rates—nearly 3 percent—while the global average stood at 1.1 percent.
“Turkey made rapid progress by extending access to nonsolid fuels to an average of 1.4 million people each year between 1990 and 2010, an annual growth rate of 1.9 percent.”

**Figure 2. Access to nonsolid fuels by country, 2010**

- a. Access to nonsolid fuel (%)

<table>
<thead>
<tr>
<th>Country</th>
<th>Access to Nonsolid Fuel (%)</th>
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<tbody>
<tr>
<td>Turkmenistan</td>
<td>100.0</td>
</tr>
<tr>
<td>Belarus</td>
<td>99.7</td>
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<tr>
<td>Russia</td>
<td>99.7</td>
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<tr>
<td>Ukraine</td>
<td>97.1</td>
</tr>
<tr>
<td>Turkey</td>
<td>96.7</td>
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<td>Azerbaijan</td>
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<td>Moldova</td>
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<tr>
<td>Serbia</td>
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<td>Macedonia</td>
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<td>Tajikistan</td>
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<td>Albania</td>
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<tr>
<td>Bosnia and Herzegovina</td>
<td>54.7</td>
</tr>
<tr>
<td>Georgia</td>
<td>54.3</td>
</tr>
</tbody>
</table>

**Figure 3. The 15 countries with the greatest annual increases in access to nonsolid fuels, 1990–2010**

“Half of the countries in ECA derive 20 percent or more of their final energy needs from renewables. However, the regional average is pulled down by the larger economies.”

How has the share of renewable energy evolved?

Despite relatively abundant hydropower, the share of renewables in energy consumption has remained relatively 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 share of renewable energy in the regional mix is much lower, remaining relatively stable at around 5 percent of TFEC between 1990 and 2010 (figure 4). Hydropower accounted for half this share, the remainder being divided equally between traditional and modern biomass.4

By country, the share of renewables in TFEC varied substantially in 2010 from 0 percent in Turkmenistan to almost 60 percent in Tajikistan. Half of the countries in ECA derive 20 percent or more of their final energy needs from renewables. However, the regional average is pulled down by the larger economies, with Russia accounting for 57 percent of TFEC in the region and Turkey and Ukraine 10 percent each. Where renewables account for a large share it is through traditional biomass and hydropower (figure 5).

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 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.
“The share of modern renewables has increased in most countries of the region. The significance of the increase in share is offset, however, by the fact that, between 1990 and 2010 the region’s TFEC actually declined.”

Between 1990 and 2010, the growth in consumption of solar and geothermal energy in ECA outstripped global growth rates, while hydro-power consumption grew more slowly. Biomass consumption decreased over time at an annual rate of around 2 percent (figure 6). No significant consumption of other renewable resources was registered.

The share of modern renewables has increased in most countries of the region. The significance of the increase in share is offset, however, by the fact that, between 1990 and 2010 the region’s TFEC actually declined (figure 7). Among the countries shown, only Macedonia and Turkey show increases in TFEC over the 20-year period. Focusing on Turkey, modern biomass as a share of TFEC dropped by 13 percent in 20 years, though the country further diversified its energy mix with geothermal, solar, and wind power. Albania saw the greatest gain in penetration of modern renewable energy—some 22 percent.
How does the region fare on energy efficiency?

Very high energy intensity levels have come down 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.

Each year between 1990 and 2010, the energy intensity of the region declined by an average of -2.3 percent (in CAGR terms). Most of the reductions were achieved in the second decade of the period, as energy intensity remained relatively stable for the first decade. The region remains very energy intensive, consuming 11.8 MJ/$2005 in 2010 compared with the global average of 7.9 MJ/$2005. At the country level, Azerbaijan achieved remarkable improvements in energy intensity between 1990 and 2010, whereas energy intensity in Turkey, Macedonia, and Serbia remained unchanged. In 2010, energy intensity varied substantially across countries, with Turkmenistan using nearly seven times as many units of primary energy per unit of gross domestic product as Albania (figure 8).

Energy intensity is an imperfect proxy for energy efficiency. This is because energy intensity is affected by other factors, such as shifts...
“As a percentage of primary energy supply, the largest savings from reductions in energy intensity over the period were achieved by Armenia, which saved nearly one and a half times the energy it consumed.”

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 ECA, improvements in energy intensity within sectors, in particular between 2000 and 2010, were offset by a shift toward more energy-intensive sectors. Within sectors, the largest absolute improvement in energy intensity occurred in sectors other than industry and agriculture (figure 9).5

**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. Energy savings in the ECA region were achieved only after 1999 (figure 10). Cumulative energy savings since 1990 were 142 EJ, while those in 2010 alone amounted to 26 EJ.

At the country level, the Russian market stands out for the size of its primary energy supply and energy savings (figure 11). However, as a percentage of primary energy supply, the largest savings from reductions in energy intensity over the period were achieved by Armenia, which saved nearly one and a half times the energy it consumed.

Where is the region headed?

**The big questions are how renewables will evolve when energy demand picks up again and whether recent rates of decline in energy intensity will continue**

Monitoring progress at the regional and country level provides a much clearer picture of how the region is moving toward the SE4All goals. Access to electricity is not an issue in ECA countries. Access to nonsolid fuel is still a challenge for a few countries, such as Romania. The penetration of renewable energy in the region is relatively low and remained stable between 1990 and 2010. But because energy demand was stagnant during the period, it remains to be
seen how renewables will evolve when the region again faces growing energy demands.

At 10.7 MJ/$2005 in 2010, ECA is the world’s most energy-intensive region and is heavily reliant on nonrenewable energy sources. However, the region’s reductions in energy intensity between 2000 and 2010 were more rapid than in any other world region, a trend that may or may not continue toward 2030.

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


The peer reviewer for this note was Jasneet Singh, senior energy specialist 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.