Energy Efficiency Indicators in the SEforALL Global Tracking Framework

Ivan Jaques – World Bank
Paris, December 13, 2016
What is the Global Tracking Framework?
Global Tracking Framework measures progress towards SEforAll Goals
## SEforALL SDG 7

<table>
<thead>
<tr>
<th>Energy access</th>
<th>Target</th>
<th>By 2030, ensure universal access to modern energy services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicators</td>
<td></td>
<td>Percentage of population with access to electricity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Percentage of population with access to non-solid fuels</td>
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<tr>
<td></td>
<td></td>
<td>Percentage of population with primary reliance on clean fuels and technology</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Energy efficiency</th>
<th>Target</th>
<th>By 2030, double the global rate of improvement of energy efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator</td>
<td></td>
<td>Energy intensity measured in terms of total primary energy supply and GDP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Renewable energy</th>
<th>Target</th>
<th>By 2030, <strong>double</strong> the share of renewable energy in the global energy mix</th>
<th>By 2030, <strong>increase substantially</strong> the share of renewable energy in the global energy mix.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator</td>
<td></td>
<td>Renewable energy share in the total final energy consumption</td>
<td></td>
</tr>
</tbody>
</table>
Global Tracking Framework takes a pragmatic approach balancing ideal metrics and data availability.
Global Tracking Framework pools and standardizes data produced by national statistical agencies

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Pillar</th>
<th>Coverage (% of global population)</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household Surveys (DHS, MIC, LSMS) and Censuses</td>
<td></td>
<td></td>
<td>22 years (1990-2012)</td>
</tr>
<tr>
<td>WHO Cooking Database</td>
<td>Energy Access</td>
<td>212 Economies (100%)</td>
<td></td>
</tr>
<tr>
<td>WB Electrification Database</td>
<td></td>
<td>193 Economies (99%)</td>
<td></td>
</tr>
<tr>
<td>National Economic Statistics</td>
<td>Energy Efficiency</td>
<td>181 Economies (98%)</td>
<td></td>
</tr>
<tr>
<td>WDI, UN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Energy Balances</td>
<td>Renewable Energy</td>
<td>181 Economies (98%)</td>
<td></td>
</tr>
<tr>
<td>IEA Energy Balances</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UN Energy Balances</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WDI, REN 21, IRENA, BNEF</td>
<td></td>
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</tbody>
</table>

Energy intensity = \frac{\text{Total Primary Energy Supply (TJ)}}{\text{GDP (2011 $ PPP)}}
GTF energy efficiency indicators: demand side

Figure O.12. Rate of change in global energy intensity (CGAR, PPP) compared with target

<table>
<thead>
<tr>
<th>Period</th>
<th>Compound annual growth rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990–2000</td>
<td>-1.5</td>
</tr>
<tr>
<td>2000–10</td>
<td>-1.2</td>
</tr>
<tr>
<td>2010–12</td>
<td>-1.7</td>
</tr>
<tr>
<td>2010–30</td>
<td>-2.6</td>
</tr>
</tbody>
</table>

Source: IEA and WDI data.
GTF energy efficiency indicators: demand side

Figure 3.2. Evolution of global energy intensity, annual change

Annual change in energy intensity (%)

Energy intensity (megajoules per 2011 PPP $)

Source: IEA and WDI databases.
GTF energy efficiency indicators: demand side
GTF energy efficiency indicators: demand side
GTF energy efficiency indicators: demand side

Figure O.13. Primary energy intensity by income group: rate of change and energy intensity

Change in primary energy intensity (compound annual growth rate, %)

Energy intensity, 2012 (megajoules per 2011 PPP $)

-4  -3  -2  -1  0  1  2  3  4  5  6  7  8

High-income countries  Upper-middle-income countries  Lower-middle-income countries  Low-income countries  World


Source: IEA and WDI data.
GTF energy efficiency indicators: demand side

Figure O.19. Primary energy intensity trends, top 20 primary energy consumers in 2012

Energy intensity, compound annual growth rate (%)

Source: IEA and WDI data.
GTF energy efficiency indicators: demand side

Figure 3.7. Rate of change in global final energy intensity by sector

Source: IEA and WDI databases.

Note: Energy intensity in the residential sector is calculated as energy consumption per household.
GTF energy efficiency indicators: demand side

Figure 3.17. Decomposition of trends in global final energy consumption: Contributions of activity, structure, and intensity components, 1990–2012

Trends by component (index, 1990 = 1.0)

Activity component

Energy consumption index

Structure component

Intensity component

Source: Energy intensity decomposition analysis based on IEA, WDI, and UN databases.
GTF energy efficiency indicators: demand side

Figure 3.24. Decomposition of trends in total final energy consumption, top 20 primary energy consumers, 2012

Change in energy consumption (%)

Source: Energy intensity decomposition analysis based on IEA, WDI, and UN databases.

Note: Countries ordered by total final energy consumption in 2012. See annex 1 for data and methods used for this and following figures. Includes transport, with activity measured as value added.
GTF energy efficiency indicators: demand side

Figure O.11. Actual and avoided global primary energy consumption due to declining energy intensity

Source: Energy intensity decomposition analysis based on IEA, WDI, and UN data.
GTF energy efficiency indicators: supply side

Figure 3.10. Thermal efficiency of fossil power generation by fuel and by income group

Overall thermal efficiency of fossil power generation (main activity producer plant, %)

By fuel

- Natural gas
- Oil
- Coal
- Average of all fossil power generation

By income group

- High-income countries
- Upper-middle-income countries
- Lower-middle-income countries
- Low-income countries

Source: IEA databases.

Note: Data are for main activity electricity plants, excluding, for instance, on-site power generation at industrial facilities.
Figure 3.9. **Global losses in natural gas transmission and distribution**

Gas supply losses (%)

<table>
<thead>
<tr>
<th>Year</th>
<th>Gas Supply Losses (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>1.50</td>
</tr>
<tr>
<td>1995</td>
<td>1.25</td>
</tr>
<tr>
<td>2000</td>
<td>1.00</td>
</tr>
<tr>
<td>2005</td>
<td>0.75</td>
</tr>
<tr>
<td>2010</td>
<td>0.50</td>
</tr>
<tr>
<td>2012</td>
<td>0.50</td>
</tr>
</tbody>
</table>

**Source:** IEA databases.

**Note:** To compensate for inconsistencies in the underlying data, U.S. refinery losses are assumed constant at 2012 levels throughout the period.
GTF energy efficiency indicators: supply side

Figure 3.11. T&D loss rates in the power sector, selected countries and regions

Transmission and distribution loss rate (%)

Source: IEA data.

Note: Transmission and distribution loss rates are calculated as a share of domestic supply (net generation plus imports less exports).
Improvements needed

Is this enough? NO!

• Improve what we have
  • Fill gaps in basic data sets
  • Harmonization
  • Communicate results better

• Add better indicators using expanded datasets
  • Explanatory drivers
  • Measure impact

• Capacity building
For more information on the GTF report, please go to:

trackingenergy4all.worldbank.org

#endenergypoverty