ESCWA EGM on Energy Statistics and Balances
UN House, Beirut, April 18-20, 2012

Energy use and Energy Efficiency Indicators

Example of the residential sector

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International Energy Agency
Overview

- What information is available from the energy balances?

- Which further data are needed?

- Starting points
  - The IEA Energy Efficiency Indicators Template
  - The future Manual on Statistics for Energy Efficiency Indicators
Information from energy balance provides useful insights...

Residential accounts for 16% of ESCWA* final consumption in 2009

*Data for 13 ESCWA members, based on IEA data 2011
... that can be coupled to macro-economic information to provide further insight

Final consumption in ESCWA*

Index: 1990=100  Data for 13 ESCWA members, based on IEA data 2011
But has limits...

### WORLD ENERGY BALANCE

<table>
<thead>
<tr>
<th>Supply and Consumption</th>
<th>Coal &amp; Peat</th>
<th>Crude Oil</th>
<th>Oil Products</th>
<th>Gas</th>
<th>Nuclear</th>
<th>Hydro</th>
<th>Geoth, Solar</th>
<th>Combust, Renew, &amp; Waste</th>
<th>Electricity</th>
<th>Heat</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>3641.50</td>
<td>4041.34</td>
<td>3068.17</td>
<td>712.18</td>
<td>275.88</td>
<td>88.35</td>
<td>1225.43</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>8.96</td>
</tr>
<tr>
<td>Imports</td>
<td>591.76</td>
<td>2332.71</td>
<td>995.62</td>
<td>782.77</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>8.40</td>
</tr>
<tr>
<td>Exports</td>
<td>-104.60</td>
<td>2200.43</td>
<td>1074.56</td>
<td>-777.99</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>52.84</td>
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<tr>
<td>Stock changes</td>
<td>-72.21</td>
<td>28.78</td>
<td>-7.72</td>
<td>-22.10</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.15</td>
</tr>
<tr>
<td>TPES</td>
<td>3274.94</td>
<td>4146.84</td>
<td>4020.04</td>
<td>2791.07</td>
<td>712.18</td>
<td>275.88</td>
<td>88.35</td>
<td>1225.43</td>
<td>-</td>
<td>-</td>
<td>-1.55</td>
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</tbody>
</table>

#### OTHER SECTORS

<table>
<thead>
<tr>
<th>Sector</th>
<th>Coal &amp; Peat</th>
<th>Crude Oil</th>
<th>Oil Products</th>
<th>Gas</th>
<th>Nuclear</th>
<th>Hydro</th>
<th>Geoth, Solar</th>
<th>Combust, Renew, &amp; Waste</th>
<th>Electricity</th>
<th>Heat</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>136.42</td>
<td>0.23</td>
<td>425.87</td>
<td>633.44</td>
<td>-</td>
<td>-</td>
<td>14.37</td>
<td>834.05</td>
<td>820.32</td>
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</tr>
<tr>
<td>Commercial &amp; Public Serv.</td>
<td>76.58</td>
<td>-</td>
<td>222.89</td>
<td>418.55</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6.98</td>
<td>805.42</td>
<td>395.81</td>
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</tr>
<tr>
<td>Agriculture/Forestry</td>
<td>23.30</td>
<td>-</td>
<td>107.32</td>
<td>173.79</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.15</td>
<td>16.33</td>
<td>338.31</td>
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<tr>
<td>Fishing</td>
<td>9.57</td>
<td>0.02</td>
<td>102.97</td>
<td>5.58</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.16</td>
<td>7.02</td>
<td>36.20</td>
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<tr>
<td>Non-specified</td>
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<td>0.21</td>
<td>14.00</td>
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<td>-</td>
<td>-</td>
<td>6.05</td>
<td>5.28</td>
<td>49.64</td>
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</tr>
</tbody>
</table>

What most countries collect on a regular basis is limited to aggregated levels.

No breakdown by end use:
- space heating
- water heating
- lighting
- cooking
- air conditioning
- appliances

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More information is required...
To understand how energy is used

Most of the growth in residential energy consumption in 18 IEA member countries is attributable to appliances and electronics.
To define public policies

The increase is entirely due to small appliances.

Energy consumption from large appliances decreased by 11%.

In 18 IEA member countries, in the residential sector, most of the appliances energy consumption growth in due to small appliances.
Without savings from energy efficiency, energy consumption in IEA 19 would have been 13% higher in 2006.
The indicators pyramid

- Aggregated Indicators
  - TPES/GDP
  - TPES/Production
  - Electricity Cons./Population
  - CO2/GDP PPP
  - Efficiency Elec. Prod.

- Disaggregated Indicators
  - Cons./ton cement
  - Heating Cons./sqm/DD
  - Litres/100km (stock)
  - Dry process
  - Condensing boiler
  - Litres/100km

- Process/Appliance Efficiency

- Unit Energy Consumption
- End-use Energy Intensity
- Sectoral Energy Intensity

Data requirement
Data for energy efficiency indicators - Residential sector

- **End uses**
  - Space heating
  - Space cooling
  - Water heating
  - Cooling
  - Lighting

- **Appliances**
  - Refrigerator
  - Freezer
  - Dishwasher
  - Clothes washer
  - Clothes dryer
  - TV
  - Computers

- **Fuel consumption by fuel type**

- **Appliance stock**

- **Appliance diffusion**
  - Units per dwelling

- **Efficiency indicators**
  - Energy consumption per unit
  - Energy per floor area
The IEA Energy Efficiency Indicators Template

Energy Efficiency Indicators Template
country name

<table>
<thead>
<tr>
<th>COUNTRY DATA SECTION (to be reviewed and updated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MACRO ECONOMIC DATA</td>
</tr>
<tr>
<td>COMMODITIES</td>
</tr>
<tr>
<td>INDUSTRY</td>
</tr>
<tr>
<td>SERVICES</td>
</tr>
<tr>
<td>RESIDENTIAL</td>
</tr>
<tr>
<td>TRANSPORT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IEA DATA and AGGREGATE INDICATORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTRICITY GENERATION</td>
</tr>
<tr>
<td>BASIC INDICATORS</td>
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<table>
<thead>
<tr>
<th>SUPPORT TOOLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>USER REMARKS</td>
</tr>
<tr>
<td>DATA COVERAGE</td>
</tr>
<tr>
<td>SINGLE INDICATOR GRAPHS</td>
</tr>
<tr>
<td>MULTIPLE INDICATORS GRAPHS</td>
</tr>
<tr>
<td>CONSISTENCY CHECKS</td>
</tr>
</tbody>
</table>
Manual on Statistics for Energy Efficiency Indicators

- Background
- Sector
- Collection Method
- Time
- Cost
- Notes and comments
For more information, please contact:
energyindicators@iea.org