Energy Efficiency Indicators

Laila El-Ashmawy
14 December 2018, Beirut
What is energy efficiency?

Is this energy efficiency?

➢ Consume **LESS** energy to provide **SAME** service
  e.g. substitute Incandescent bulbs with LED

➢ Consume **SAME** energy to provide **MORE** service
  e.g. increased production with the same energy

Warm up: Yes / No / Maybe
What is energy efficiency?

Is this energy efficiency?

- Consume **LESS** energy because of **CHANGE** in service
  e.g. economic restructuring

- Consume **LESS** energy and provide **LESS** service
  e.g. walk or bike instead of drive

**Warm up:**
Yes / No / Maybe
Overview

➢ Why developing energy efficiency indicators?

➢ What information is available from the energy balances?

➢ What further data are needed to track energy efficiency?

➢ How to collect these data?
Why developing energy efficiency indicators?

The importance of energy efficiency
The importance of energy efficiency – Multiple benefits

Environmental, economic and social

The importance of energy efficiency – Emission savings

Avoided global GHG emissions from energy efficiency improvements

Energy efficiency reduced GHG emissions by 4 GtCO₂-eq, or 13% of total CO2 emissions in 2016.

The importance of energy efficiency – key to set targets and monitor impacts

Energy Efficiency

Reporting targets

Under Article 24, paragraph 11, of the Energy Efficiency Directive, the “Commission shall make the reports referred to in paragraphs 1 and 2 publicly available.” Reports are published on this page as soon as they are received from Member States.
The importance of energy efficiency – Untapped potential

Currently, 70% of global energy consumption is not subject to mandatory efficiency standards targets.

Energy consumption covered by efficiency regulations, 2000-2015

- **2000**
  - Covered: 11%
  - Untapped: 89%

- **2015**
  - Covered: 30%
  - Untapped: 70%

What information is available from the energy balances?

Are available data enough to track energy efficiency?
Most countries collect basic energy statistics...
…which can be combined to build energy balances
The importance of energy balances

### Energy Balance

<table>
<thead>
<tr>
<th>Category</th>
<th>Supply</th>
<th>Transformation</th>
<th>Final Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy intensity, Self-sufficiency</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Efficiencies of transformation sector</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Shares of energy consumption by sector</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

### Energy Balance Table

<table>
<thead>
<tr>
<th>Product</th>
<th>Supply</th>
<th>Transformation</th>
<th>Final Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Suppliers and Consumption (in million tonnes of oil equivalents)**

<table>
<thead>
<tr>
<th>Supplier, Category</th>
<th>Crude Oil</th>
<th>Other Products</th>
<th>Oil</th>
<th>Natural Gas</th>
<th>Nuclear</th>
<th>Hydro</th>
<th>Solar</th>
<th>Wind</th>
<th>Heat</th>
<th>Biofuels</th>
<th>Derived</th>
<th>Alkali</th>
<th>Electricity</th>
<th>Total</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Producers</td>
<td>3984.33</td>
<td>17179.34</td>
<td>306.44</td>
<td>4230.38</td>
<td>7183.91</td>
<td>7185.91</td>
<td>296.62</td>
<td>192.02</td>
<td>1277.68</td>
<td>194.00</td>
<td>12777.25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imports</td>
<td>686.87</td>
<td>2980.06</td>
<td>1655.71</td>
<td>491.87</td>
<td>871.02</td>
<td>871.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>871.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exports</td>
<td>-420.16</td>
<td>-2319.30</td>
<td>-117.08</td>
<td>-489.35</td>
<td>-431.35</td>
<td>-431.35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-431.35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL Consumptions</td>
<td>3417.77</td>
<td>19189.77</td>
<td>2506.85</td>
<td>3070.38</td>
<td>6869.49</td>
<td>6869.49</td>
<td>296.62</td>
<td>192.02</td>
<td>1277.68</td>
<td>194.00</td>
<td>12777.25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**WORLD ENERGY BALANCE**

- **Supply**
  - Natural gas
  - Nuclear
  - Hydro
  - Solar
  - Wind
  - Heat
  - Biofuels

- **Transformation**
  - Efficiencies of transformation sector

- **Final Consumption**
  - Energy intensity
  - Self-sufficiency

---

**Energy Balance Table**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Energy Balance</th>
<th>Final Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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The limitations of energy balances

What most countries collect on a regular basis is aggregated data

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

OTHER SECTORS

Residential
Commercial (Services)
Agriculture/Forestry
Fishing
Non-specified

No breakdown by end-use and by service category

Coal & Peat
Crude Oil
Crude Oil Products
Natural Gas
Nuclear
Hydro/Geoth/Solar/Comb. Renew./Waste
Electricity
Heat
Total

1012.86
-322.66
-234.44
-14.37
834.05
820.32
145.22
3036.92

18.55
-6.98
805.42
395.81
97.97
2024.19

73.79
-1.15
16.33
338.31
32.47
692.67

5.58
-0.16
7.02
36.20
3.36
164.88

0.02
-0.03
-0.36
0.06
6.17

35.51
-6.05
5.28
49.64
11.36
149.01

ENERGY BALANCE

Million tonnes of oil equivalents

<table>
<thead>
<tr>
<th>Source and Consumption</th>
<th>Coal &amp; Peat</th>
<th>Crude Oil</th>
<th>Crude Oil Products</th>
<th>Natural Gas</th>
<th>Nuclear</th>
<th>Hydro/Geoth/Solar/Comb. Renew./Waste</th>
<th>Electricity</th>
<th>Heat</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRODUCED</td>
<td>3196.36</td>
<td>4358.39</td>
<td>2719.93</td>
<td>718.96</td>
<td>926.52</td>
<td>177.68</td>
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<td></td>
<td>12788.25</td>
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<tr>
<td>IMPORTS</td>
<td>629.81</td>
<td>2306.18</td>
<td>1885.71</td>
<td>817.22</td>
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<td></td>
<td></td>
<td></td>
<td>5398.77</td>
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<tr>
<td>FUEL COMB.</td>
<td>-486.12</td>
<td>-721.19</td>
<td>-1171.98</td>
<td>-813.35</td>
<td>-459.35</td>
<td>-179.21</td>
<td>-259.35</td>
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<td>-3931.01</td>
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<tr>
<td>OTHER USES</td>
<td>-3177.47</td>
<td>4978.77</td>
<td>2573.77</td>
<td>578.96</td>
<td>290.52</td>
<td>152.82</td>
<td>6.94</td>
<td></td>
<td>12177.58</td>
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<tr>
<td>Transfers</td>
<td>-3.38</td>
<td>-179.94</td>
<td>175.53</td>
<td>-1.02</td>
<td></td>
<td>0.20</td>
<td>-5.49</td>
<td>1.43</td>
<td>-27.99</td>
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<tr>
<td>Sub-total</td>
<td>-51.58</td>
<td>-38.25</td>
<td>278.85</td>
<td>-71.34</td>
<td></td>
<td>-12.10</td>
<td>-5.49</td>
<td></td>
<td>-297.90</td>
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<tr>
<td>Electric plants</td>
<td>-171.94</td>
<td>-86.22</td>
<td>-253.17</td>
<td>-296.67</td>
<td>-173.07</td>
<td>-295.92</td>
<td>-86.21</td>
<td>41.49</td>
<td>-2098.47</td>
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<tr>
<td>CHP plants</td>
<td>-141.03</td>
<td>-56.01</td>
<td>-22.38</td>
<td>-300.76</td>
<td>-14.15</td>
<td>-1.02</td>
<td>-32.21</td>
<td>171.71</td>
<td>-205.35</td>
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<tr>
<td>Heat plants</td>
<td>-100.31</td>
<td>-86.21</td>
<td>-12.39</td>
<td>-30.14</td>
<td>-14.15</td>
<td>-2.22</td>
<td>-16.42</td>
<td>-5.54</td>
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<tr>
<td>Steam boilers</td>
<td>-14.08</td>
<td>-3.97</td>
<td>-7.61</td>
<td>-8.62</td>
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<td>0.20</td>
<td>-3.97</td>
<td></td>
<td>-59.35</td>
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<tr>
<td>Combined heat plants</td>
<td>-11.08</td>
<td>-2.97</td>
<td>-1.90</td>
<td></td>
<td></td>
<td>0.20</td>
<td>-2.97</td>
<td></td>
<td>-24.99</td>
</tr>
<tr>
<td>District heating plants</td>
<td>-396.25</td>
<td>3671.58</td>
<td>-360.25</td>
<td>-23.99</td>
<td></td>
<td>0.20</td>
<td>-23.99</td>
<td></td>
<td>-363.20</td>
</tr>
<tr>
<td>Domestic heat (区)</td>
<td>9531.25</td>
<td>-21.35</td>
<td>-</td>
<td>-23.14</td>
<td>-4.09</td>
<td>-1.15</td>
<td>-15.13</td>
<td>46.01</td>
<td>-379.50</td>
</tr>
<tr>
<td>Other transformation</td>
<td>-10.25</td>
<td>-7.90</td>
<td>-1.17</td>
<td>-22.17</td>
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<td>0.20</td>
<td>-22.17</td>
<td></td>
<td>-62.27</td>
</tr>
<tr>
<td>Energy intensity uses</td>
<td>-36.02</td>
<td>-35.32</td>
<td>-23.93</td>
<td>-27.50</td>
<td></td>
<td>-0.13</td>
<td>-10.27</td>
<td>18.35</td>
<td>-109.62</td>
</tr>
<tr>
<td>Light and metering</td>
<td>0.29</td>
<td>-0.22</td>
<td>0.58</td>
<td>-29.02</td>
<td></td>
<td>-0.14</td>
<td>0.16</td>
<td>153.87</td>
<td>-122.27</td>
</tr>
<tr>
<td>Indirect losses</td>
<td>-3.38</td>
<td>-6.98</td>
<td>-232.89</td>
<td>-56.36</td>
<td></td>
<td>-0.14</td>
<td>-62.67</td>
<td>22.57</td>
<td>-212.27</td>
</tr>
<tr>
<td>Indirect losses</td>
<td>-26.96</td>
<td>0.21</td>
<td>-14.00</td>
<td>35.51</td>
<td></td>
<td>-6.05</td>
<td>5.28</td>
<td>49.64</td>
<td>149.01</td>
</tr>
<tr>
<td>Sub-total</td>
<td>852.34</td>
<td>3542.29</td>
<td>3052.45</td>
<td>1533.65</td>
<td></td>
<td>21.07</td>
<td>116.41</td>
<td>1139.09</td>
<td>215.63</td>
</tr>
</tbody>
</table>
Balances data example

**United States TFC by sector, 2015**

- **Road** 36%
  - Domestic aviation 3%
  - Rail 1%
  - Domestic navigation 1%
  - Industry 17%
  - Residential 17%
  - Commerce and public services 14%
  - Other 11%

**Road transport is the most consuming.**

**How do we track road transport efficiency?**

**We need more detailed data:**

- consumption by vehicle type e.g. cars, buses, trucks
- activity data e.g. distance travelled, passenger/tonne-kilometers

Data source: IEA (2017), World energy balances.
Energy balances coupled with macroeconomic data explain overall consumption patterns

Residential energy consumption index (IEA20)

Aggregated indicators can be useful ...

Data for IEA 20 (Australia, Austria, Canada, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Japan, Netherlands, Norway, Slovakia, Spain, Sweden, Switzerland, UK, USA).
Data source: IEA, Energy efficiency indicators.
We need more disaggregated data to get the full picture

Residential energy consumption index (IEA20)

Data for IEA 20 (Australia, Austria, Canada, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Japan, Netherlands, Norway, Slovakia, Spain, Sweden, Switzerland, UK, USA).

* Temperature correction using heating degree days

Data source: IEA, Energy efficiency indicators.
Understanding aggregated indicators requires attention

Energy intensity (TFC/GDP) changes (1990-2010)

Intensity decreased more in country X

Quiz!!

Which country has decreased more its energy intensity?

(Country X / Country Y)

Can we say that Country X has improved more in ENERGY EFFICIENCY?

(Yes / No / Maybe)

Data source: IEA, Energy efficiency indicators.
Aggregated indicators are sometimes used inappropriately

Country X intensity reduction was mostly due to structural changes, while country Y improved more in energy efficiency.

Data source: IEA, Energy efficiency indicators.
What further data are needed to track energy efficiency?
Energy efficiency indicators: what level of detail?

Commonly available data: Energy Balances

- Aggregated Indicators
  - TPES/GDP
  - TFC/Population
  - End-use efficiency indicators
    - Heating /square meter
    - Energy use /ton steel
    - Energy use /# TVs
  - Process/appliance efficiency indicators
    - Energy use /ton steel
    - Energy use /# TVs

Data requirement
Energy efficiency indicators: definition

An efficiency indicator explains how much energy is needed to provide a certain service.
Indicators for residential energy efficiency

For each end-use:
- Space heating*
- Space cooling*
- Water heating
- Cooking
- Lighting
- Appliances (energy use, stock, diffusion)
  - Refrigerator
  - Freezer
  - Dishwasher
  - Clothes washer
  - Clothes dryer
  - TV
  - Computers

* Temperature corrected, using HDD & CDD
Residential: matching energy and activity

QUIZ

Water heating

floor area (m²)

# of dwellings

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Residential: matching energy and activity

QUIZ

Appliances

floor area (m²)

Appliance stocks
Indicators for services

For each end-use:
- Space heating*
- Space cooling*
- Lighting
- Other building use
- Non-building use

* Temperature corrected, using HDD & CDD

energy efficiency indicator = energy activity

Value added ($)  Floor area (m²)  # of employees

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Indicators for industry

For major ISIC subsectors (by energy product)

Energy efficiency indicator

Value added ($)  Physical production (t)

For major ISIC subsectors

- Paper
- Chemicals
- Other non-metallic mineral
- Basic metals
Industry sub-sectors

19 sub-sectors

- Chemical
  - Ethylene
  - Propylene
  - BTX

- Iron and steel
  - Basic Oxygen Furnace
  - Electric Arc Furnace
  - Direct Reduced Iron

- Non-ferrous metals
  - Aluminum
  - Bauxite
  - Alumina refining

- Non-metallic minerals
  - Cement
  - Clinker

- Pulp and paper
  - Pulp
    - Chemical pulp
    - Mechanical pulp
  - Recovered paper
    - Inked
    - De-inked

- etc.
  - Paper and paperboard
    - Newsprint
    - Household sanitary
    - Printing + writing
Indicators for transport

- **Transport segment**
  - passenger / freight
- **Transport modes**
  - road, rail, air, water, etc.

**energy efficiency indicator** = **energy** / **activity**

- **Passenger-km** or **tonne-km**
- **Occupancy**
- **Load factor**
- **Vehicle stock**
- **Distance travelled**
Transport: defining energy efficiency

- Transport MORE and FARTHER with LESS fuel consumption

  e.g. Is it more energy efficient to use public transport instead of personal cars?

Quiz!
(Yes / No / Maybe)
Transport: defining energy efficiency

- Transport **MORE** and **FARTHER** with **LESS** fuel consumption

  e.g. Is it more energy efficient to use public transport instead of personal cars?

Needs detailed **ACTIVITY** data in addition to fuel consumption...
Activity data needed for transport indicators

Activity and structure

- Stock of vehicles
- Vehicle-kilometres
- Passenger-kilometres
- Tonne-kilometres

\[
\begin{align*}
V\text{-km} &= 5\text{km} + 5\text{ km} = 10 \text{ v-km} \\
P\text{-km} &= 6 \text{ passengers} \times 5 \text{ km} = 30 \text{ p-km} \\
\text{Avg. load} &= \frac{p\text{-km}}{v\text{-km}} = \frac{30}{10} = 3 \frac{p}{v}
\end{align*}
\]
Indicators link activity and energy data – the reality

Need to understand the accuracy of both the energy and activity data – size of error terms

Think about data in indicators
How to collect energy efficiency data?
The IEA EEI data collection

- Agreed by member countries in 2009 (IEA Ministerial)

- Developed with international community of experts, based on historical work on indicators (Odyssee, LBNL, etc.)

- A user-friendly Excel template (available online)

- Collects energy consumption and activity data

- Covers four sectors: residential, services, industry, transport

- A publication: *Energy efficiency indicators Highlights*
Energy Efficiency Indicators Highlights – new edition coming out soon!

Cross-sectoral overview:
- Largest end-uses by sector, 2014
- Top 6 CO₂ emitting end-uses, 2014

Final energy consumption by source:

Drivers of final energy consumption:

Estimated energy savings from efficiency:

Estimated cumulative energy savings by sector, 2000-14:

Residential sector:
- Residential consumption P, Q, R
- Share of final fuels (space heating/cooling)
- Population (mil)
- Consumption per capita (GJ/pers)
- Average dwelling surface (m²)
- Average dwelling consumption (GJ/pers)

Residential energy consumption by end-use, 2014:

Residential energy consumption by source:

Appliances per dwelling, 2005-14 % change:

Energy intensities by end-use per floor area:

Energy intensities by end-use per dwelling:

*Other end-uses includes agriculture, mining and construction, passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the input; coal, renewables includes combustible renewables and waste; other sources includes heat and other energy sources.
The end use data collected by the IEA

Country
- Residential
  - End use:
    - Space heating
    - Space cooling
    - Water heating
    - Cooking
    - Lighting
    - Appliances
    - Other
  - Energy product:
    - Oil
    - Natural Gas
    - Renew. & waste
    - Heat
    - Electricity
    - Other
- Services
  - End use:
    - Space heating
    - Space cooling
    - Lighting
    - Other
  - Energy product:
    - (...)
- Industry
  - End use:
    - Iron and steel
    - Chemicals
    - Paper
    - Textiles
    - Basic metals
    - Other
  - Energy product:
    - Oil
    - Natural Gas
    - Renew. & waste
    - Heat
    - Electricity
    - Other
- Transport
  - End use:
    - Passenger cars
    - Buses
    - Passeng. trains
    - Trucks
    - Freight trains
    - Other
  - Energy product:
    - Oil
    - Natural Gas
    - Renew. & waste
    - Heat
    - Electricity
    - Other

Energy indicator
- Per capita energy intensity (GJ/cap)
- Per dwelling energy intensity (GJ/dw)
- Per floor area energy intensity (GJ/m2)
- Per unit equipment energy intensity (GJ/unit)
- Per services employee energy intensity (GJ/employee)
- Per VA energy intensity (GJ/USD PPP 2010)
- Per physical output energy intensity (GJ/t)
- Fuel intensity (liters/100 vkm)
- Passenger-kilometer energy intensity (MJ/pkm)
- Tonne-kilometer energy intensity (MJ/tkm)
- Vehicle-kilometer energy intensity (MJ/vkm)
- Other
The IEA energy efficiency indicators (EEI) template

Energy Efficiency Indicators Template
country name

### COUNTRY DATA SECTION (to be reviewed and updated)

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MACRO ECONOMIC DATA</td>
<td>Macro economic and activity data</td>
</tr>
<tr>
<td>COMMODITIES</td>
<td>Production outputs from selected energy-consuming industries</td>
</tr>
<tr>
<td>INDUSTRY</td>
<td>Energy consumption by ISIC categories</td>
</tr>
<tr>
<td>SERVICES</td>
<td>Energy consumption by end-uses in the services sector</td>
</tr>
<tr>
<td>RESIDENTAL</td>
<td>Household energy consumption by end-uses and selected appliances data</td>
</tr>
<tr>
<td>TRANSPORT</td>
<td>Energy and activity data for passenger and freight transport</td>
</tr>
</tbody>
</table>

### IEA DATA and AGGREGATE INDICATORS

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTRICITY GENERATION</td>
<td>Electricity generation from combustible fuels and efficiencies</td>
</tr>
<tr>
<td>BASIC INDICATORS</td>
<td>Predetermined set of aggregate energy and activity indicators</td>
</tr>
</tbody>
</table>

### SUPPORT TOOLS

<table>
<thead>
<tr>
<th>Tool</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>USER REMARKS</td>
<td>To incorporate comments associated to the data from the individual sheets</td>
</tr>
<tr>
<td>DATA COVERAGE</td>
<td>Generates a graphical summary of data coverage (completed vs. expected)</td>
</tr>
<tr>
<td>SINGLE INDICATOR GRAPHS</td>
<td>To generate a graph for one energy indicator</td>
</tr>
<tr>
<td>MULTIPLE INDICATORS GRAPHS</td>
<td>To generate a graph comparing trends from multiple indicators</td>
</tr>
<tr>
<td>CONSISTENCY CHECKS</td>
<td>To run the integrated consistency checks</td>
</tr>
</tbody>
</table>

If you have any questions or need assistance with this questionnaire, write to energyindicators@iea.org

Click on the START button to begin working

START
The EEI template: starting point for data collection

<table>
<thead>
<tr>
<th></th>
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### The EEI template: helps identifying data gaps and issues

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### Domestic passenger airplanes

| Jet Fuel & Aviation Gasoline | PJ | 0.50 | 0.63 | 0.75 | 1.00 | 0.67 | 0.42 | 0.48 | 0.33 | 0.50 | 0.88 |
| Other | PJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | PJ | 0.50 | 0.63 | 0.75 | 1.00 | 0.67 | 0.42 | 0.48 | 0.33 | 0.50 | 0.88 |

### Energy intensity

| Energy intensity | MJ/okm | 2.07 | 2.50 | 2.20 | 2.37 | 0.99 | 0.27 | 0.19 | 0.12 | 0.14 | 0.19 |
Methods used to collect data for indicators

- **Administrative sources**
  - before starting new data collection

- **Surveys**
  - representative sample
  - possibly expanding existing surveys

- **Metering and measuring**
  - costly but very effective for monitoring specific equipment efficiency

- **Modelling**
  - complementary to surveys or stand alone
Tools to develop indicators

➢ Fundamentals on statistics:
  to provide guidance on how to collect the data needed for indicators
  ▪ Includes a compilation of existing practices from across the world
  ▪ https://goo.gl/Y8QD1G

➢ Essentials for policy making:
  ▪ to provide guidance to develop and interpret energy efficiency indicators
  ▪ https://goo.gl/agcNg2

Both available also in:
  Spanish
  Russian
  Chinese
Country practices database

A platform to share expertise worldwide: practices are available in a searchable database. Contact us and share your practice!

https://www.iea.org/eeindicatorsmanual/
Key Messages

Detailed end-use and activity data are crucial.

WHY:

- highlighting priority subsectors,
- understanding energy efficiency trends,
- monitoring policy effectiveness.

HOW:

- raising awareness of detailed data needs,
- adapting data collection to the country profile,
- sharing expertise across countries and organizations.
Understanding where energy is used: the importance of end-use data

Diagram showing the breakdown of total final consumption into residential, services, industry, transport, and other categories, with further细分 to space heating, cooking, lighting, etc. for residential, chemical and petrochemical products for industry, road and rail transport for transport, and mining and quarrying for other.