Energy end use data and Efficiency Indicators

Mafalda Silva

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IEA

Outline

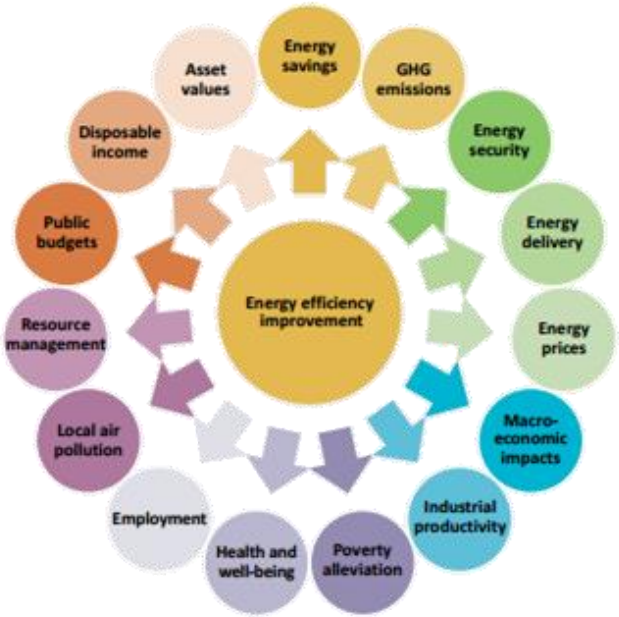
- Why developing energy efficiency **indicators**?
- What information is available from the **energy balances**?
- **What further data** needed to track energy efficiency?
- **How to collect** these data?

Why developing energy efficiency indicators?

The importance of energy efficiency

The importance of energy efficiency – Multiple benefits

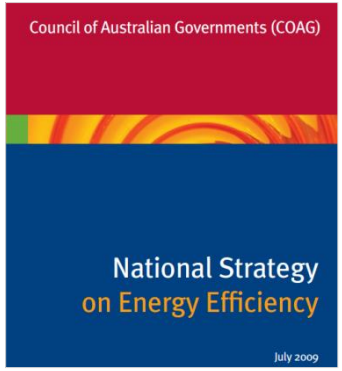
The multiple benefits of energy efficiency

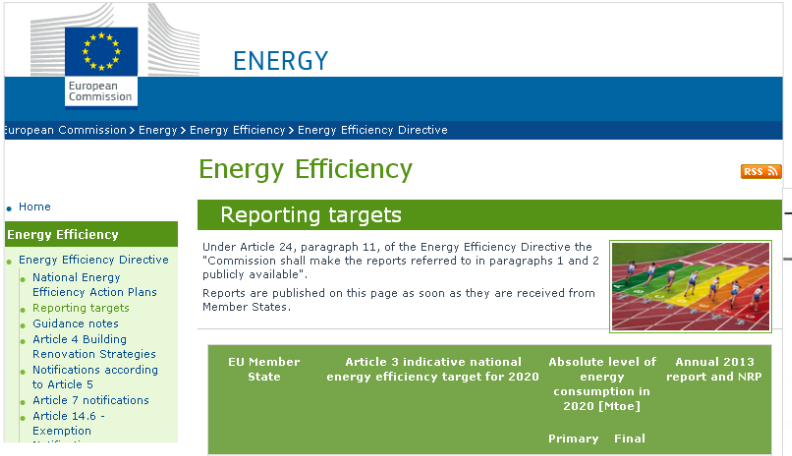


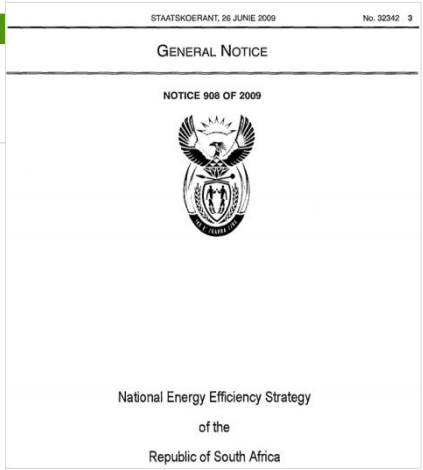
Environmental, economic and social benefits

Source: IEA (2014), *Capturing the multiple benefits of energy efficiency*, OECD/IEA, Paris.

The importance of tracking energy efficiency



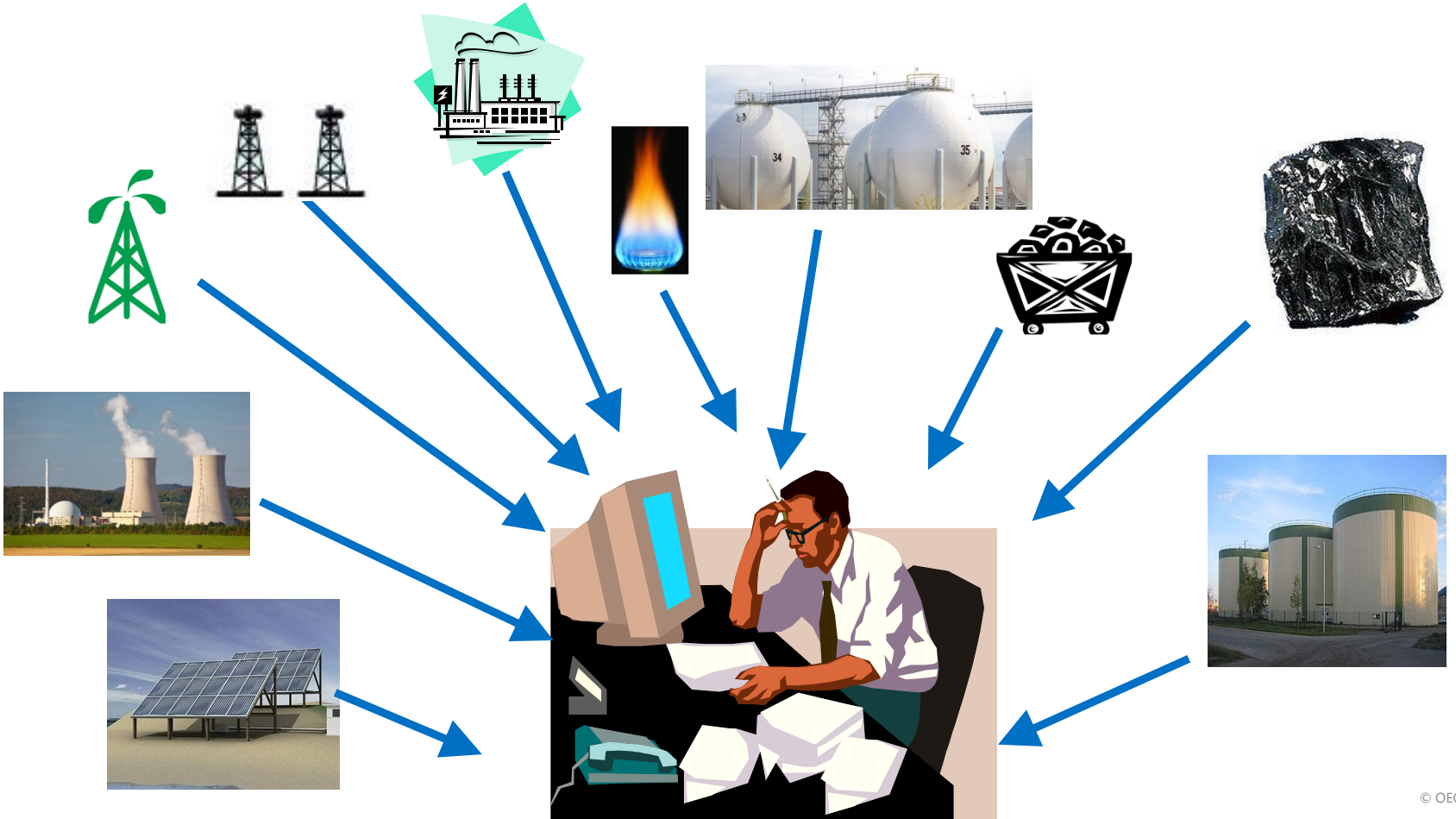




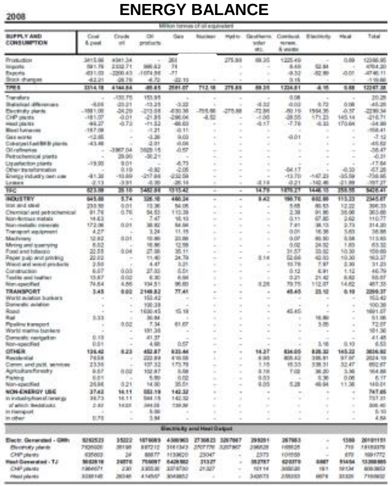
What information is available from the energy balances?

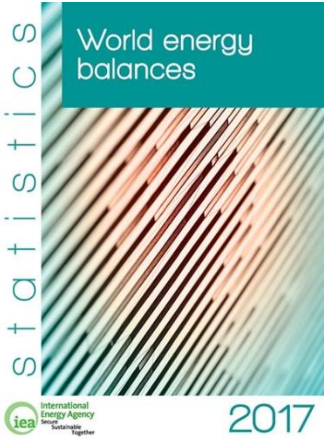
Are available data enough to track energy efficiency?

Most countries collect basic energy statistics…



…which can be combined to build energy balances





The importance of energy balances

Supply

Transformation

Final consumption

ENERGY BALANCE

Million tonnes of oil equivalent

SUPPLY AND CONSUMPTION	Coal & peat	Crude oil	Oil products	Natural Gas	Nuclear	Hydro	Geotherm. solar etc.	Biofuels & waste	Electricity	Heat	Total
Production	3596.04	4069.38	-	2719.10	718.96	295.62	112.02	1277.08	-	1.04	12789.25
Imports	640.82	2295.06	1053.71	817.02	-	-	-	10.78	51.38	0.00	4868.77
Exports	-681.28	-2211.55	-1111.80	-826.35	-	-	-	-9.29	-50.74	-0.01	-4891.01
Stock changes	-79.80	6.49	6.16	17.84	-	-	-	-0.54	-	-	-49.86
TPES	**3475.77**	**4159.37**	**-51.93**	**2727.61**	**718.96**	**295.62**	**112.02**	**1278.03**	**0.64**	**1.04**	**12717.16**
Transfers	0.00	-156.64	179.33	-	-	-	-	-	-	-	22.69
Statistical differences	-49.50	11.30	-27.05	-1.68	-	-	0.00	-0.40	1.43	-1.24	-67.14
Electricity plants	-1974.84	-34.63	-201.57	-705.47	-715.67	-295.62	-88.61	-63.40	1671.71	-0.37	-2408.47
CHP plants	-161.19	-0.01	-22.50	-304.76	-3.13	-	-1.06	-35.21	171.56	150.84	-205.45
Heat plants	-103.61	-0.81	-12.92	-90.14	-0.15	-	-0.22	-10.42	-0.34	189.23	-29.38
Blast furnaces	-168.50	-	-0.79	-0.11	-	-	-	-	-	-	-169.40
Gas works	-8.80	-	-3.53	2.81	-	-	-	-0.02	-	-	-9.54
Coke/pat.fuel/BKB plants	-51.08	-	-2.40	-0.00	-	-	-	-0.01	-	-	-53.49
Oil refineries	-	-3964.42	3921.30	-0.80	-	-	-	-	-	-	-43.92
Petrochemical plants	-	30.51	-31.35	-	-	-	-	-	-	-	-0.84
Liquefaction plants	-16.20	7.85	-	-7.10	-	-	-	-	-	-	-15.45
Other transformation	0.01	0.13	-0.17	-2.22	-	-	-	-53.14	-	-0.39	-55.77
Energy industry own use	-86.22	-10.10	-210.37	-275.36	-	-	-0.13	-13.27	-156.15	-40.51	-792.10
Losses	-2.70	-8.23	-0.58	-24.63	-	-	-0.14	-0.15	-153.17	-22.67	-212.27
TFC	**853.14**	**34.34**	**3535.48**	**1318.16**	**-**	**-**	**21.87**	**1102.01**	**1535.69**	**275.93**	**8676.63**
INDUSTRY	**677.86**	**12.51**	**310.02**	**463.87**	**-**	**-**	**0.46**	**195.83**	**636.96**	**125.43**	**2422.94**
Iron and steel	248.74	0.03	11.36	51.71	-	-	0.01	4.16	87.06	17.48	420.54
Chemical and petrochemical	58.37	2.18	47.73	99.18	-	-	0.00	2.30	95.52	45.11	350.39
Non-ferrous metals	14.47	0.00	6.84	16.16	-	-	0.00	0.11	68.40	2.97	108.96
Non-metallic minerals	176.70	0.07	36.98	50.61	-	-	0.00	7.08	40.97	3.01	315.43
Transport equipment	4.67	0.01	3.19	11.35	-	-	0.00	0.01	18.39	4.22	41.83
Machinery	14.34	0.05	10.04	23.24	-	-	0.00	0.17	67.77	6.78	122.39
Mining and quarrying	6.93	-	16.96	15.93	-	-	-	0.06	23.72	2.52	66.11
Food and tobacco	22.70	0.12	26.68	37.22	-	-	0.00	29.92	34.93	11.20	162.78
Paper pulp and printing	21.66	0.01	8.08	26.06	-	-	0.15	53.10	40.87	10.88	160.79
Wood and wood products	2.71	0.01	4.78	3.30	-	-	0.00	11.58	7.89	5.87	36.14
Construction	6.12	0.05	26.92	6.38	-	-	0.00	0.16	8.00	1.78	49.41
Textile and leather	11.18	0.06	5.59	7.14	-	-	0.00	0.23	23.22	7.01	54.44
Non-specified	89.28	9.93	104.85	115.59	-	-	0.30	86.95	120.21	6.60	533.72
TRANSPORT	**3.36**	**0.04**	**2195.89**	**89.06**	**-**	**-**	**-**	**57.56**	**23.91**	**-**	**2369.81**
World aviation bunkers	-	-	153.65	-	-	-	-	-	-	-	153.65
Domestic aviation	-	-	96.42	-	-	-	-	-	-	-	96.42
Road	-	0.03	1666.60	28.52	-	-	-	57.53	0.00	-	1752.68
Rail	3.22	-	28.37	-	-	-	-	0.02	18.04	-	49.65
Pipeline transport	-	-	0.43	59.99	-	-	-	-	2.90	-	63.31
World marine bunkers	-	-	200.72	-	-	-	-	-	-	-	200.72
Domestic navigation	0.12	-	43.98	0.05	-	-	-	0.01	-	-	44.16
Non-specified	0.01	0.00	5.73	0.49	-	-	-	0.00	2.97	-	9.21
OTHER	**135.96**	**6.75**	**435.64**	**612.83**	**-**	**-**	**21.41**	**848.62**	**874.82**	**150.50**	**3086.53**
Residential	78.65	0.55	210.54	421.08	-	-	9.42	820.70	438.24	105.72	2072.88
Comm. and publ. services	22.94	0.11	102.97	179.56	-	-	2.01	17.76	358.61	31.52	715.47
Agriculture/forestry	10.90	0.09	101.47	6.07	-	-	0.67	7.43	38.98	3.76	169.37
Fishing	0.01	-	6.23	0.02	-	-	0.06	0.00	0.39	0.05	6.77
Non-specified	23.47	6.00	14.43	6.10	-	-	9.25	2.73	50.60	9.45	122.04
NON-ENERGY USE	**35.97**	**15.05**	**593.93**	**152.40**	**-**	**-**	**-**	**-**	**-**	**-**	**797.35**
in industry/transf./energy	35.63	15.05	569.93	152.40	-	-	-	-	-	-	773.01
of which: feedstocks	*2.44*	*14.49*	*362.42*	*149.75*	-	-	-	-	-	-	*529.10*
in transport	-	-	6.63	0.00	-	-	-	-	-	-	6.63
in other	0.33	-	17.38	-	-	-	-	-	-	-	17.71
Electricity and Heat Output											
Electr. Generated - GWh	**8697512**	**27881**	**961377**	**4768076**	**2756289**	**3437483**	**449596**	**331679**	**-**	**1573**	**21431466**
Electricity plants	*8091865*	*27864*	*891872*	*3582493*	*2746188*	*3437483*	*446008*	*211248*	*-*	*827*	*19435848*
CHP plants	*605647*	*17*	*69505*	*1185583*	*10101*	*-*	*3588*	*120431*	*-*	*746*	*1995618*
Heat Generated - TJ	**5706864**	**26036**	**751312**	**6597541**	**27357**	**-**	**346248**	**761894**	**7495**	**68077**	**14284824**
CHP plants	*2058353*	*216*	*299046*	*3489955*	*20944*	*-*	*10389*	*434740*	*208*	*24958*	*6338809*
Heat plants	*3648511*	*25820*	*452266*	*3107586*	*6413*	*-*	*335859*	*327154*	*7287*	*35119*	*7946015*

Energy intensity, Self-sufficiency …

Efficiencies of transformation sector

Shares of energy consumption by sector

The limitation of energy balances: aggregated data

No breakdown by end-use:
- Space heating
- Space cooling
- water heating
- Lighting
- Cooking
- Appliances

No breakdown
by end-use
/ service category

ENERGY BALANCE

Million tonnes of oil equivalent

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Exports	-681.28	-2211.55	-1111.80	-826.35	-	-	-	-9.29	-50.74	-0.01	-4891.01
Stock changes	-79.80	6.49	6.16	17.84	-	-	-	-0.54	-	-	-49.86
TPES	3475.77	4159.37	-51.93	2727.61	718.96	295.62	112.02	1278.03	0.64	1.04	12717.16
Transfers	0.00	-156.64	179.33	-	-	-	-	-	-	-	22.69
Statistical differences	-49.50	11.30	-27.05	-1.68	-	-	0.00	-0.40	1.43	-1.24	-67.14
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Blast furnaces	-168.50	-	-0.79	-0.11	-	-	-	-	-	-	-169.40
Gas works	-8.80	-	-3.53	2.81	-	-	-	-0.02	-	-	-9.54
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Oil refineries	-	-3964.42	3921.30	-0.80	-	-	-	-	-	-	-43.92
Petrochemical plants	-	30.51	-31.35	-	-	-	-	-	-	-	-0.84
Liquefaction plants	-16.20	7.85	-	-7.10	-	-	-	-	-	-	-15.45
Other transformation	0.01	0.13	-0.17	-2.22	-	-	-	-53.14	-	-0.39	-55.77
Energy industry own use	-86.22	-10.10	-210.37	-275.36	-	-	-0.13	-13.27	-156.15	-40.51	-792.10
Losses	-2.70	-8.23	-0.58	-24.63	-	-	-0.14	-0.15	-153.17	-22.67	-212.27
TFC	853.14	34.34	3535.48	1318.16	-	-	21.87	1102.01	1535.69	275.93	8676.63
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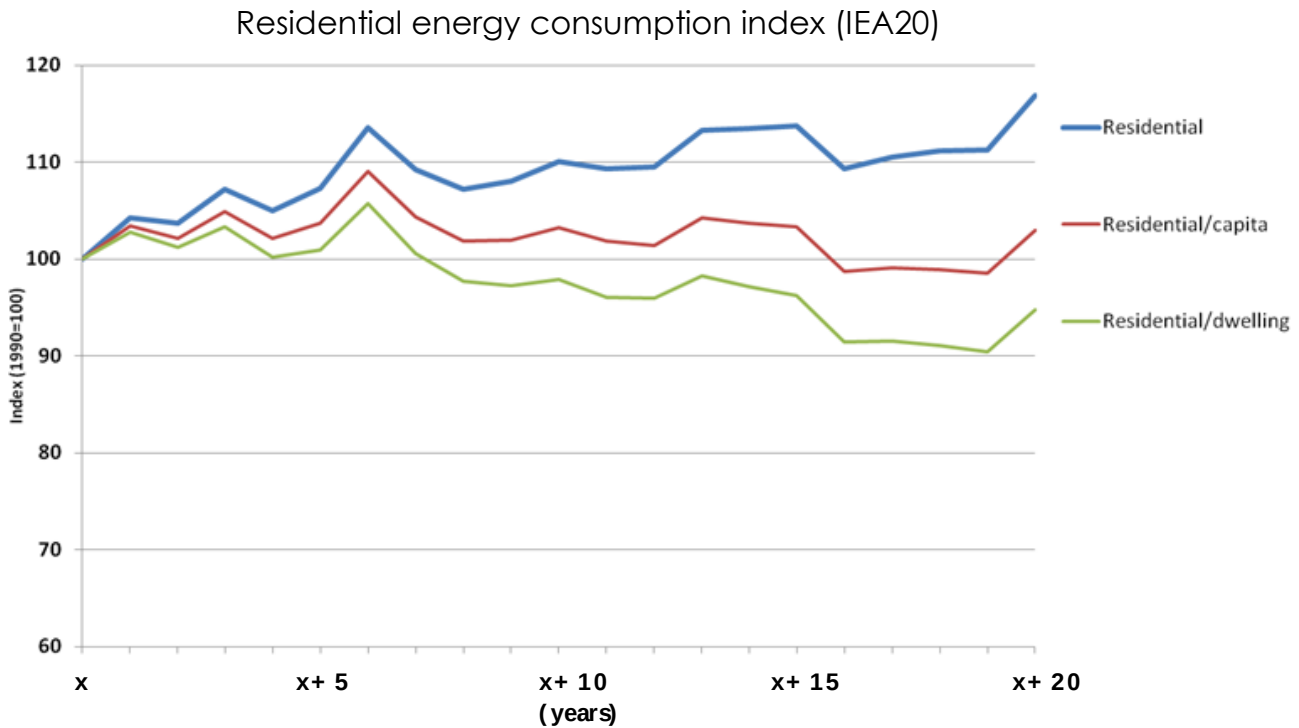
Non-metallic minerals	176.70	0.07	36.98	50.61	-	-	0.00	7.08	40.97	3.01	315.43
Transport equipment	4.67	0.01	3.19	11.35	-	-	0.00	0.01	18.39	4.22	41.83
Machinery	14.34	0.05	10.04	23.24	-	-	0.00	0.17	67.77	6.78	122.39
Mining and quarrying	6.93	-	16.96	15.93	-	-	-	0.06	23.72	2.52	66.11
Food and tobacco	22.70	0.12	26.68	37.22	-	-	0.00	29.92	34.93	11.20	162.78
Paper pulp and printing	21.66	0.01	8.08	26.06	-	-	0.15	53.10	40.87	10.88	160.79
Wood and wood products	2.71	0.01	4.78	3.30	-	-	0.00	11.58	7.89	5.87	36.14
Construction	6.12	0.05	26.92	6.38	-	-	0.00	0.16	8.00	1.78	49.41
Textile and leather	11.18	0.06	5.59	7.14	-	-	0.00	0.23	23.22	7.01	54.44
Non-specified	89.28	9.93	104.85	115.59	-	-	0.30	86.95	120.21	6.60	533.72
TRANSPORT	3.36	0.04	2195.89	89.86	-	-	-	57.56	23.91	-	2369.81

	Coal & Peat	Crude Oil	Oil Products	Gas	Nuclear	Hydro	Geoth/Solar	Comb. Ren.&Waste	Electricity	Heat	Total
OTHER SECTORS	**136.42**	**0.23**	**425.87**	**633.44**	**-**	**-**	**14.37**	**834.05**	**820.32**	**145.22**	**3036.92**
Residential	**76.58**	**-**	**222.89**	**418.55**	**-**	**-**	**6.98**	**805.42**	**395.81**	**97.97**	**2024.19**
Commercial (Services)	**23.30**	**-**	**107.32**	**173.79**	**-**	**-**	**1.15**	**16.33**	**338.31**	**32.47**	**692.67**
Agriculture/Forestry	**9.57**	**0.02**	**102.97**	**5.58**	**-**	**-**	**0.16**	**7.02**	**36.20**	**3.36**	**164.88**
Fishing	**0.01**	**-**	**5.69**	**0.02**	**-**	**-**	**0.03**	**-**	**0.36**	**0.06**	**6.17**
Non-specified	**26.96**	**0.21**	**14.00**	**35.51**	**-**	**-**	**6.05**	**5.28**	**49.64**	**11.36**	**149.01**

Aggregated indicators



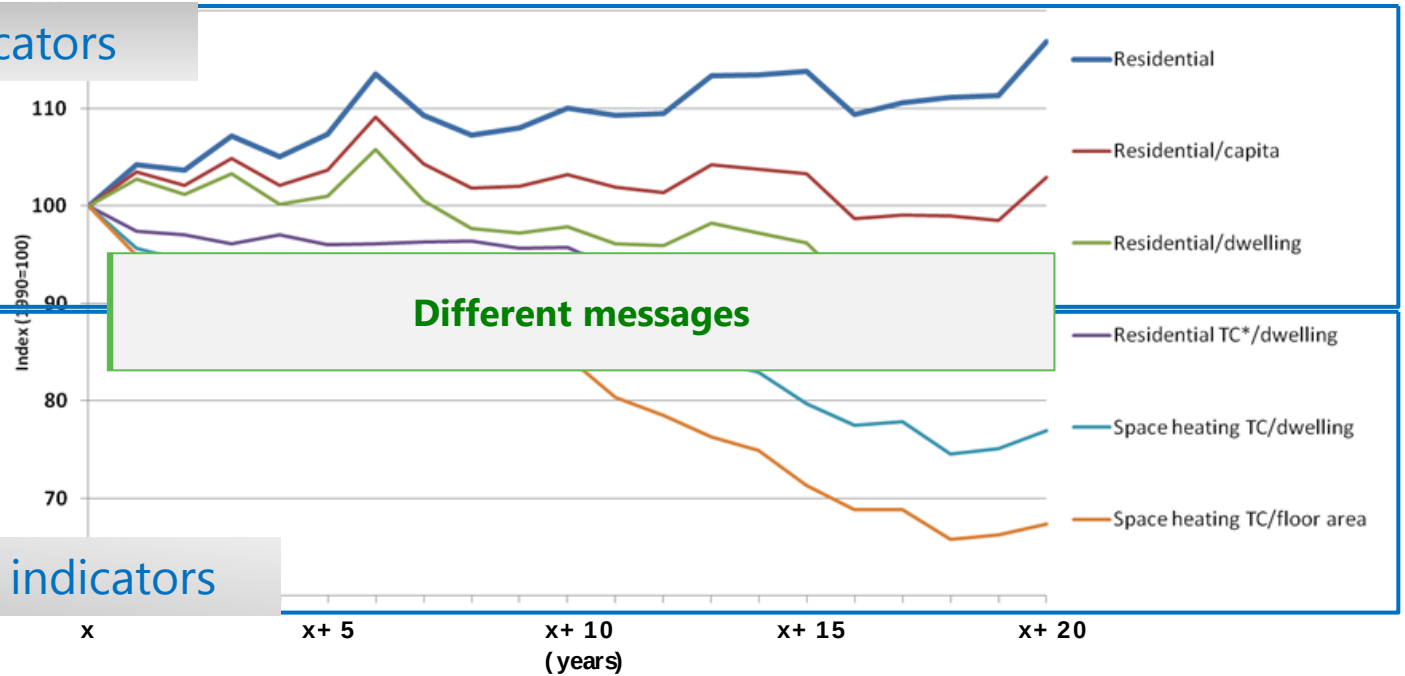
Energy balances coupled with macroeconomic data can be useful to explain overall consumption patterns

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)

High level indicators

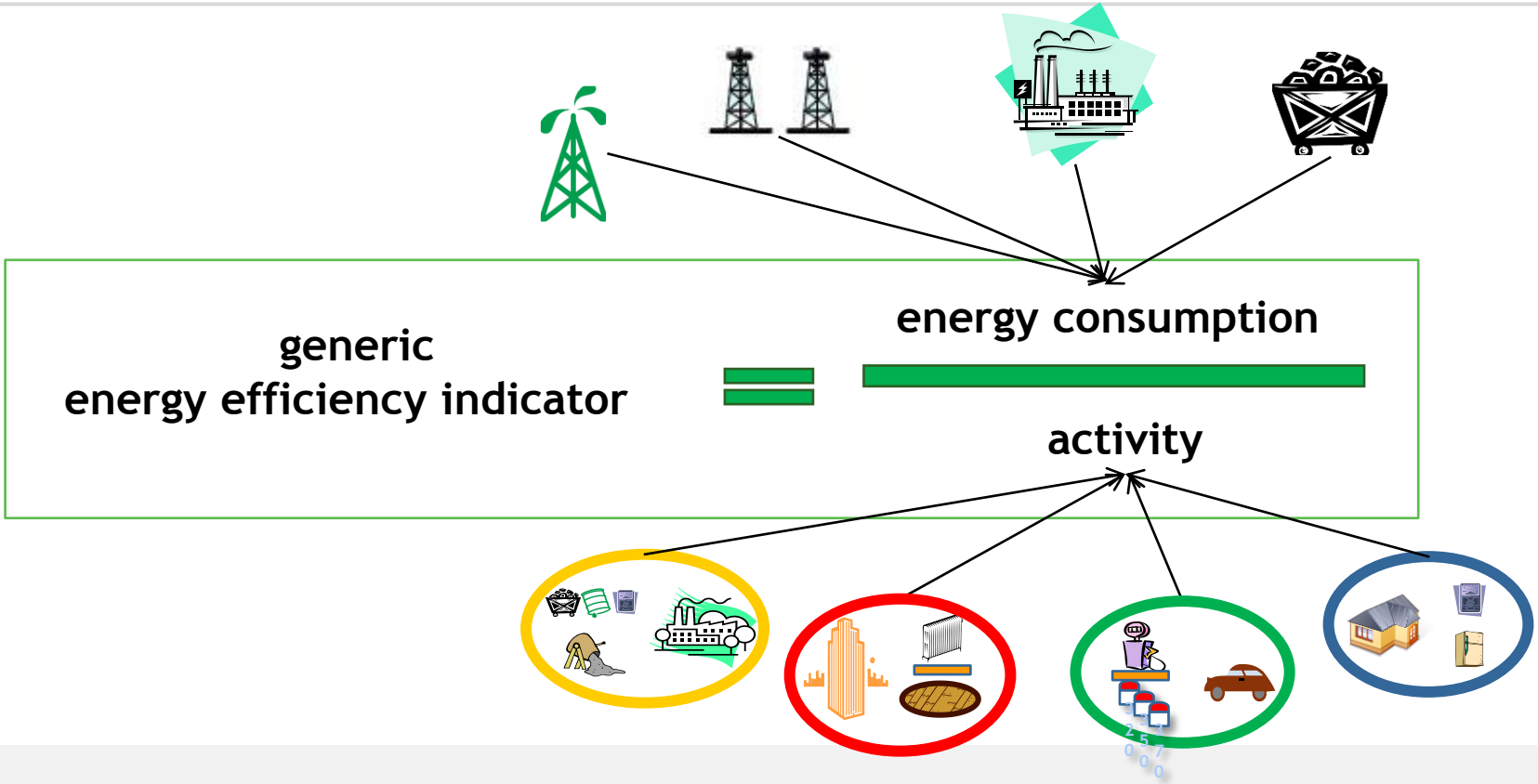


Disaggregated indicators

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.

Further data needed to track energy efficiency

Energy efficiency indicators: definition



An efficiency indicator explains how much energy is needed to provide a certain service

Indicators for residential

energy efficiency indicator = energy / activity

of dwellings

floor area (m²)

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

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

Indicators for industry

For major ISIC subsectors (by energy product)

Energy efficiency indicator = energy / activity

Value added ($)

Physical production (t)

Indicators for transport

Transport type

- passenger / freight

Transport mode

- road, rail, air, water…

energy efficiency indicator = energy / activity

Passenger-km or ***tonne-km***

Vehicle stock

×

Distance travelled

×

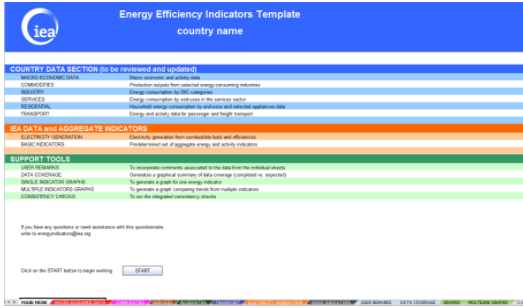
Occupancy

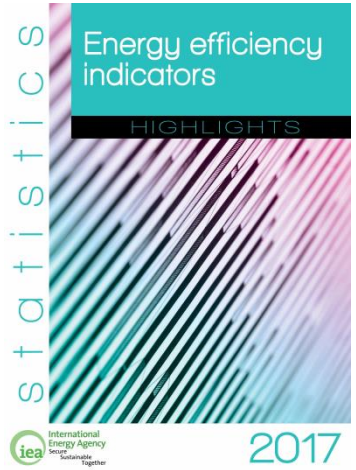
Load factor

How to collect energy efficiency data?

The IEA end use data collection

- Agreed by member countries in 2009 (IEA Ministerial)
- 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*

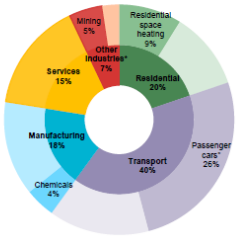




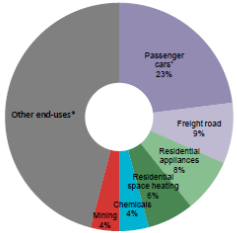
Energy Efficiency Indicators Highlights

Cross-sectoral overview

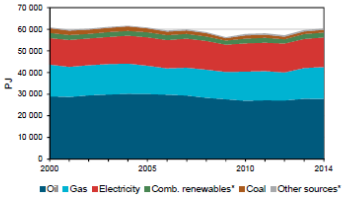
Largest end-uses by sector, 2014



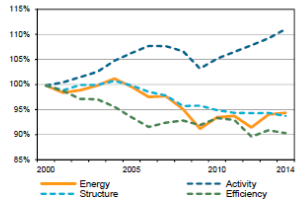
Top-6 CO_2 emitting end-uses, 2014**



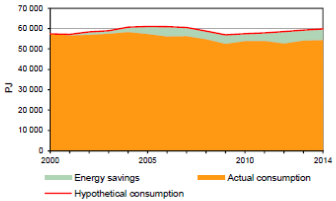
Final energy consumption by source



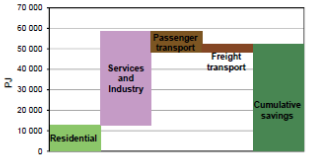
Drivers of final energy consumption***



Estimated energy savings from efficiency***



Estimated cumulative energy savings by sector, 2000-14***

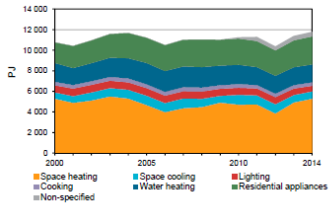


*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat and other energy sources.

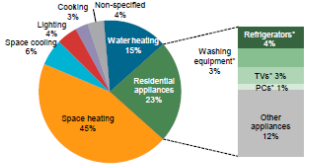
Residential sector

	Residential consumption (PJ)	Share of fossil fuels* in space heating (%)	Population (million)	Consumption per capita (GJ/pers)	Average dwelling surface (m²)	Average dwelling occupancy (pers/dw)
2000	10 772	84	282	38	196	2.8
2014	11 792	79	319	37	181	2.8

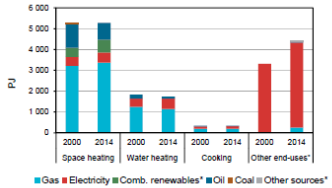
Residential energy consumption by end-use



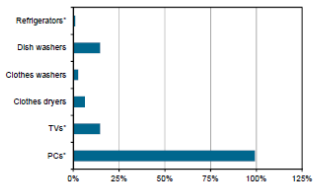
Residential energy consumption by end-use, 2014



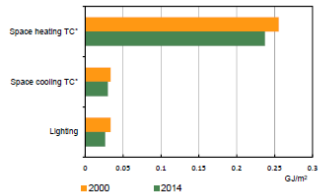
Residential energy consumption by source



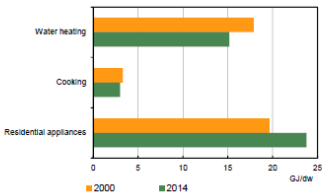
Appliances per dwelling, 2000-14 % change



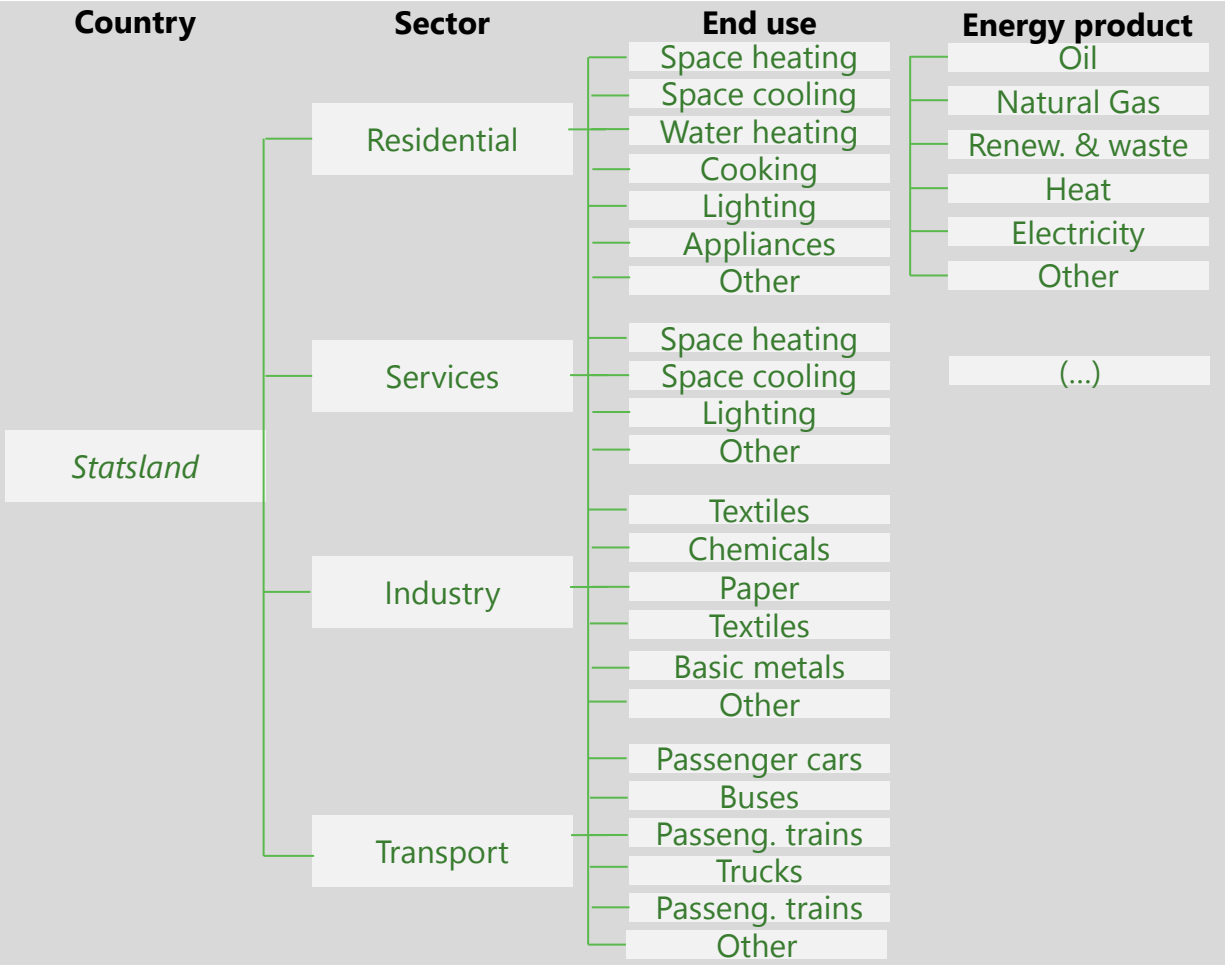
Energy intensities by end-use per floor area



Energy intensities by end-use per dwelling



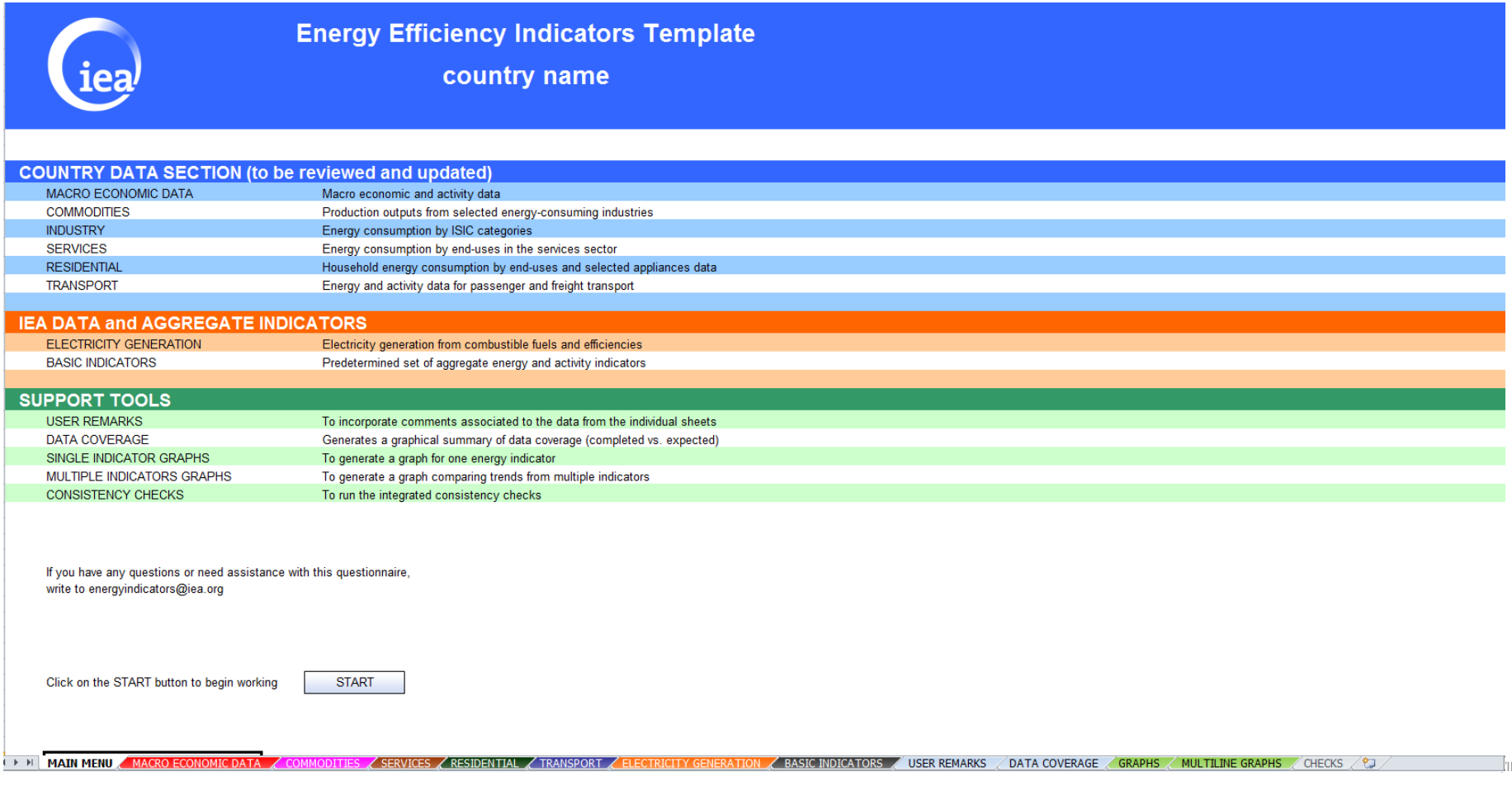
The end use data collected by the IEA



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/pkm)
- Vehicle-kilometer energy intensity (MJ/pkm)
- Other

The IEA energy efficiency indicators (EEI) template



Energy Efficiency Indicators Template

country name

COUNTRY DATA SECTION (to be reviewed and updated)	
MACRO ECONOMIC DATA	Macro economic and activity data
COMMODITIES	Production outputs from selected energy-consuming industries
INDUSTRY	Energy consumption by ISIC categories
SERVICES	Energy consumption by end-uses in the services sector
RESIDENTIAL	Household energy consumption by end-uses and selected appliances data
TRANSPORT	Energy and activity data for passenger and freight transport
IEA DATA and AGGREGATE INDICATORS	
ELECTRICITY GENERATION	Electricity generation from combustible fuels and efficiencies
BASIC INDICATORS	Predetermined set of aggregate energy and activity indicators
SUPPORT TOOLS	
USER REMARKS	To incorporate comments associated to the data from the individual sheets
DATA COVERAGE	Generates a graphical summary of data coverage (completed vs. expected)
SINGLE INDICATOR GRAPHS	To generate a graph for one energy indicator
MULTIPLE INDICATORS GRAPHS	To generate a graph comparing trends from multiple indicators
CONSISTENCY CHECKS	To run the integrated consistency checks

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

MAIN MENU | MACRO ECONOMIC DATA | COMMODITIES | SERVICES | RESIDENTIAL | TRANSPORT | ELECTRICITY GENERATION | BASIC INDICATORS | USER REMARKS | DATA COVERAGE | GRAPHS | MULTILINE GRAPHS | CHECKS

The EEI template: starting point for data collection

	B	D	L	M	N	O	P	Q	R	S	T	U	V	W
1		units	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
5														
6	**Total Energy Use in Residential Sector**													
7	**Oil & Petroleum Products**	**PJ**	**309.42**	**323.61**	**288.04**	**294.10**	**286.82**	**286.66**	**292.16**	**294.44**	**273.65**	**274.13**	**300.58**	**304.07**
8	**Natural Gas**	**PJ**	**21.59**	**19.77**	**19.88**	**20.98**	**22.47**	**24.89**	**28.45**	**30.39**	**30.35**	**29.61**	**31.02**	**30.71**
10	**Combus. Renewables & Waste**	**PJ**	**281.18**	**282.33**	**283.59**	**284.98**	**267.09**	**266.24**	**267.03**	**266.65**	**266.43**	**264.60**	**263.24**	**262.05**
12	**Electricity**	**PJ**	**106.72**	**114.08**	**120.14**	**130.06**	**138.04**	**140.52**	**143.50**	**146.64**	**153.11**	**160.03**	**165.01**	**170.82**
13	**Other**	**PJ**	**0.73**	**0.82**	**0.91**	**1.04**	**1.24**	**1.38**	**1.59**	**1.77**	**2.02**	**2.25**	**2.60**	**3.20**
14	**Total**	**PJ**	**719.63**	**740.61**	**712.56**	**731.15**	**715.67**	**719.68**	**732.73**	**739.89**	**725.55**	**730.62**	**762.44**	**770.86**
18														
19	**Space Heating**													
20	Oil & Petroleum Products	PJ	0	0	0	0	0	4.01	3.38	2.72	2.27	2.26	3.18	3.82
21	Natural Gas	PJ	0	0	0	0	0	0.20	0.19	0.17	0.10	0.10	0.13	0.15
23	Combus. Renewables & Waste	PJ	0	0	0	0	0	0	0	0	0	0	0	0
25	Electricity	PJ	0	0	0	0	0	2.05	2.21	2.36	1.67	2.25	1.14	1.06
27	**Total**	**PJ**	**0**	**0**	**0**	**0**	**0**	**6.26**	**5.78**	**5.25**	**4.04**	**4.61**	**4.45**	**5.04**
28	Total (climate corrected for 1990-2007)	PJ	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
29														
30	**Space Cooling**													
36	Electricity	PJ	0	0	0	0	0	8.82	8.71	8.62	13.00	11.02	14.85	18.76
38	**Total**	**PJ**	**0**	**0**	**0**	**0**	**0**	**8.82**	**8.71**	**8.62**	**13.00**	**11.02**	**14.85**	**18.76**
39	Total (climate corrected for 1990-2007)	PJ	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
40														
41	**Water Heating**													
42	Oil & Petroleum Products	PJ	0	0	0	0	0	174.51	179.14	181.81	169.37	170.32	197.76	209.65
43	Natural Gas	PJ	0	0	0	0	0	15.17	17.47	18.76	18.79	18.41	20.46	21.26
49	**Total**	**PJ**	**0**	**0**	**0**	**0**	**0**	**189.68**	**196.61**	**200.57**	**188.16**	**188.74**	**218.23**	**230.91**
50														
51	**Cooking**													
52	Oil & Petroleum Products	PJ	0	0	0	0	0	108.14	109.64	109.92	102.01	101.55	99.64	90.60
53	Natural Gas	PJ	0	0	0	0	0	9.52	10.79	11.47	11.45	11.09	10.43	9.30
55	Combus. Renewables & Waste	PJ	0	0	0	0	0	266.24	267.03	266.65	266.43	264.60	263.24	262.05
57	Electricity	PJ	0	0	0	0	0	0.20	0.22	0.25	0.42	0.51	0.26	0
59	**Total**	**PJ**	**0**	**0**	**0**	**0**	**0**	**384.10**	**387.68**	**388.28**	**380.31**	**377.76**	**373.57**	**361.95**
60														
61	**Lighting**													
62	Electricity	PJ	0	0	0	0	0	41.17	42.24	43.34	43.67	45.61	46.26	46.83
64	**Total**	**PJ**	**0**	**0**	**0**	**0**	**0**	**41.17**	**42.24**	**43.34**	**43.67**	**45.61**	**46.26**	**46.83**

The EEI template: helps identifying data gaps and issues

Water Heating									
Oil & Petroleum Products	PJ	0	0	0	0	12.77	11.22	10.22	9.34
Natural Gas	PJ	0	0	0	0	5.19	5.15	5.07	5.02
Coal & Coal Products	PJ	0	0	0	0	0	0	0	0
Combus. Renewables & Waste	PJ	0	0	0	0	7.62	7.75	7.87	8.04
Heat	PJ	0	0	0	0	0	0	0.04	0.04
Electricity	PJ	2.18	2.05	2.14	2.22	3.94	3.31	2.76	2.34
Other	PJ	0	0	0	0	0	0	0	0
Total	**PJ**	**2.18**	**2.05**	**2.14**	**2.22**	**29.52**	**27.42**	**25.96**	**24.79**
Cooking									
Oil & Petroleum Products	PJ	0	0	0	0	16.58	16.87	17.17	17.46
Natural Gas	PJ	0	0	0	0	3.94	4.27	4.61	4.94
Coal & Coal Products	PJ	0	0	0	0	0	0	0	0
Combus. Renewables & Waste	PJ	0	0	0	0	0	0	0	0
Heat	PJ	0	0	0	0	0	0	0	0
Electricity	PJ	0.59	0.42	0.42	0.46	1.67	2.09	2.64	3.31
Other	PJ	0	0	0	0	0	0	0	0
Total	**PJ**	**0.59**	**0.42**	**0.42**	**0.46**	**22.19**	**23.24**	**24.41**	**25.71**
Lighting									
Electricity	PJ	4.61	4.90	5.11	6.99	7.41	7.54	7.79	5.53
Other	PJ	0	0	0	0	0	0	0	0
Total	**PJ**	**4.61**	**4.90**	**5.11**	**6.99**	**7.41**	**7.54**	**7.79**	**5.53**

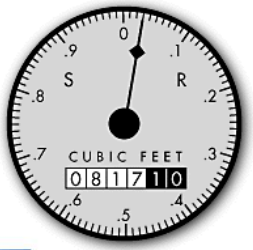
Domestic passenger airplanes										
Jet Fuel & Aviation Gasoline	PJ	0.50	0.63	0.75	1.00	0.67	0.42	0.46	0.33	0.50	0.88
Other	PJ	0	0	0	0	0	0	0	0	0	0
Total	**PJ**	**0.50**	**0.63**	**0.75**	**1.00**	**0.67**	**0.42**	**0.46**	**0.33**	**0.50**	**0.88**
Energy intensity	MJ/pkm	2.07	2.50	2.20	2.37	0.99	0.27	0.19	0.12	0.14	0.19

Methods used to collect data for indicators

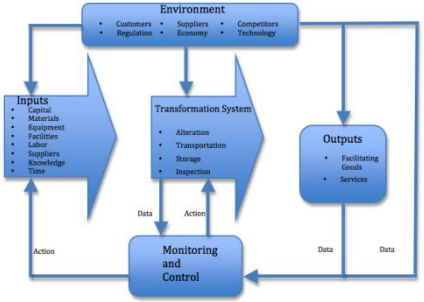
- Administrative sources
  - before starting new data collection

- Surveys
  - representative sample
  - possibly expanding existing surveys

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

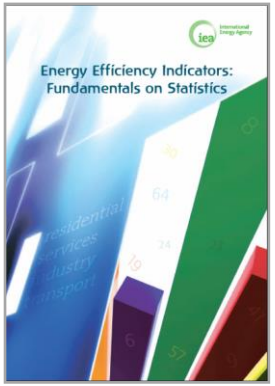


- Modelling
  - complementary to surveys or stand alone

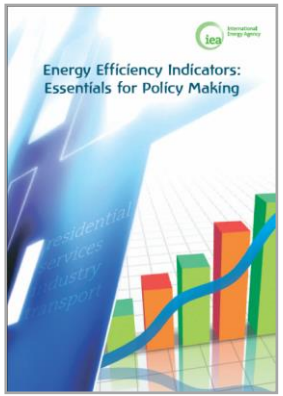


Tools to develop indicators

- 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

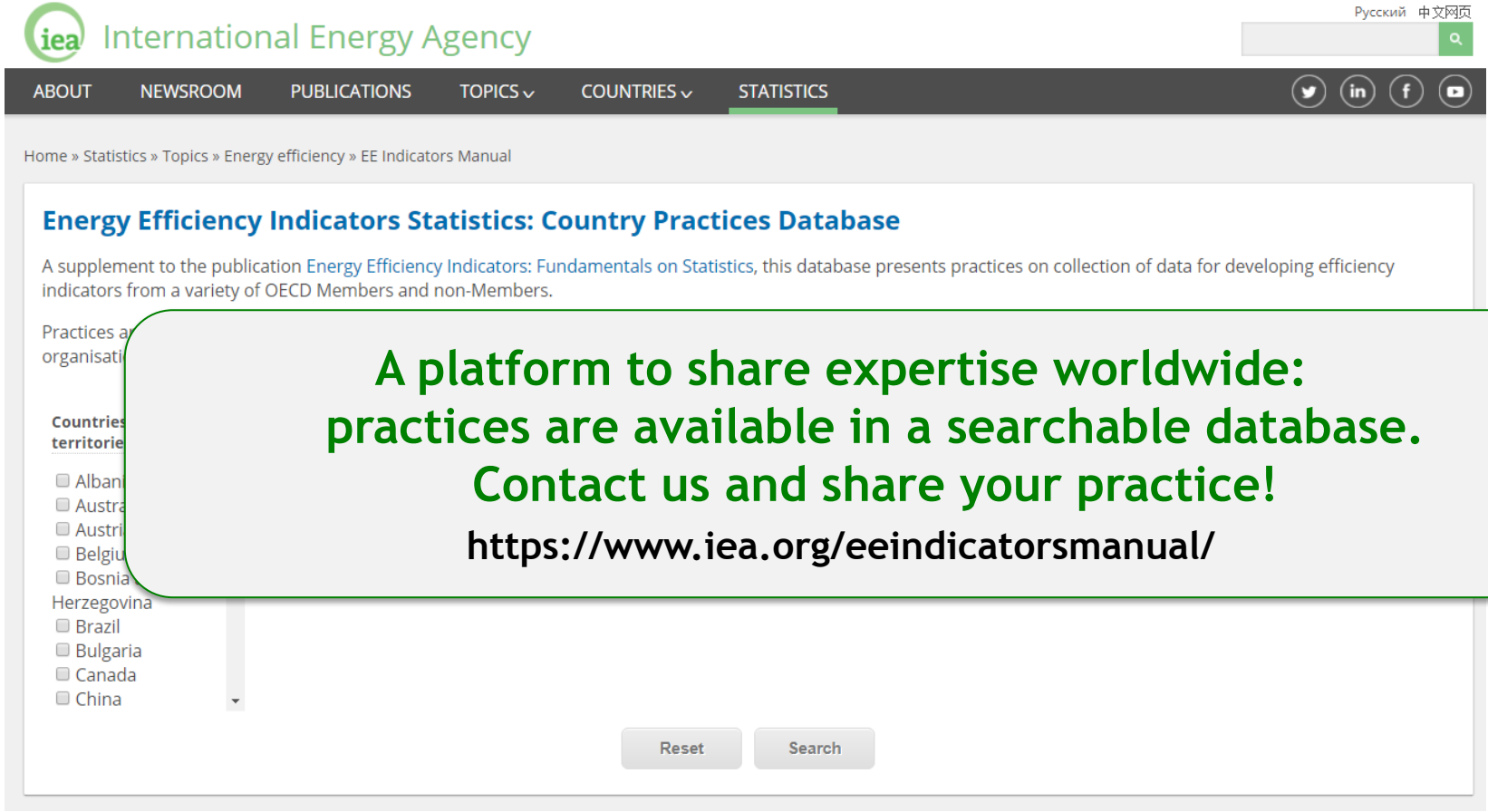


- Essentials for policy makers:
  - to provide guidance to develop and interpret energy efficiency indicators
  - https://goo.gl/agcNg2



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:

- rising awareness on detailed data needs,
- adapting data collection to the country profile,
- sharing expertise across countries and organizations.

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Understanding where energy is used: the importance of end-use data