Energy Efficiency Indicators

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14 December 2018, Beirut

IEA

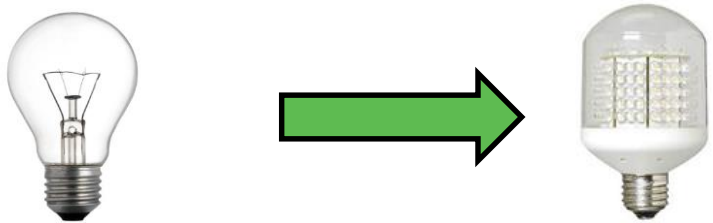
What is energy efficiency?

Is this energy efficiency?

Warm up:
Yes / No / Maybe

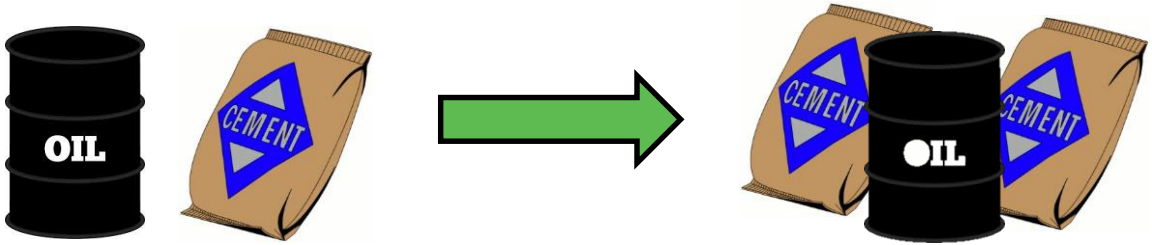
- Consume **LESS** energy to provide **SAME** service

  e.g. substitute Incandescent bulbs with LED



- Consume **SAME** energy to provide **MORE** service

  e.g. increased production with the same energy



What is energy efficiency?

Is this energy efficiency?

Warm up:
Yes / No / Maybe

- 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

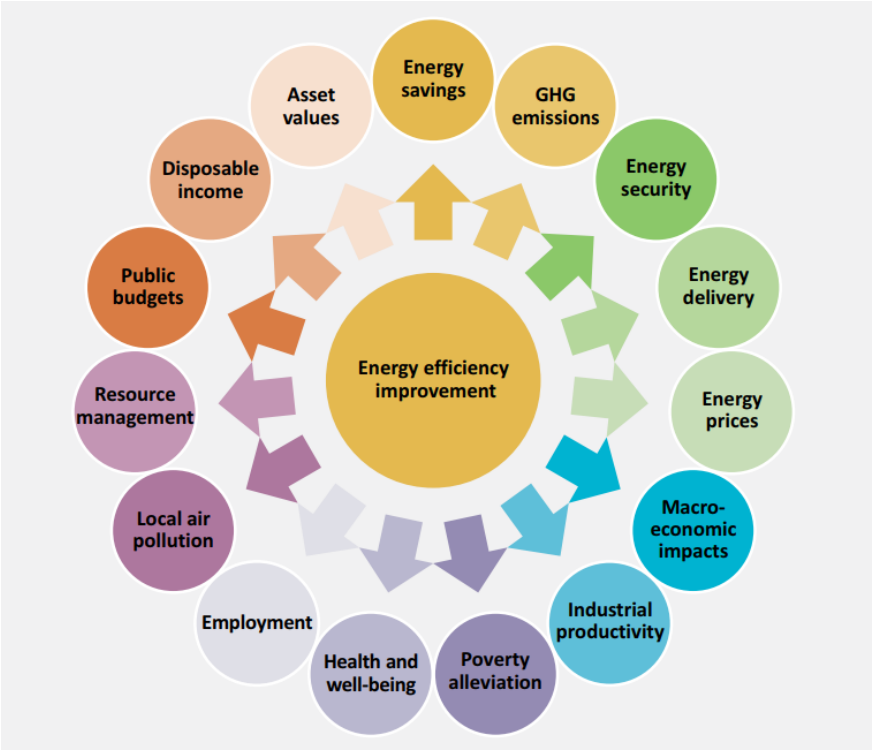
Overview

- 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

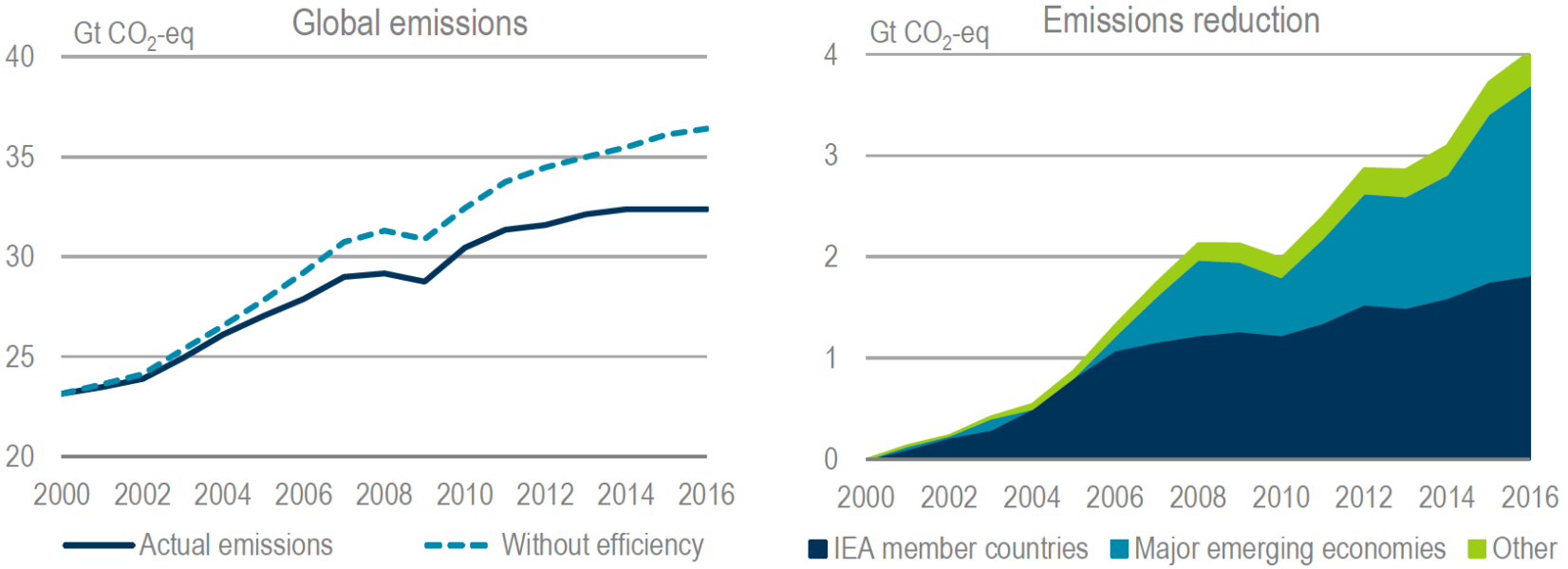


Environmental, economic and social

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

The importance of energy efficiency – Emission savings

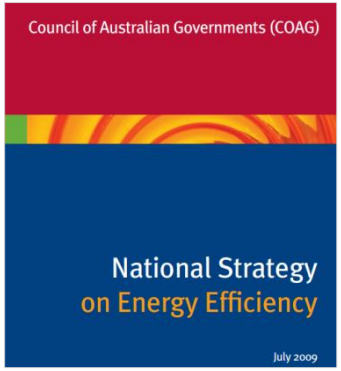
Avoided global GHG emissions from energy efficiency improvements

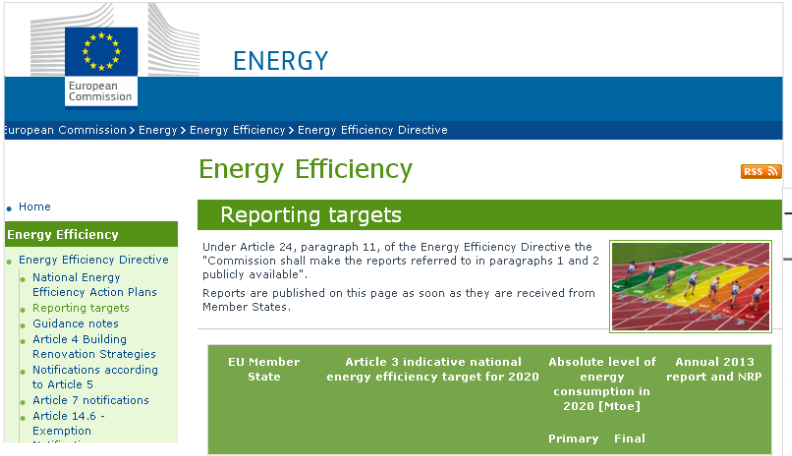


Energy efficiency reduced GHG emissions by 4 $GtCO_2$-eq, or 13% of total CO2 emissions in 2016.

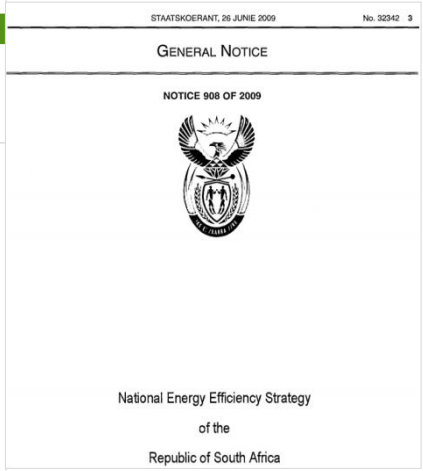
Source: IEA (2017), *Energy Efficiency Market Report*, OECD/IEA, Paris.

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



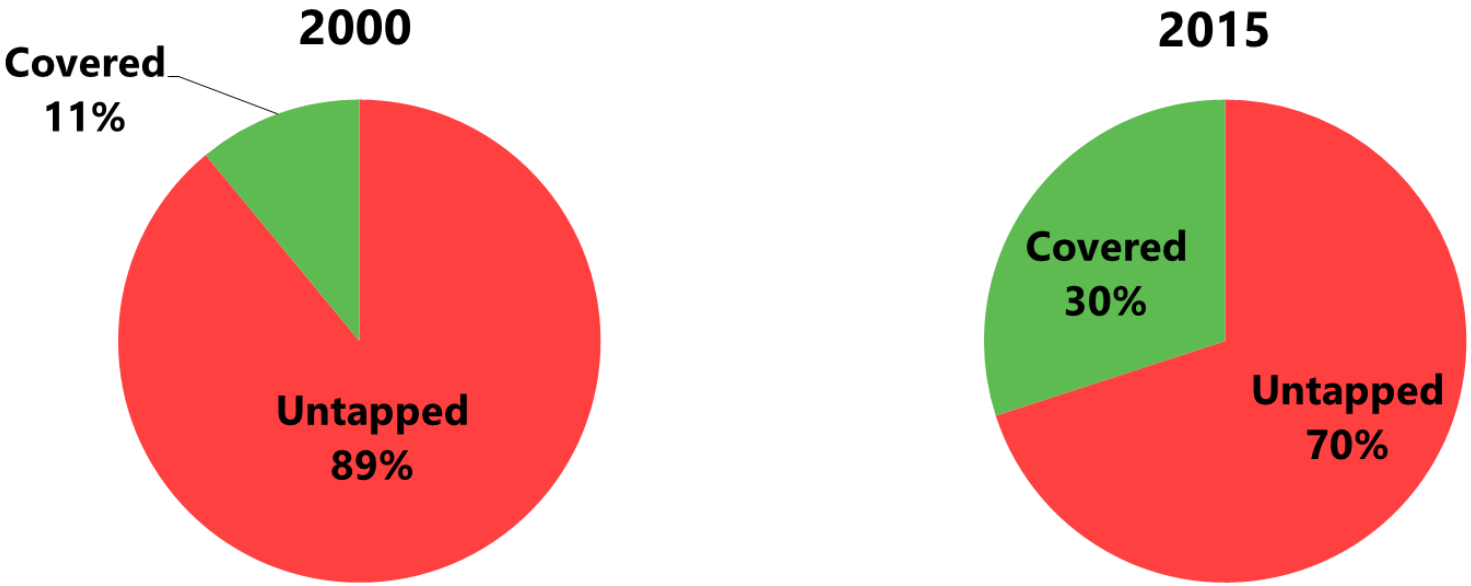


EU Member State	Article 3 indicative national energy efficiency target for 2020	Absolute level of energy consumption in 2020 [Mtoe]		Annual 2013 report and NRP
		Primary	Final	
Austria	Final energy consumption of 1100 PJ	31.5	26.3	DE/EN [4 MB] ... NRP
Belgium	18% reduction in primary energy consumption by 2020 relative to the Primes 2007 baseline (53.3 Mtoe)	43.7	32.5	EN [469 KB] ... NRP
Bulgaria	Increase of energy efficiency by 25% until 2020 (5 Mtoe primary energy savings in 2020) and 50% energy intensity reduction by 2020 compared to 2005 levels	15.8	9.16	BG [3 MB] .../EN [229 KB] ... NRP
Croatia	Increase in energy efficiency resulting in final energy consumption reduction of 19,77 PJ in 2016 and 22,76 PJ in 2020	-	9.24	HR/EN [910 KB] ... NRP
Cyprus	0.463 Mtoe energy savings in 2020	2.8	2.2	



The importance of energy efficiency – Untapped potential

Energy consumption covered by efficiency regulations, 2000-2015



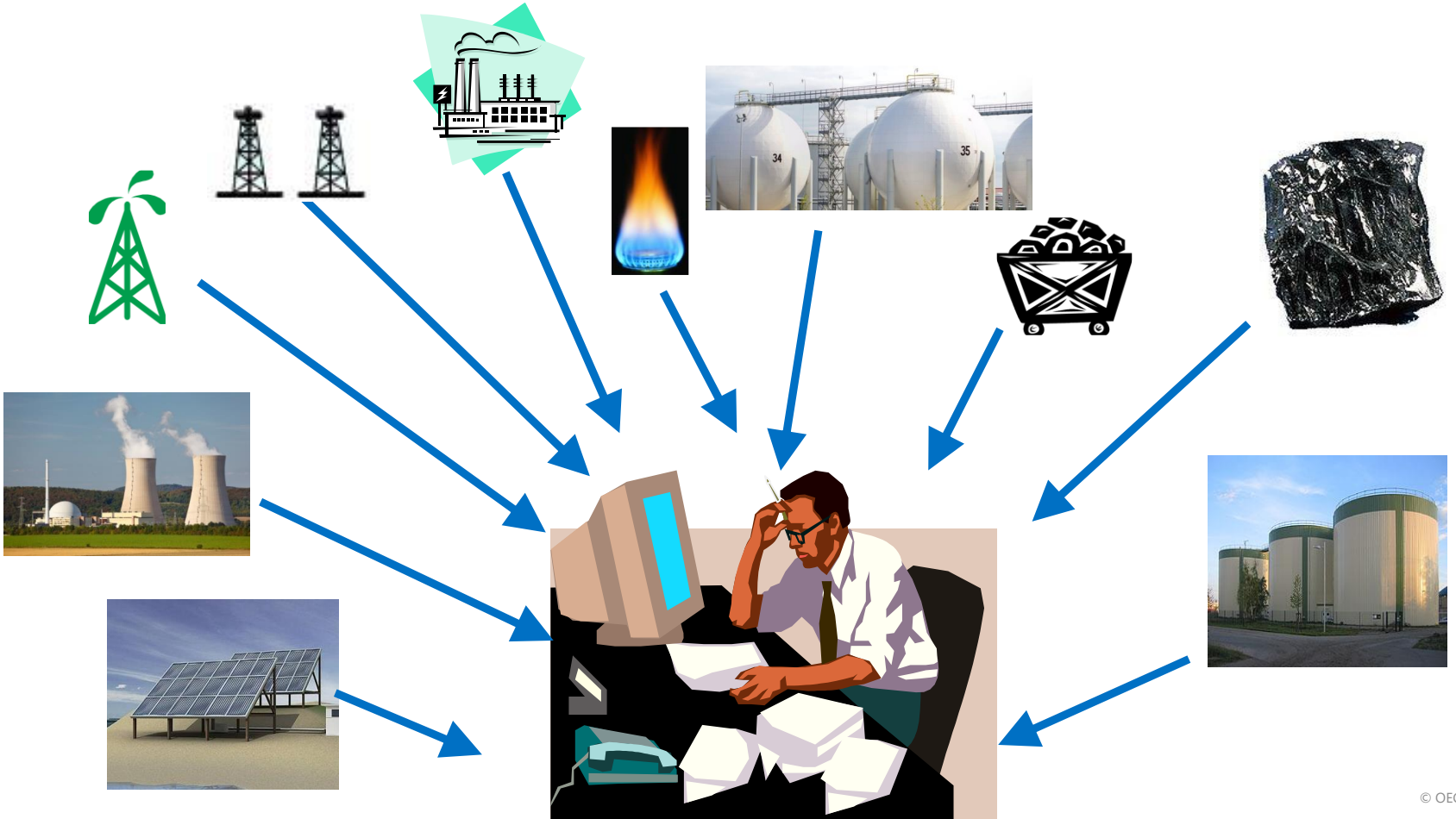
"Currently, 70% of global energy consumption is not subject to mandatory efficiency standards targets"

Source: IEA (2016), *Energy Efficiency Market Report*, OECD/IEA, Paris.

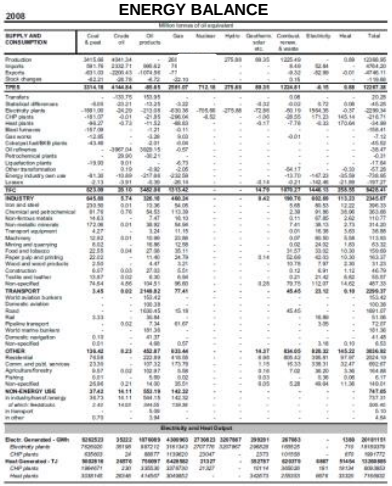
What information is available from the energy balances?

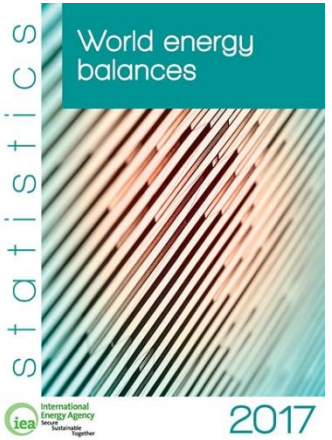
Are available data enough to track energy efficiency?

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 limitations of energy balances

No breakdown by end-use:

- space heating
- space cooling
- water heating
- lighting
- cooking
- appliances

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
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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
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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
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
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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	56.61	-	-	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

What most countries collect on a regular basis is aggregated data

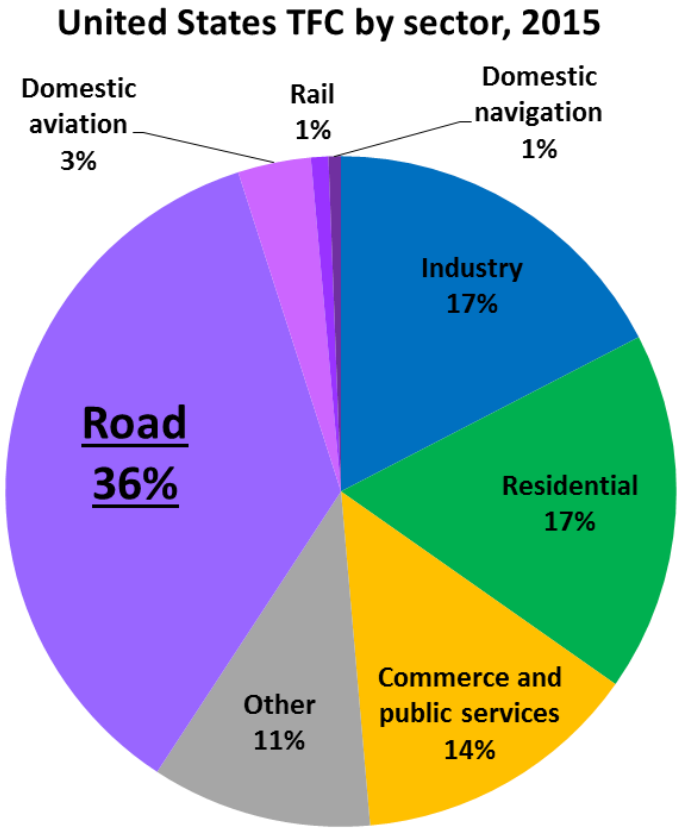
OTHER SECTORS

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

No breakdown by end-use and by service category

Coal & Peat	Crude Oil	Oil Products	Gas	Nuclear	Hydro	Geoth/Solar	Comb. Ren.&Waste	Electricity	Heat	Total
1			633.44	-	-	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

Balances data example



Road transport is the most consuming.

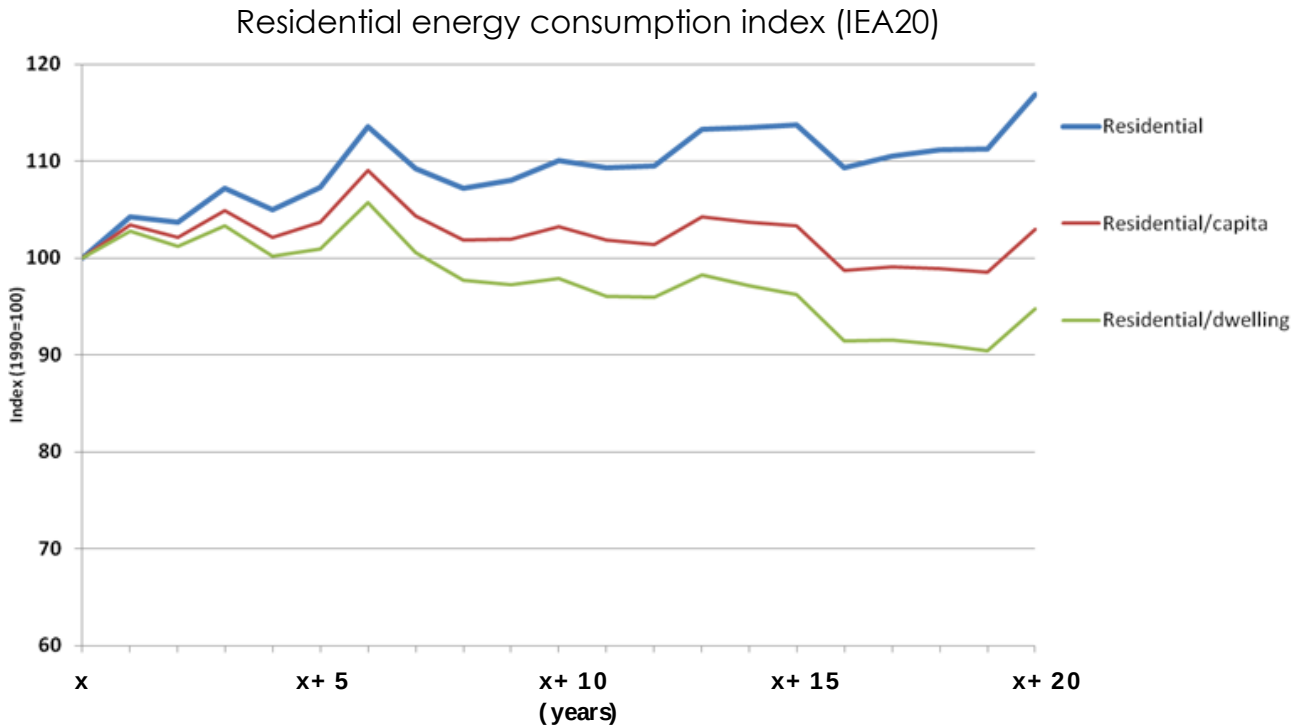
How do we track road transport efficiency?

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

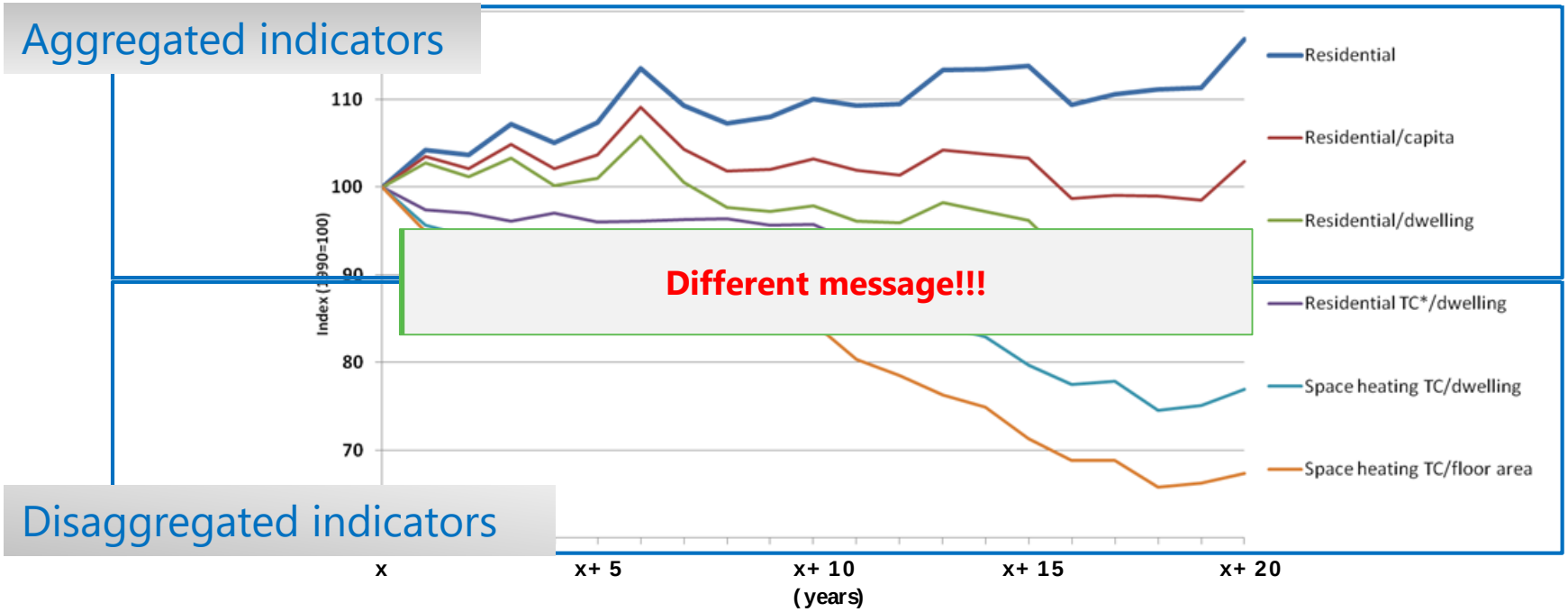


Aggregated indicators can be useful …

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.

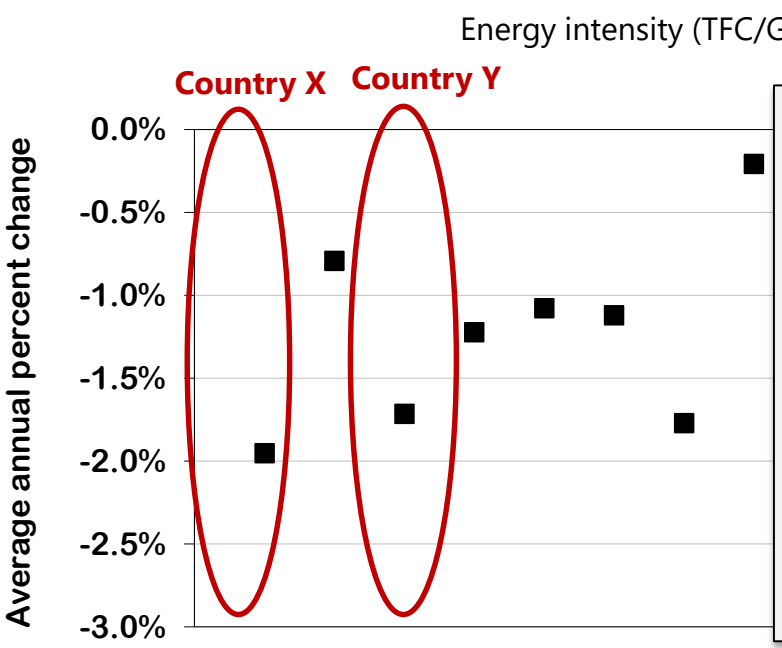
We need more disaggregated data to get the full picture

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



Quiz!!

Which country has decreased more its energy intensity?

(Country X / Country Y)

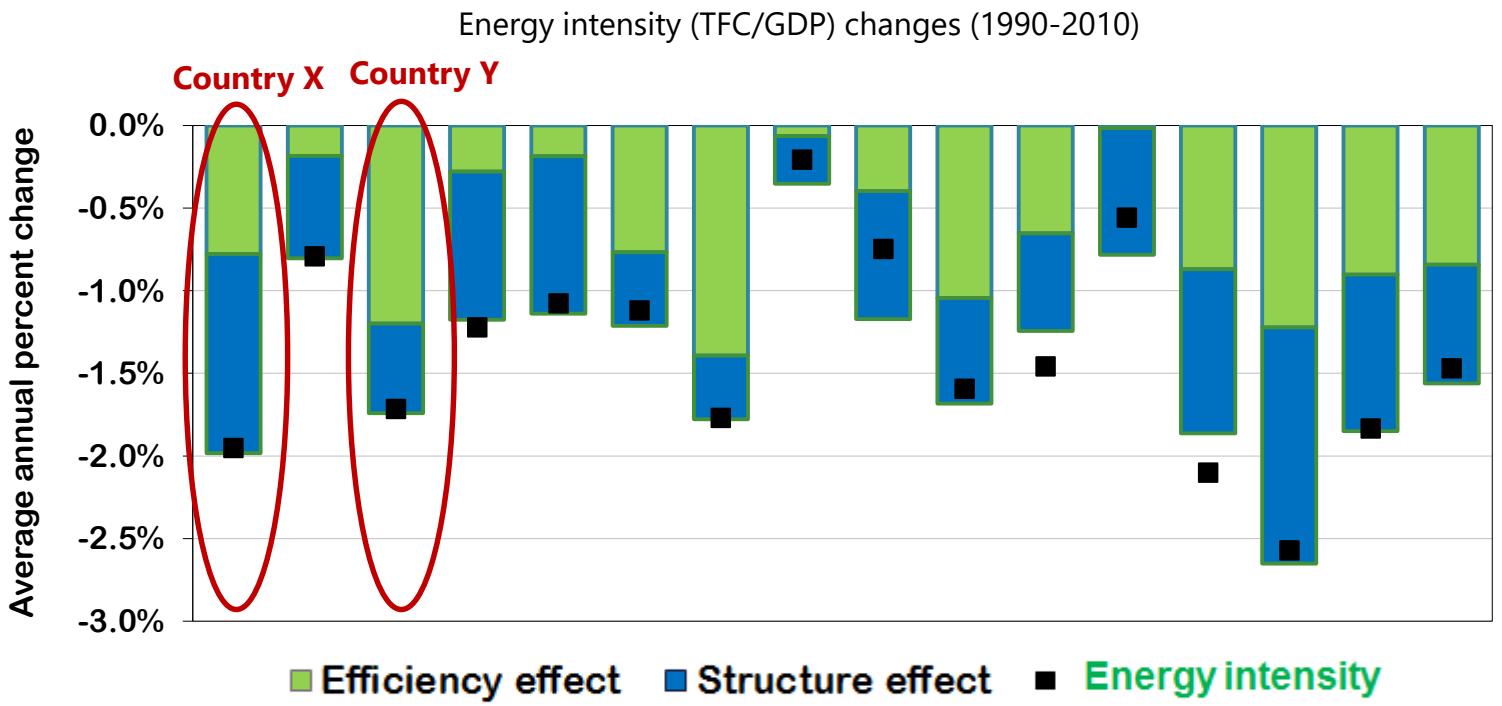
Can we say that Country X has improved more in ENERGY EFFICIENCY?

(Yes / No / Maybe)

Intensity decreased more in country X

Data source: IEA, Energy efficiency indicators.

Aggregated indicators are sometimes used inappropriately



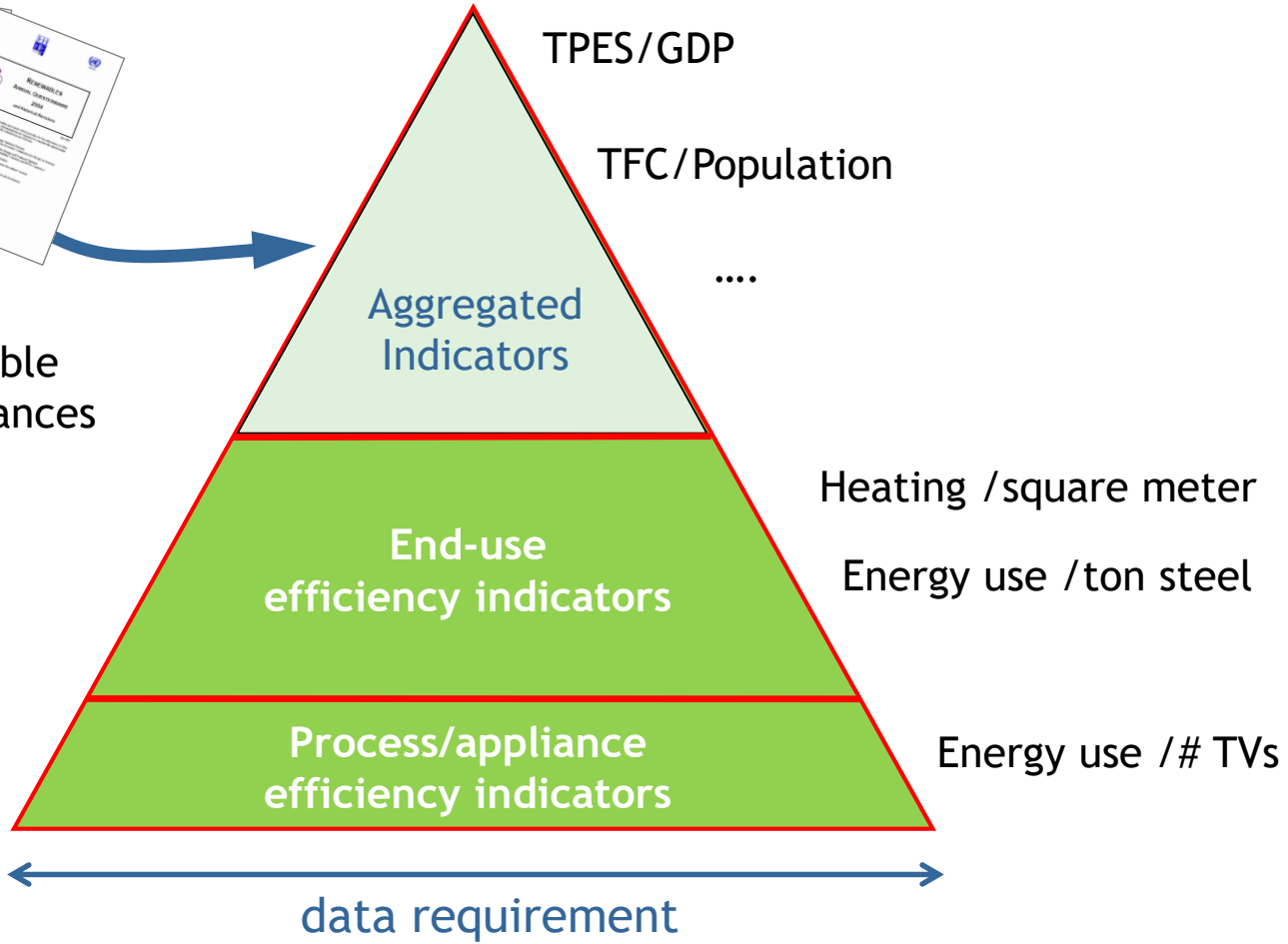
Country X intensity reduction was mostly due to structural changes, while country Y improved more in energy efficiency.

Data source: IEA, Energy efficiency indicators.

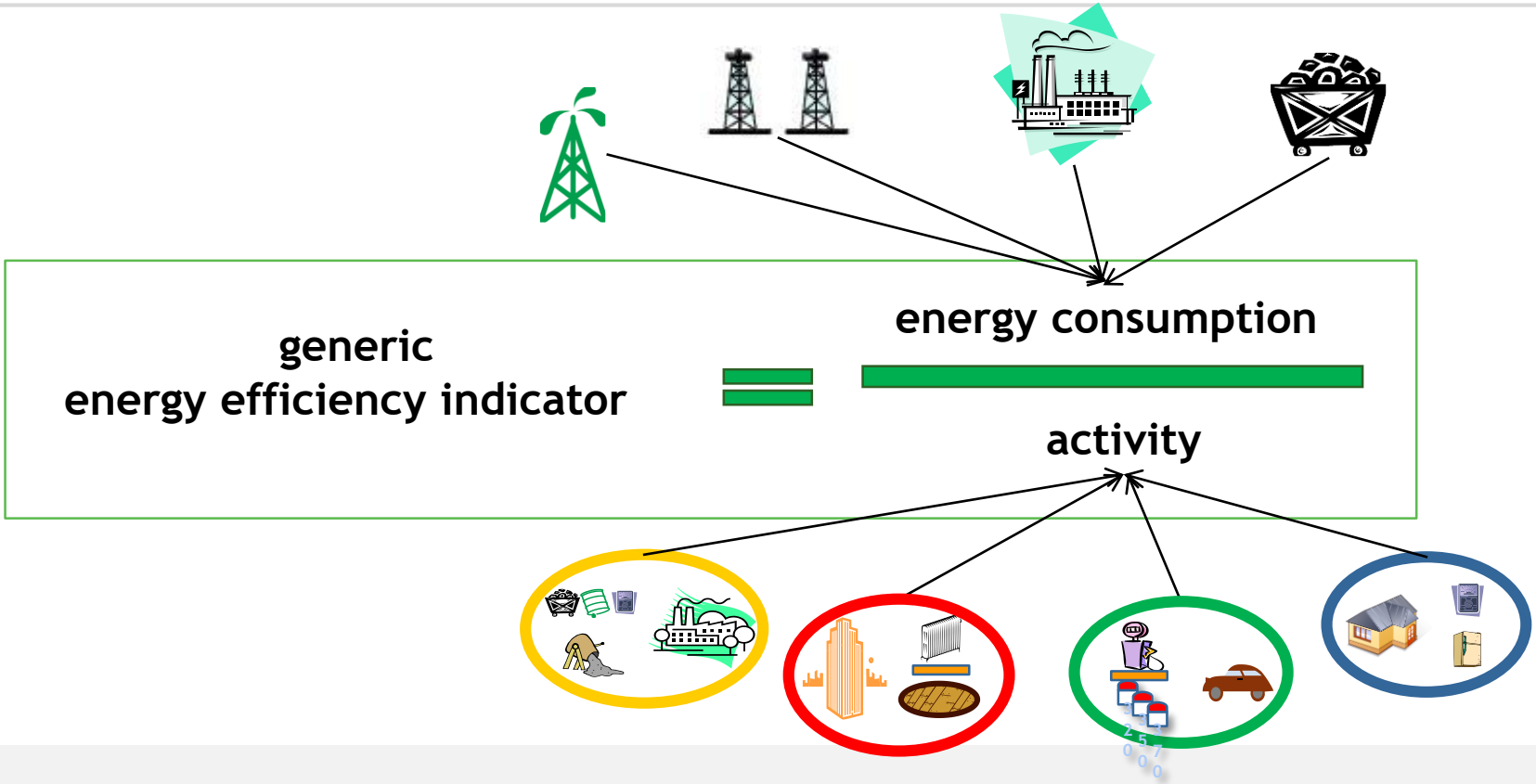
What further data are needed to track energy efficiency?

Energy efficiency indicators: what level of detail?

Commonly available data: Energy Balances



Energy efficiency indicators: definition



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

Indicators for residential

energy efficiency indicator = $\frac{\text{energy}}{\text{activity}}$

# of dwellings

floor area (m^2)

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

Residential: matching energy and activity

QUIZ

Appliances

floor area (m^2)

# of dwellings

Residential: matching energy and activity

QUIZ

Appliances

floor area (m²)

Appliance stocks

Indicators for services

energy efficiency indicator = $\frac{\text{energy}}{\text{activity}}$

For each end-use:

- Space heating*
- Space cooling*
- Lighting
- Other building use
- Non-building use

* Temperature corrected, using HDD & CDD

Value added ($)

Floor area (m²)

# of employees

Indicators for industry

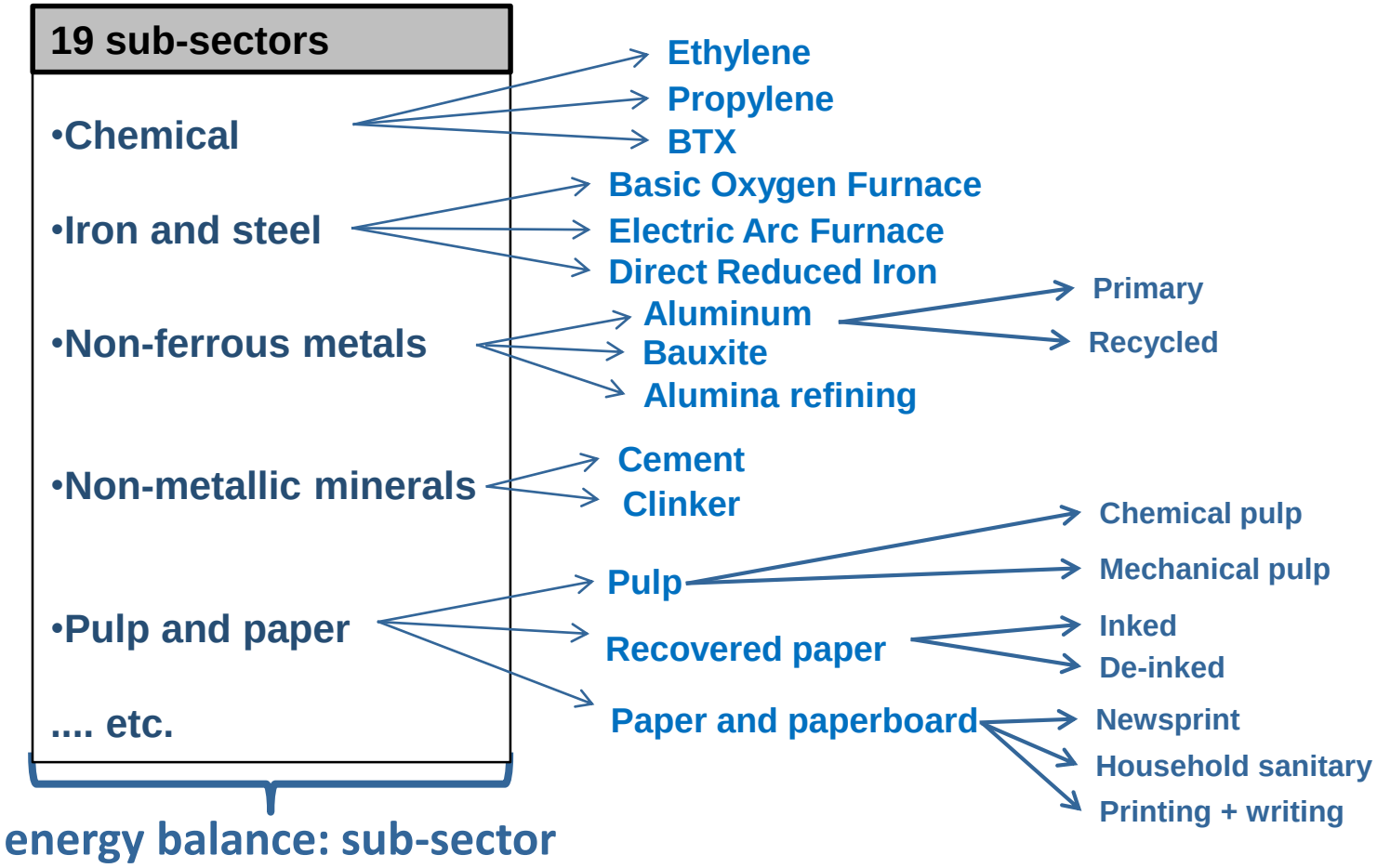
For major ISIC subsectors
(by energy product)

Energy efficiency indicator = $\frac{\text{energy}}{\text{activity}}$

Value added ($)

Physical production (t)

Industry sub-sectors



Indicators for transport

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

energy efficiency indicator = $\frac{\text{energy}}{\text{activity}}$

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

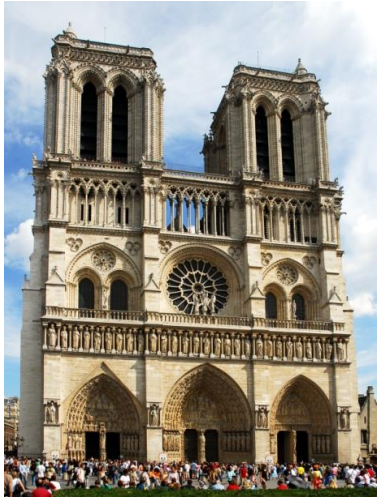
Activity and structure

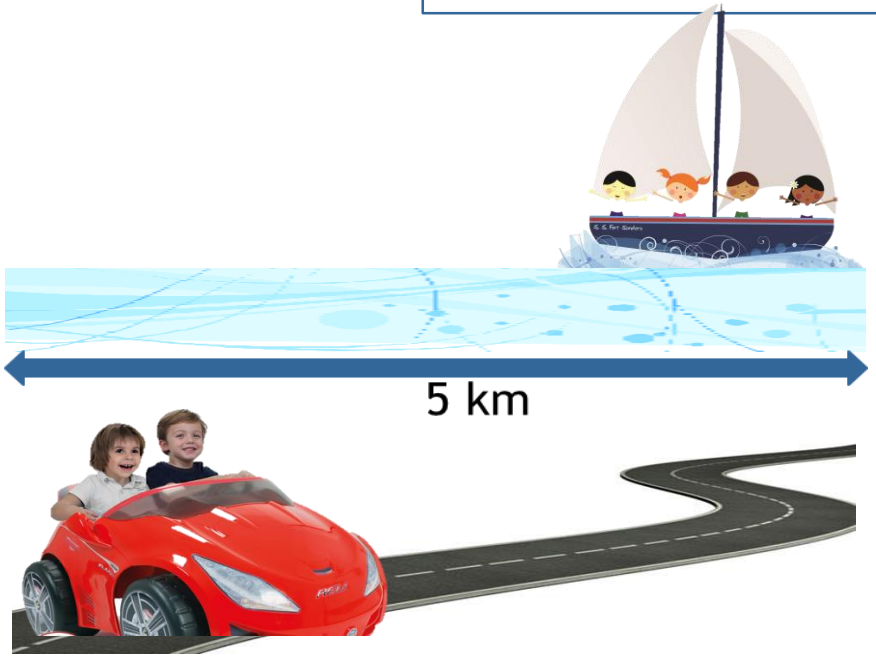
- Stock of vehicles
- Vehicle-kilometres
- Passenger-kilometres
- Tonne-kilometres

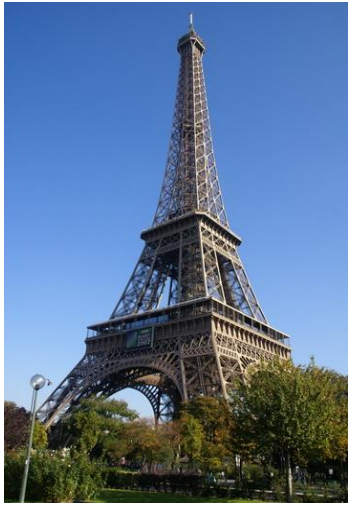
V-km = 5km + 5 km = 10 v-km

P-km = 6 passengers * 5 km = 30 p-km

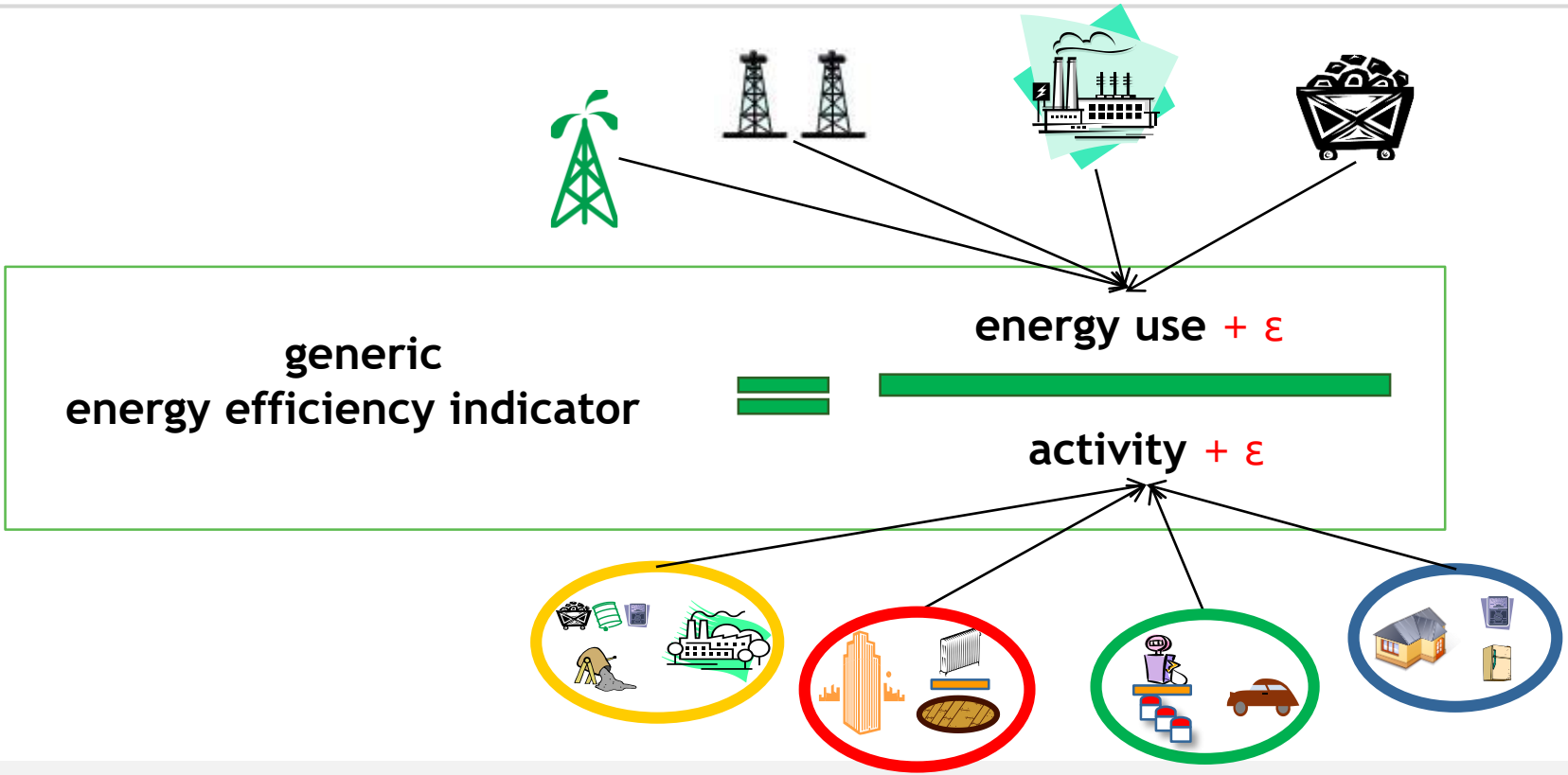
Avg. load = p-km/v-km = 30 / 10 = 3 p/v







Indicators link activity and energy data – the reality

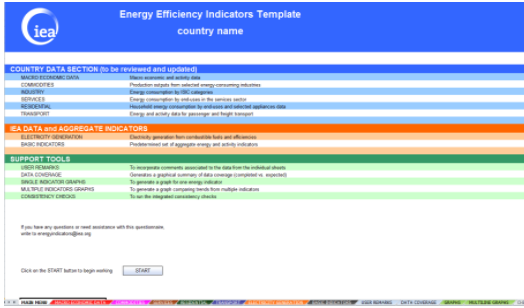


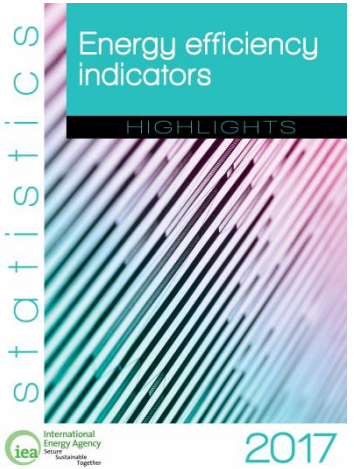
Need to understand the accuracy of both the energy and activity data – size of error terms
Think about data in indicators

How to collect energy efficiency data?

The IEA EEI data collection

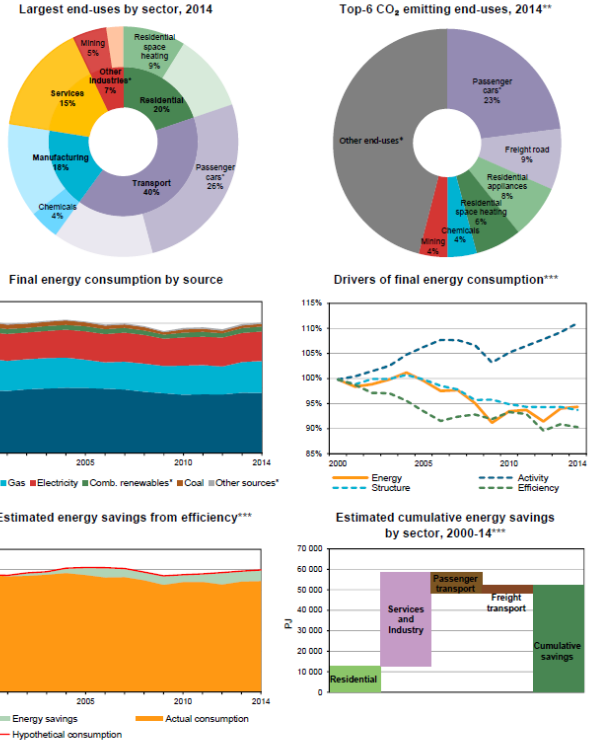
- Agreed by member countries in 2009 (IEA Ministerial)
- Developed with international community of experts, based on historical work on indicators (Odyssee, LBNL, etc.)
- A user-friendly Excel template (available online)
- Collects energy consumption and activity data
- Covers four sectors: residential, services, industry, transport
- A publication: *Energy efficiency indicators Highlights*





Energy Efficiency Indicators Highlights – new edition coming out soon!

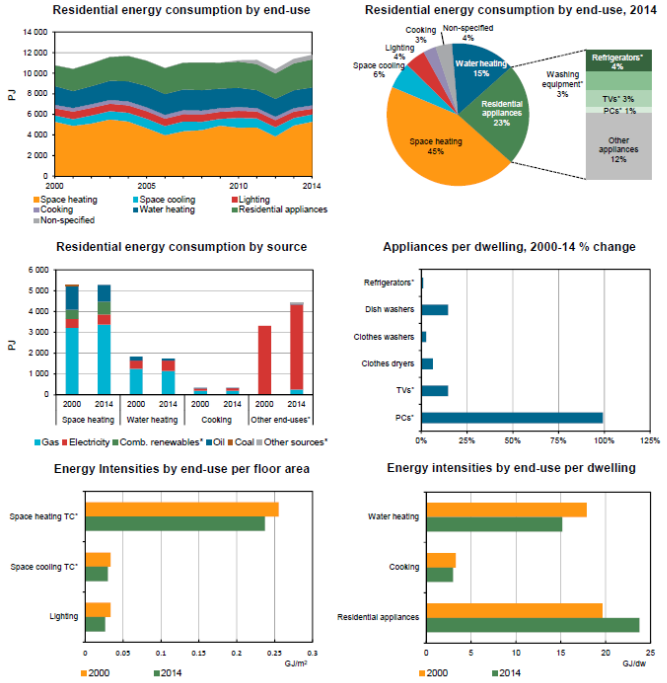
Cross-sectoral overview



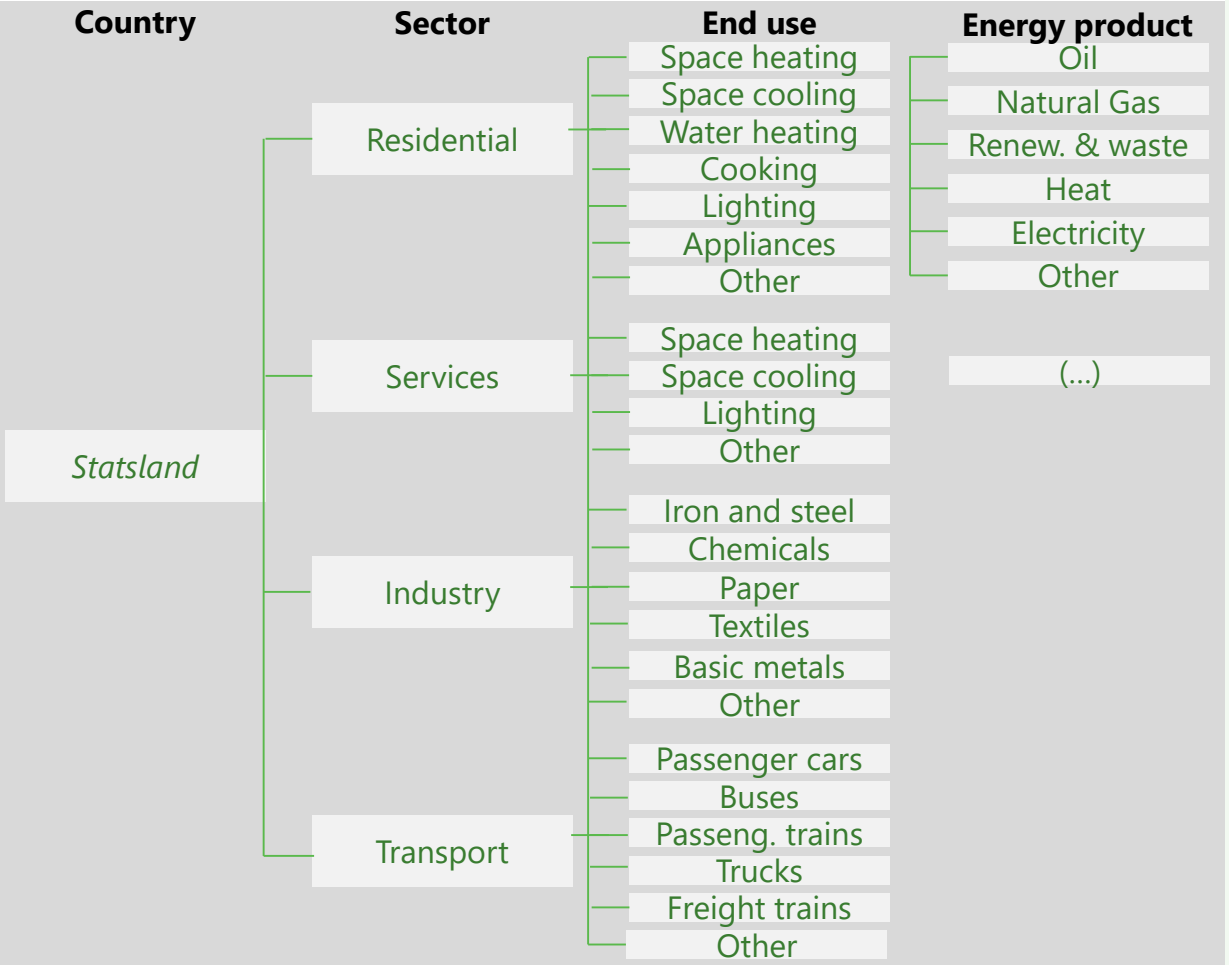
*Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-6; comb. renewables includes combustible renewables and wastes; other sources includes heat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



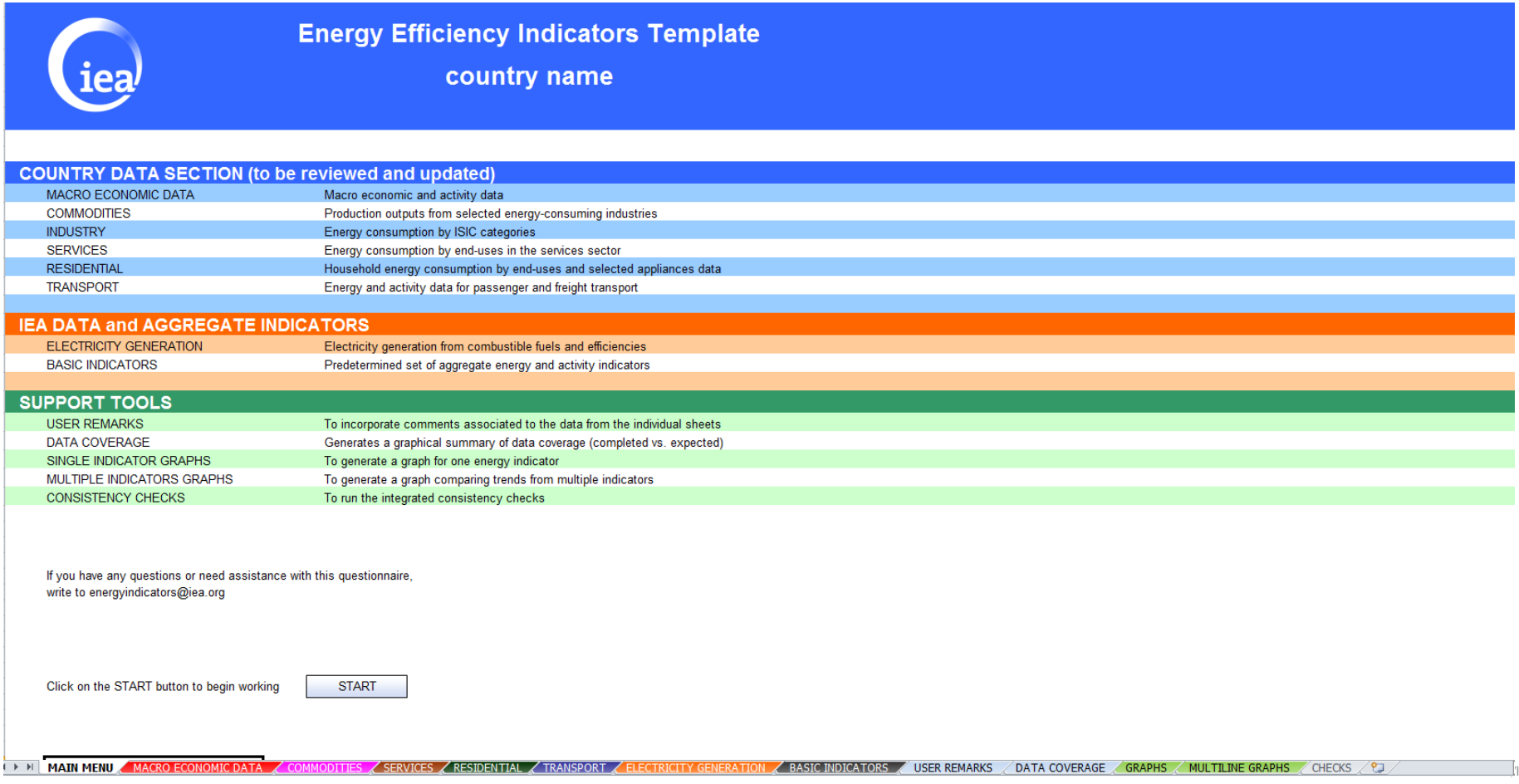
The end use data collected by the IEA



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/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)	
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

		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**													
30	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
59	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**

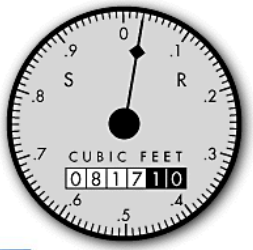
Domestic passenger airplanes										
Jet Fuel & Aviation Gasoline	PJ	0.50	0.63	0.75	1.00	0.67	0.42	0.46	0.33	0.50	0.88
Other	PJ	0	0	0	0	0	0	0	0	0	0
Total	**PJ**	**0.50**	**0.63**	**0.75**	**1.00**	**0.67**	**0.42**	**0.46**	**0.33**	**0.50**	**0.88**
Energy intensity	MJ/pkm	2.07	2.50	2.20	2.37	0.99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

Methods used to collect data for indicators

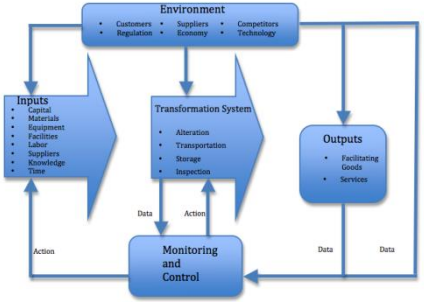
- Administrative sources
  - before starting new data collection

- Surveys
  - representative sample
  - possibly expanding existing surveys

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

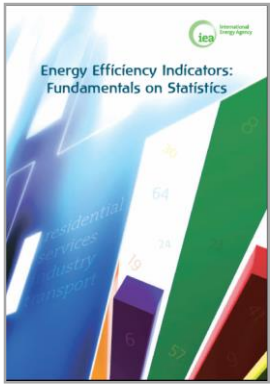


- Modelling
  - complementary to surveys or stand alone

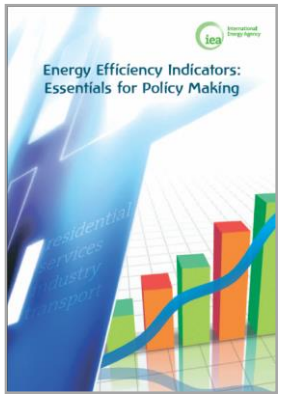


Tools to develop indicators

- 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

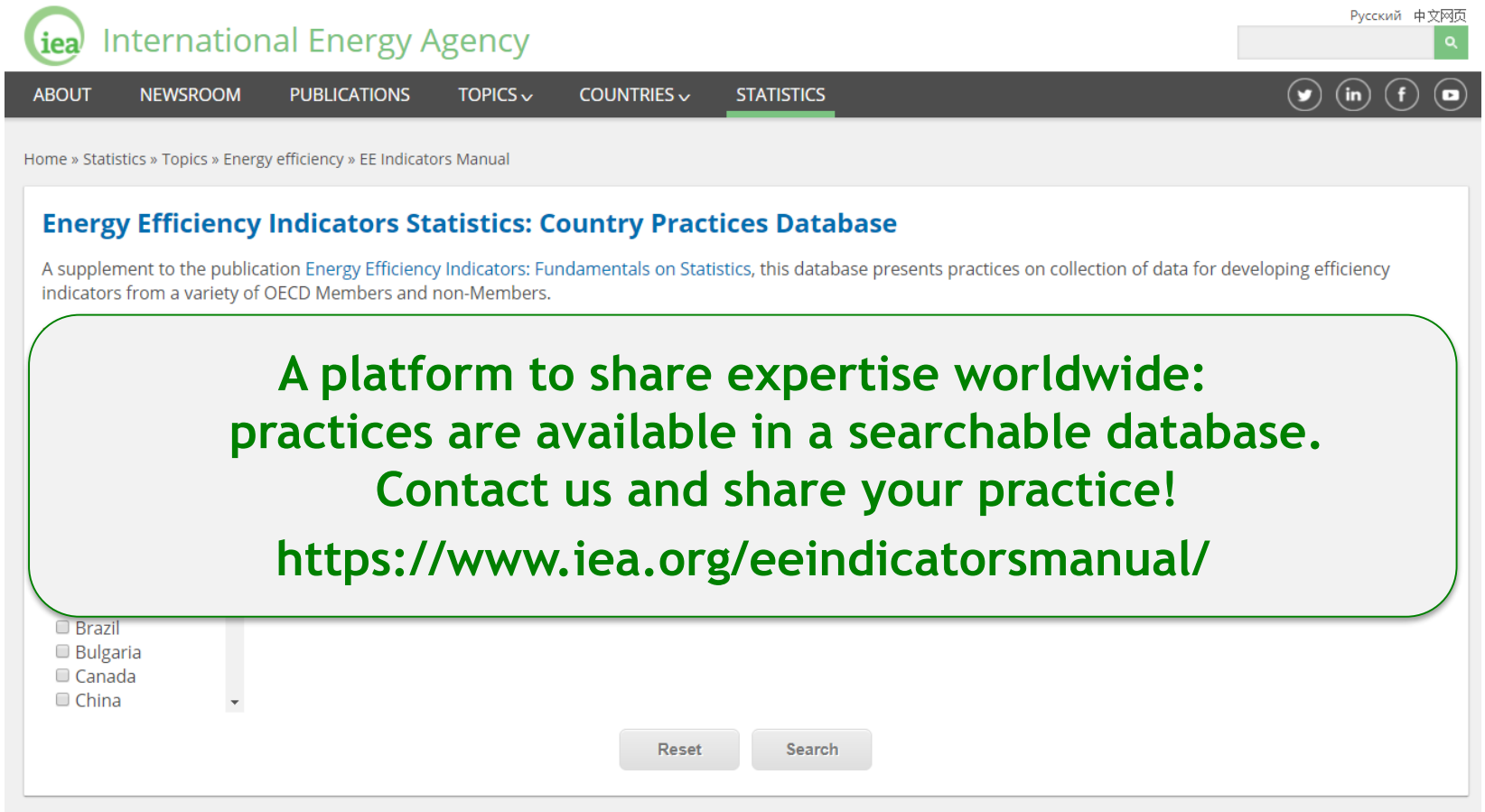


- Essentials for policy making:
  - to provide guidance to develop and interpret energy efficiency indicators
  - https://goo.gl/agcNg2



Both available also in:
Spanish
Russian
Chinese

Country practices database



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.

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