

Energy efficiency: Developments in data collection activities

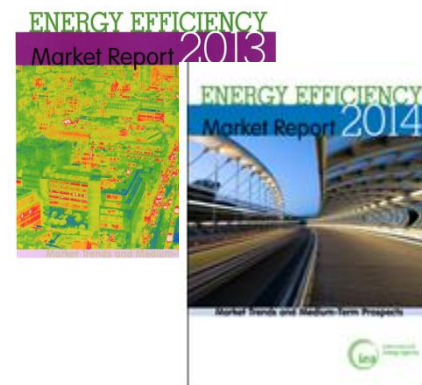
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IEA - Energy Data Centre

2015 Interenerstat meeting
IEA, Paris, September 2015

A high demand for energy efficiency data

- To monitor efficiency trends
- To analyse technology impacts
- To forecast energy demand patterns

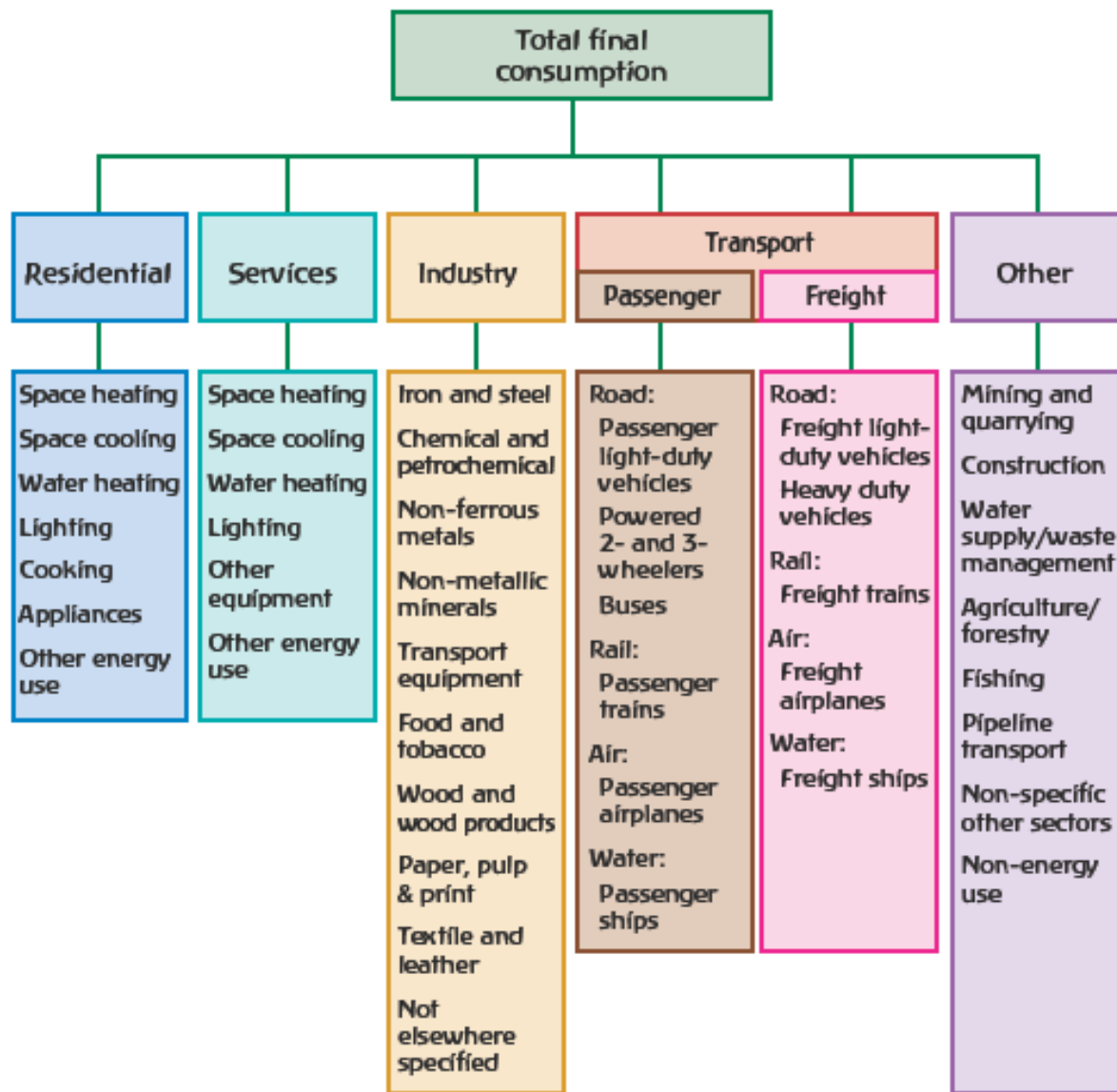
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What data to monitor efficiency? Capturing energy consumption across end uses

Sectors

End-uses/
Sub-sectors/
modes



To understand end-uses beyond balances: the IEA energy efficiency indicators data collection

 Draft 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

Available
online

As an answer to a request from IEA Ministers in 2009, the IEA designed a “template” to collect data for energy efficiency indicators



The IEA data collection for energy efficiency indicators (EEI)

- Agreed by member countries in 2009 (IEA Ministerial)
- Developed with international community of experts, based on historical work on indicators (Odyssee, LNBL, etc)
- A user-friendly Excel template (available online)
- Collects energy consumption and activity data
- Covers four sectors: residential, services, industry, transport
- Annual collection at testing stage (five years so far)
- Data dissemination through analytical reports (e.g. Energy Efficiency Market report)

Draft Energy Efficiency Indicators Template	
country name	
COUNTRY DATA SECTION (to be reviewed and updated)	
MACRO-ECONOMIC DATA	Gross domestic product (GDP) and activity data
INDUSTRY	Industrial energy consumption by sector
SERVICES	Energy consumption by end use in the service sector
RESIDENTIAL	Residential energy consumption by end use and climate zone
TRANSPORT	Energy and activity data for passenger and freight transport
IEA DATA and AGGREGATE INDICATORS	
INDICATOR CALCULATION	Country-specific aggregate energy and activity indicators
BASIC INDICATORS	Predefined set of aggregate energy and activity indicators
SUPPORT TOOLS	
DATA COVERAGE	To document countries according to the data from the individual sheets
INDICATOR COVERAGE	To generate a graphical summary of data coverage (completed in Excel)
MULTIPLE INDICATOR GRAPHS	To generate a graph comparing trends from multiple indicators
COMPARISON GRAPHS	To plot the aggregated country trends

The IEA template: example of residential sector data

	A	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		Combust. 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		Combust. 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		Combust. 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

Similar data collection activities for some sectors emerging across regions

Questionnaire for statistics on energy consumption in households

The following data concerning the energy consumption in households by type of end-use are reported according to Regulation (EC) 1099/2008 on energy statistics and its amendments.

Submission country:

If 'Other', please specify:

Contact details for the questionnaire at country level:

Name:

e-mail:

Telephone number:

Definitions

Space heating

Cooking

TABLE

Space cooling

Lighting and electrical appliances

APEC EE Template

	Unit	2010	2011	2012	2013
RESIDENTIAL					
Space Heating					
Oil & Petroleum Products	PJ				
Natural Gas	PJ				
Coal & Coal Products	PJ				
Combust. Renewables & Waste	PJ				
Heat	PJ				
Electricity	PJ				
Other	PJ				
Space Cooling					
Oil & Petroleum Products	PJ				
Natural Gas	PJ				
Coal & Coal Products	PJ				
Combust. Renewables & Waste	PJ				
Heat	PJ				
Electricity	PJ				
Other	PJ				
Water Heating					
Oil & Petroleum Products	PJ				
Natural Gas	PJ				
Coal & Coal Products	PJ				
Combust. Renewables & Waste	PJ				
Heat	PJ				
Electricity	PJ				
Other	PJ				

Are we able to provide quality data?

Main data sources for EEI data

- **Country submission**
- **Cooperation with ODYSSEE (consistent templates)**
 - for EU countries
- **IEA balances**
 - for industry energy data
- **OECD database**
 - for macroeconomic data (VA, GDP, employment)
- **Other organizations (FAO, World Steel, USGS, ...)**
 - for commodities (activity data)

Major challenge in current data: missing data

Space Heating				
Oil & Petroleum Products	PJ	0	0	0
Natural Gas	PJ	0	0	0
Coal & Coal Products	PJ	0	0	0
Combust. Renewables & Waste	PJ	0	0	0
Heat	PJ	0	0	0
Electricity	PJ	0	0	0
Other	PJ	0	0	0
Total	PJ	0	0	0
Space Cooling				
Oil & Petroleum Products	PJ	0	0	0
Natural Gas	PJ	0	0	0
Coal & Coal Products	PJ	0	0	0
Combust. Renewables & Waste	PJ	0	0	0
Heat	PJ	0	0	0
Electricity	PJ	0	0	0
Other	PJ	0	0	0
Total	PJ	0	0	0
Lighting				
Electricity	PJ	0	0	0
Other	PJ	0	0	0
Total	PJ	0	0	0

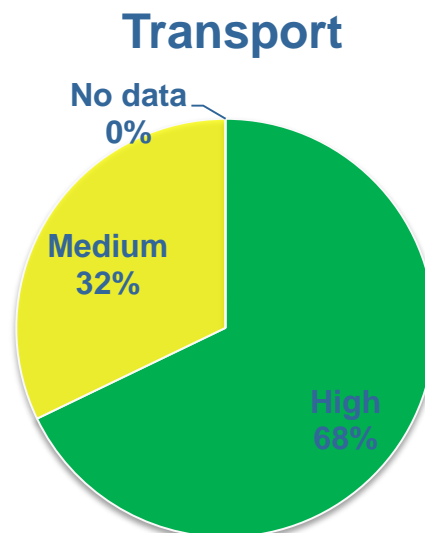
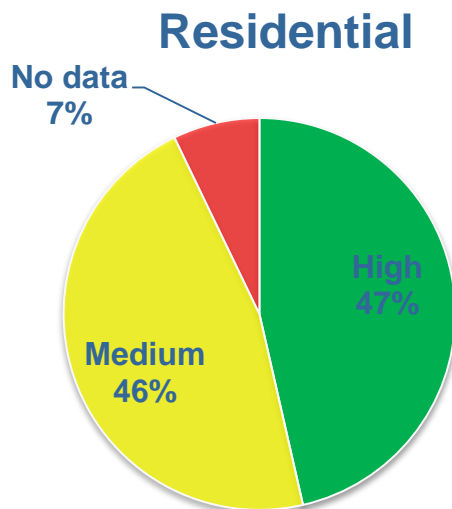
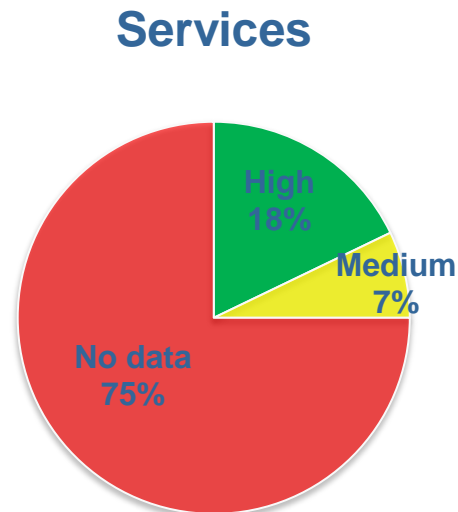
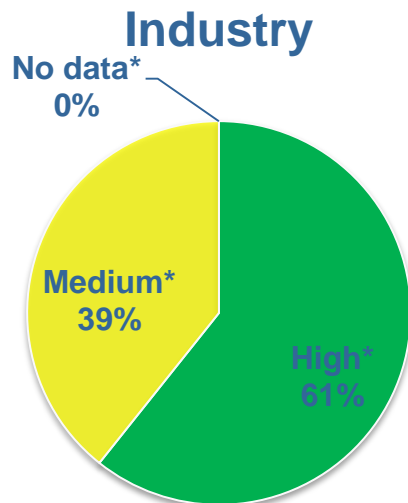
e.g. Services
end-use
consumption &
activity

e.g. Transport
activity
by vehicle type

TRANSPORT				units	2006	2007	2008	2009	2010	sources	
Legend	Check all/none	Add remarks	Manual								
Activity & Structure indicators											
Passenger transport [passenger-kilometres]											
Cars, SUV and personal light trucks				10 ⁹ pass-km	0	0	0	0	0		
- gasoline (spark ignition) engine				10 ⁹ pass-km	0	0	0	0	0		
- diesel (compression ignition) engine				10 ⁹ pass-km	0	0	0	0	0		
Motorcycles (2 wheelers) & 3 wheelers				10 ⁹ pass-km	0	0	0	0	0		
Buses				10 ⁹ pass-km	0	0	0	0	0		
Passenger Trains				10 ⁹ pass-km	0	0	0	0	0		
Domestic passenger airplanes				10 ⁹ pass-km	0	0	0	0	0		
Domestic passenger ships				10 ⁹ pass-km	0	0	0	0	0		
Total Passenger Transport				10⁹ pass-km	0	0	0	0	0		
Freight transport [tonne-kilometres]											
Freight & Commercial road transport				10 ⁹ tonne-km	0	0	0	0	0		
- gasoline (spark ignition) engine				10 ⁹ tonne-km	0	0	0	0	0		
- diesel (compression ignition) engine				10 ⁹ tonne-km	0	0	0	0	0		
Freight trains				10 ⁹ tonne-km	0	0	0	0	0		
Domestic freight airplanes				10 ⁹ tonne-km	0	0	0	0	0		
Domestic freight ships				10 ⁹ tonne-km	0	0	0	0	0		
Total Freight Transport				10⁹ tonne-km	0	0	0	0	0		

Completeness vary across sectors

2013 (p) cycle - total 28 countries

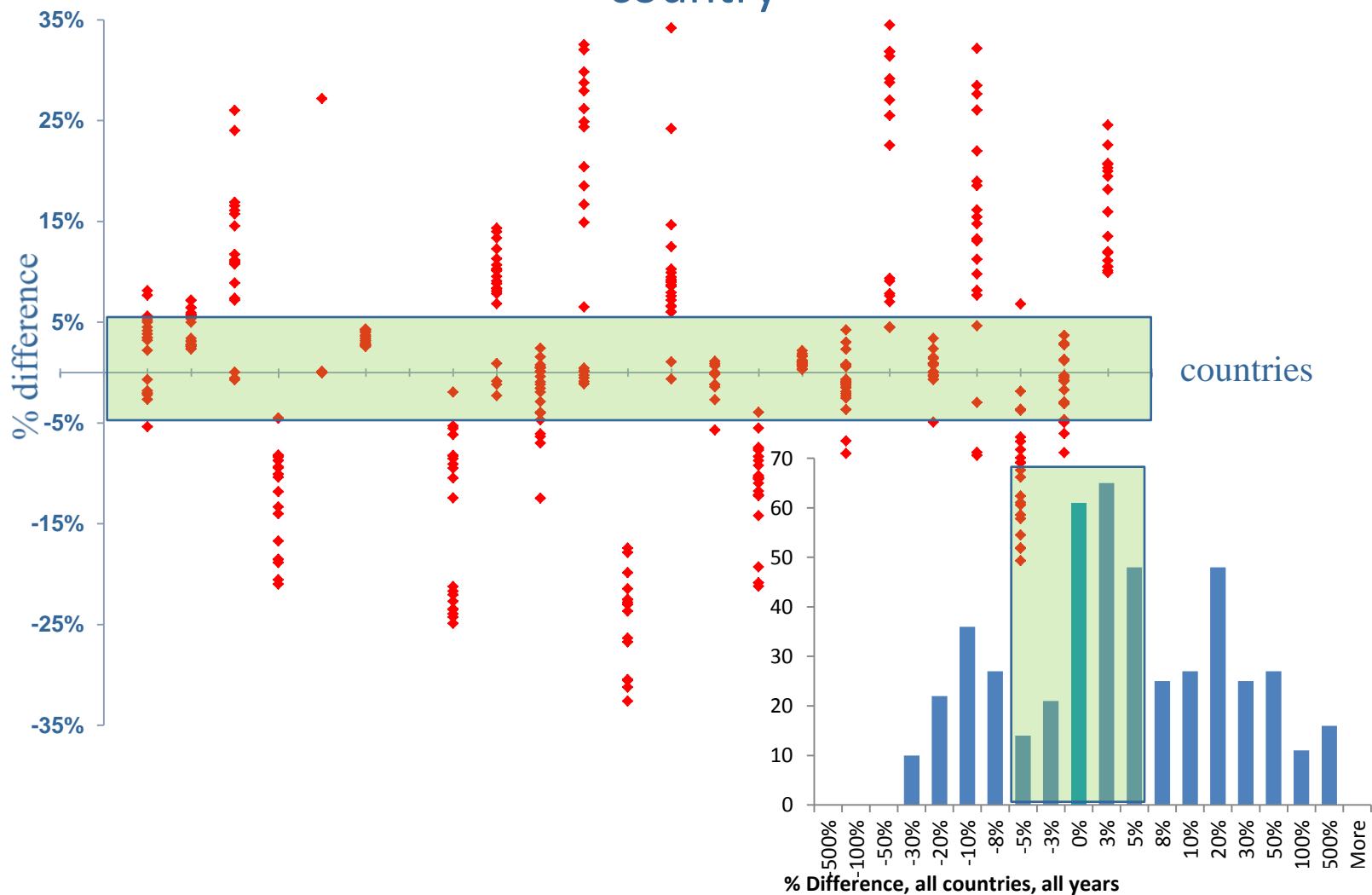


*High: 70~100%
 Medium: 30~70%
 No data: 0~30%

Consistency across submissions

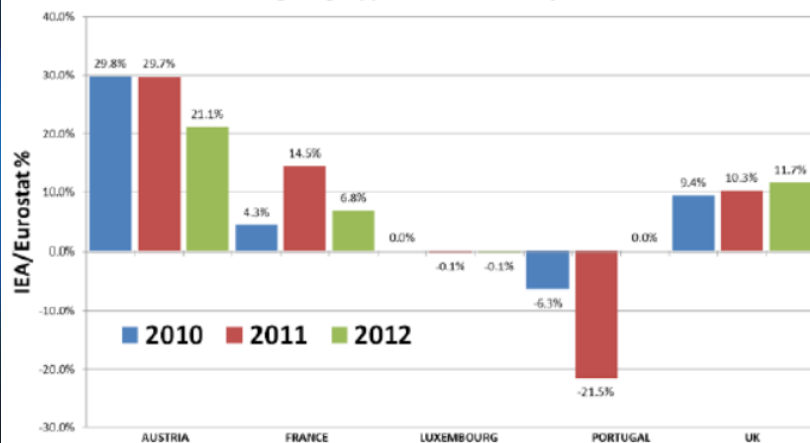
Services total energy consumption

EEI template vs. IEA balances, 1990-2010, by country

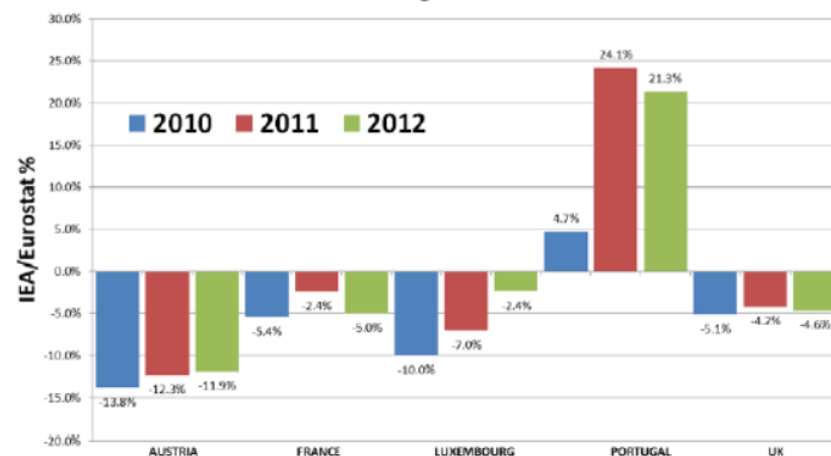


Consistency across organisations: IEA vs Eurostat (residential) example*

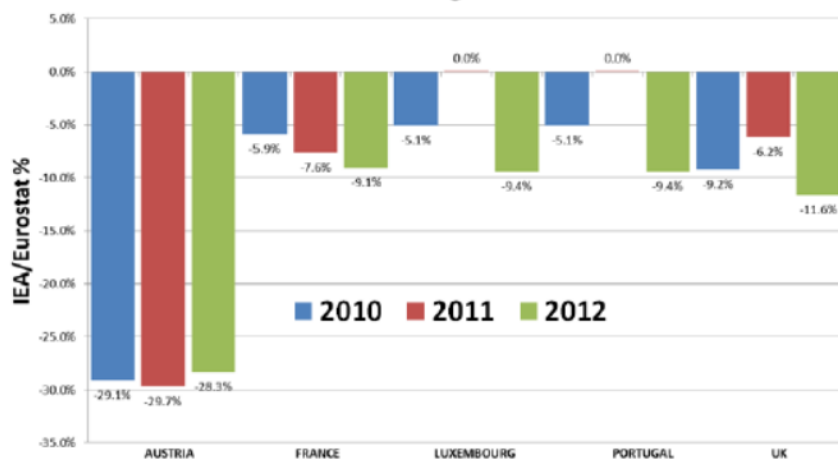
Lighting+appliances - Electricity



Cooking - Total



Water heating - Total



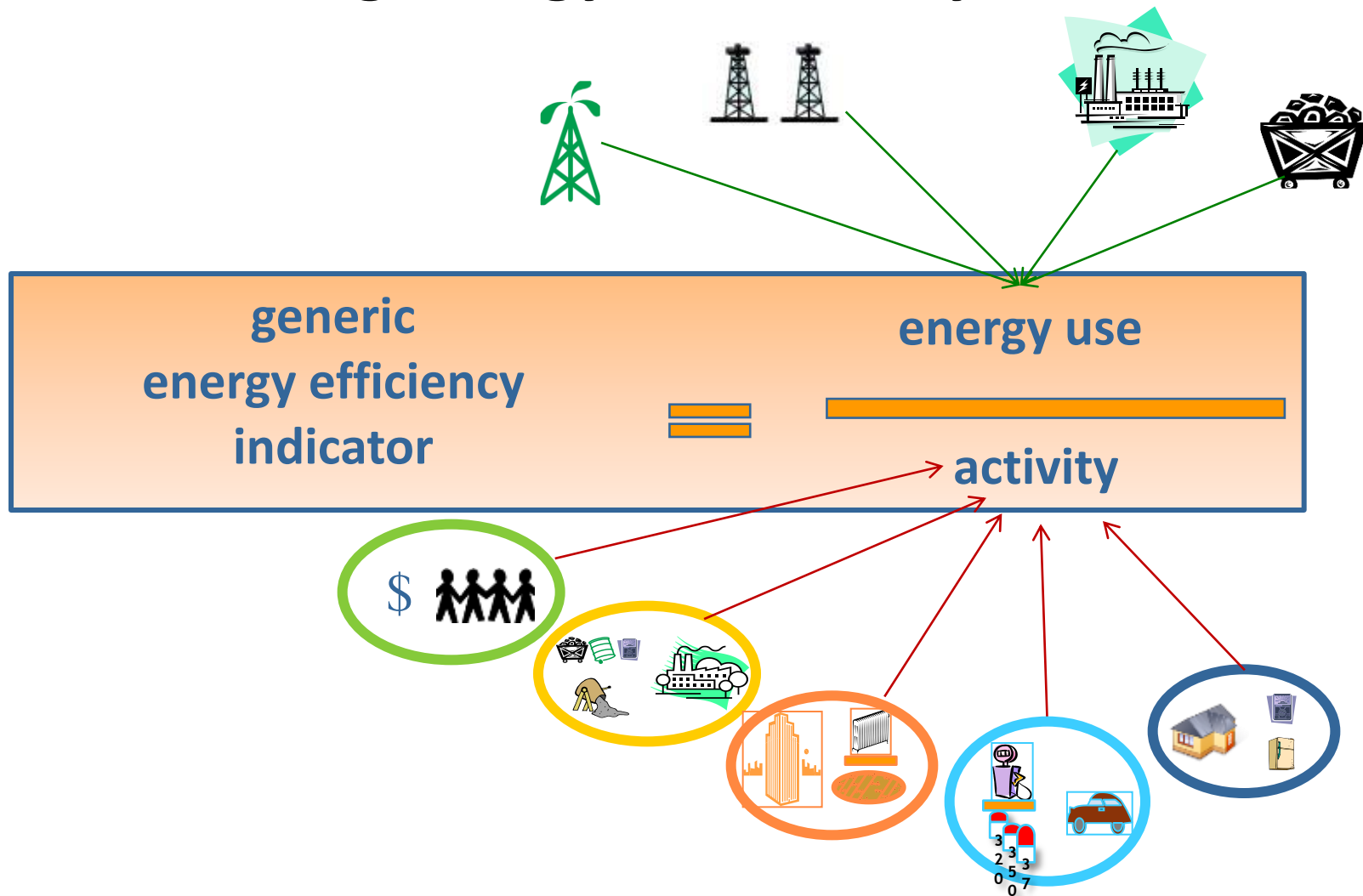
Space heating - Total



*Only for internal discussion – data are not published

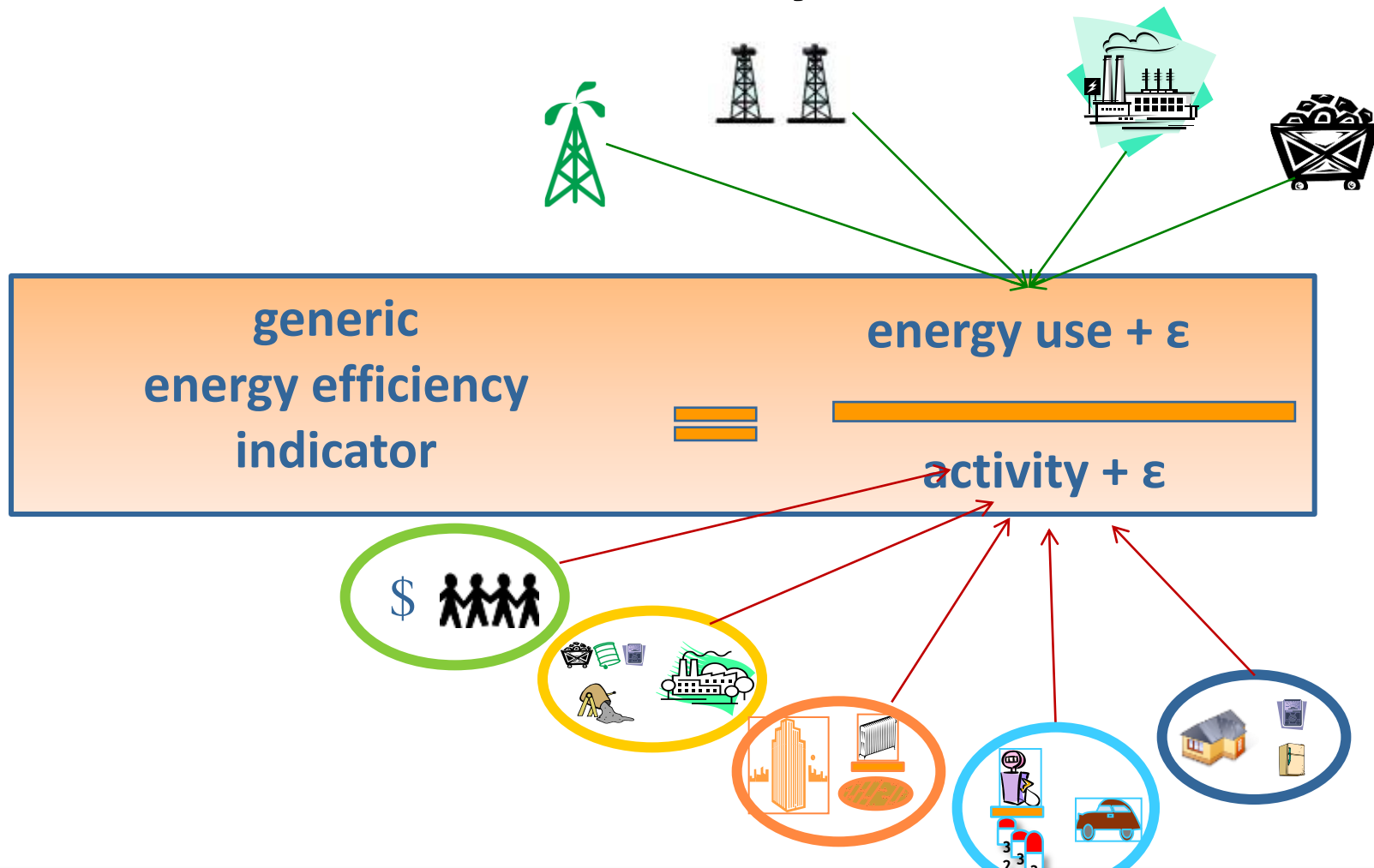
Quality data are key to developing indicators

Energy efficiency indicators: linking energy and activity data



Energy and activity data need to refer to the same boundaries

Linking energy and activity data: the reality



Need to understand the accuracy of both the energy and activity data – are error terms greater than change

For discussion...

- **The need for harmonised definitions and methodologies across organisations/countries**
- **Need for capacity building in data collection at national level**
- **Upfront cooperation across organisations is key**
- **Benefit of focused event on data for energy efficiency to meet challenge**

Thank you

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www.iea.org

The IEA logo is a circular emblem. It features a thick, light blue outer ring. Inside this ring is a solid dark blue circle. The letters "iea" are written in a white, lowercase, sans-serif font across the center of the dark blue circle. The dot on the "i" is a small white circle.

iea