ENERGY STATISTICS

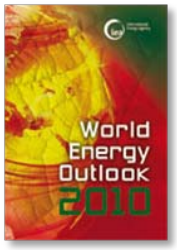
Robert Schnapp
Head of Coal, Renewables, Electricity, and Heat Section
Energy Statistics Division

Application of Energy Balances: The Development of the IEA Energy Efficiency Template

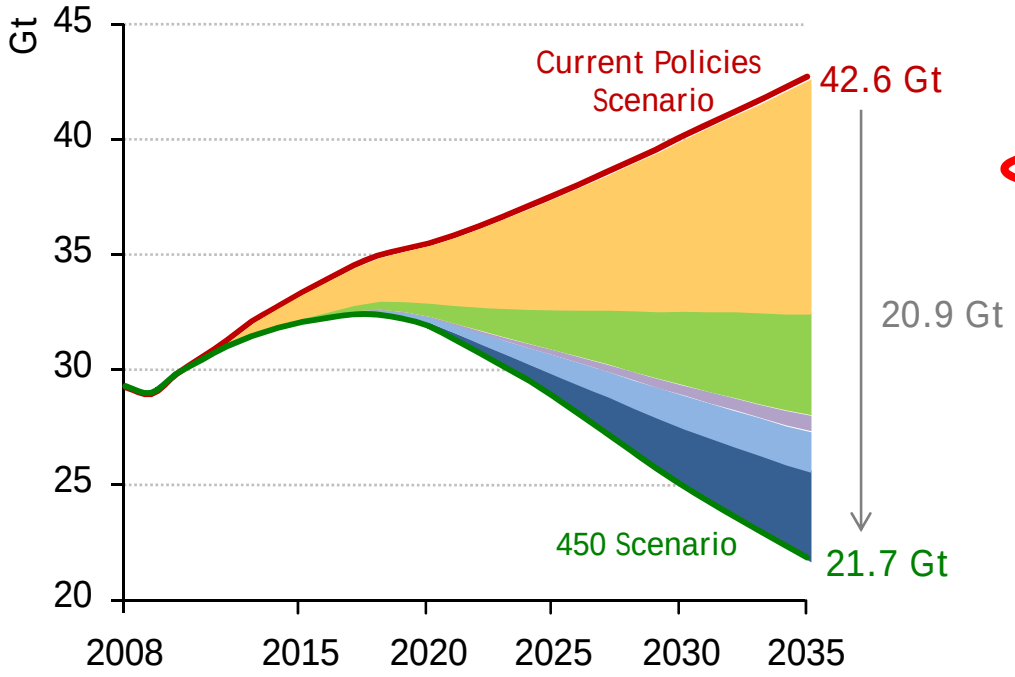
Workshop on Energy Statistics and Energy Balances
Kuala Lumpur, Malaysia, 5 December 2011

International Energy Agency

Energy Efficiency is key for any sustainable future



World energy-related CO2 emission savings by technology in the 450 Scenario relative to the Current Policies Scenario



Share of cumulative abatement between 2010-2035	
Efficiency	53%
Renewables	21%
Biofuels	3%
Nuclear	9%
CCS	15%

➔ **More than 50% of the reduction of CO_2 emissions should come from energy efficiency**

Benefits of energy efficiency

- Environmental benefits by reducing greenhouse gas emissions and local pollution
- Increased energy security
- Reduced investments in energy infrastructure
- Increased competitiveness
- Improved consumer welfare
- Job creation

Countries are adopting ambitious targets

- **China** Reduce CO_2 intensity of the economy by 40-45% between 2005 and 2020
- **India** Reduce CO_2 intensity of the economy by 20% between 2005 and 2020
- **European Union**

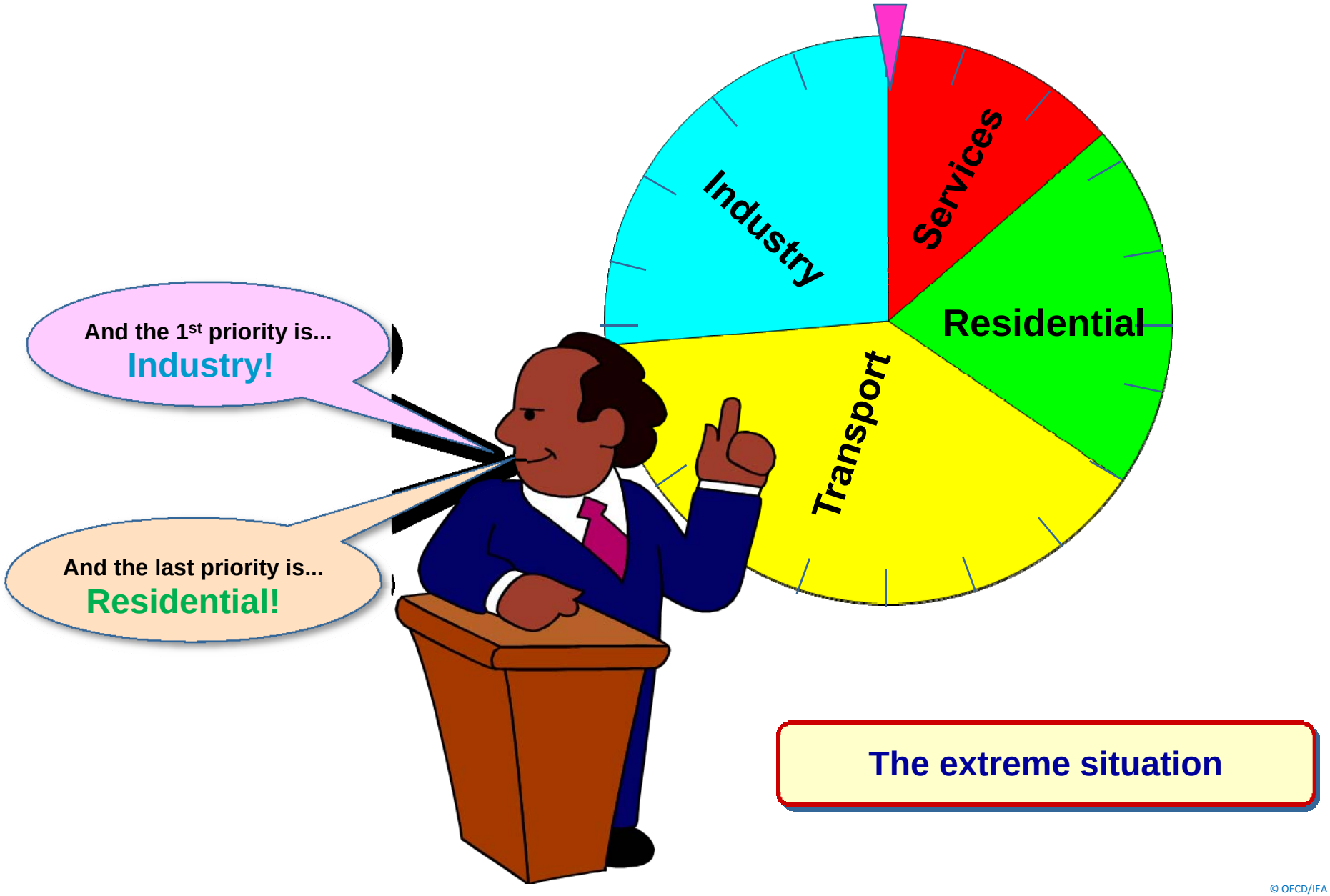
  20-20-20 programme energy efficiency to reduce energy consumption by 20% by 2020

How to identify priorities for energy efficiency policies?

Assess progresses and failures of policies?

And verify if countries meet their targets?

Lack of proper indicators could lead to major uncertainties for formulating action plans



The extreme situation

Why a need for more detailed data

Aggregated Indicators

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

Disaggregated Indicators

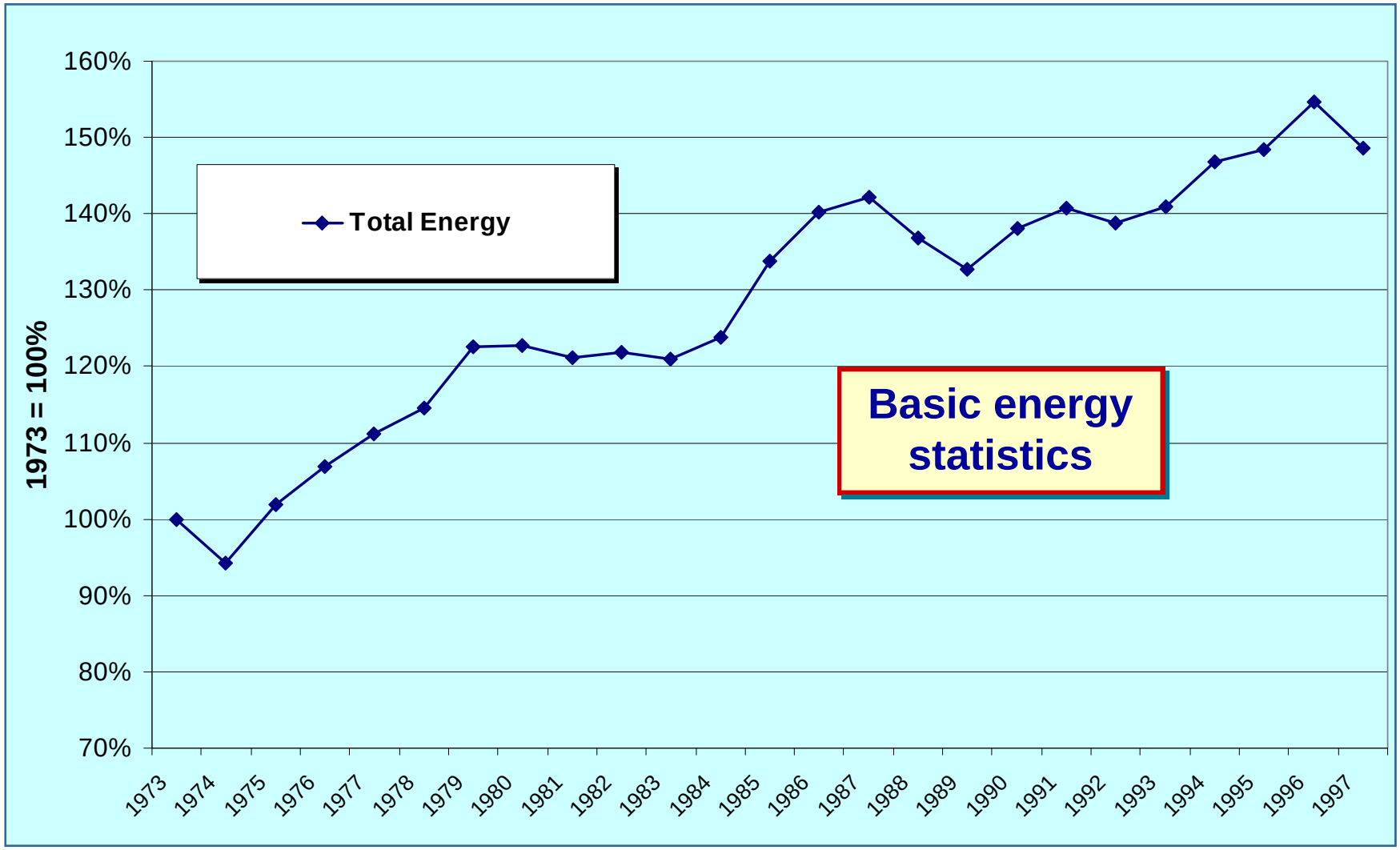
- Cons./ton cement
- Heating Cons./sqm/DD
- Litre/100km (stock)

Process Efficiency

- Dry process
- Condensing boiler
- Litre/100km (vintage)

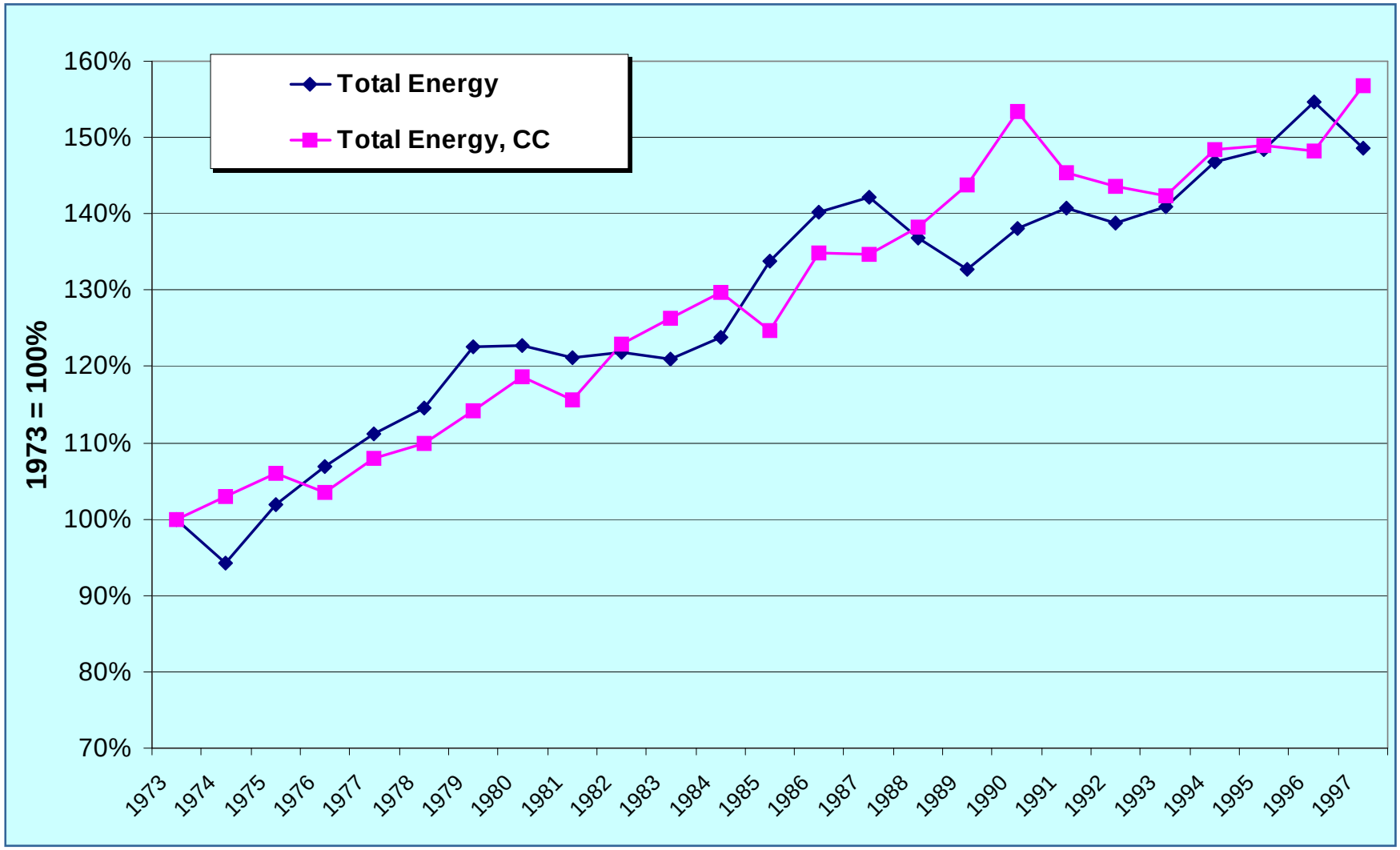
Current data do not allow to build sound indicators for energy efficiency policies

Why Go Beyond Aggregate Energy Consumption Data?



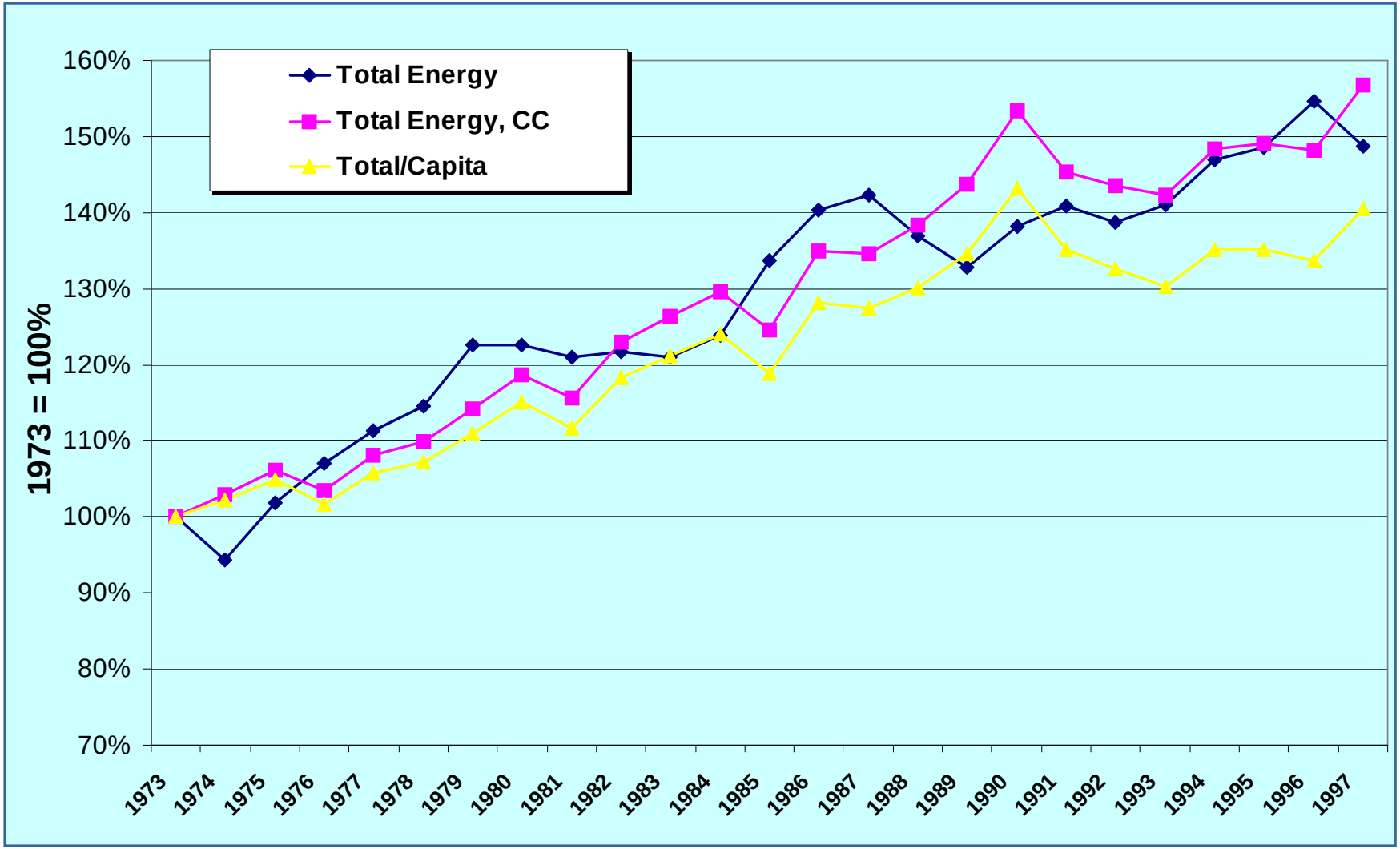
Example of Canada's Residential Sector

Why Go Beyond Aggregate Energy Consumption Data?



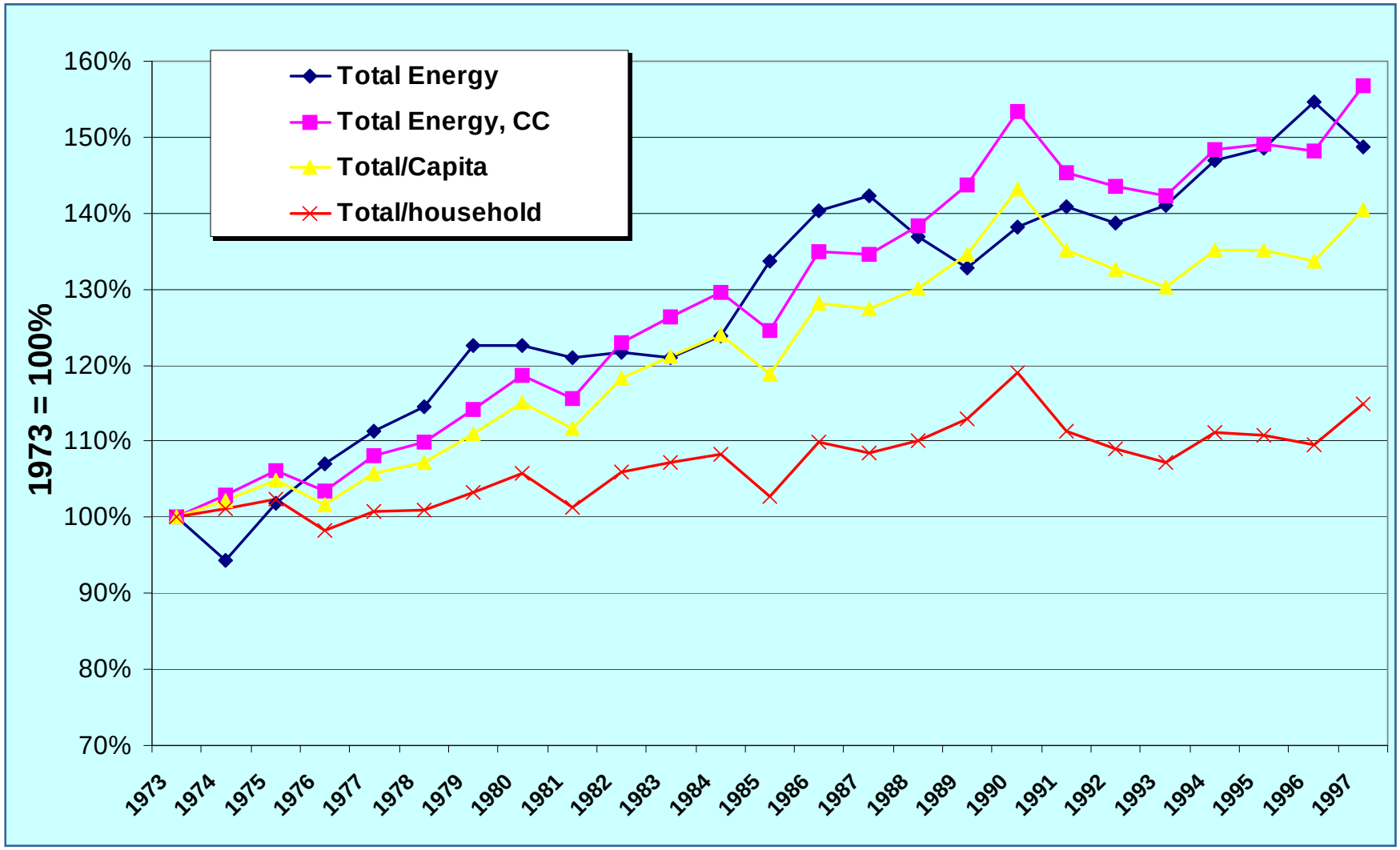
Example of Canada's Residential Sector

Why Go Beyond Aggregate Energy Consumption Data?



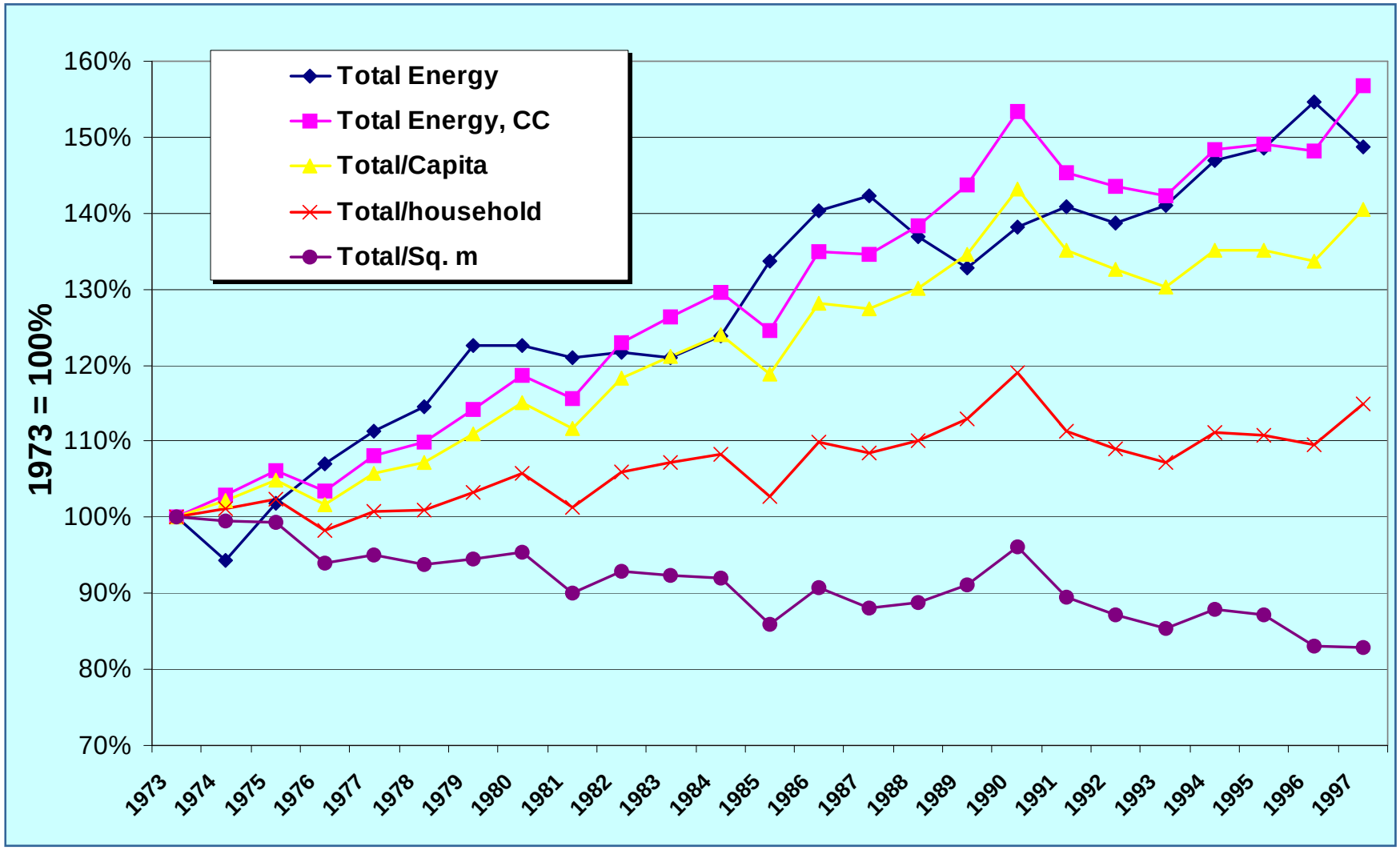
Example of Canada's Residential Sector

Why Go Beyond Aggregate Energy Consumption Data?



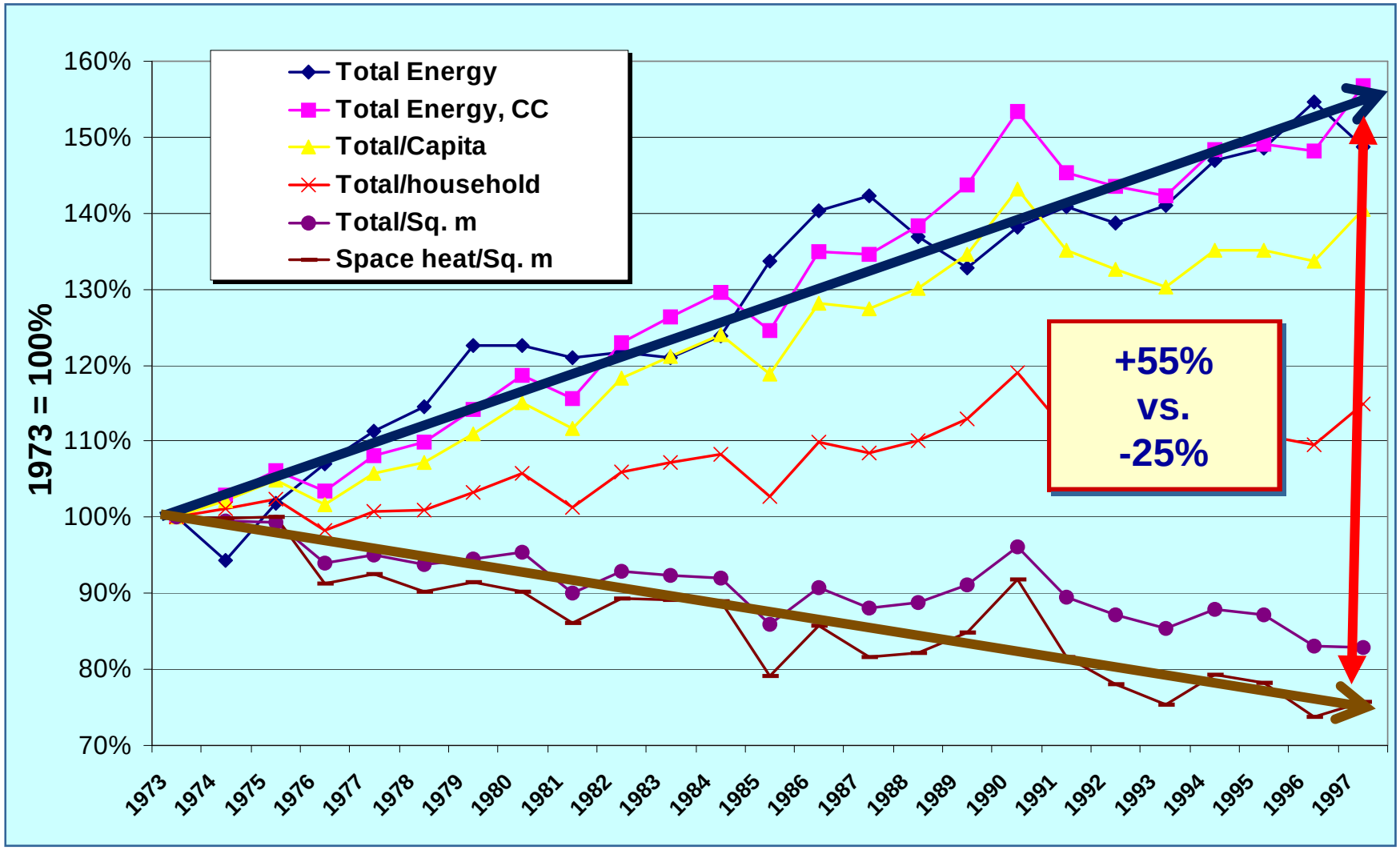
Example of Canada's Residential Sector

Why Go Beyond Aggregate Energy Consumption Data?



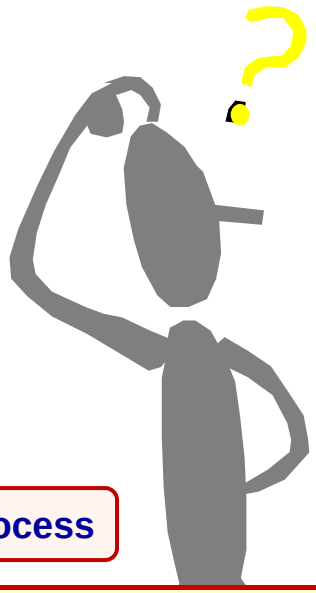
Example of Canada's Residential Sector

Why Go Beyond Aggregate Energy Consumption Data?



Example of Canada's Residential Sector

What data for what indicators



Modeling

Census

Data quality / timeliness

Appliances

Energy data

Residential

Industry

End uses

Process

ISIC: 2, 3, or 4 digits

Priorities depend on many elements: climate (heating vs. cooling), structure of the economy (industry vs. services) size of the country (transport, domestic aviation), energy mix (biomass), electrification rate, …

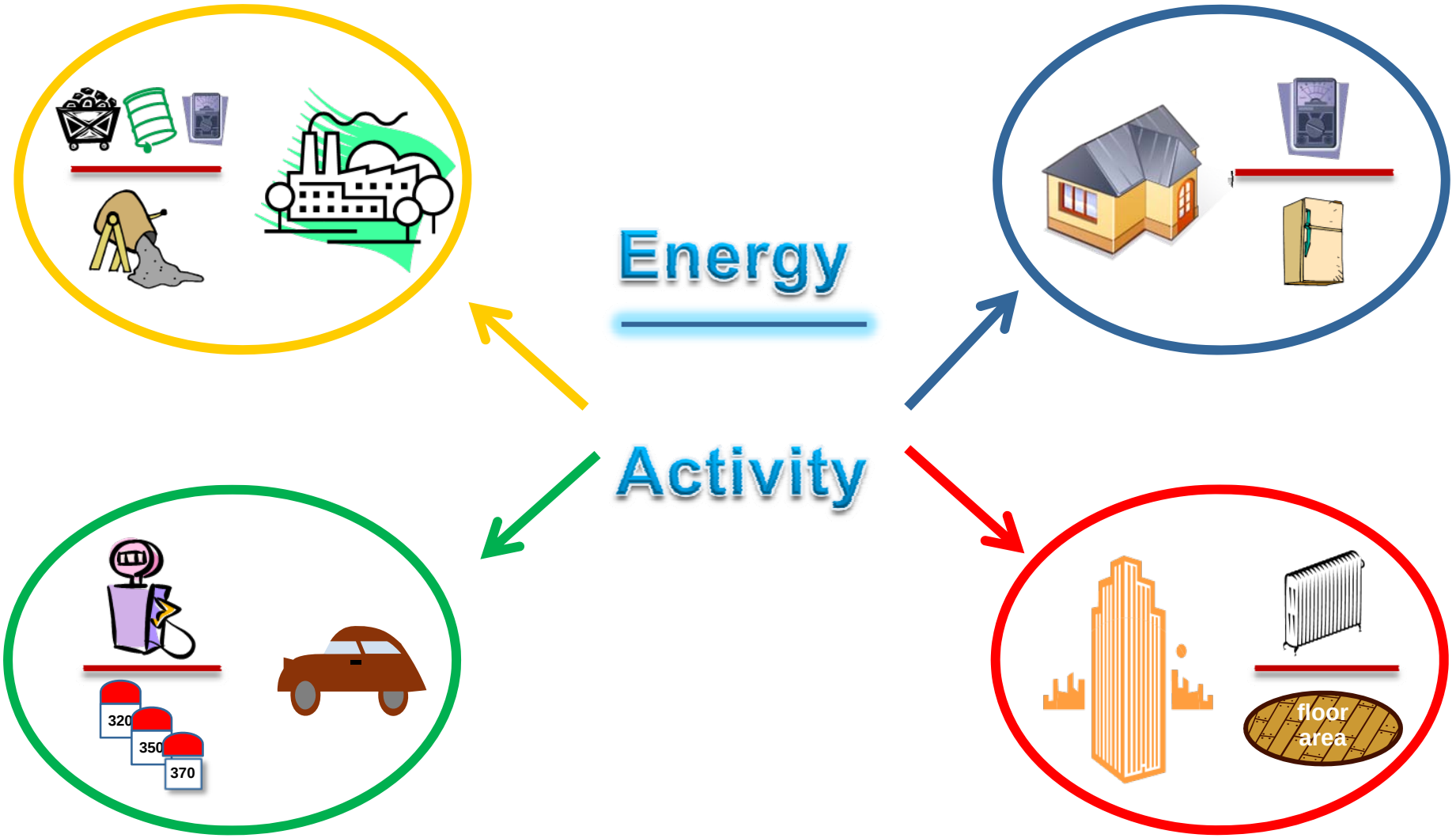
olic

Surveys

Transport

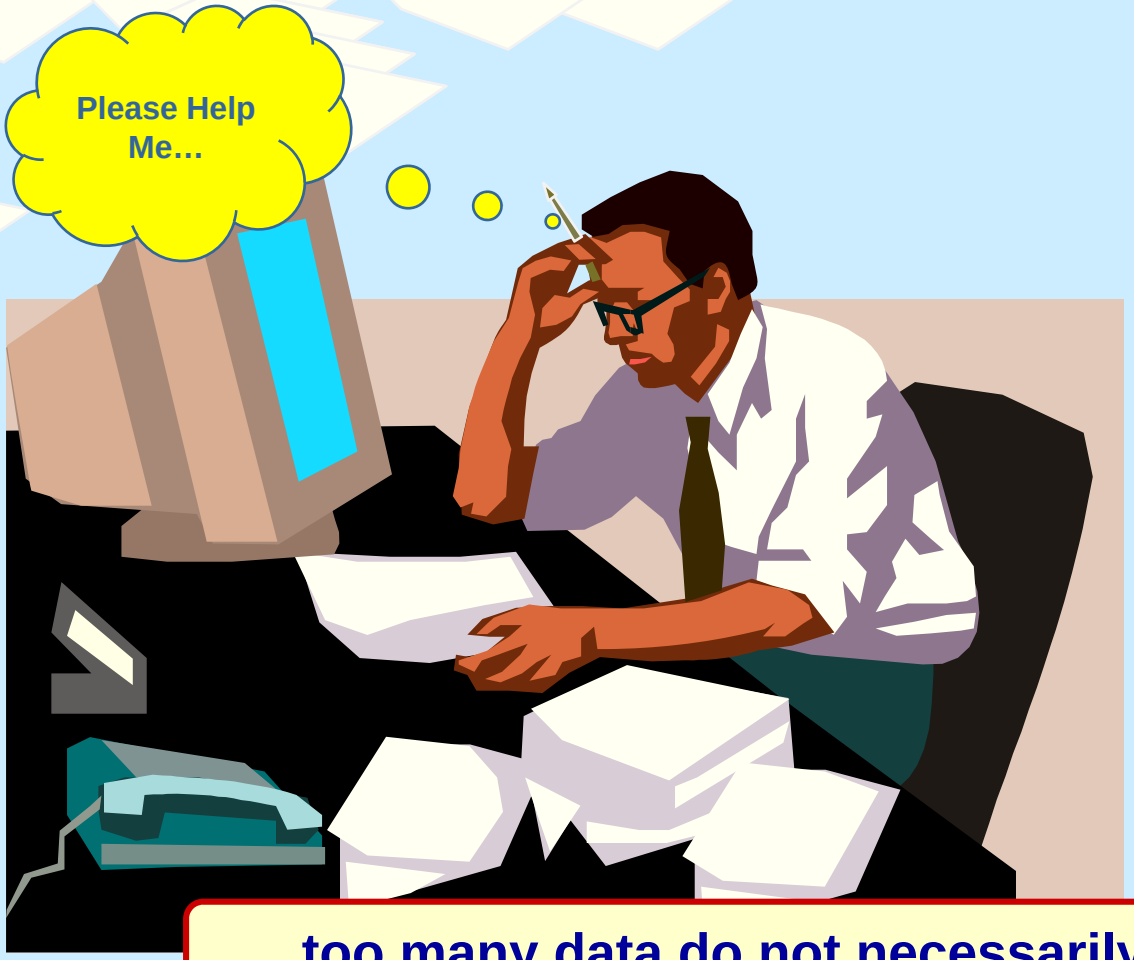
Frequency

What data for what indicators (cont.)



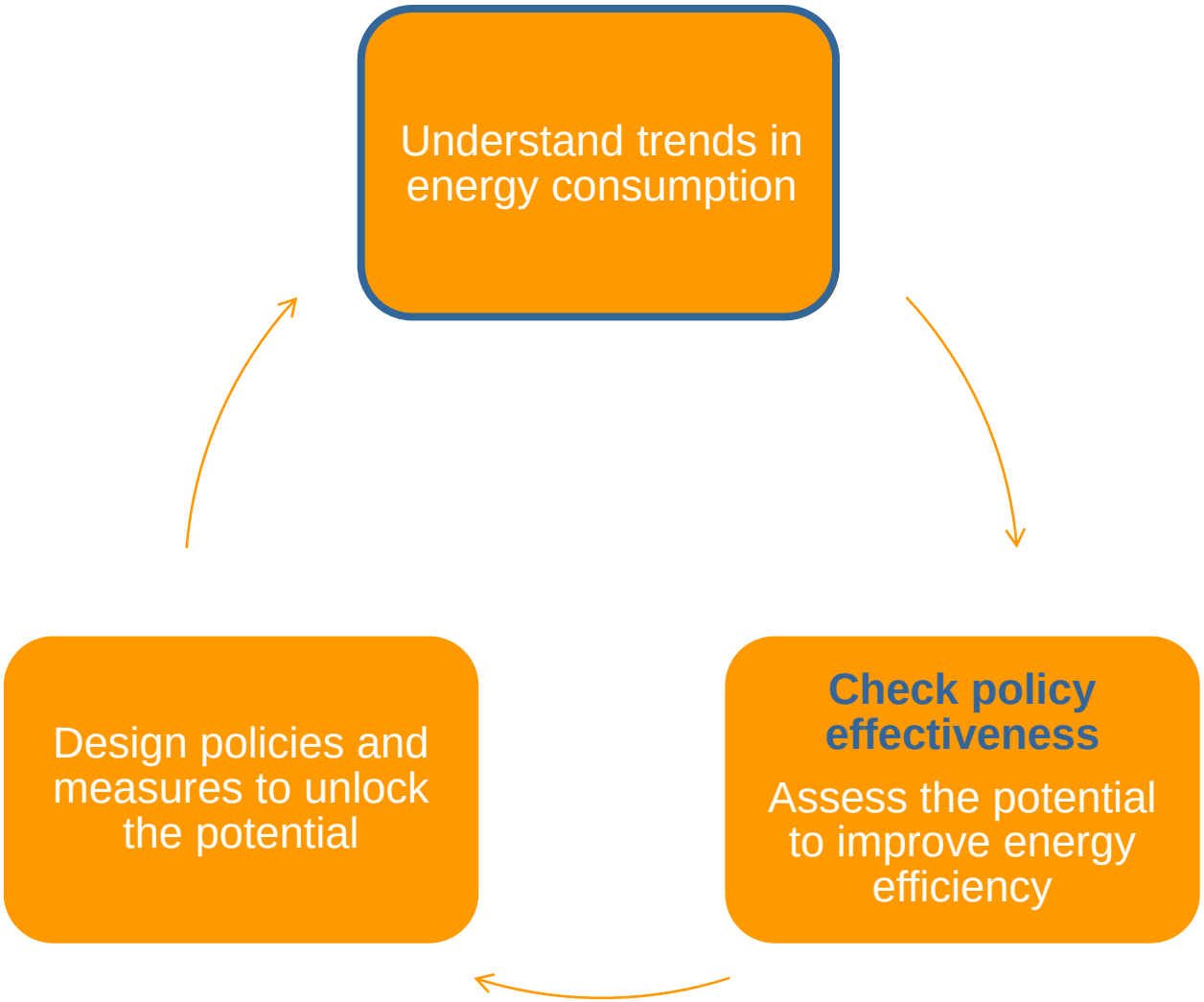
Other indicators include energy/energy ratio (efficiency of a furnace) or activity/activity ratio (electrification rate)

Do not over collect…

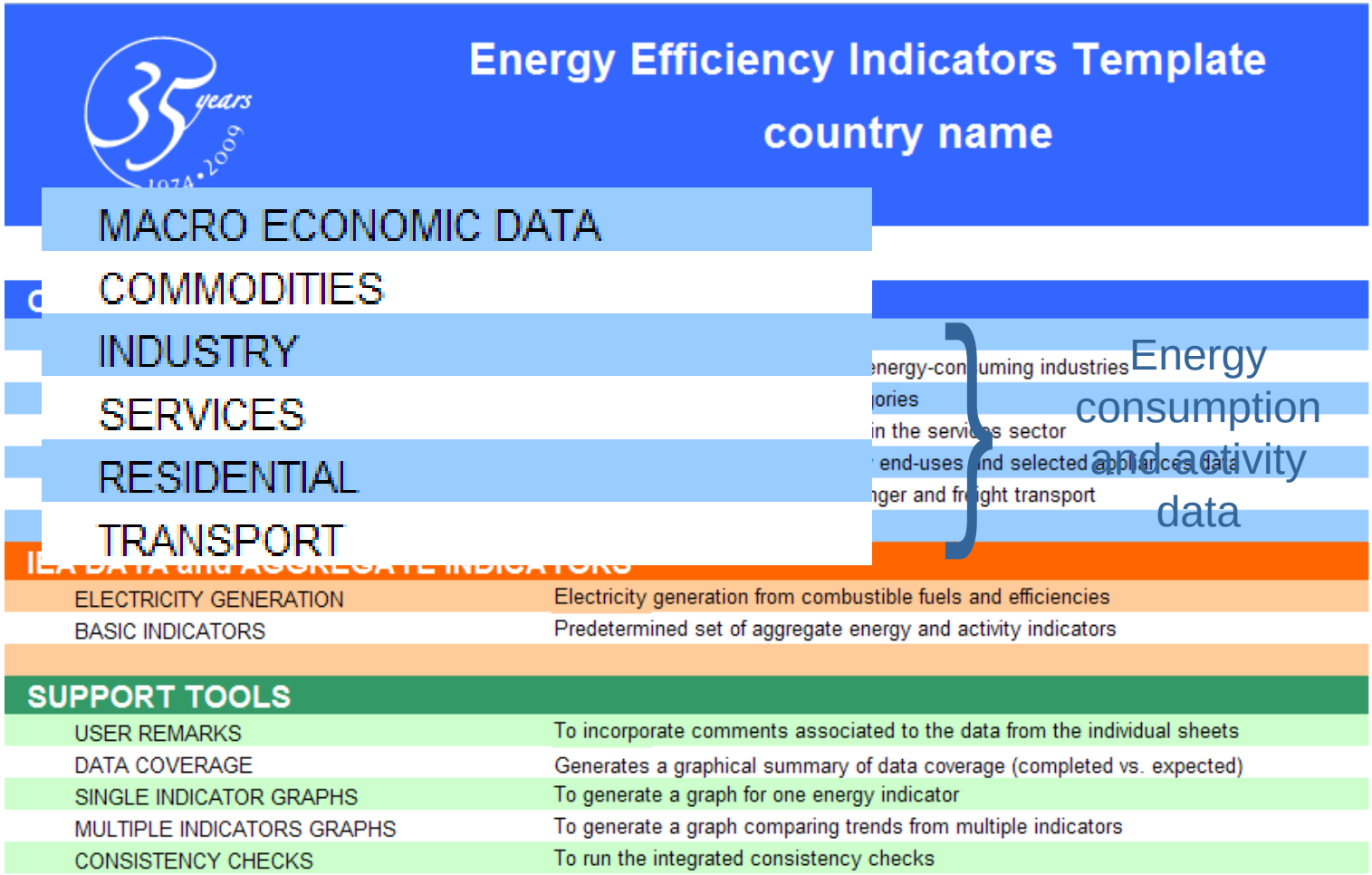


… too many data do not necessarily help…

How to unlock the potential of energy efficiency?



The IEA has defined a minimum set of data to be collected



List of macro economic data to be collected

- **Structural activities**
  - **Population**
  - **Employment**
  - **Dwellings**
  - **Heating and cooling degree-days**
  - **Exchange rate and purchasing power**
  - **Final consumption**
  - **GDP**
  - **Value-added by sector**

INDUSTRY

- **Energy consumption by fuel type**
  - Oil and petroleum products
  - Natural gas
  - Coal and Coal Products
  - Combustible renewables and waste
  - Heat
  - Electricity
  - Other
- **Value-added**
- **19 Major ISIC categories**
  - ISIC 01-05 Agriculture, hunting, fishing and forestry
  - ISIC 10-14 Mining and quarrying
  - ISIC 15-37 Manufacturing (each sub-sector individually)
  - ISIC 40-41 Electricity, Gas and Water
  - ISIC 45 Construction
- **Derived indicators:**
  - Energy/value-added

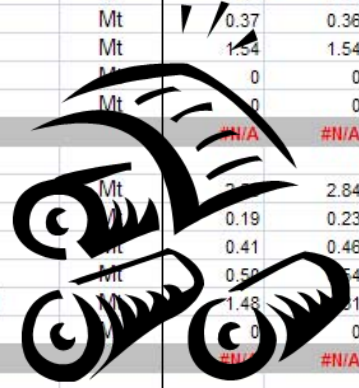
COMMODITIES PRODUCTION

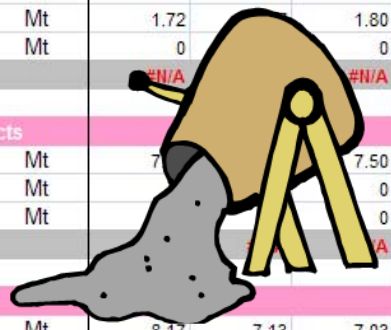
- **Physical production for major manufacturing sectors**
  - **ISIC 21. Paper and paper products**
  - **ISIC 24. Chemicals and chemical products**
  - **ISIC 26. Other non-metallic mineral products**
  - **ISIC 27. Basic metals**
- **Efficiency indicator:**
  - **Energy Intensity: energy use / production**

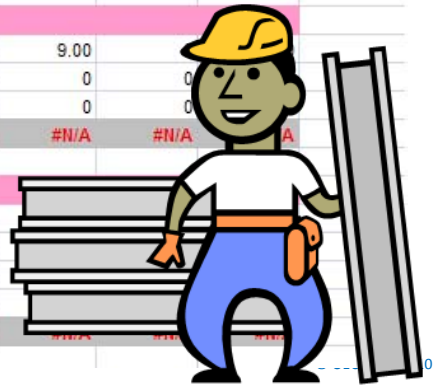
The industry sector

COMMODITIES

	A	B	C	D	N	O	P	Q	R	S	T	U	V	W
1					1999	2000	2001	2002	2003	2004	2005	2006	2007	
2	Menu	Legend	Che											
3		Production of commodities bas		vision										
4	21	21: Manufacture of paper and paper products												
5	☑	Pulp		Mt	0.88	1.03	1.21	1.39	1.17	1.11	1.16	1.15	0	
6	☑	Chemical pulp		Mt	0.39	0.40	0.41	0.61	0.63	0.64	0.67	0.69	0	
7	☑	Mechanical pulp		Mt	0.37	0.36	0.54	0.54	0.45	0.38	0.39	0.37	0	
8	☑	Recovered Paper		Mt	1.54	1.54	1.63	1.63	1.92	2.18	2.41	3.02	0	
9	☑	Inked		Mt	0	0	0	0	0	0	0	0	0	
10	☑	De-inked		Mt	0	0	0	0	0	0	0	0	0	
11		structural impact - index			#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	
12														
13	☑	Paper and paperboard		Mt		2.84	2.67	2.65	3.09	3.10	3.24	3.89	0	
14	☑	Household + Sanitary Paper		Mt	0.19	0.23	0.20					0.22	0	
15	☑	Newsprint		Mt	0.41	0.46	0.47					0.42	0	
16	☑	Printing + Writing Paper		Mt	0.59	0.54	0.55					0.66	0	
17	☑	Wrapping + Packaging Paper + Paperboard		Mt	1.48	1.51	1.43					2.59	0	
18	☑	Other		Mt	0	0	0.02					0.01	0	
19		structural impact - index			#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	
20														
21	24	24: Manufacture of chemicals and chemical products												
22	☑	Ethylene		Mt	48.42	53.80	53.80					62.31	0	
23	☑	Propylene		Mt	14.53	15.68	16.31					18.31	0	
24	☑	BTX		Mt	0	0	0					0	0	
25	☑	Ammonia (NH3)		Mt	1.72		1.80					1.93	0	
26	☑	Butadiene		Mt	0		0					0	0	
27		structural impact - index			#N/A		#N/A					#N/A	#N/A	
28														
29	26	26: Manufacture of other non-metallic mineral products												
30	☑	Cement		Mt	7		7.50	7.55	8.00	8.00	9.00			
31	☑	Clinker		Mt			0	0	0	0	0	0		
32	☑	Cement production		Mt			0	0	0	0	0	0		
33		structural impact - index					A	#N/A	#N/A	#N/A	#N/A	#N/A	A	
34														
35	27	27: Manufacture of basic metals												
36	☑	Crude Steel		Mt	8.17	7.13	7.03	7.53	7.54	7.41				
37	☑	Basic Oxygen Furnace production		Mt	0	0	0	0	0	0				
38	☑	Electric Arc Furnace production		Mt	0	0	0	0	0	0				
39	☑	Direct Reduced Iron		Mt	0	0	0	0	0	0				
40		structural impact - index			#N/A	#N/A	#N/A	#N/A	#N/A	#N/A				
41														







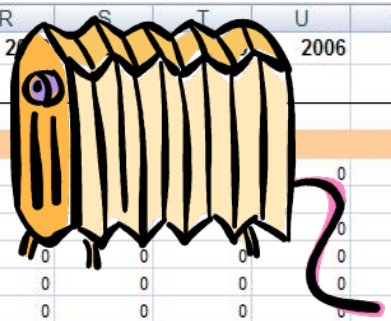
SERVICES

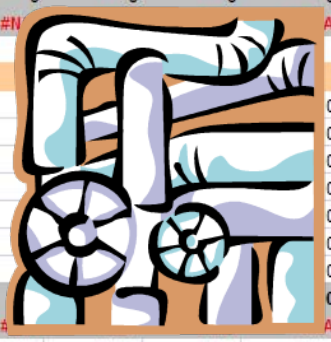
- Energy consumption by fuel type
  - Climate corrected
- End-uses
  - Space heating
  - Space cooling
  - Lighting
  - Other building energy use
  - Non-building energy use (e.g. street lighting)
- Floor space
- Derived indicators:
  - Energy consumption / floor space
  - Energy consumption / value-added

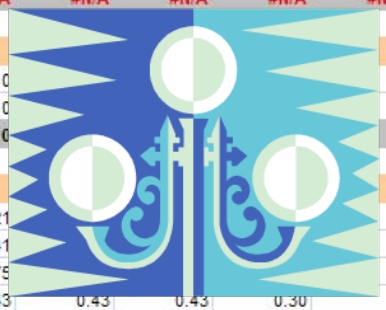
The services sector

SERVICES

	A			N	O	P	Q	R	S	T	U	V	W
1				1999	2000	2001	2002	2			2006	2007	
2	Menu	Legend	Check all/none										
18													
19		**Space Heating**											
20		Oil & Petroleum Products	PJ	0	0	0	0				0	0	
21		Natural Gas	PJ	0	0	0	0					0	
22		Coal & Coal Products	PJ	0	0	0	0				0	0	
23		Combus. Renewables & Waste	PJ	0	0	0	0	0	0	0	0	0	
24		Heat	PJ	0	0	0	0	0	0	0	0	0	
25		Electricity	PJ	0	0	0	0	0	0	0		0	
26		Other	PJ	0	0	0	0	0	0	0	0	0	
27	☑	**Total**	**PJ**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
28		Total (climate corrected for 1990-2007)	PJ	#N			A	#N/A	#N/A	#N/A	#N/A	#N/A	
29													
30		**Space Cooling**											
31		Oil & Petroleum Products	PJ				0	0	0	0	0	0	
32		Natural Gas	PJ				0	0	0	0	0	0	
33		Coal & Coal Products	PJ				0	0	0	0	0	0	
34		Combus. Renewables & Waste	PJ				0	0	0	0	0	0	
35		Heat	PJ				0	0	0	0	0	0	
36		Electricity	PJ				0	0	0	0	0	0	
37		Other	PJ				0	0	0	0	0	0	
38	☑	**Total**	**PJ**				**0**	**0**	**0**	**0**	**0**	**0**	
39		Total (climate corrected for 1990-2007)	PJ	#			A	#N/A	#N/A	#N/A	#N/A	#N/A	
40													
41		**Lighting**											
42		Electricity	PJ	0	0	0	0	0				0	
43		Other	PJ	0	0	0	0	0				0	
44	☑	**Total**	**PJ**	**0**	**0**	**0**	**0**	**0**				**0**	
45													
46		**Other Building Energy Use in Services Sector**											
47		Oil & Petroleum Products	PJ	19.33	19.40	18.23	19.48	19.21				0	
48		Natural Gas	PJ	44.22	44.76	38.61	39.15	39.41				0	
49		Coal & Coal Products	PJ	1.92	2.85	3.82	3.70	3.75				0	
50		Combus. Renewables & Waste	PJ	0.42	0.42	0.42	0.42	0.43	0.43	0.43	0.30	0	
51		Heat	PJ	0	0	0	0	0	0	0	0	0	
52		Electricity	PJ	139.42	144.19	159.93	166.55	166.41	165.98	168.11	168.10	0	
53		Other	PJ	0	0	0	0	0	0	0	0	0	
54	☑	**Total**	**PJ**	**205.31**	**211.62**	**221.01**	**229.30**	**229.22**	**230.21**	**233.45**	**239.00**	**0**	
55													







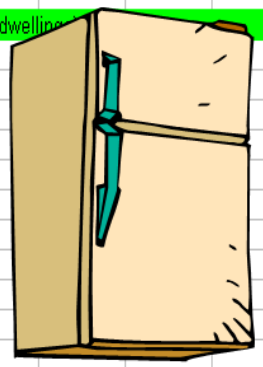
RESIDENTIAL

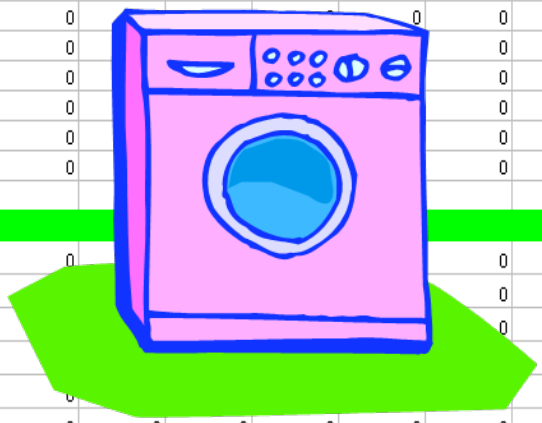
- **End-uses**
  - Space heating
  - Space cooling
  - Water heating
  - Cooking
  - Lighting
- **Appliances**
  - Refrigerator
  - Freezer
  - Dishwasher
  - Clothes washer
  - Clothes dryer
  - TV
  - Computers
- **Fuel consumption by fuel type**
  - Climate corrected
- **Appliance stock**
- **Appliance diffusion**
  - Units per dwelling
- **Efficiency indicators**
  - Energy consumption per unit
  - Energy per floor area

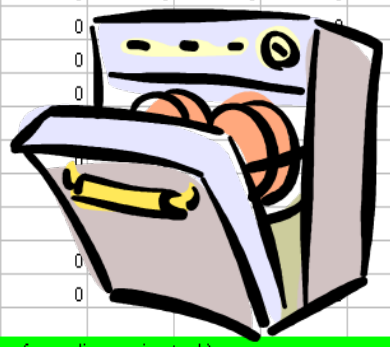
The residential sector

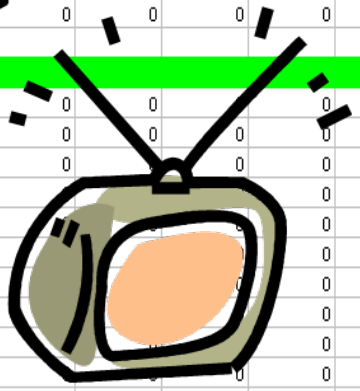
RESIDENTIAL

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Appliances Diffusion (as a percentage of occupied dwellings)																		
Refrigerators	%				0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freezers	%				0	0	0	0	0	0	0	0	0	0	0	0	0	0
Refrigerator/Freezer Combinations	%				0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dish Washers	%				0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clothes Washers	%				0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clothes Dryers	%				0	0	0	0	0	0	0	0	0	0	0	0	0	0
Room Air Conditioners	%				0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central Air Conditioners	%				0	0	0	0	0	0	0	0	0	0	0	0	0	0
Television	%				0	0	0	0	0	0	0	0	0	0	0	0	0	0
PC	%				0	0	0	0	0	0	0	0	0	0	0	0	0	0
Appliances Stock (only within occupied dwellings)																		
Refrigerators	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freezers	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Refrigerator/Freezer Combinations	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dish Washers	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clothes Washers	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clothes Dryers	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Room Air Conditioners	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central Air Conditioners	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Television	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PC	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Appliances, unit energy consumption per year (average for appliances in stock)																		
Refrigerators	kWh/unit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freezers	kWh/unit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Refrigerator/Freezer Combinations	kWh/unit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dish Washers	kWh/unit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clothes Washers	kWh/unit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clothes Dryers	kWh/unit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Room Air Conditioners	kWh/unit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central Air Conditioners	kWh/unit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Television	kWh/unit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PC	kWh/unit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy Use (total final energy use - net calorific values)																		









%

10^6

kWh/unit

TRANSPORT

- Transport modes
  - Road
  - Rail
  - Water
  - Air
- Type of transport
  - Passenger
  - Freight
- Type of road vehicles
  - Cars, SUVs and personal light trucks
  - Two and three-wheel motorcycles
  - Buses
  - Freight & Commercial road transport

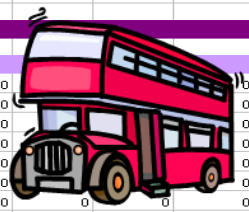
TRANSPORT

- **Activity and Structure**
  - Stock of vehicles
  - Vehicle-kilometres
  - Passenger-kilometres
  - Tonne-kilometres
- **Efficiency indicators**
  - Energy per passenger-kilometre
  - Energy per tonne-kilometre

The transport sector

TRANSPORT

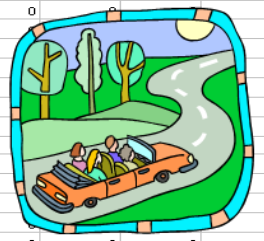
	units	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Passenger transport [passenger-kilometres]																		
Cars, SUV and personal light trucks	10^9 pass-km	0				0	0	0	0	0	0	0	0	0	0	0	0	0
- gasoline (spark ignition) engine		0				0	0	0	0	0	0	0	0	0	0	0	0	0
- diesel (compression ignition) engine		0				0	0	0	0	0	0	0	0	0	0	0	0	0
Motorcycles (2 wheelers) & 3 wheelers	10^9 pass-km	0				0	0	0	0	0	0	0	0	0	0	0	0	0
Buses	10^9 pass-km	0				0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Trains	10^9 pass-km	0				0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic passenger airplanes	10^9 pass-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic passenger ships	10^9 pass-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight transport [tonne-kilometres]																		
Freight & Commercial road transport	10^9 tonne-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- gasoline (spark ignition) engine	10^9 tonne-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- diesel (compression ignition) engine		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight trains		0	0	0				0	0	0	0	0	0	0	0	0	0	0
Domestic freight airplanes		0	0	0				0	0	0	0	0	0	0	0	0	0	0
Domestic freight ships	10^9 tonne-km	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight transport [tonnes]																		
Freight & Commercial road transport	10^6 tonnes	0	0	0				0	0	0	0	0	0	0	0	0	0	0
- gasoline (spark ignition) engine	10^6 tonnes	0	0	0				0	0	0	0	0	0	0	0	0	0	0
- diesel (compression ignition) engine		0	0	0				0	0	0	0	0	0	0	0	0	0	0
Freight trains		0	0	0				0	0	0	0	0	0	0	0	0	0	0
Domestic freight airplanes		0	0	0				0	0	0	0	0	0	0	0	0	0	0
Domestic freight ships	10^6 tonnes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle kilometres																		
Cars, SUV and personal light trucks	10^9 vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- gasoline (spark ignition) engine	10^9 vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- diesel (compression ignition) engine	10^9 vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Motorcycles (2 wheelers) & 3 wheelers	10^9 vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buses	10^9 vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Trains	10^9 vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic passenger airplanes	10^9 vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic passenger ships	10^9 vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight & Commercial road transport	10^9 vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- gasoline (spark ignition) engine	10^9 vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- diesel (compression ignition) engine	10^9 vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight trains	10^9 vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic freight airplanes	10^9 vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic freight ships	10^9 vkm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle stocks (number of vehicles in use)																		
Cars, SUV and personal light trucks	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- gasoline (spark ignition) engine	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- diesel (compression ignition) engine	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Motorcycles (2 wheelers) & 3 wheelers	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buses	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger Trains	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic passenger airplanes	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic passenger ships	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight & Commercial road transport	10^6	0	0															
- gasoline (spark ignition) engine	10^6	0	0															
- diesel (compression ignition) engine	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight trains	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic freight airplanes	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic freight ships	10^6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



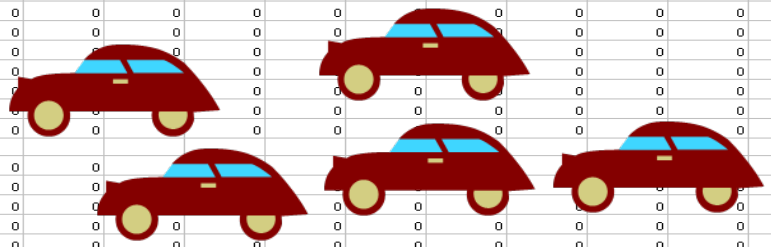
pass-km

Tonnes-km

tonnes

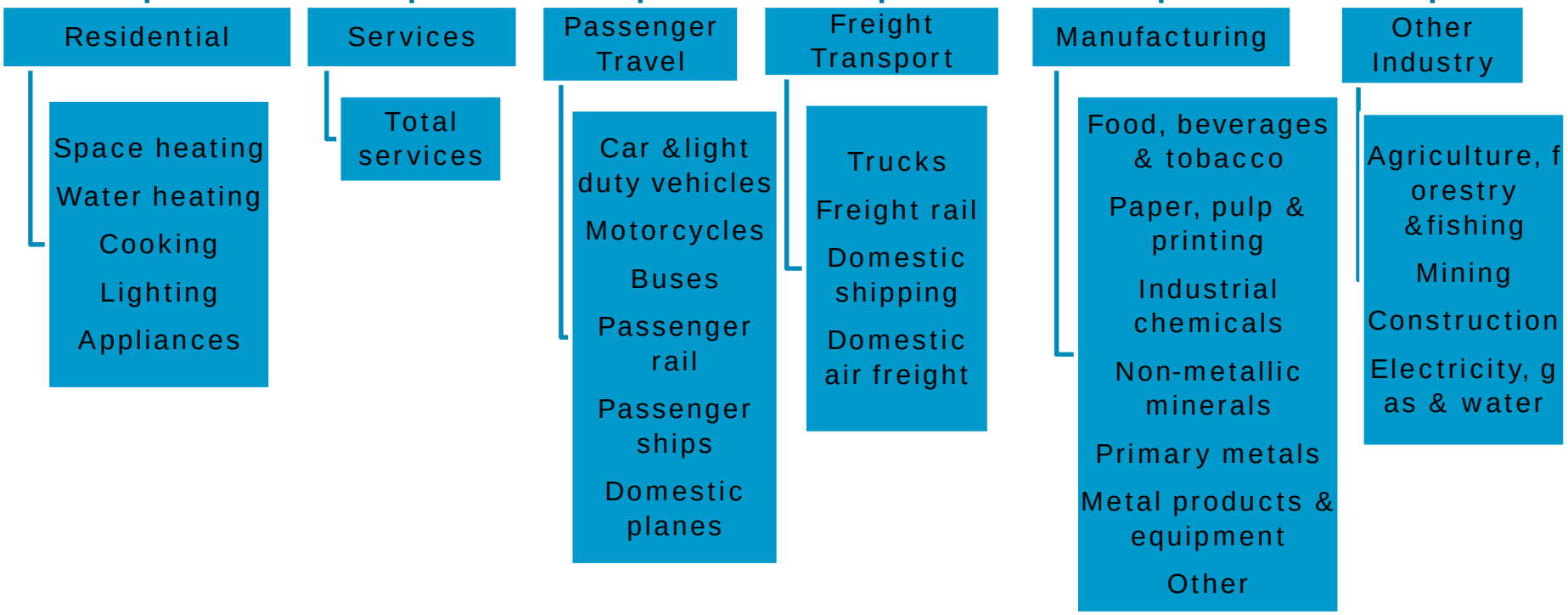


Veh-km



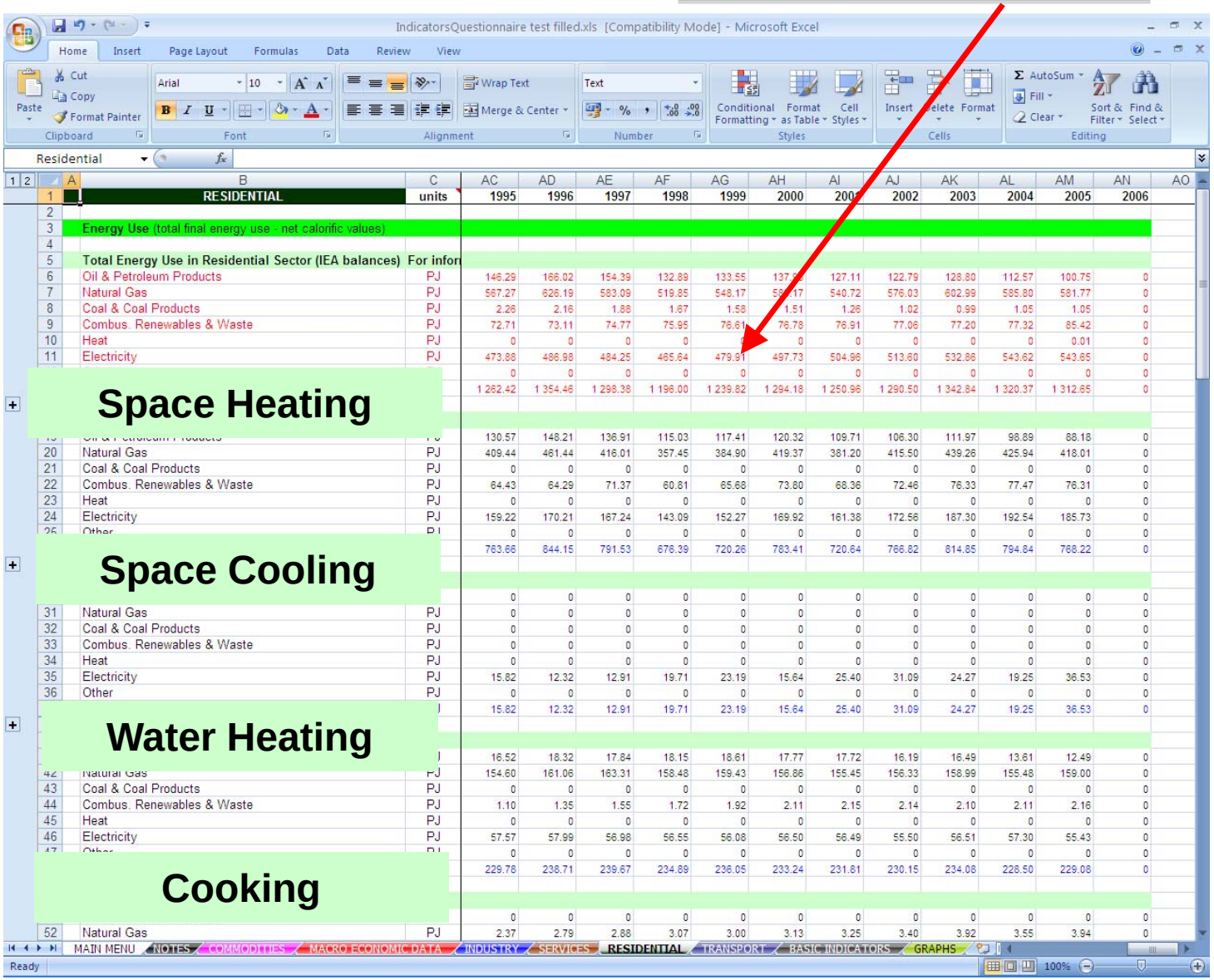
10^6

End-Use Coverage

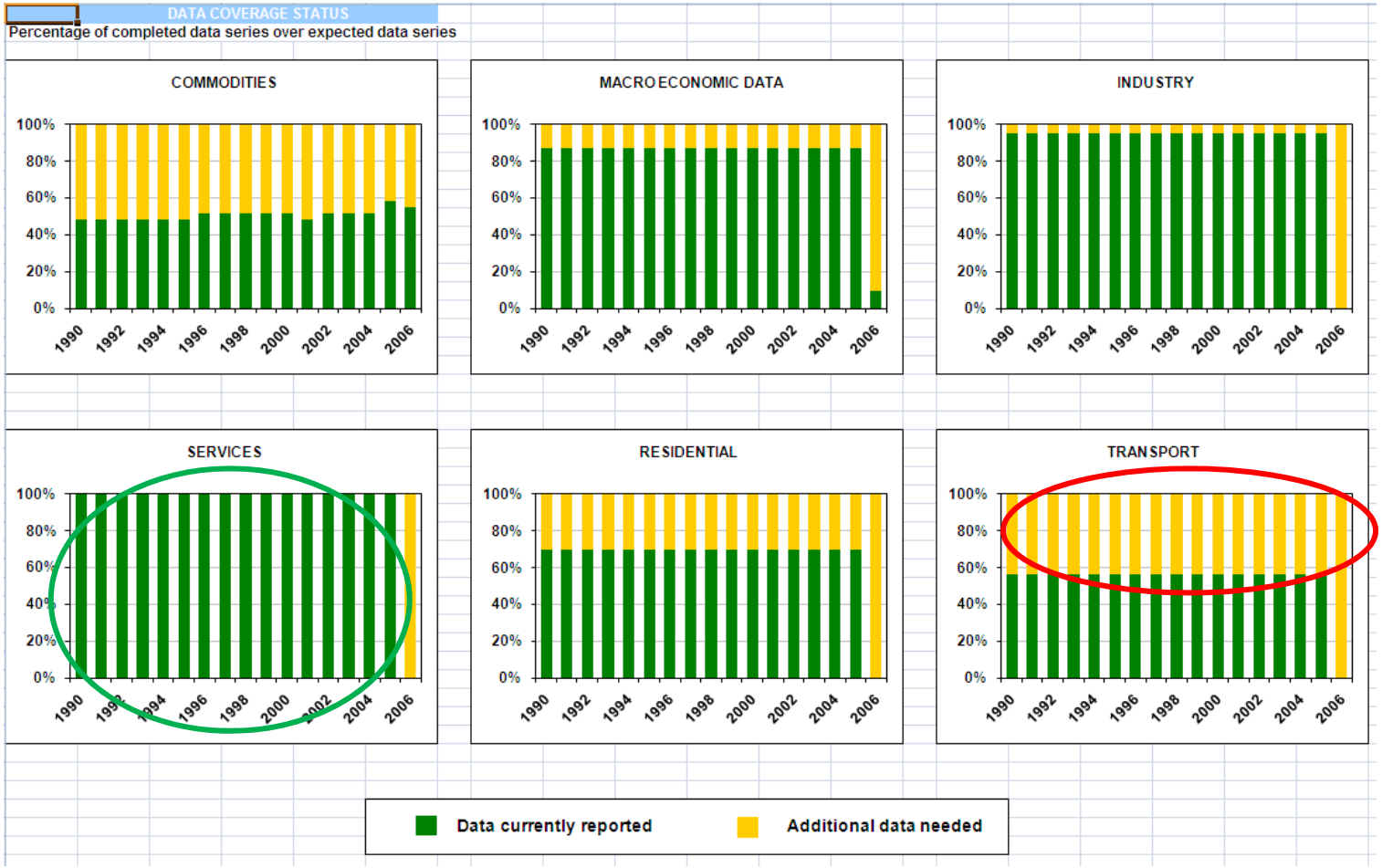


User-friendliness of the template

Pre-filled time series



User-friendliness of the template



100% coverage

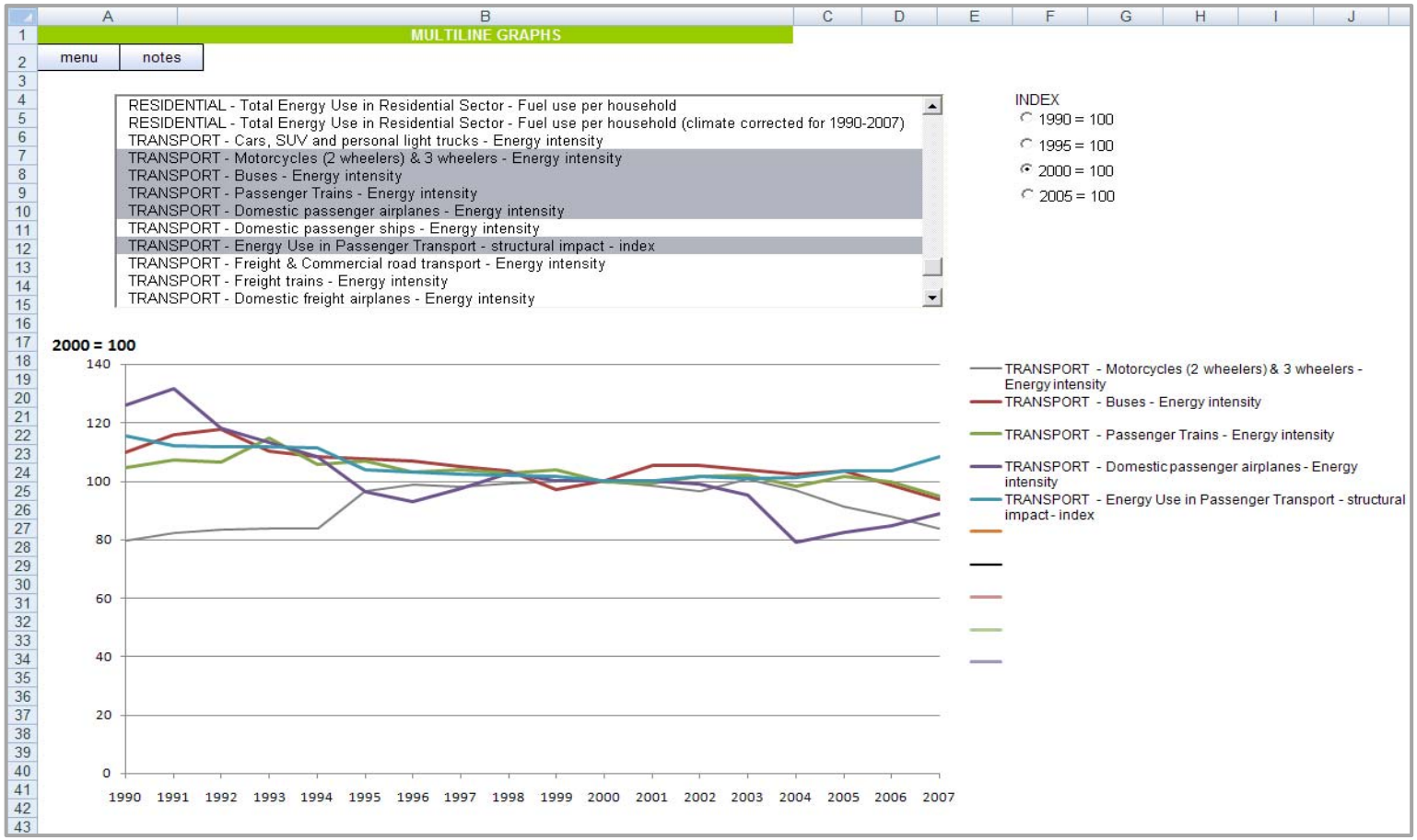
Missing data

A report on the coverage status is automatically updated when new data are entered.

User-friendliness of the template

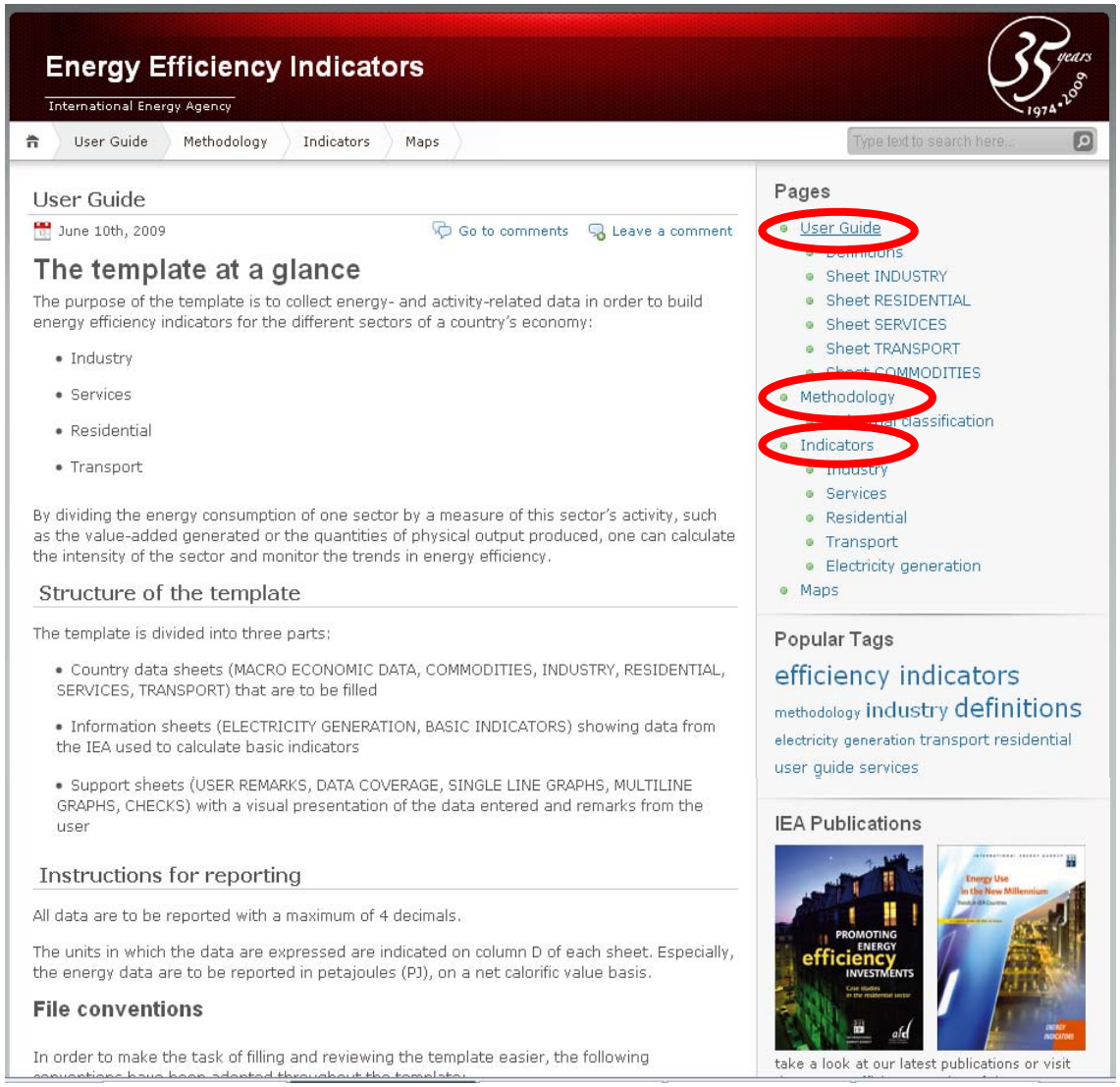
Various options offered for plotting indicators

User-friendliness of the template



Possibility to compare indicators

An electronic manual to help



A few words on the validation process

- Internal consistency
- Consistency with IEA energy balances
- Checks against secondary sources
- Plausibility
- Gross vs Net Calorific Value
- Coverage / definitions

- The aim is to try to understand "*how*" to help countries overcome the difficulties they face in providing quality data

Provides a starting point for collecting important data

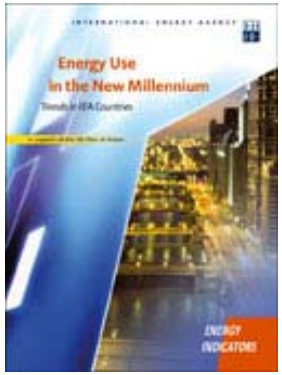
	A	B	D	L	M	N	O	P	Q	R	S	T	U	V	W
1			units	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
5															
6	Total Energy Use in Residential Sector														
7		Oil & Petroleum Products	PJ	309.42	323.61	288.04	294.10	286.82	286.66	292.16	294.44	273.65	274.13	300.58	304.07
8		Natural Gas	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		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													
35		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

Helps identifying data gaps and issues

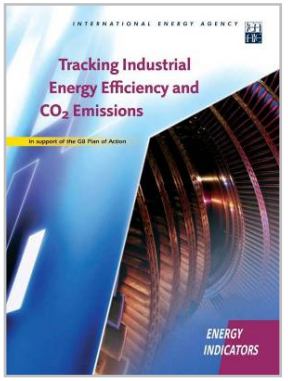
Water Heating									
Oil & Petroleum Products	PJ	0	0	0	0	12.77	11.22	10.22	9.34
Natural Gas	PJ	0	0	0	0	5.19	5.15	5.07	5.02
Coal & Coal Products	PJ	0	0	0	0	0	0	0	0
Combus. Renewables & Waste	PJ	0	0	0	0	7.62	7.75	7.87	8.04
Heat	PJ	0	0	0	0	0	0	0.04	0.04
Electricity	PJ	2.18	2.05	2.14	2.22	3.94	3.31	2.76	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**

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

Dissemination is essential

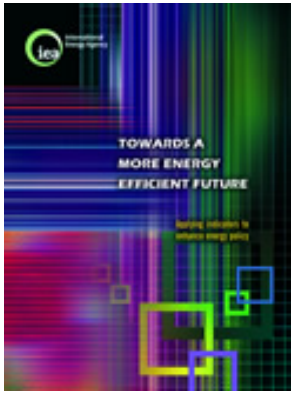


Energy Use in a New Millennium

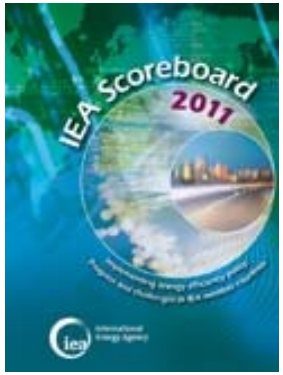


Tracking Industrial Energy Efficiency and CO_2 Emissions

Worldwide Trends in Energy Use and Efficiency

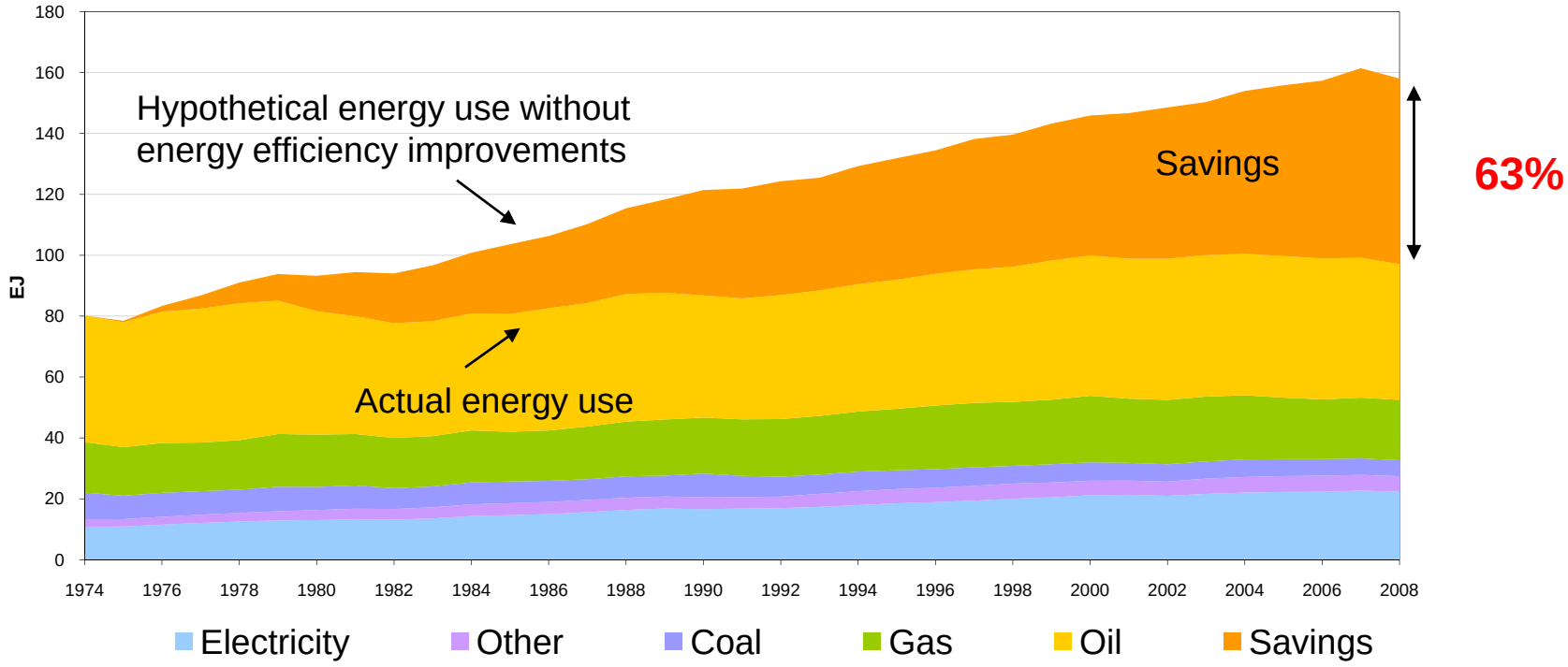


Towards a More Energy Efficient Future



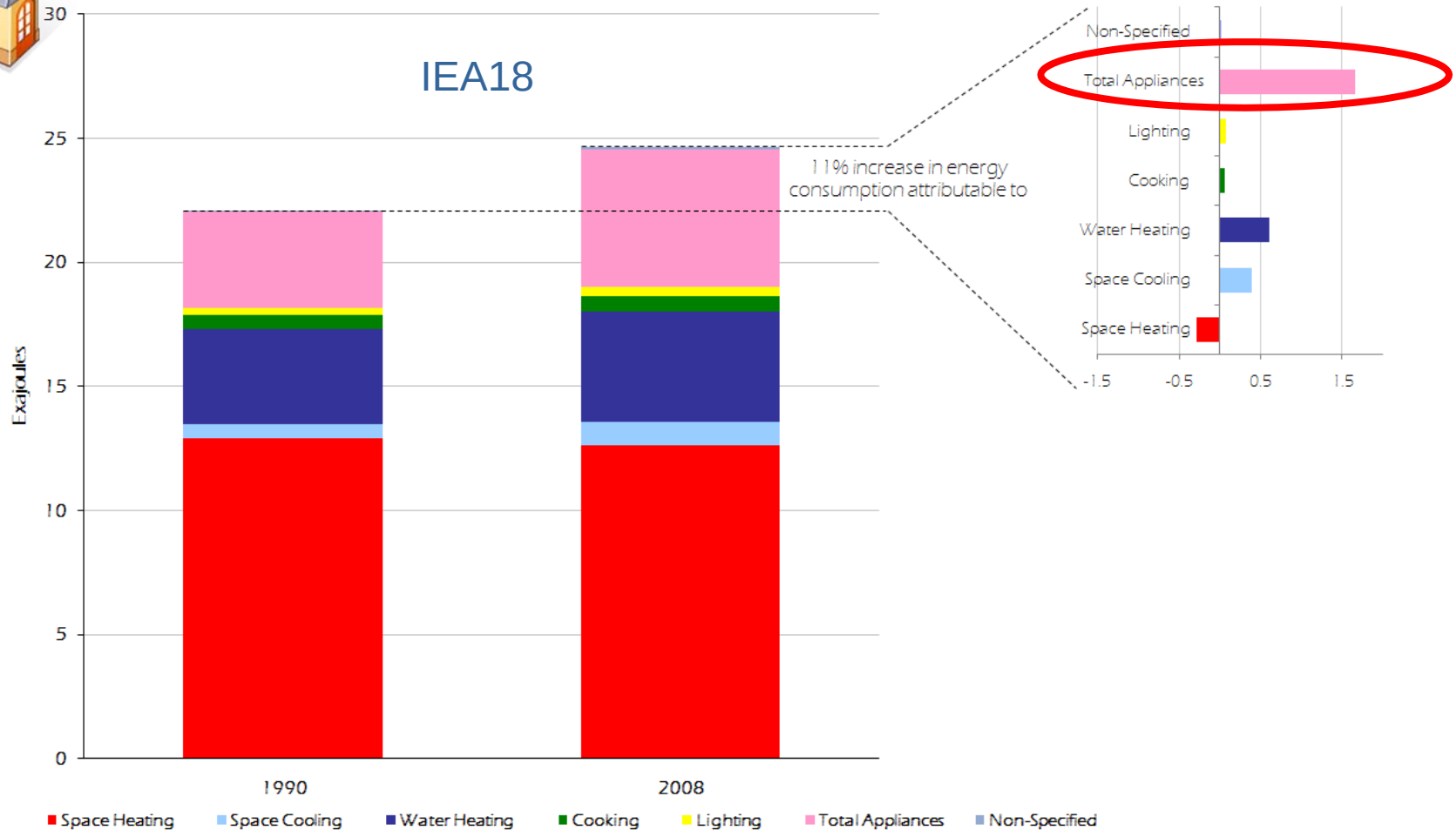
The IEA Scoreboard 2011

Support to decision makers



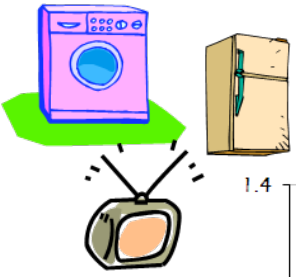
Without the savings from improved energy efficiency since 1974 in 11 IEA countries, energy use would now be 63% higher.

Support to decision makers

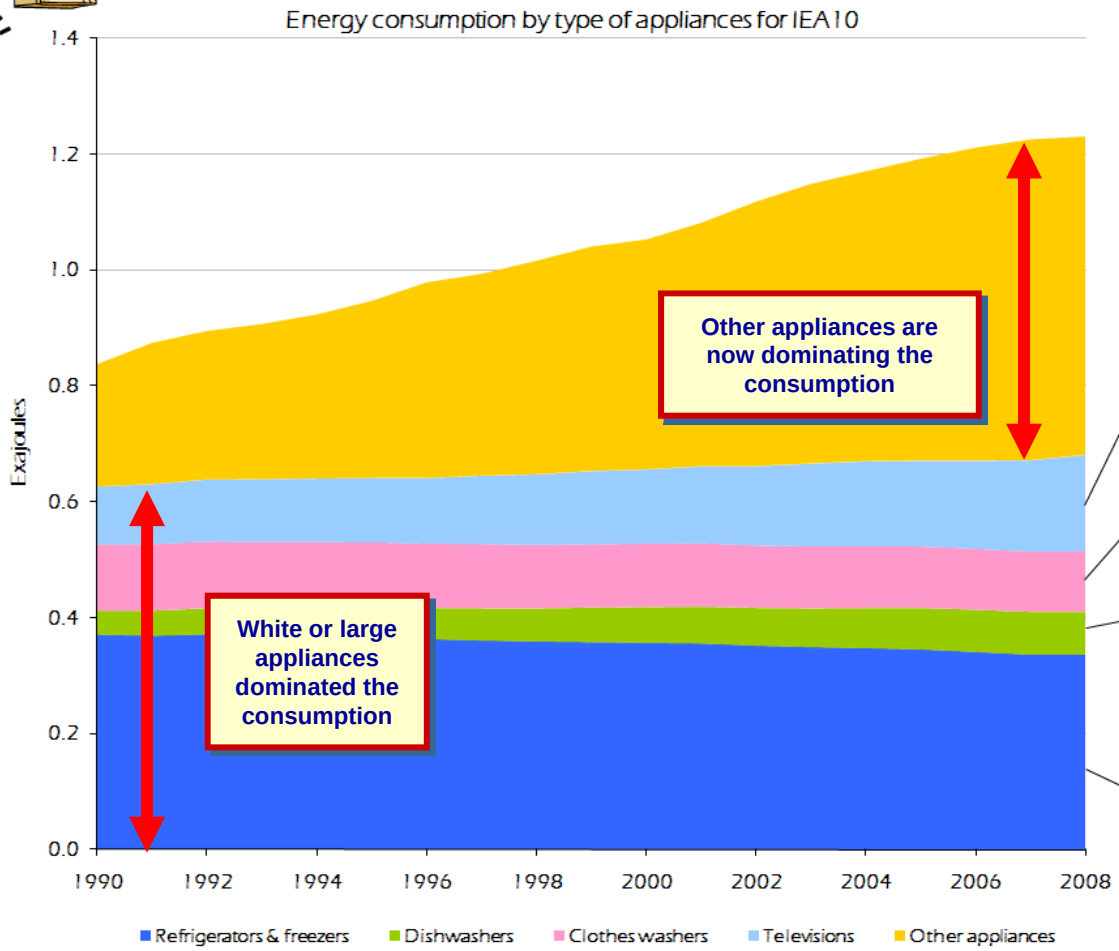


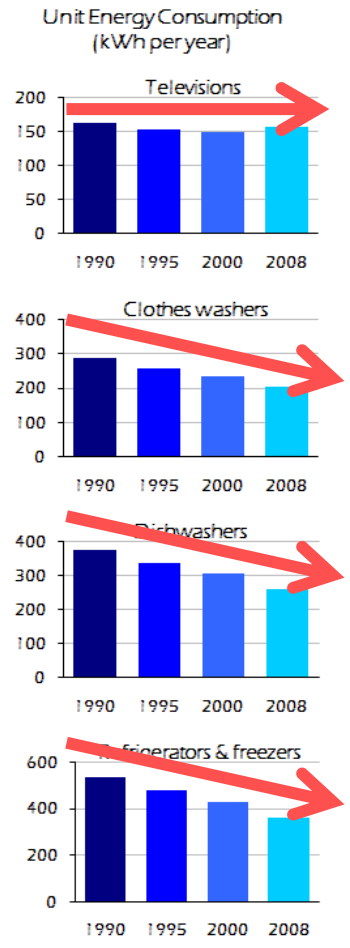
Out of a total growth in residential energy consumption of 2.5 EJ in 18 IEA member countries, 1.7 EJ is attributable to appliances and electronics

Support to decision makers



A need for tougher standards on small appliances

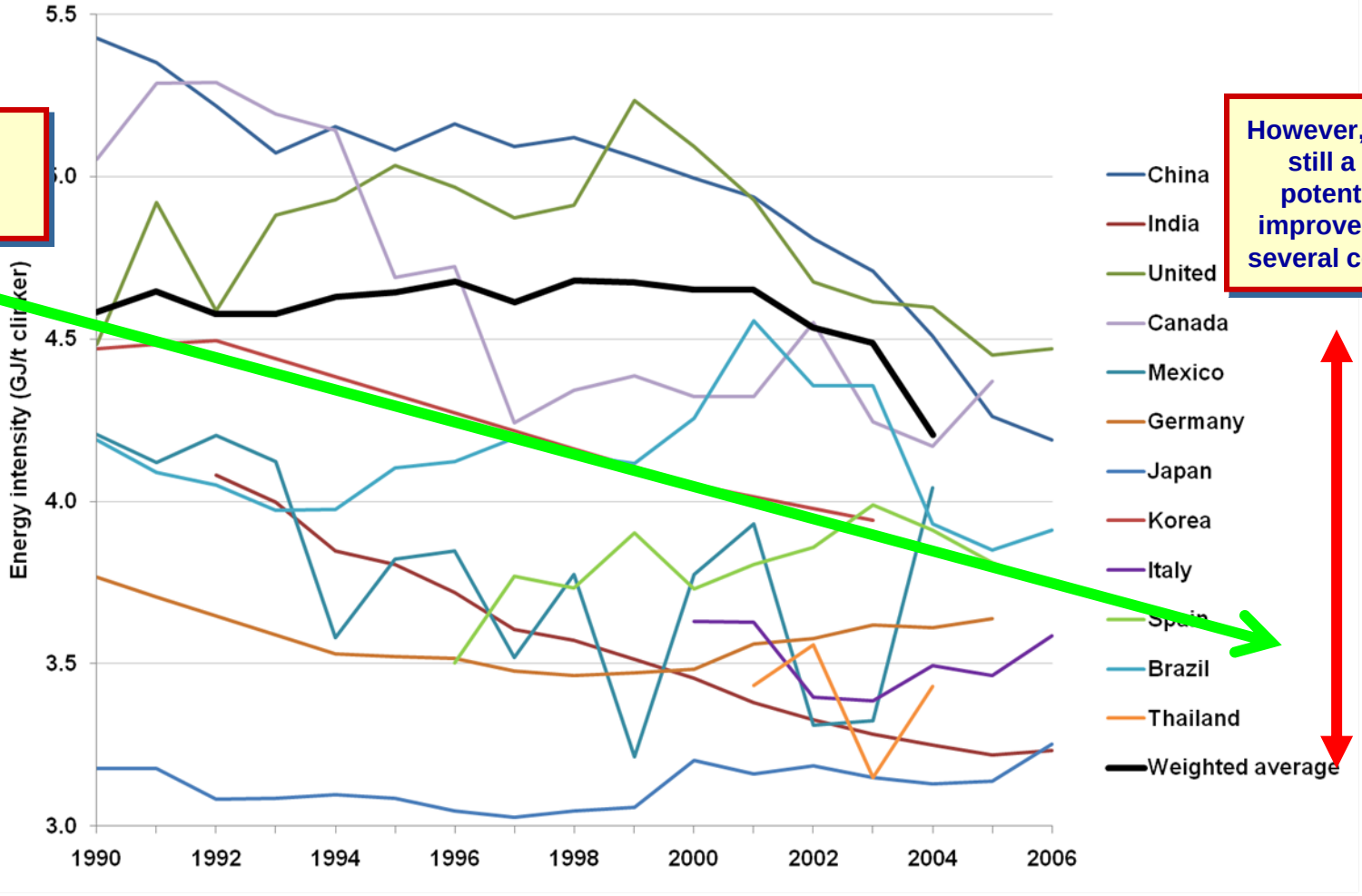




Most of the increase is due to "other appliances"

Support to decision makers

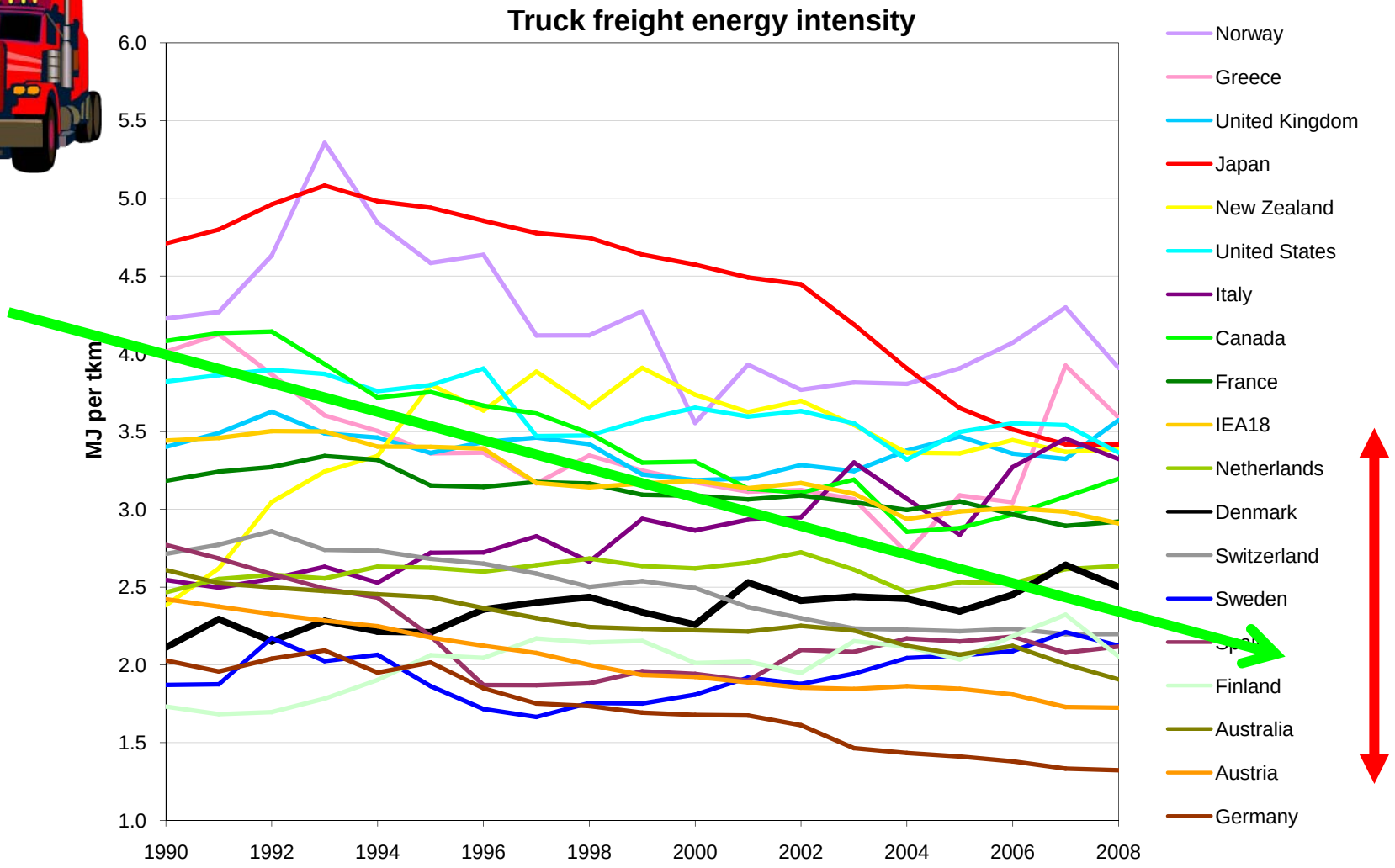
Thermal Energy Requirement per ton of Clinker by Country including Alternate Fuels



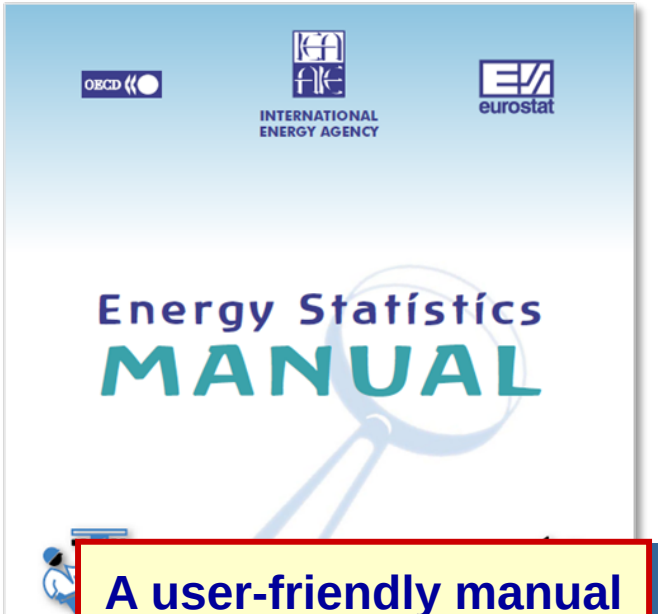
Good news: Intensity is decreasing

However, there is still a huge potential for improvement in several countries

Support to decision makers



A manual to help statisticians

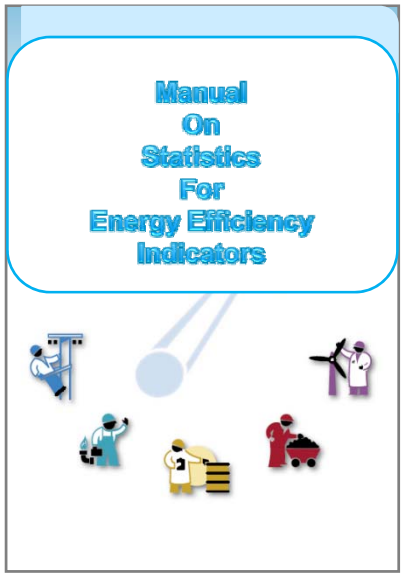


A user-friendly manual to give necessary information to newcomers to understand/complete annual questionnaires

The Manual is now available in 10 languages and widely used all around the world

A manual on Statistics for Energy Efficiency Indicators

- **The IEA is developing a Manual on Statistics for Energy Efficiency Indicators**
  - **To help countries to collect energy end-use and activity data for the development of energy efficiency indicators**
  - **To collect best practices from IEA member countries and beyond**
  - **In cooperation with the ODYSSEE network, APEC, countries, companies and associations**
- **Release expected in mid-2012**



How to collect the data needed

- There is no universal recipe to collect those data. It depends on the needs, situation, time, resources.
- However, the most frequently used methodologies can be grouped into four main categories:
  - Surveys
  - Metering and Measuring
  - Modelling
  - Administrative Sources
- Each methodology has advantages and disadvantages, pros and cons, limits, associated costs, etc.

A quick overview of the table of contents

Foreword

Why a Manual
Describe the goals and purpose of the manual. Show the growing importance of energy efficiency in the energy policy world. Explain that currently only limited data are available to build meaningful energy efficiency indicators. The purpose of the book is to help bridge the gap and to provide examples of good and best practices to collect the data needed to build energy efficiency indicators.

Energy Efficiency Indicators: What are they?
Description of energy efficiency indicators, their importance, and their limits.

The Data behind the Indicators: How to collect them?
Provide general background information on energy-related data and activity-related data. The chapter will discuss how to collect data through four key approaches namely: Surveying, Measuring, Modeling and Administrative Sources.

Collecting What and How for the Residential Sector
(See the more detailed outline in the example on the residential chapter)

Collecting What and How for the Commercial and Public Services Sector
(See the residential chapter)

Collecting What and How for the Industry Sector
(See the residential chapter)

Collecting What and How for the Transport Sector
(See the residential chapter)

Validating and Disseminating
Discuss validation methods used for the different sectors. Also discuss best practices for effective data presentation and dissemination.

Annexes

I. *Selected good and best practices for the residential sector*
II. *Selected good and best practices for the commercial sector*
III. *Selected good and best practices for the industry sector*
IV. *Selected good and best practices for the transport sector*
V. *Specific issues (to be identified at a later stage)*

A chapter at a glance

Residential

What does the residential sector mean and cover?
A brief discussion of what the residential sector is and what it does and does not include (such as transport).

Why is the residential sector important?
The residential sector accounts for a quarter of global total final consumption. However, there are huge variations between countries from less than 10% to more than 90%. There are many players having an influence on the energy consumption of the sector: households, policy makers, utilities, appliance manufacturers, architects.

What are the main end-uses driving the consumption of the sector?
A description of the main energy end-uses: heating, cooling, domestic hot water, lighting, cooking, appliances, etc. There are also large variations in the respective shares of the end-uses. It ranges from countries with a large share for heating in cold countries to a large share for cooking in developing countries which are highly dependent on fuelwood.

What are the most frequently used indicators?
A commented list of the most frequently used indicators for the residential sector. Indicators cover many different aspects: heating consumption per square meter, average electricity consumption per type of appliance, average lighting per household, etc. A discussion will be included on other useful indicators not directly considered as energy efficiency indicators, such as electrification rate, dependency on fuel wood.

The data behind the indicators
Most indicators include a numerator (an energy consumption) and a denominator (an activity data). A description will be provided of both energy consumption data and activity data needed to build the indicators mentioned in the previous paragraph.

How to collect the data?
This constitutes the main part of the chapter. A description of the most commonly used methodologies for collecting the data used to build indicators. Methodologies include surveys, metering, modeling, administrative sources. Selected examples will be given.

Specific issues with data on households
A list of the most common issues encountered in collecting the data. Examples of possible solutions to deal with those issues will be presented.

Communicating indicators effectively
If collecting data and building indicators are essential steps, preparing powerful graphs and other materials to disseminate the indicators is equally essential. Selected examples on how to make the indicators meaningful and powerful will be presented.

Example of template for good/best practice

Example of Data Collection Methodologies • Survey

Sector Industry **Method** Survey

Background	Name of the Survey	Energy consumption of small and medium sized enterprise in the industry
	Country	Austria
	Who was Responsible	Statistics Austria
	Sectors covered	Aluminium, Iron and Steel, Cement, Pulp and Paper, Chemicals, All manufacturing sectors
	Economic activity classification used	NACE (Statistical Classification of Economic Activities in the European Community)
	Survey purpose	• To track over time energy consumption of the industry • To complement another data collection initiative
Data Collection	Sample design/method	Stratified random sampling
	Population description	Small and medium sized industrial establishments with more than 3 employees and not included in the sample of the Material Input Statistics
	Collection method	• Paper form by mail • Internet
	Frequency	Every two years
	Last time Surveyed	2009
	Required/voluntary	NA
	Fine/incentive	None
	Population size	30041
	Sample size	3000
	Response rate	28%
	Survey respondents	Enterprises
	Types of elements collected	• Total energy consumption of a facility • Energy use by type of end-use (*eg.* boilers, motors, lighting, space heating, etc.)
	Energy sources and fuels	Yes

Time and Cost	Tasks	Time *(weeks)*	Cost *(thousand US$)*
	Pre-survey design	1	NA
	Survey execution	10	NA
	Data processing and analysis	3	NA
	Publication	0	NA
	Project management		
	total	14	NA

Notes and comments	Main challenges	• Low response rate • Inconsistent responses • Response quality
	Possible improvements	• Larger sample • Face to face interviews
	Key best practice	Small and simple questionnaire (only one A4 page) to increase the response rate, including quantities and monetary values to have some check possibilities, the online version of the questionnaire includes checks. Inconsistent and incomplete questionnaires (e.g. electricity and at least one fuel for space heating has to be filled in) cannot be submitted.
	Copy of the Survey	Available

Sector and Collection Method

Background

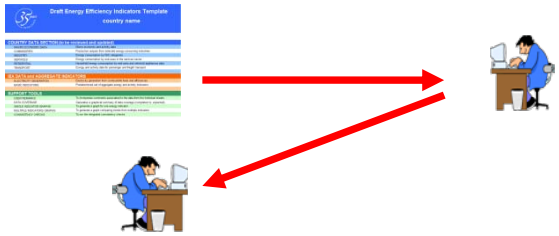
Data Collection

Time and Cost

Notes and Comments

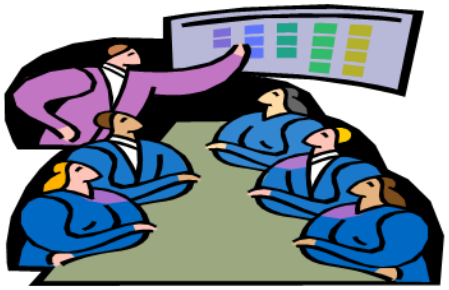
A few words to conclude

The plan is to have the Manual complemented by a CD with survey forms, also available on Internet.



The IEA is now collecting statistics for energy efficiency indicators for the year 2009, and is actively working with countries, ODYSSEE, others to improve quality and coverage

The IEA will organise a 2-day workshop on energy efficiency indicators on 14-15 March 2012. Statisticians, Analysts, Policy Makers: The three faces of the same coin.



Cooperation is key to boost energy efficiencies world wide.

Thank you