Energy Efficiency Indicators Manual
Essentials for Policy Making

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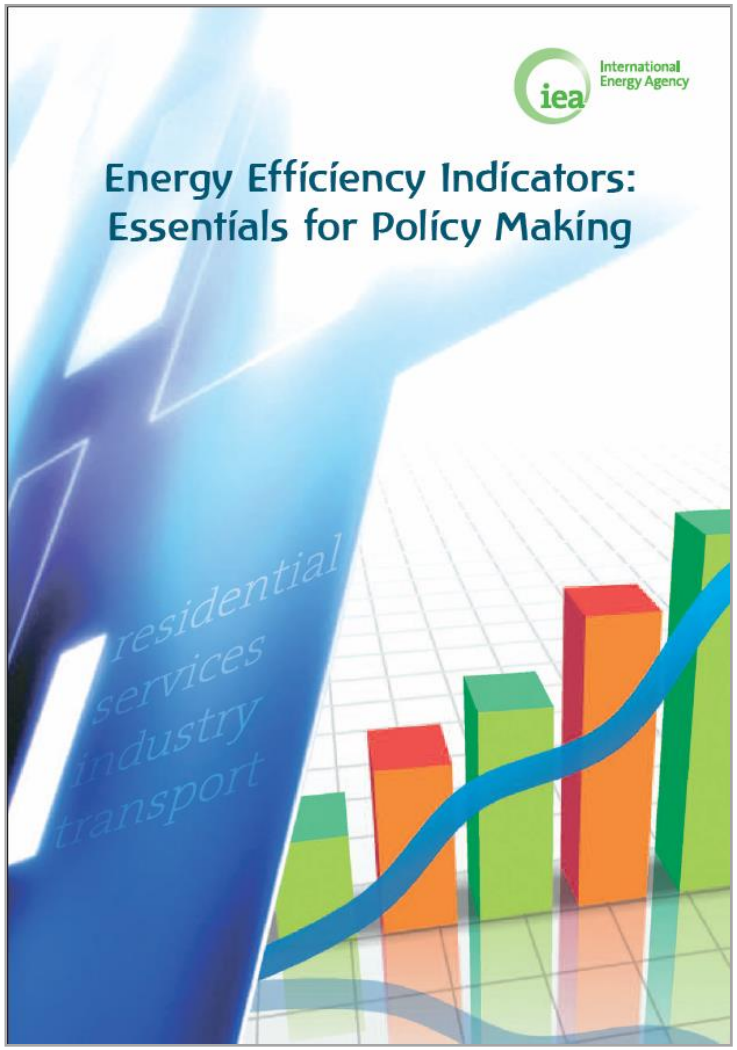
Energy Efficiency Indicators: Essentials for Policy Making



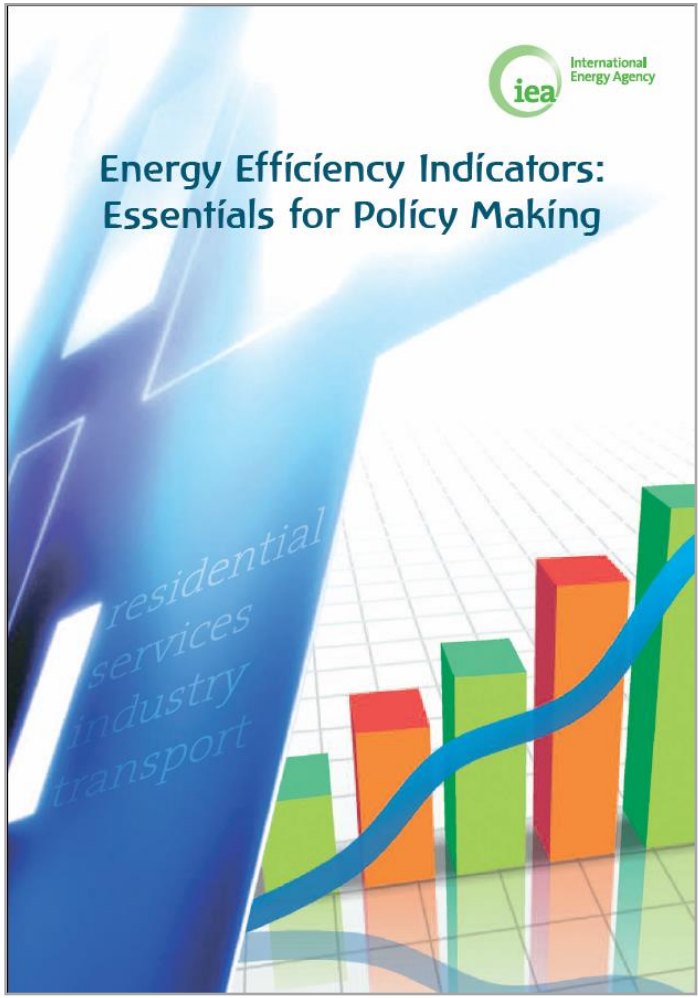
An answer to the growing number of requests

Users of the manual:

Policy makers – Overview on what is needed to construct useful indicators

Analysts – Insight into policy needs

Statisticians – Insight into how data collected is used



Energy Efficiency Indicators: Essentials

- What are the basic indicators & how to prioritise development of indicators?
- What key insights do indicators provide into trends driving energy use?
- How can these indicators be used to quantify energy efficiency and track policy impacts?
- Discusses what additional data and indicators are required for more robust analysis and cross country comparisons

IEA Energy Efficiency Indicators Analysis

- Manual provides an overview of existing IEA Indicators
- Ambition to develop meaningful indicators and cross-country comparisons
- Quantify energy efficiency
  - Past trends according to existing IEA decomposition analysis
  - Future trends based on detailed end-use models

Essentials manual structure

- Broad discussion on the methodology
  - Supplemented with detailed annexes

- Individual chapters:
  - Residential
  - Services
  - Industry
  - Passenger Transport
  - Freight Transport

Essentials sector chapter structure

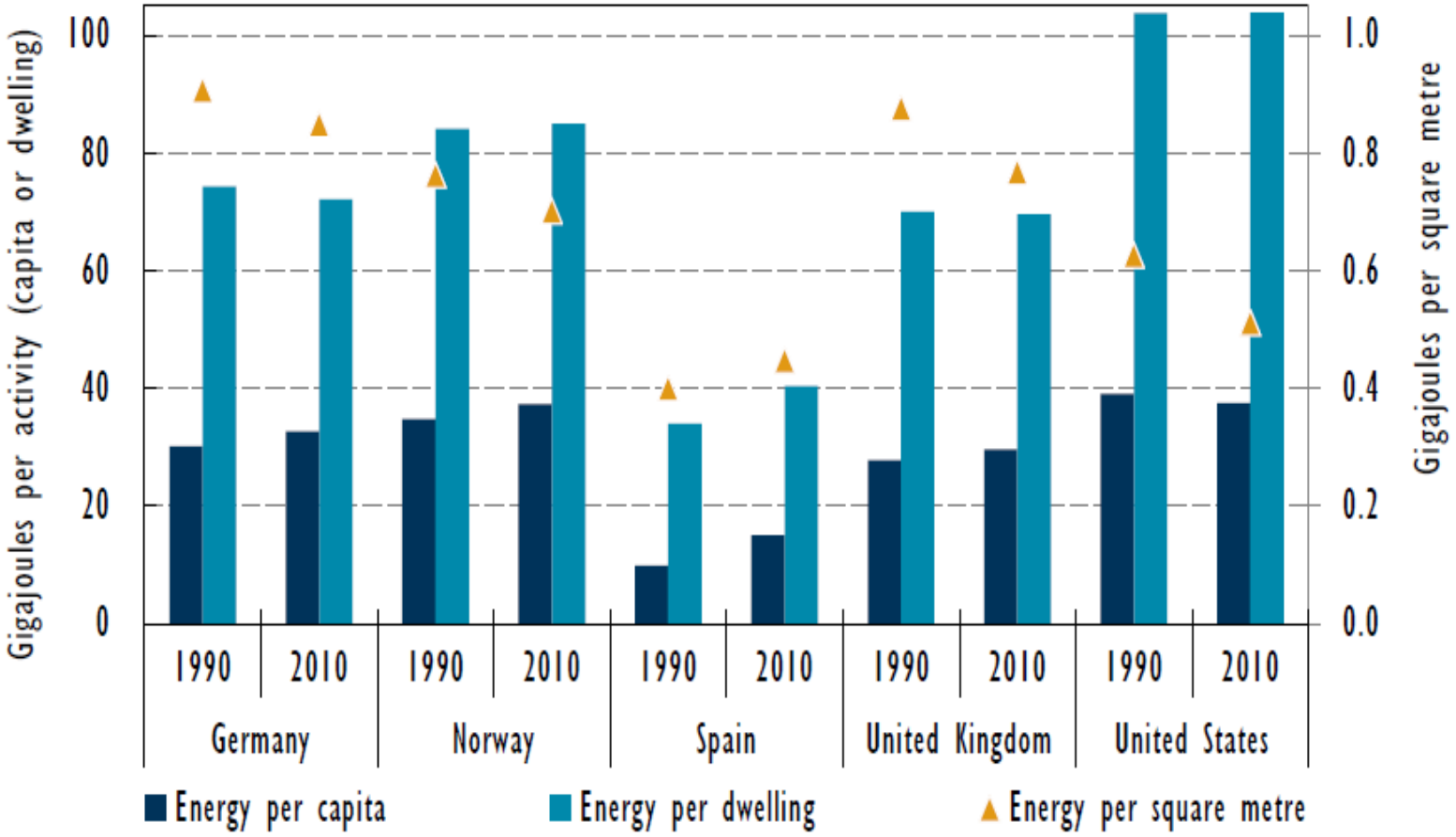
- What is driving energy use?
- How is energy being used and how has it evolved recently?
- What sector / sub-sector / end use / technology / process should be prioritised?
- Develop indicators by level of the pyramid
- Additional indicators
- Decomposition analysis
- Policy information and evaluation

Level 1 indicators: Residential Example

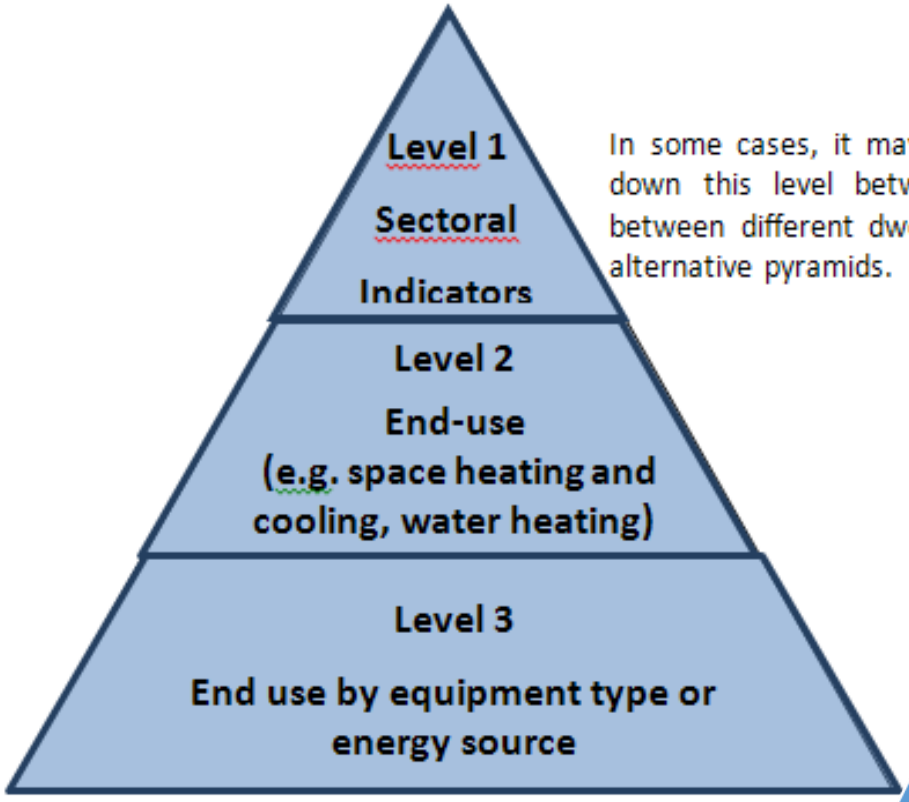
Indicator	Data required	Purpose	Limitation
Residential energy consumption per capita	• Total residential energy consumption by energy source. • Population.	• Can be constructed for many countries and provides a consistent basis for comparison. • Provides qualitative information on v… might have bee… growing.	• **Does not measure energy efficiency developments.** • The indicator is influenced by the penetration rate of different appliances, the number of …tants per house, the … level of households, the …n house size and dwelling …e efficiency of water and …ooling devices, the type … bulbs used, the efficiency …uilding envelope, etc.
Residential energy consumption per occupied dwelling	• Energy consumption. • Number of occupied dwellings.	• Provides a gene… the trends in ag… intensity. • When energy u… not known, ene… occupied dwell… as an energy-int… indicator. • Some important conclusions can be drawn if the weather, ownership of energy-using appliances and dwelling area are known.	**…ot measure energy …cy developments.** …ced by many factors not … to energy efficiency such …ges in income level or …prices.
Residential energy consumption per floor area	• Energy consumption. • Total floor area.	• Monitor energy use in the residential sector. • Combined with energy use per household, provides useful insights on what might have been the main driver of energy consumption.	• **Does not measure energy efficiency developments.** • Influenced by many factors not related to energy efficiency such as changes in income level or energy prices.

Tables clearly outline data requirements, purpose and limitation for different indicators developed at different levels

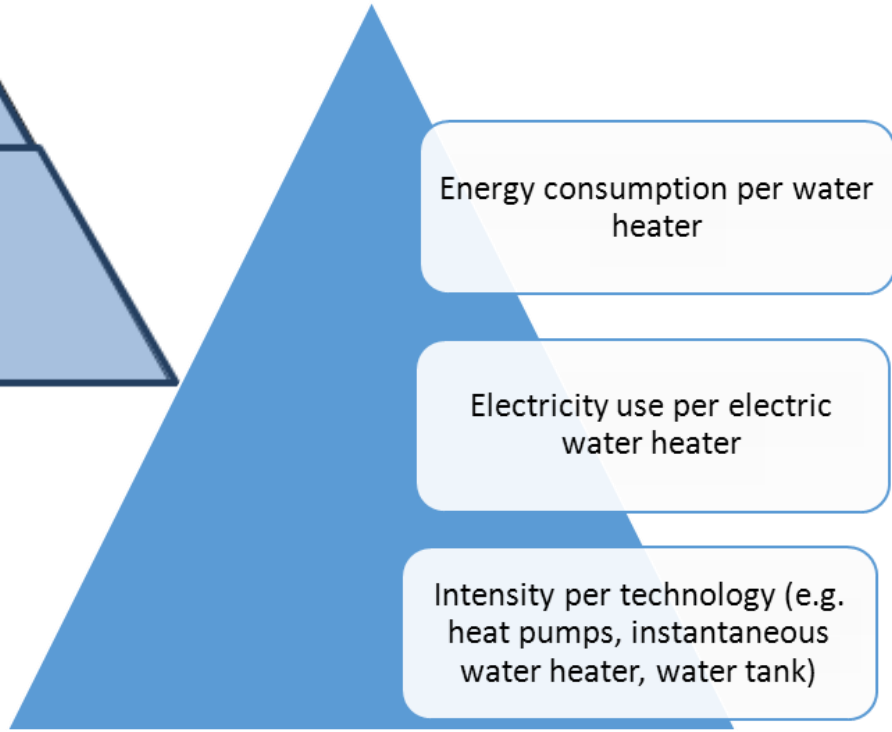
Residential level 1 indicators



Residential Pyramid



In some cases, it may be required to further break-down this level between urban and rural, and/or between different dwelling type. See Appendix G for alternative pyramids.



Level 2 indicators: Services Example

Indicator	Data required	Purpose	Limitation
Space heating energy consumption per value-added	• Energy use for space heating. • Services value-added.	• Provide an indication of the trends in space heating energy intensity.	• This indicator does not take into account the effect of floor area and the share of floor area heated.
Space heating energy consumption per floor area	• Energy use for space heating. • Total floor area.	• Provide an indication of the trends in space heating energy intensity.	• Does not provide a distinction between equipment and building efficiency. • Does not measure energy efficiency developments. • Does not take into consideration the share of floor area heated. • Does not consider the level of heating required by different types of buildings.
Space heating energy consumption per floor area heated	• Energy use for space heating. • Total floor area heated.	• Provide a better indicator as it takes into account the share of floor area heated.	• Does not provide a distinction between equipment and building efficiency. • Does not measure energy efficiency developments. • Does not consider the level of heating required by different types of buildings.

Level 3 indicators: Transport Example

Indicator	Data required	Purpose	Limitation
Energy use per passenger-kilometre by road transport vehicle	• Passenger transport energy consumption by road transport vehicle. • Passenger-kilometres by road transport vehicle.	• Energy intensity by road vehicle is a meaningful summary indicator, if specified at a detailed enough level. • Intensities can be used to help develop transportation energy policies.	• The indicator is still affected by factors that are not related to energy efficiency such as the change in vehicle weight for LDVs within the fleet and vehicle features. • May mask important structural changes if the level of disaggregation is limited.
Energy use by vehicle kilometre	• Stock of vehicles by type of LDV. • LDV vehicle-kilometres. • LDV energy consumption. • Or fleet fuel economy survey.	• Provide insights on the average fuel economy of the vehicle stock. As opposed to energy/pkm, it is not influenced by vehicle occupancy.	• May mask embedded structural changes if the level of disaggregation is limited.

Additional indicators

- Indicators that are not necessarily energy related but which help to explain energy consumption
- Examples:
  - Socio-economic status and housing tenure
  - Private car ownership
  - Average load factor per freight vehicle
- CO_2 indicators
  - If fuel mix is known can develop CO_2 indicators
  - The purpose and limitations identified for energy efficiency indicators also apply to CO_2 indicators

Cannot look at indicators in isolation…

- Energy efficiency indicators cannot
  - predict variation in overall energy consumption

  or
  - quantify the impact of individual components or factors on overall energy consumption.

- Decomposition analysis is used to explain the interaction between different elements or factors influencing total energy consumption.

Decomposition in Essentials Manual

- Detailed equations for Laspeyres and Log Mean Divisia Index (LMDI-1) decomposition methodologies in both additive and multiplicative formats
- How to calculate hypothetical energy use
- How to extend energy decomposition analysis to CO_2 decomposition analysis by adding a fuel mix (including electricity) and a carbon intensity factor

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Thank you

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