The importance of energy efficiency indicators

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IEA Energy Data Centre

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IEA

Indicators are key to track energy policy objectives

PROGRAMA NACIONAL PARA EL APROVECHAMIENTO SUSTENTABLE DE LA ENERGÍA 2014-2018

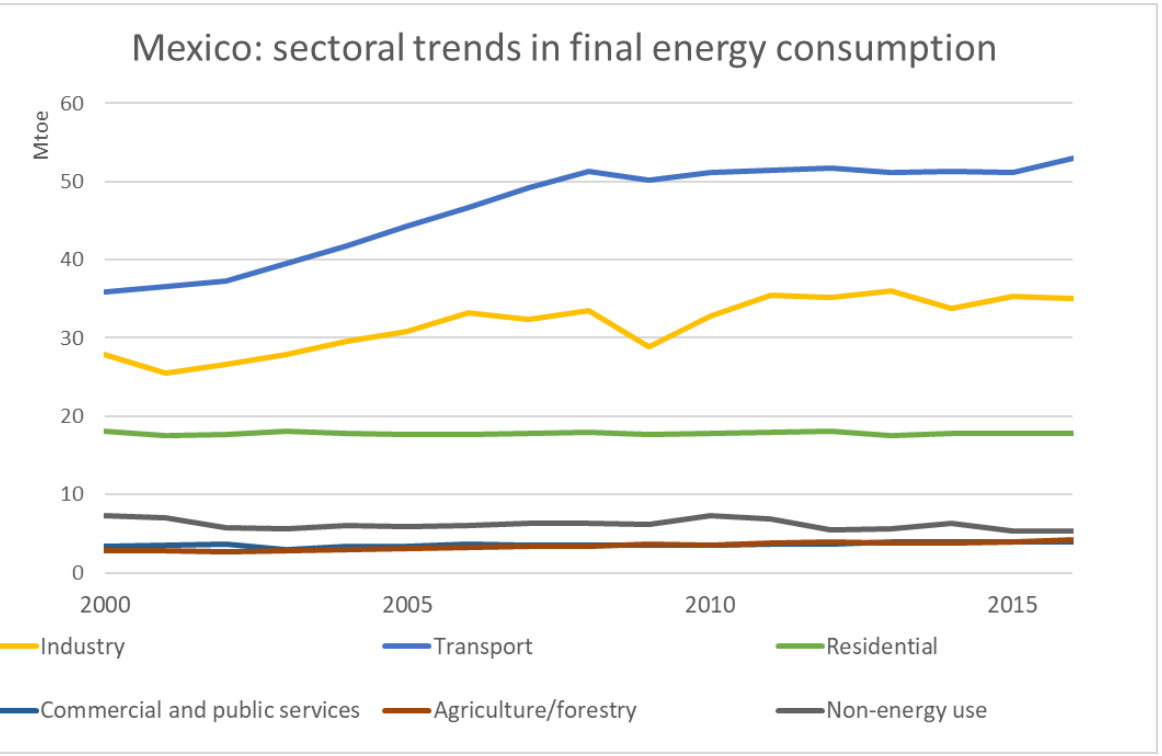
Este Programa establece las directrices que impulsarán el aprovechamiento sustentable de la energía en el país, como un elemento estratégico que refuerza las políticas de seguridad energética, estableciendo objetivos, estrategias y líneas de acción con una visión clara de las actividades que el sector llevará a cabo durante los próximos cinco años.

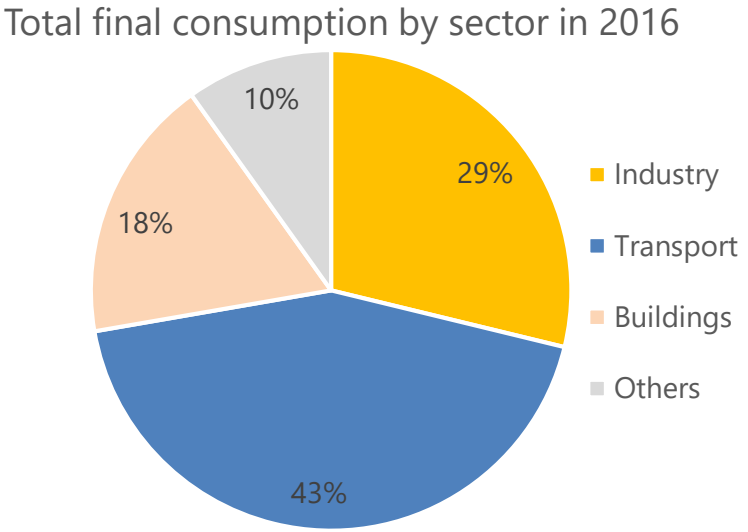
CAPÍTULO IV. INDICADORES

Indicador:	Índice de Intensidad Energética
Objetivo sectorial o transversal:	**Objetivo 1.** Diseñar y desarrollar programas y acciones que propicien el uso óptimo de energía en procesos y actividades de la cadena energética nacional.

Appropriate metrics from individual measures to high level policy objectives

Why do we need indicators to track energy efficiency progress?





Energy consumption trends without information on drivers are not enough

Data source: IEA (2018), World energy balances, based on SENER submission

Efficiency is generally tracked through intensities

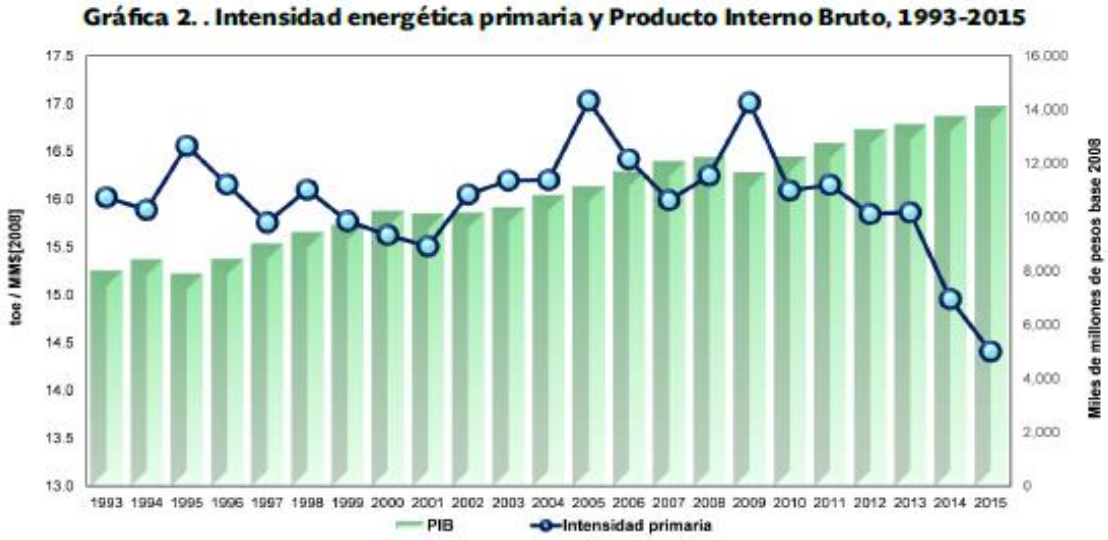
SENER CONUEE

Análisis de la evolución de los indicadores de eficiencia energética en México por sector, 1995-2015

Juan Ignacio Navarrete Barbosa[1]
Odón de Buen Rodríguez[2]

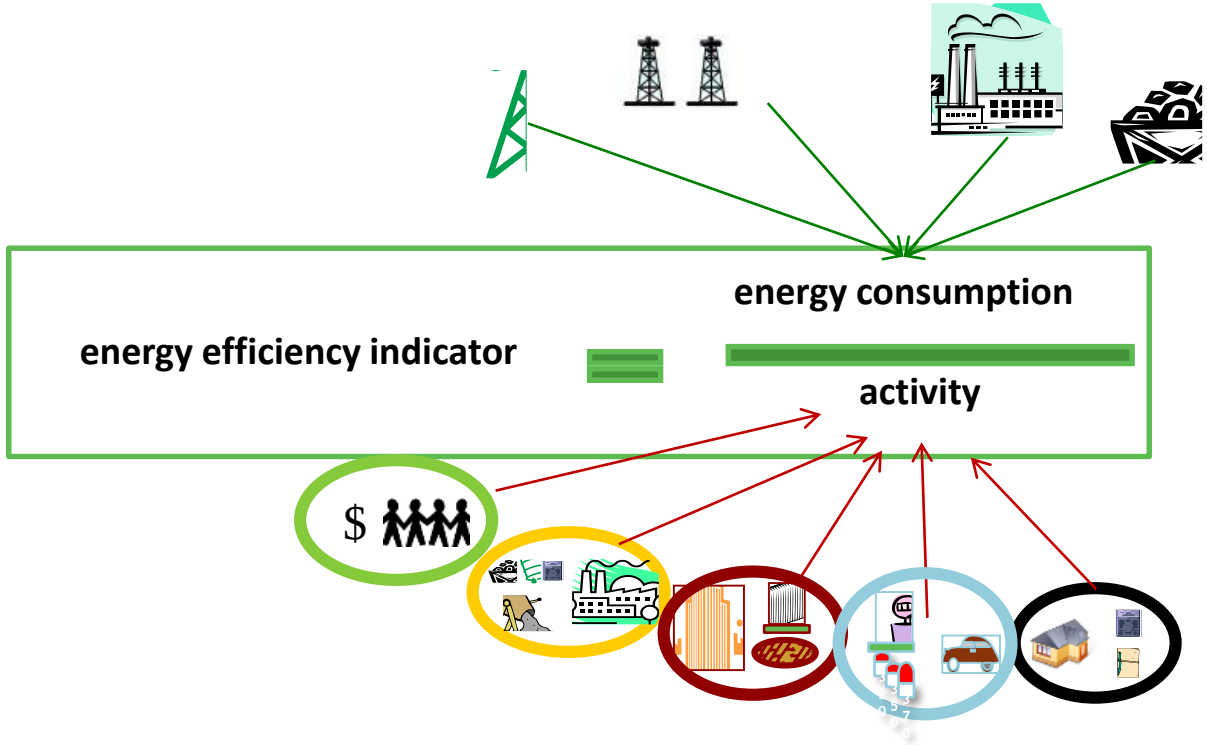
Comisión Nacional para el Uso Eficiente de la Energía

Noviembre 2017



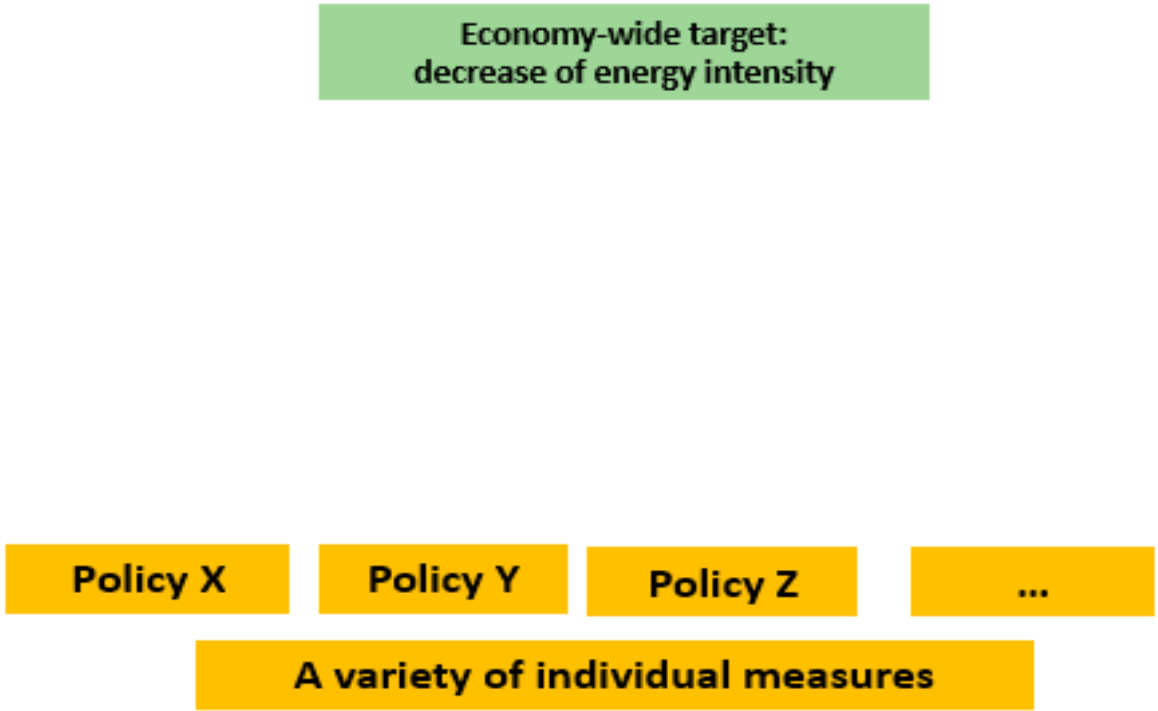
Energy intensity declines if we use less energy per unit output

Same concept with a variety of end use indicators across sectors



Ratio of energy use and appropriate activity – varies across "end-uses"

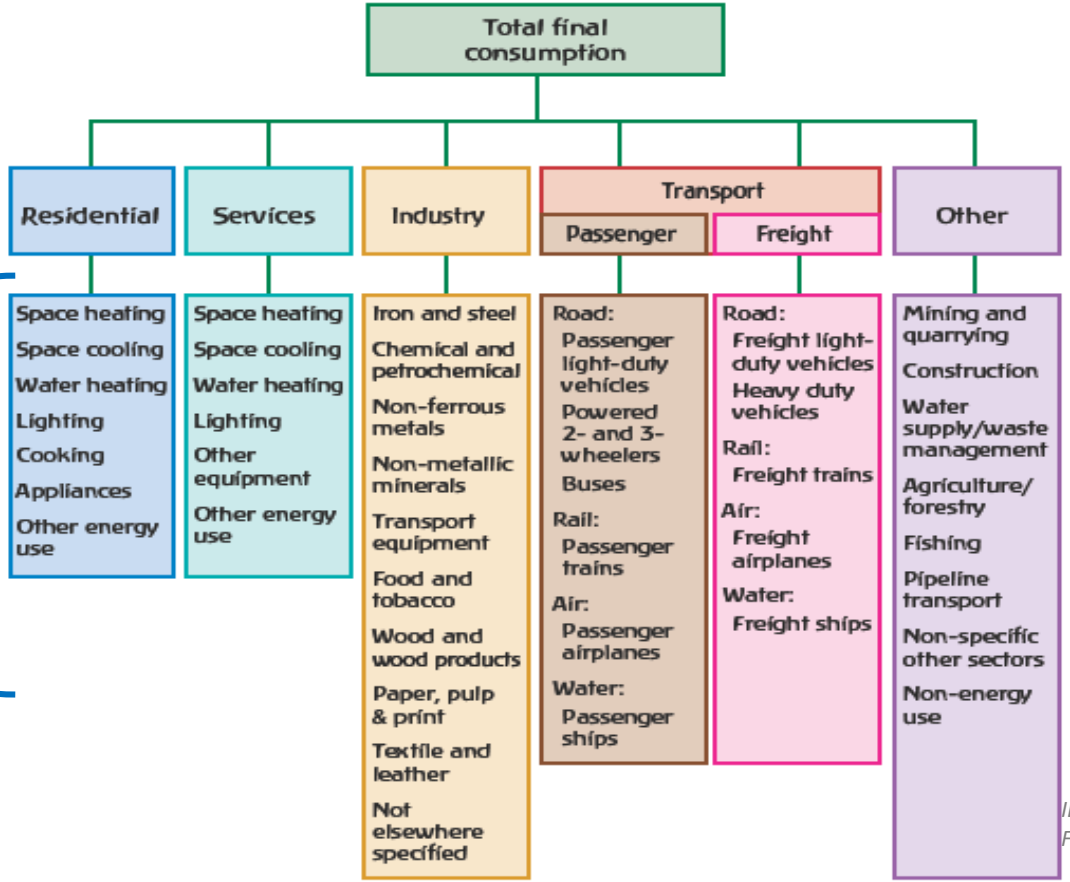
Efficiency indicators to understand impact of measures on economy



What are typical indicators for residential, transport, industry?

End-uses across sectors: why we need energy

Energy efficiency: End-use consumption



IEA Energy Efficiency Indicators: Fundamentals on Statistics, 2014

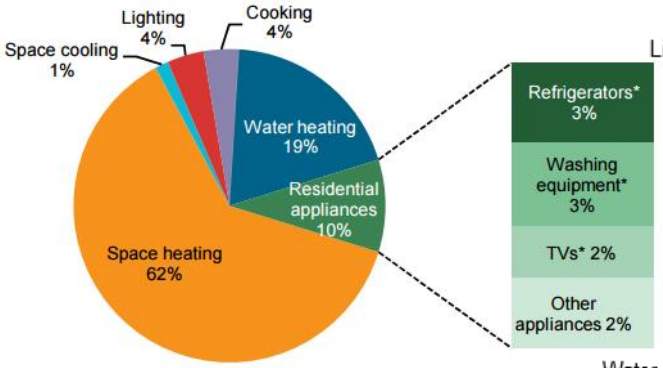
Typical efficiency indicators - residential

Key questions

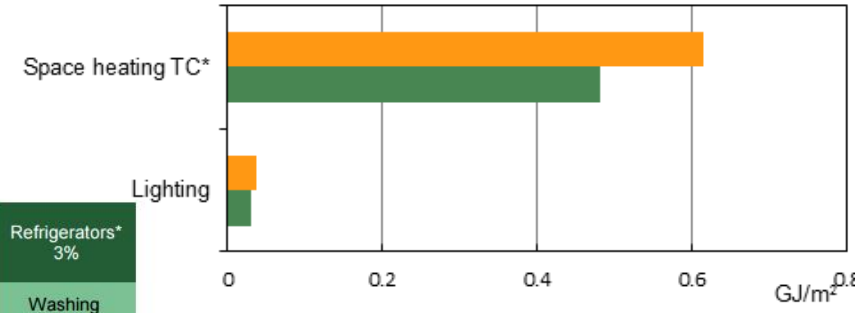
- What **end-use** consume most of the energy at home?
- What is the **share of LPG** used for cooking?
- Are we using energy for **space heating** more efficiently over time?

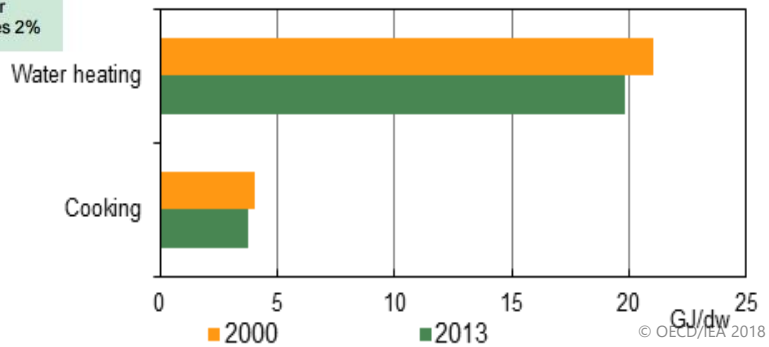
Key indicators

Residential energy end-use shares in a given country



Selected intensities





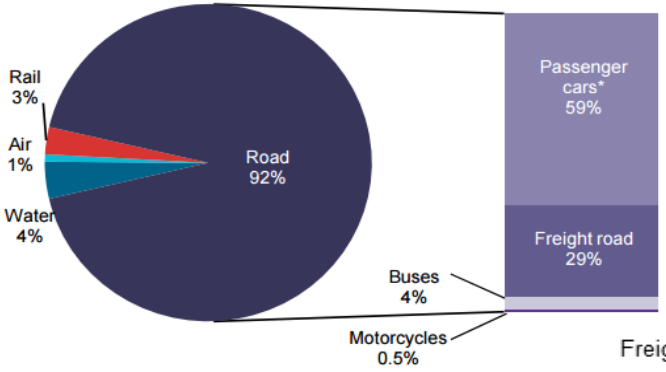
Typical efficiency indicators - transport

Key questions

- What are the **shares of passenger and freight**?
- How much **energy** is used to transport **one passenger on a distance of one kilometer**?
- Is it **more energy-intensive** to travel by bus, car or train?

Key indicators

Transport energy use by mode/vehicle type in a given country



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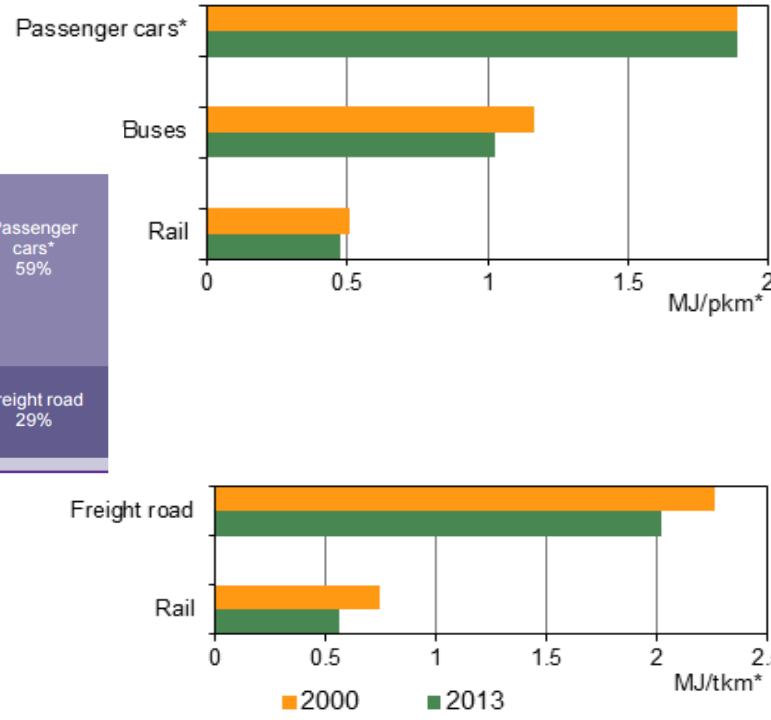


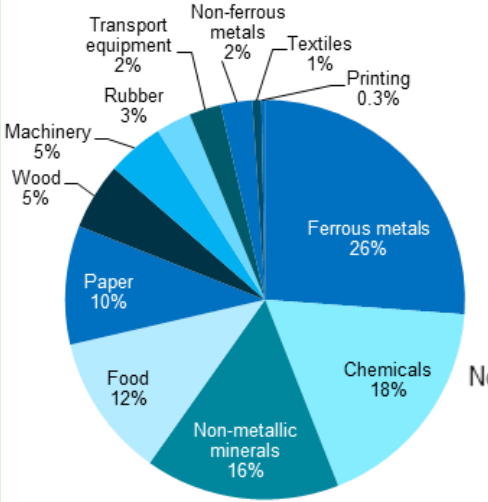
Typical efficiency indicators - industry

Key questions

- **How much energy is used** to produce the main types of goods ?
- Why is the average **industry energy intensity** in my country so high?
- How did the **energy intensity** in key sub-sectors **change** over time?

Key indicators

Industry energy consumption by sub-sector in a given country



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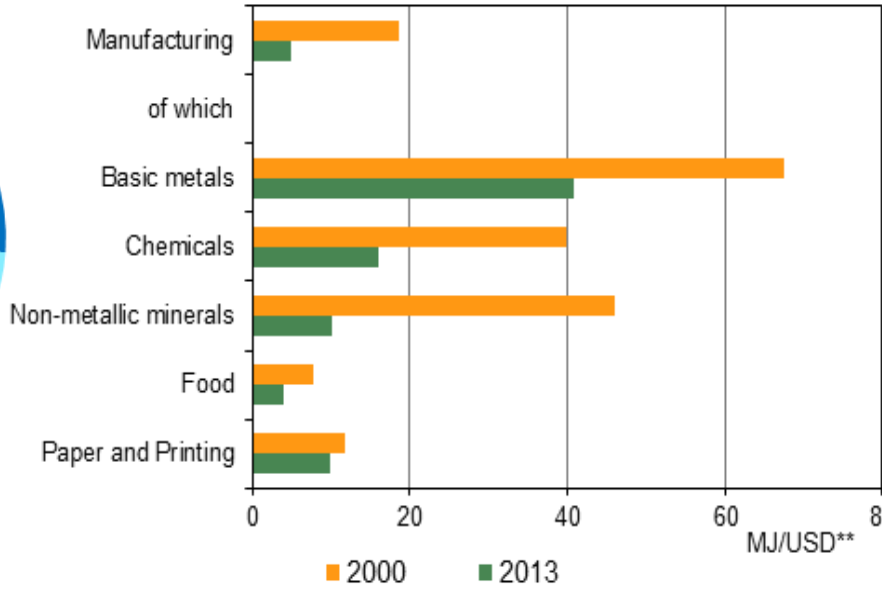
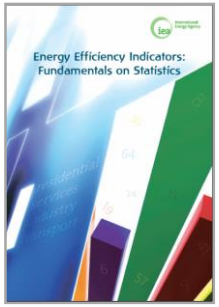
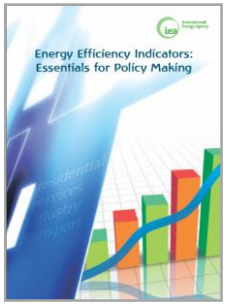


All you need to know on indicators methodologies …





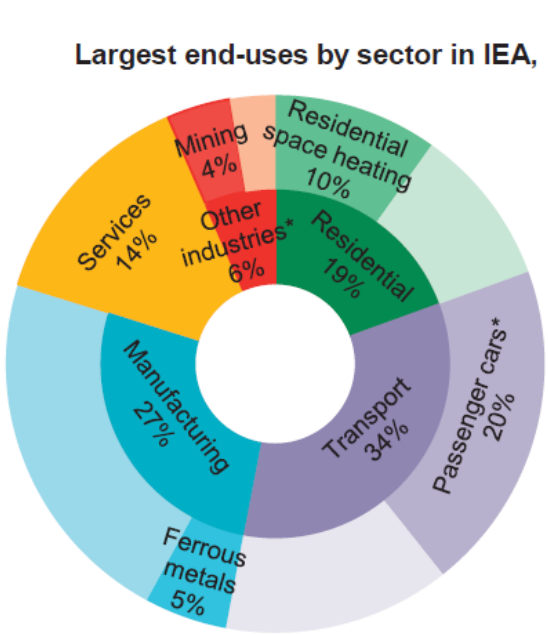
- ***Fundamentals on statistics:***
  to provide guidance on how to collect the data needed for indicators
  - Includes a compilation of existing practices from across the world
  - https://goo.gl/Y8QD1G

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

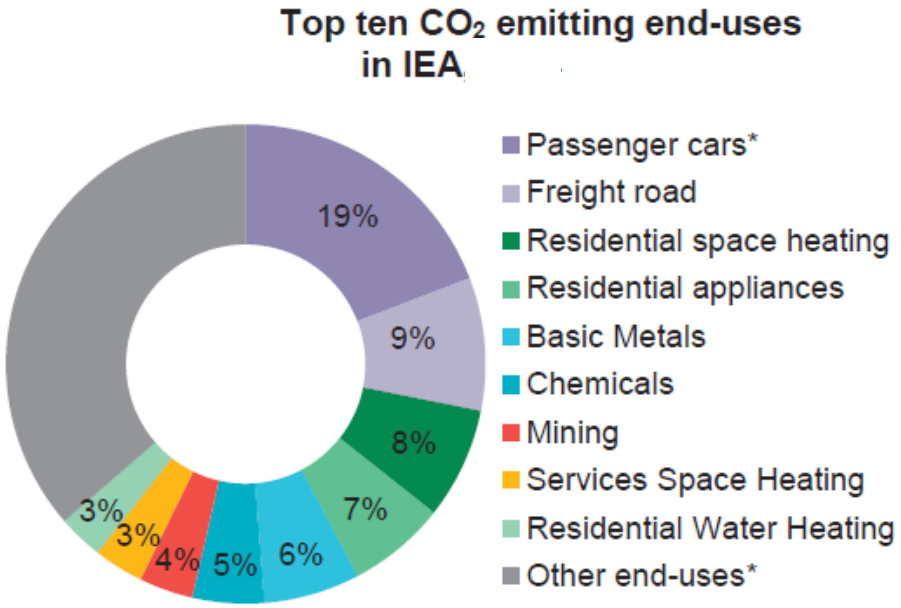
Both manuals are available for download also in Spanish + as online platform

End-use efficiency indicators: a powerful conceptual framework

End-use data show what drives energy demand – and emissions



* Other industries includes agriculture, mining and construction; passenger cars includes cars, sport utility vehicles and personal trucks.

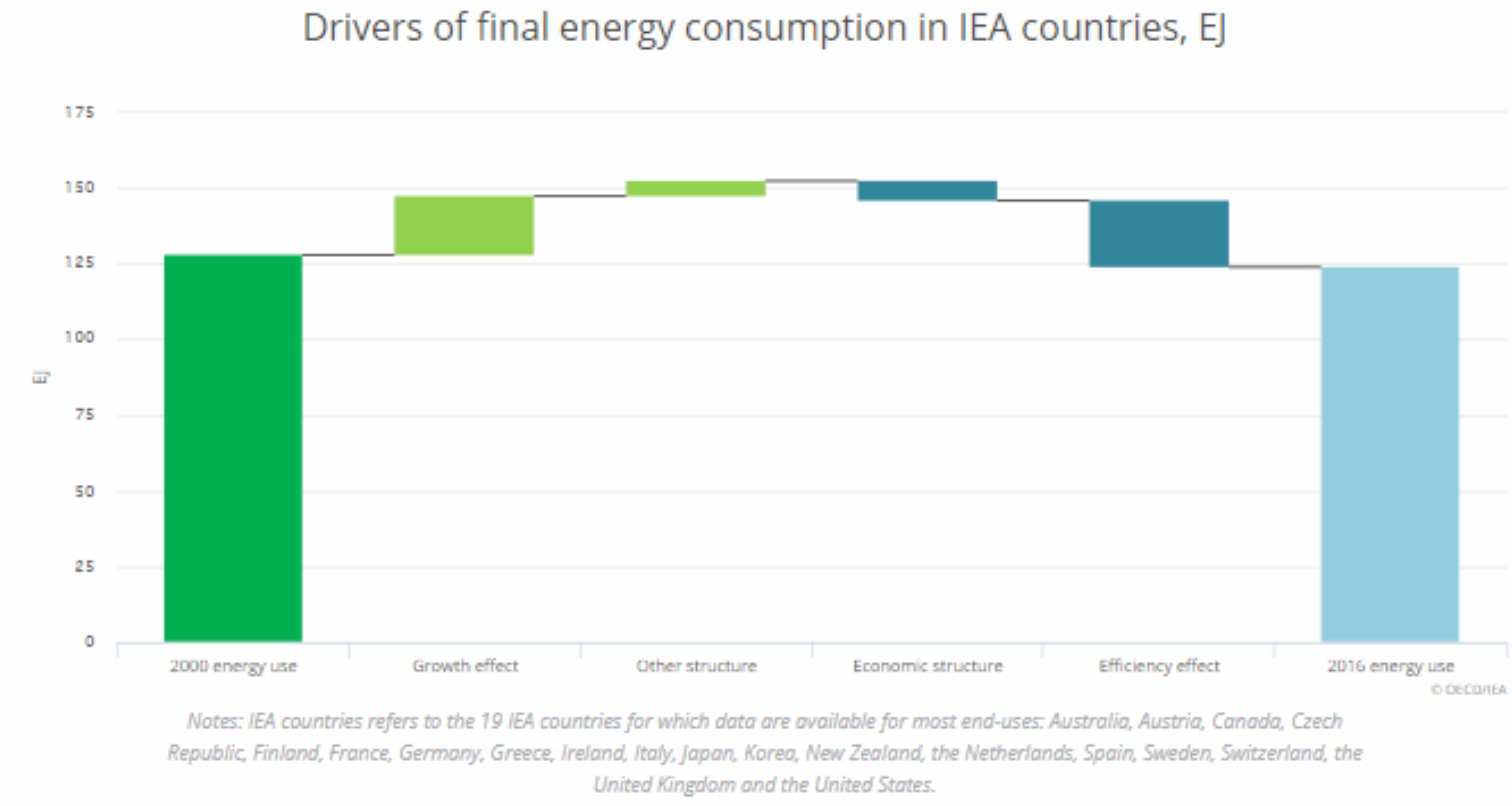


* Passenger cars includes cars, sport utility vehicles and personal trucks; other end-uses includes the remaining part of emissions beyond the top-ten.

Source: *IEA Energy Efficiency Indicators Highlights, 2017*

Refers to the 19 IEA countries for which data are available for most end uses: Australia, Austria, Canada, Czech Republic, Finland, France, Germany, Greece, Ireland, Italy, Japan, Korea, New Zealand, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom and the United States.

We can disentangle efficiency from other effects on energy trends



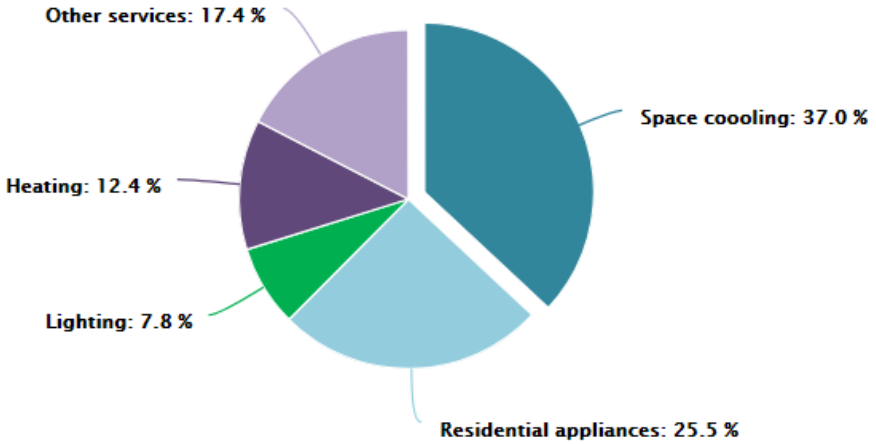
https://www.iea.org/statistics/kwes/efficiency/

End-use indicators help us project energy demand across sectors…

Cooling is the fastest growing use of energy in buildings

Without action to address energy efficiency, energy demand for space cooling will more than triple by 2050 – consuming as much electricity as all of China and India today.

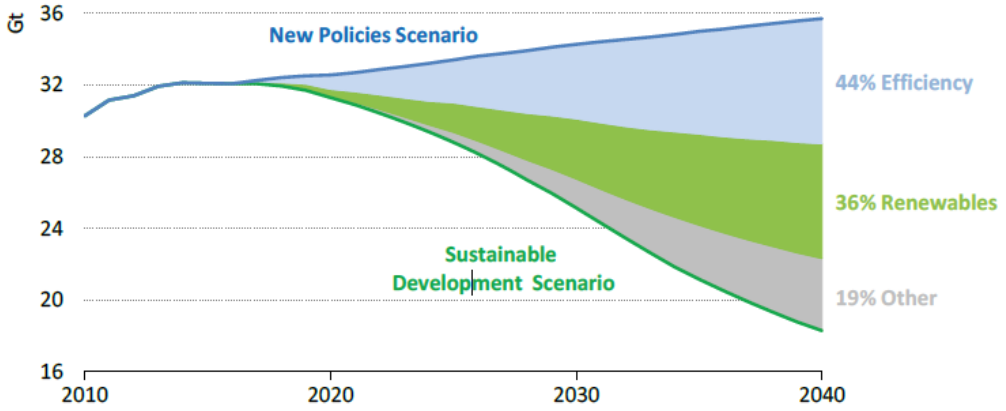
Share of final electricity demand growth to 2050



Source: IEA, The future of cooling, 2018

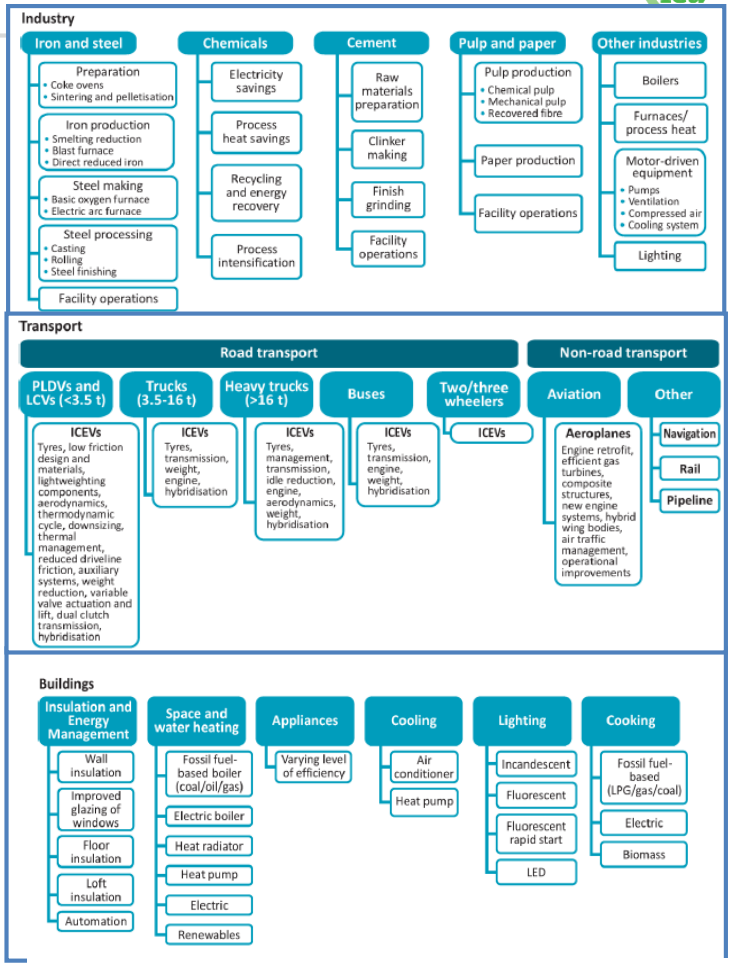
…and also project energy demand economy-wide

Figure 7.21 ▷ Global energy-related CO_2 emissions abatement and key contributions in the Sustainable Development Scenario



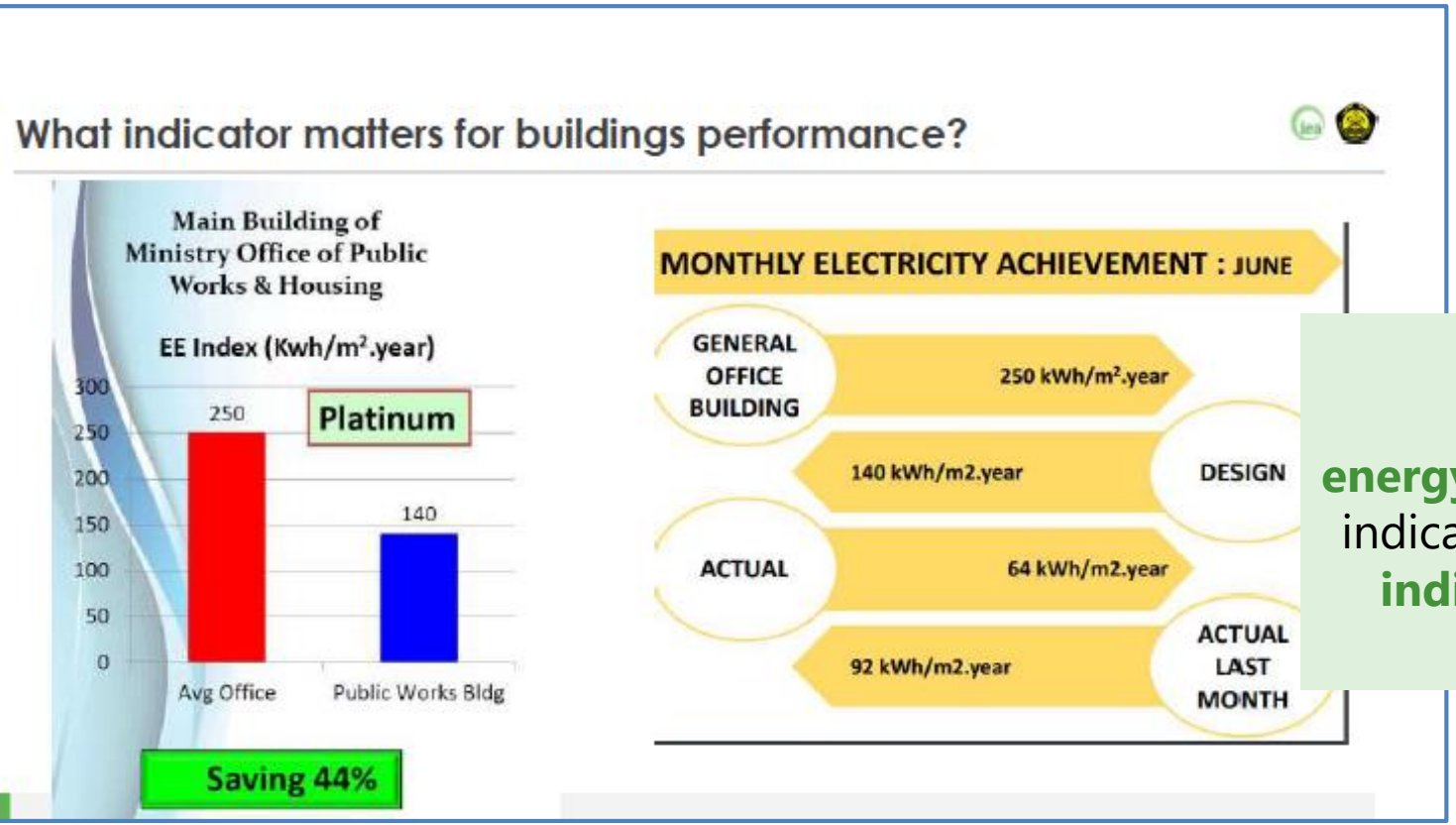
Energy efficiency and renewables are the two key abatement measures in the New Policies and Sustainable Development Scenarios

Notes: Other refers to carbon capture and storage, nuclear, and fuel switching. The shares on the right-hand side of the graph represent the cumulative contributions by measures.



Representation of energy efficiency by end-use sector* in the World Energy Model

Framework works from nation-wide to individual building or facility level

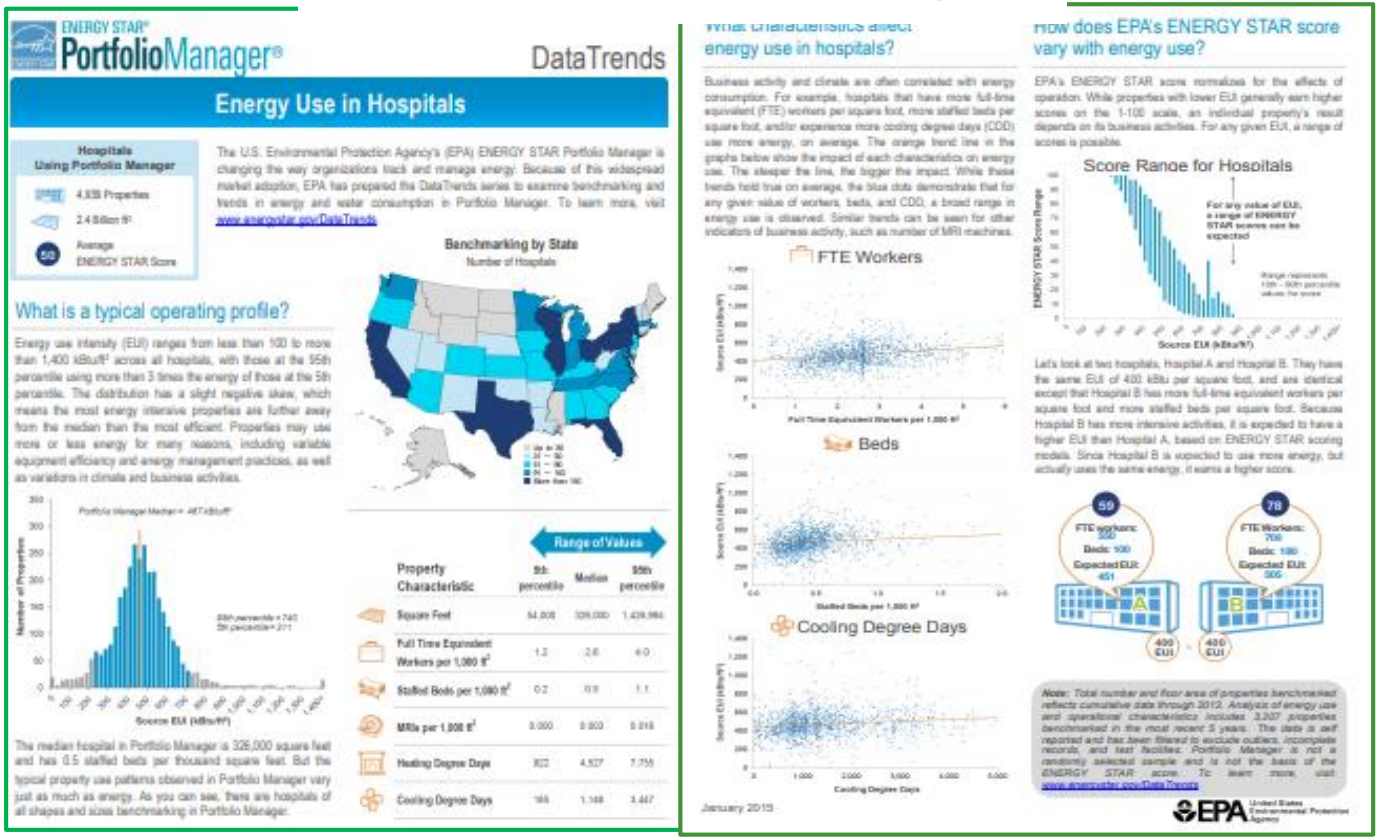


Example:
energy use per floor area
indicates performance of
individual buildings

Source: Indonesia Ministry of Office of Public Works and Housing

Indicators can be fine-tuned for sector-specific analysis

ENERGY STAR Score for Hospitals

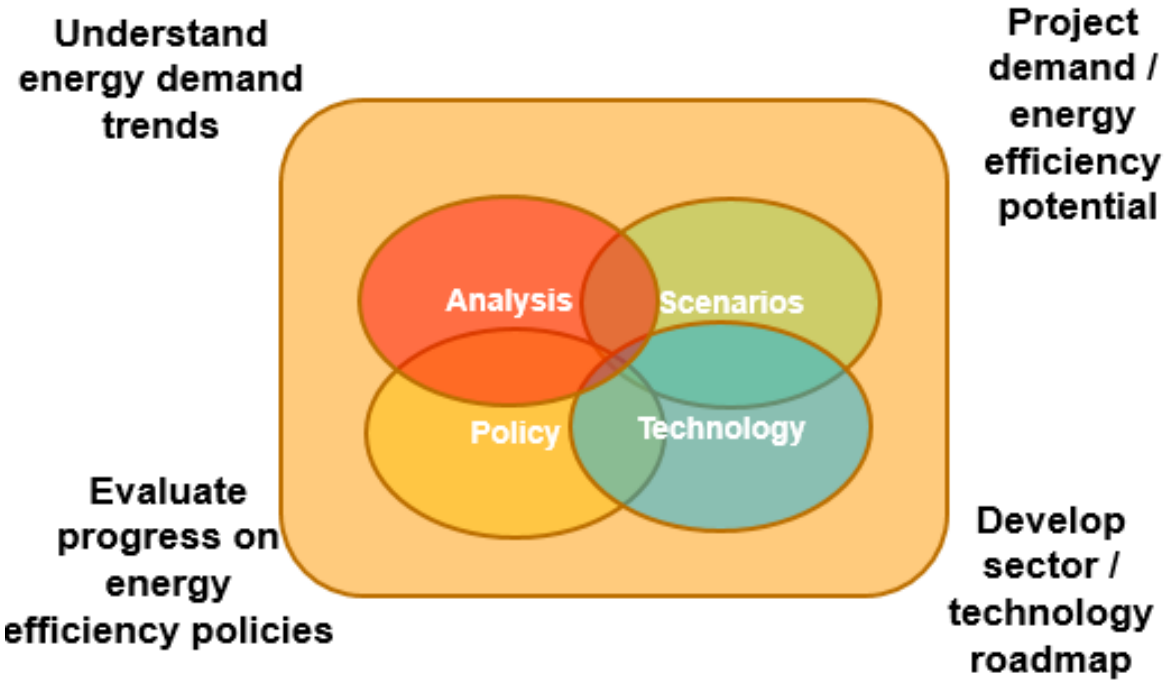


Typical indicators energy per:

- floor area;
- number of beds;
- Number of inpatient days
- Employee (FTE)
- Number of MRI machines
- ….

https://www.energystar.gov/sites/default/files/tools/Hospital_August_2018_EN_508.pdf

Efficiency indicators and end-use data: an opportunity for synergies



Cooperation among statistics, policy, analysis – at national, regional, local scale

Mexico has already started great work in this area

What is the motivation in CONUEE on EE Indicators?

- **National Commision for efficente use of energy (CONUEE)**
  - More than 27 years working on EE actions
  - Technical body in change to promoting EE in Mexico by Law
    - *Law for sustainable use of energy in 2008 (LASE)*
    - *Energy transition law in 2015 (LTE)*

- **Some requirements about monitoring by legal framework:**
  - Developing energy efficiency indicators by sectors and end-use
  - Making benchmark between different countries regarding Mexico by sectors
  - To assess yearly the PRONASE (Mexican NEEAP)

- **Others motivation:**
  - Monitoring national and current policies (30 standards, programs, etc.)
  - Starting to assess new challenges and EE policies considering in LTE
  - Improve and strengthen the relationship with international cooperation
    - *Economic Comission for Latin America and the Caribbean (ECLAC)*
    - *International Partnership for Energy Efficiency Cooperation (IPEEC)*
    - *French cooperation (ADEME and AFD)*
    - *International Energy Agency (IEA)*

CONUEE

Interactive tool on line in BIEE Project

To further develop the indicators framework in Mexico…

What are the most suitable indicators to track progress in our respective areas of work?

How can we strengthen end-use and activity data to develop such indicators?

What potential synergies between statistics and policy experts, as well as across institutions could enhance outcomes?

For discussion throughout the workshop

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