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International Energy Agency

9. Evaluation

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Pretoria, 16 October 2019

IEA #energyefficientworld

Training Overview

Evaluation and EE Indicators

Scenario: The national government wants to know how effective the energy efficiency programmes have been and wants to compare different cities.

Question: How do you develop indicators that properly measures the benefits of your programmes?

Training Overview

1. **Why Evaluate?**
   - Determine impact, provide insight, determine value for money
2. **Using indicators**
   - Value of indicators
   - Analyses that can be done (performance, demand, decomposition)
   - Examples of indicators in urban areas: IEA, ESMAP
3. **Activity:** Telling the story
4. **What are the steps?**
   - What needs to be tracked, define the indicators
   - Assess data and tell the story
   - Embedding evaluation in project planning

10 mins

15 mins

30 mins

15 mins

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1. Why Evaluate?

1. Why Evaluate?

Your peers in the Indicators and Evaluation course will specialise more on this topic. It is important to understand how you can use evaluation into your specialty in the urban environment

1. Why Evaluate?

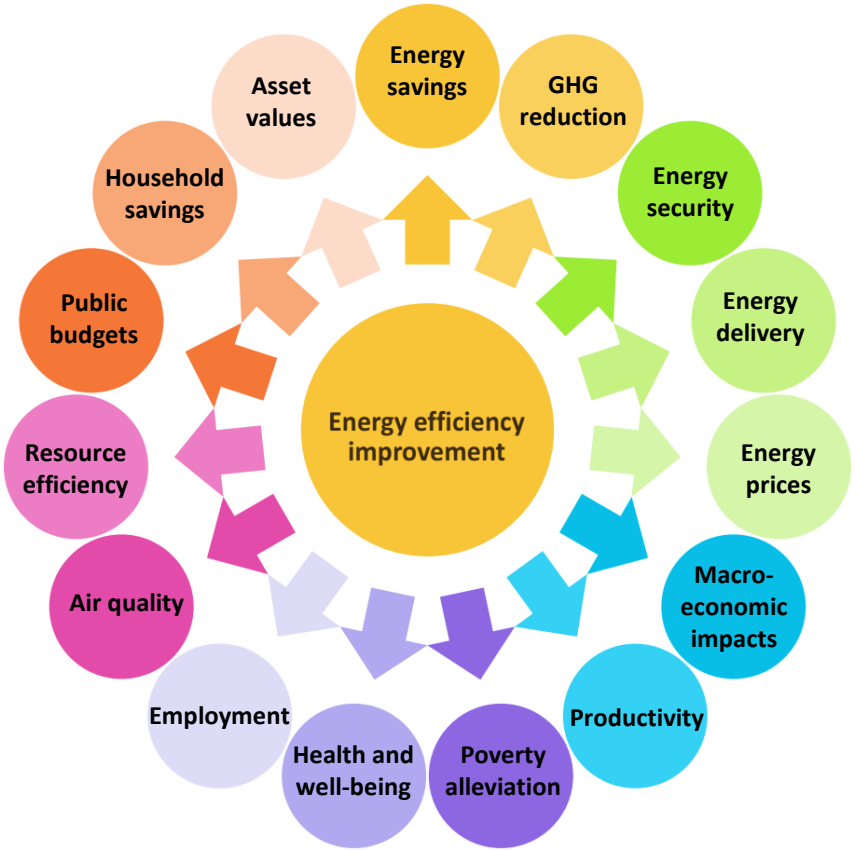
- Regulators
- NGOs and public

- Programme managers
- Partners

- Funders
- Treasury

1. Why Evaluate?

Impact, what did we achieve?



Energy efficiency policies affect multiple aspects of society and the economy of interest to stakeholders

These are some of the multiple benefits or impacts that must be considered in evaluation

Are these impacts being considered in your evaluation reports?

IEA's Multiple Benefits Diagram
https://www.iea.org/publications/freepublications/publication/Multiple_Benefits_of_Energy_Efficiency.pdf

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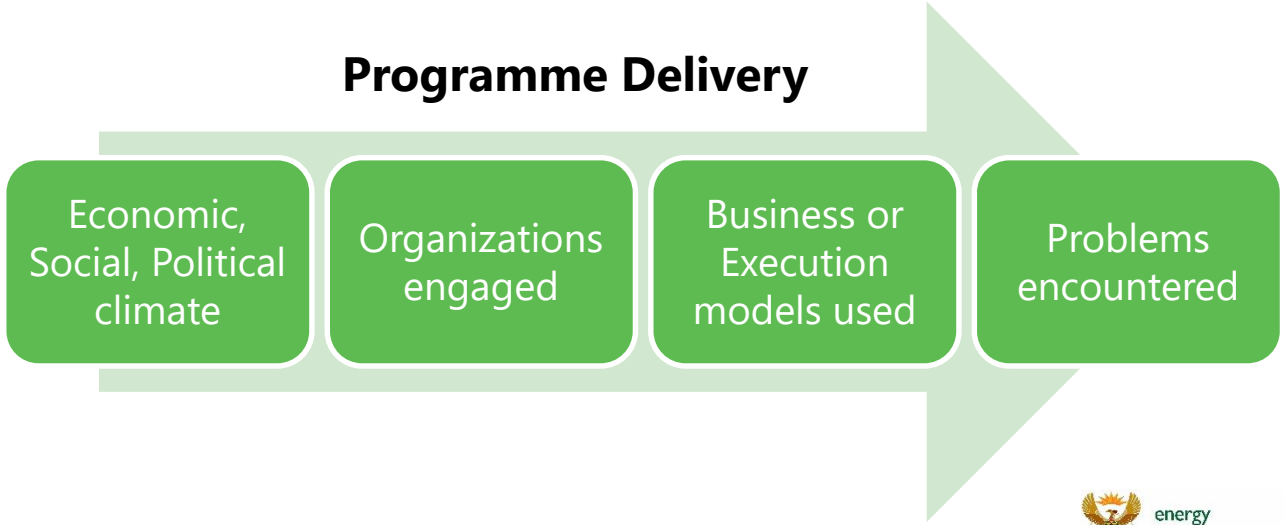
1. Why Evaluate?

Process, how did it go?

Evaluation also provides insight on how the programme was delivered



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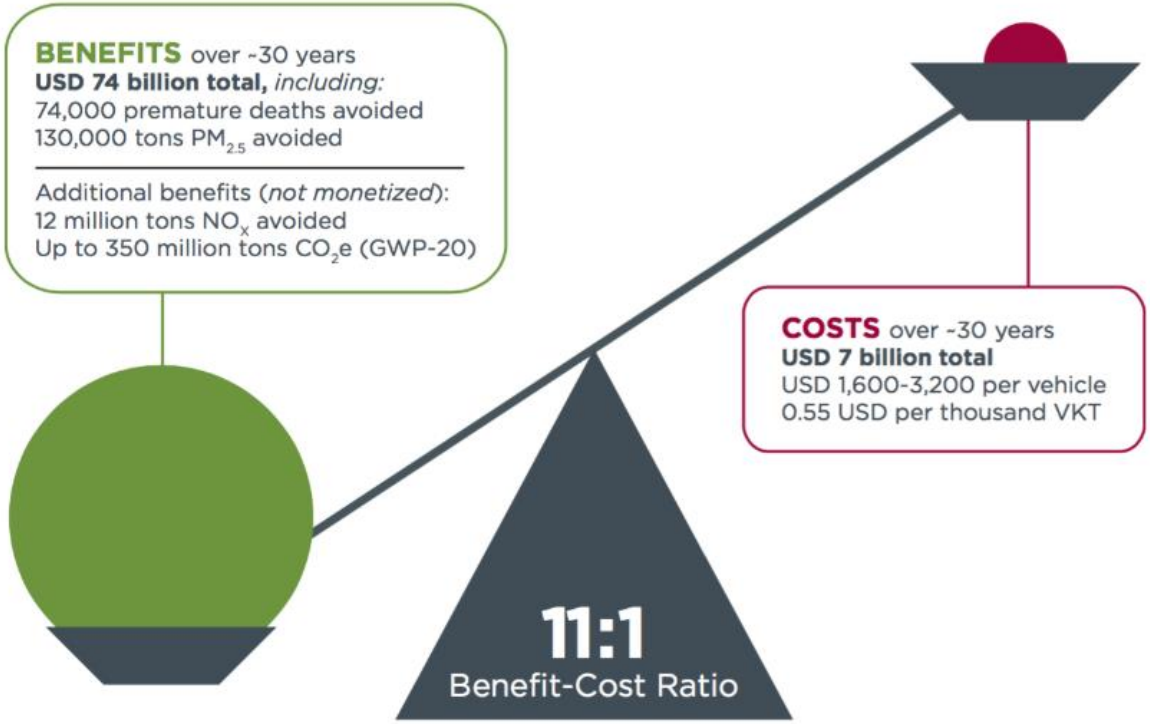
1. Why Evaluate?

Economic, did we get value for money?

Evaluation also provides metrics in comparing costs to benefits



Source: https://www.theicct.org/publications/cost-benefit-analysis-brazils-heavy-duty-emission-standards-p-8

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2. Using indicators

2. **Using indicators.** Value of indicators

Target	Progress	Motivation
• reinforces **the message of the targets**	• keeps **everyone aware of their progress** and whether they **are on-track** to meet the goals	• reinforces **competition** and provides **evidence for stronger policies** when necessary

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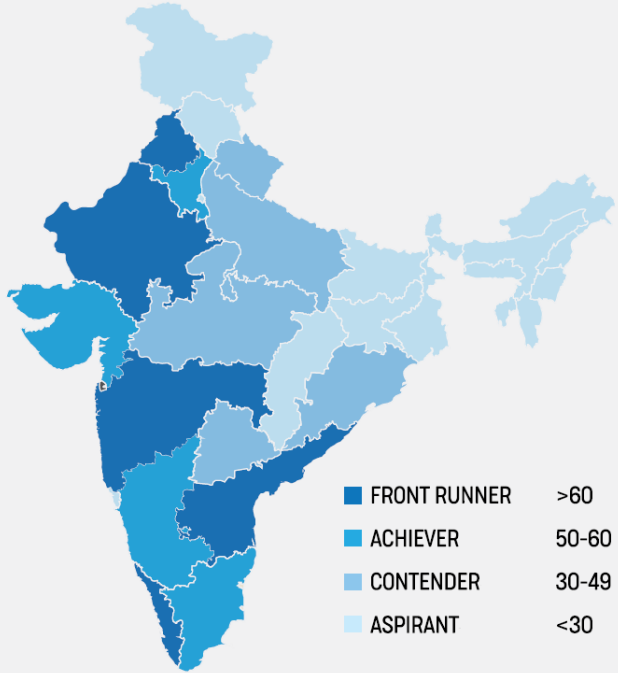
2. **Using indicators.** Value of indicators

- **For example:** AEEE's EE preparedness report



Motivation

- reinforces **competition** and provides **evidence for stronger policies** when necessary

Source State-EE-Preparedness-Index-FINAL_July2018.pdf

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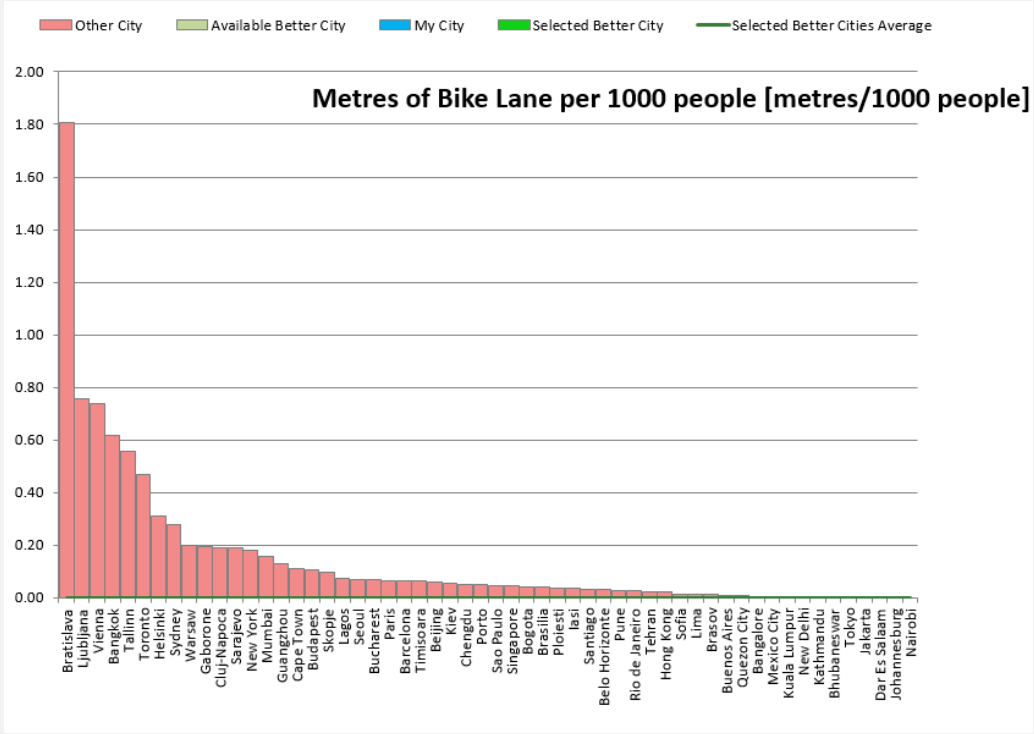
2. **Using indicators.** Value of indicators

- **For example:** ESMAP TRACE tool



Source ESMAP TRACE 2.0

Motivation

- reinforces **competition** and provides **evidence for stronger policies** when necessary

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2. **Using indicators.** Analyses that can be done

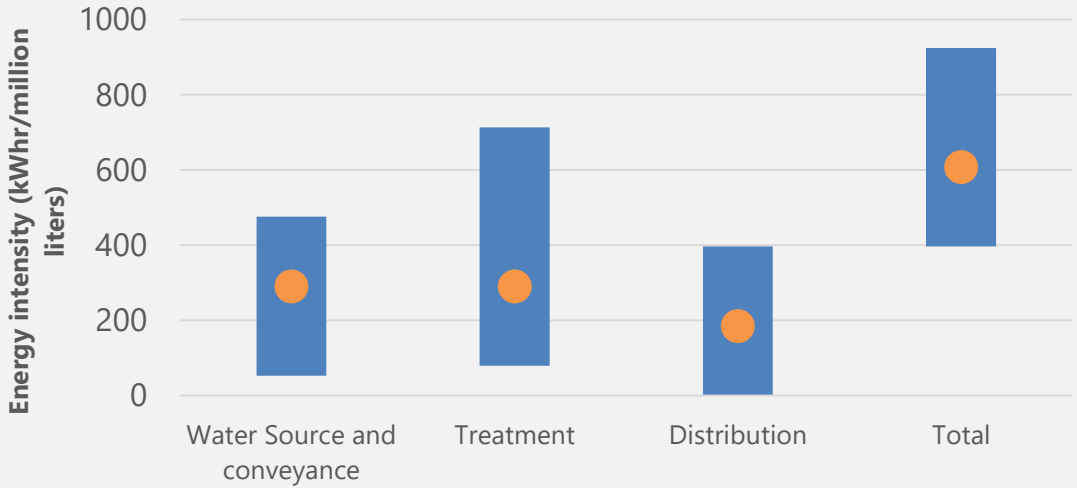
Performance Metrics	Demand Analysis	Decomposition
• Measures changes in energy intensities	• Analysing demands and projecting possible futures	• Break down energy use into individual factors to help determine where best to address future policy concerns.

2. **Using indicators.** Analyses that can be done

Performance Metrics

- Measures changes in energy intensities
  - Main energy use divided by main driver
  - More disaggregated, the better

- **Water Energy Intensity** kWhr/million liters



Source ACEEE Survey on Energy Use in Water

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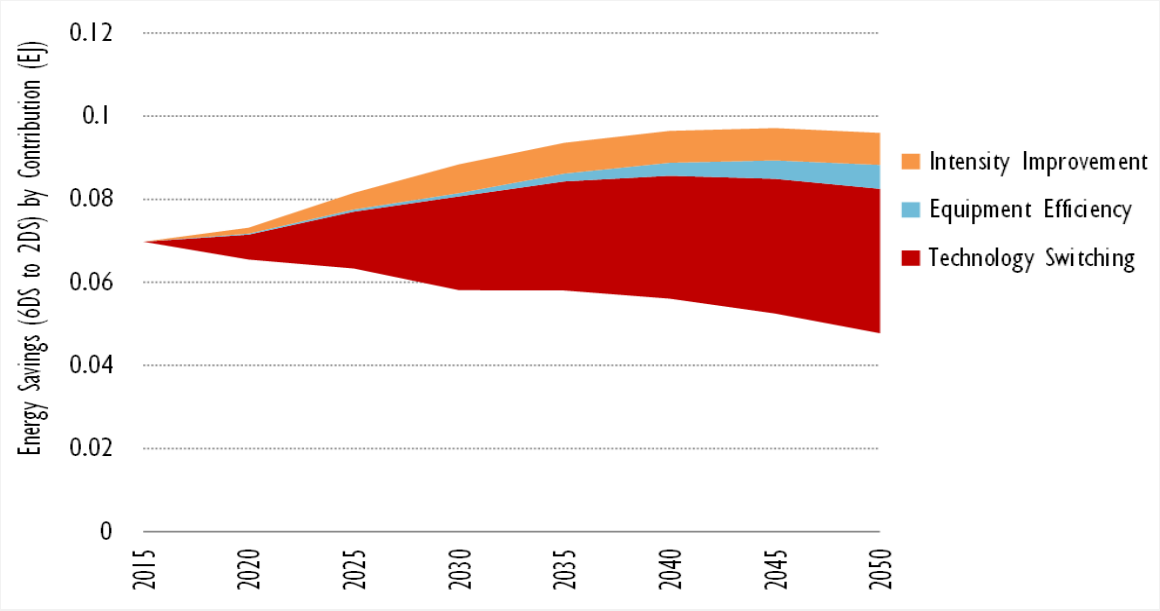
2. **Using indicators.** Analyses that can be done

Demand Analysis

- Analysing demands and projecting possible futures
  - Change each factor and see how they affect future trends

- **What-if analysis**: Proportional distribution of energy savings by holding only changing one indicator at a time



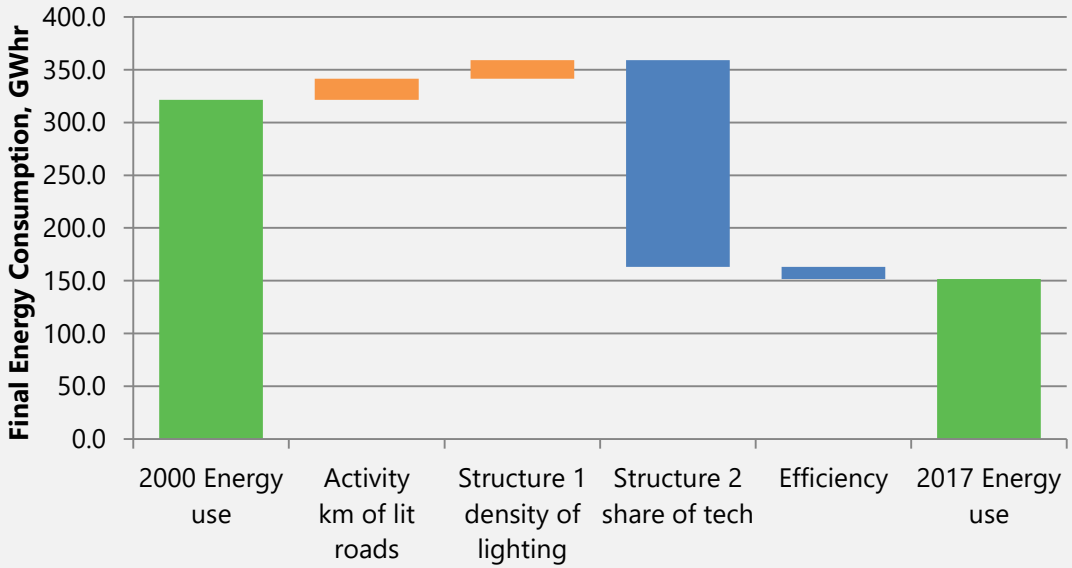
Source Energy Technology Perspectives

2. **Using indicators.** Analyses that can be done

Decomposition

- Break down energy use into individual factors to help determine where best to address future policy concerns.

- **Sample Municipality X**, street lighting performance



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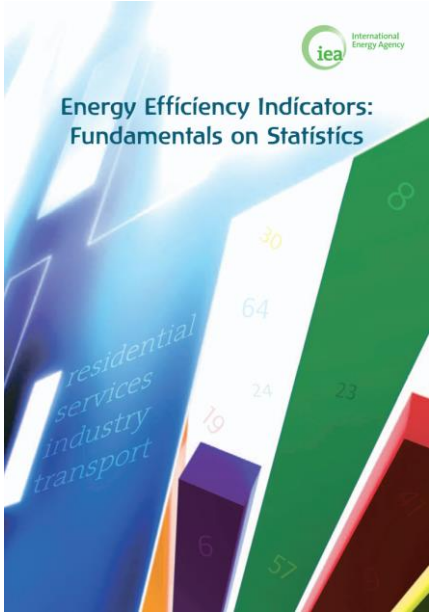
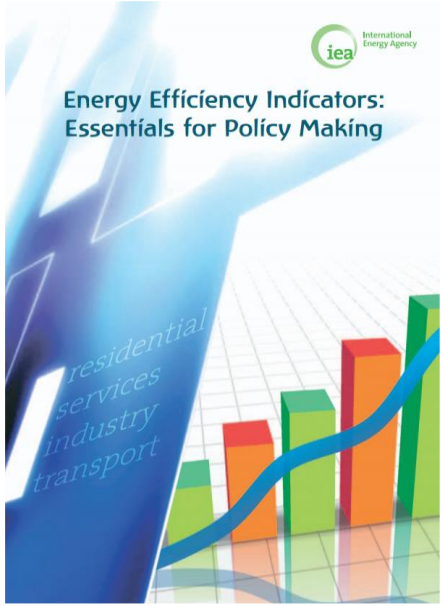
2. **Using indicators.** Analyses that can be done

Manuals on statistics



https://webstore.iea.org/energy-efficiency-indicators-fundamentals-on-statistics

Manuals on policymaking



https://webstore.iea.org/energy-efficiency-indicators-essentials-for-policy-making

2. **Using indicators.** Example: IEA indicators

Online Course

Energy Efficiency Indicators: Essentials for Policy Making

International Energy Agency -

View Course

Energy Efficiency Indicators: Fundamentals on Statistics

International Energy Agency -

View Course

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2. **Using indicators**. Example: Worldbank

Step 1 of 12. City KPIs and Data

Please provide details about your city in the Categories shown on the left.

ESMAP Energy Sector Management Assistance Program

THE WORLD BANK IBRD • IDA | WORLD BANK GROUP

8%

- Show All
- DETAILS
- CONTEXT
- PUBLIC TRANSPORTATION
- PRIVATE VEHICLES
- MUNICIPAL BUILDINGS
- COMMERCIAL BUILDINGS
- RESIDENTIAL BUILDINGS

Show KPI Definition

Double click on Year or Source to view or edit full details

KPI	Value	Units	Year	Source	Prox	keyKPI
Metres of High Capacity Transit		metres				
Metres of High Capacity Transit per 1000 People		metres/1000 people				
Transportation Non-Motorized Mode Split		%				
Public Transportation Mode Split		%				
Public Transport Energy Consumption per Passenger km		MJ/passenger km				Yes
Public Transport Energy		MJ				
Passenger Kilometers		km				
Meters of Bike Lanes		meters				
Metres of Bike Lane per 1000 people		metres/1000 people				

https://www.esmap.org/node/23572resources

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2. **Using indicators**. Example: BEST

Benchmarking and Energy Saving Tool for Low Carbon Cities (BEST Cities)
(BEST Cities)

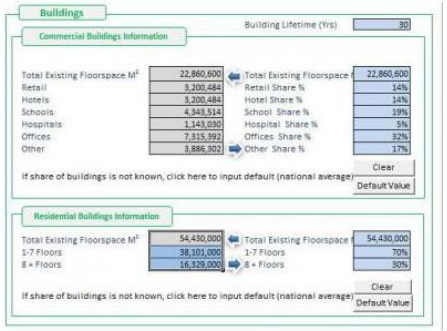
BEST-Cities is designed to provide city authorities with strategies they can follow to reduce city-wide carbon dioxide (CO_2) and methane (CH_4) emissions. The tool quickly assesses local energy use and energy-related CO_2 and CH_4 emissions across nine sectors (i.e., industry, public and commercial buildings, residential buildings, transportation, power and heat, street lighting, water & wastewater, solid waste, and urban green space), giving officials a comprehensive perspective on their local carbon performance. Cities can also use the tool to benchmark their energy and emissions performance to other cities inside and outside China, and identify those sectors with the greatest energy saving and emissions reduction potential.

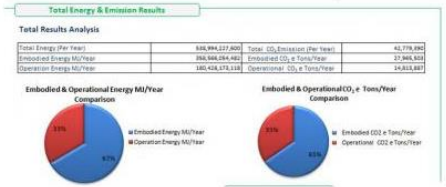
https://china.lbl.gov/tools/benchmarking-and-energy-saving-tool-low

2. Using indicators. Example: Urban RAM

Urban Form Rapid Assessment Model (Urban-RAM)

The Urban-RAM modeling tool is an Excel-based macros-enabled model designed to provide a high-level breakdown of the major contributors to a city's energy and carbon footprint when measured from the point of view of the city's inhabitants. This model asks users to provide city-level data on basic macroeconomic factors (GDP, households, population), residents' income and expenditures, building floorspace and building types, infrastructure (road, rail, subway length) and vehicle fleet to characterize a given city but also provides national average data as default.





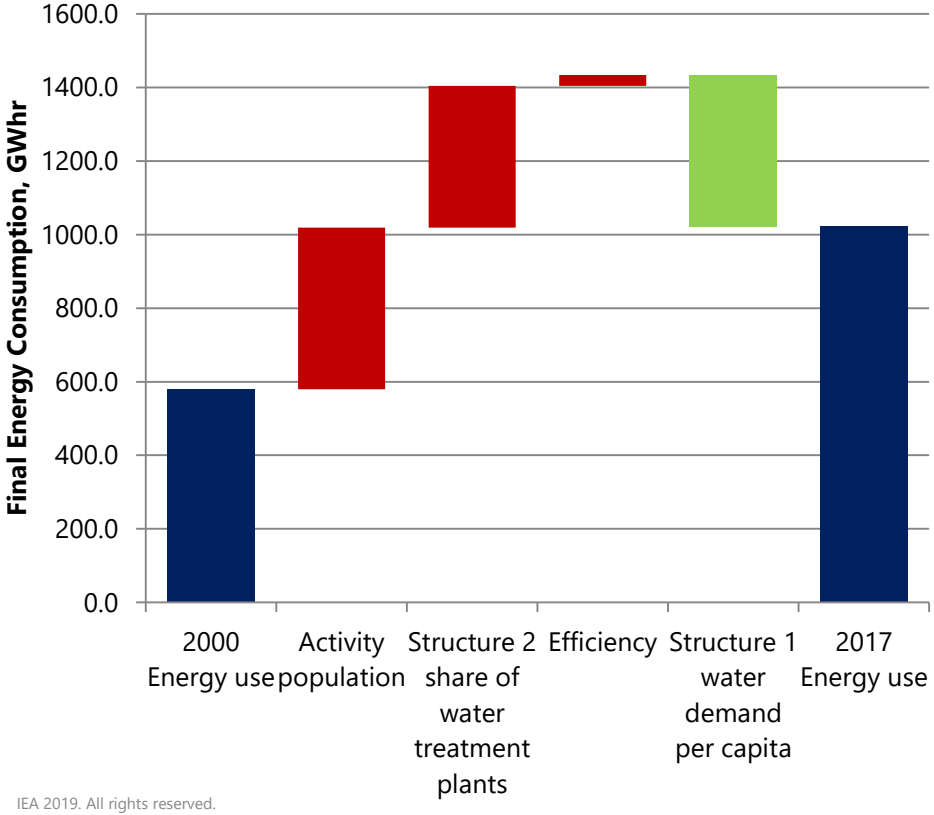
Based on a synthesis of data and life-cycle modeling approaches from both US and China sources, this model enables a quick assessment of the magnitude and sources of a city's energy and carbon footprints with minimal data requirement. This modeling tool is intended to help urban planner, policymakers and researchers quickly understand the underlying drivers of a city's energy and carbon footprint by calculating the city's embodied and operational energy and related emissions as well as common energy and CO_2 indicators.

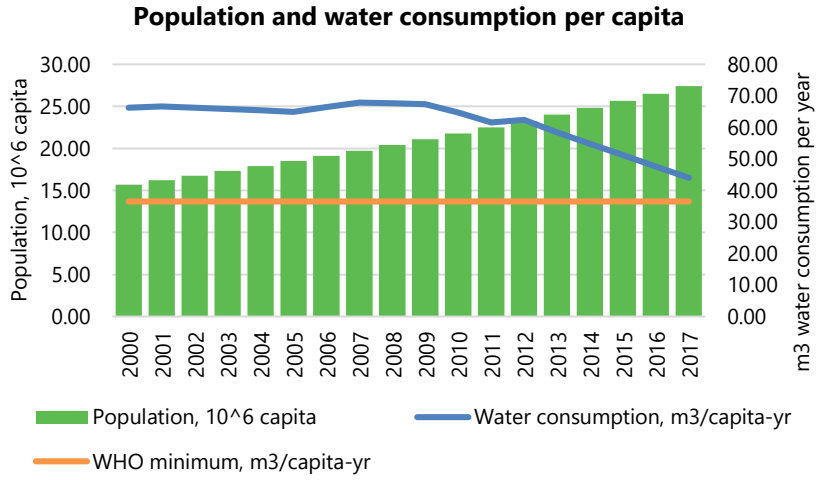
https://china.lbl.gov/tools/urban-form-rapid-assessment-model

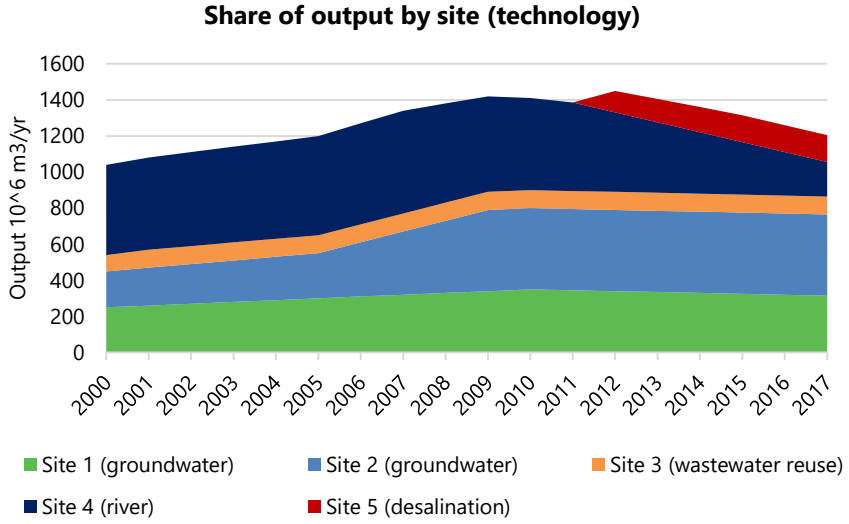
3. Activity

3. Activity

- What story can you tell about these figures?







3. Activity

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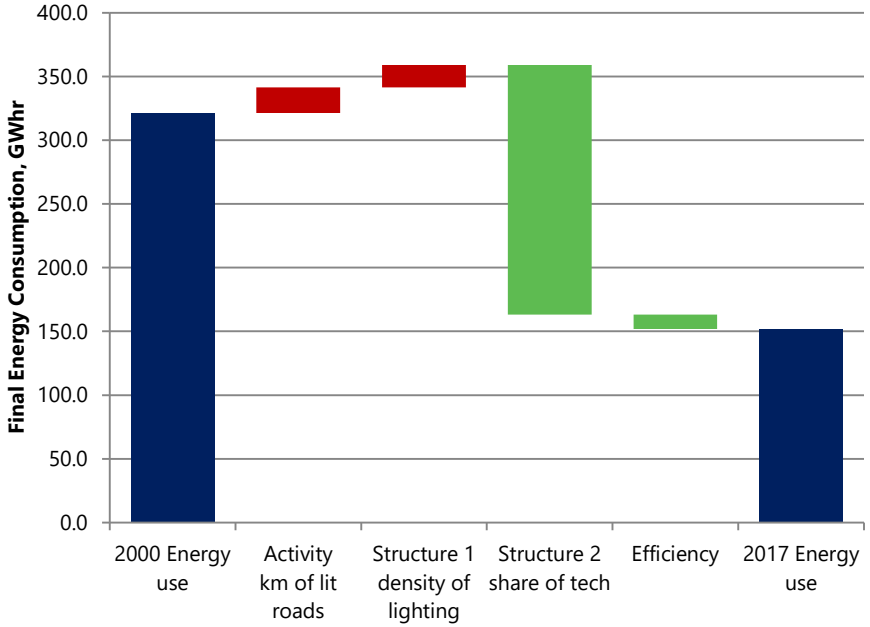
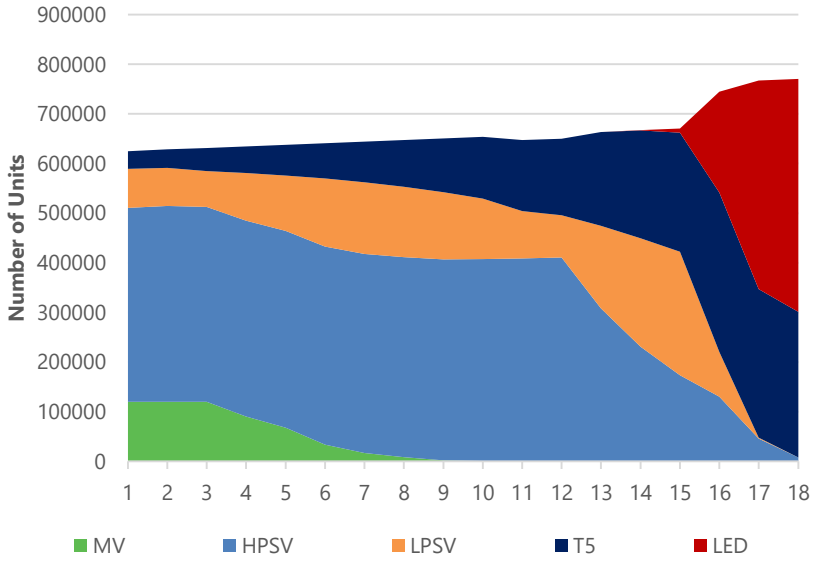




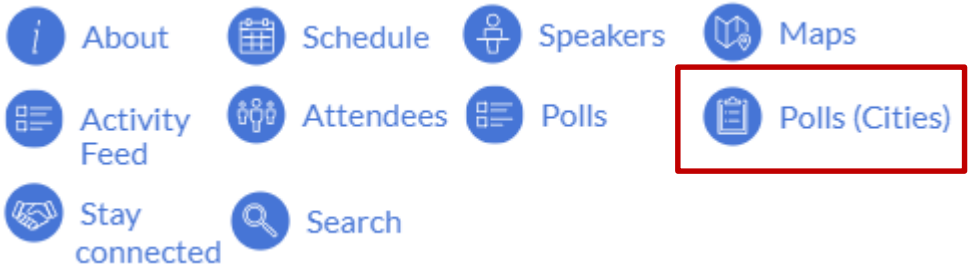
4. What are the steps?

4. What are the steps?

Step 1: Identify what needs to be tracked	• *What story should be told?* • *What were the objectives?* • *What are the risks?*
Step 2: Define the tracking indicators	• *What performance metrics can you use?* • *What data is needed?*
Step 3: Assess the data	• *What analysis method should you use?*
Step 4: Tell the story	• *How do you visualise the results?* • *How would it vary across countries?*

Poll Time! Cities 6: Urban Systems

Access the polls here:



Q: What is the main subsector that needs energy efficiency in your municipality

- Urban form
- Transport
- Water
- Lighting
- Waste

Results

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