TGP-EEDP
Thai - German Programme on Energy Efficiency Development Plan

Wuppertal Institute for Climate, Environment and Energy

Overview of assessment concepts: sectoral inventories and statistical indicators vs. policy impact evaluation with bottom-up calculation

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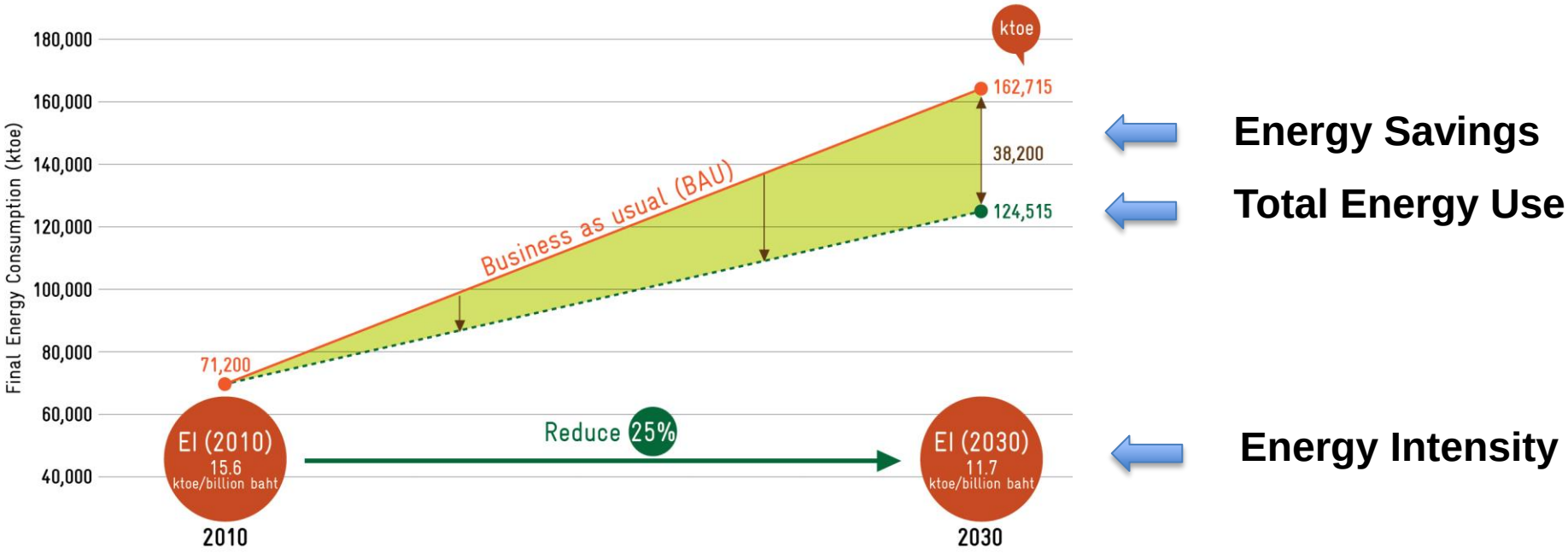
Overview

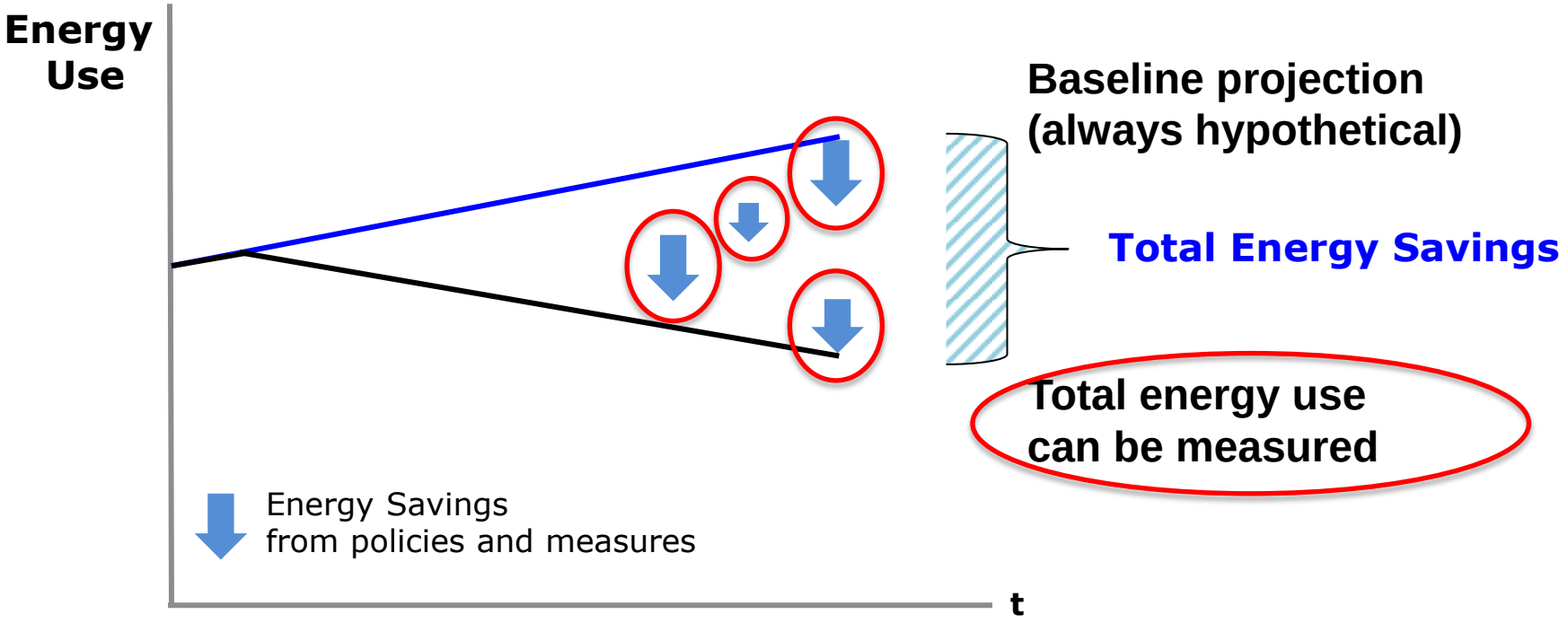
- **What do we want to know?**
- **Inventory vs policy impact perspective**
- **Statistical indicators and the inventory perspective**
- **Bottom-up approaches for policy impact evaluation**
- **Conclusions**

Background: Thai Energy Efficiency Development Plan (EEDP)



- In monitoring the progress of the EEDP, different things can be assessed:
  - Energy savings: do we get to the 38,200 ktoe in 2030?
  - Total Energy Use: do we reach the max 124,515 ktoe in 2030?
  - Energy Intensity: do we get to 11.7 ktoe/billion baht in 2030?

The "Inventory Perspective" versus "Policy Impact evaluation"



- In order to monitor the progress of the EEDP, different assessment methods may be used
- Assessment methods can be distinguished according to two main groups:
  - Policy impact (monitoring and) evaluations of „individual" policies
  - Inventory approach for monitoring of „general" progress

The “Inventory Perspective”

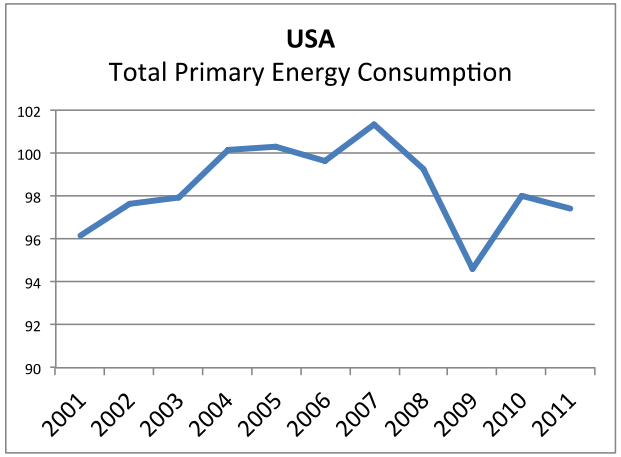
What is an “ inventory” or “ inventory perspective”?

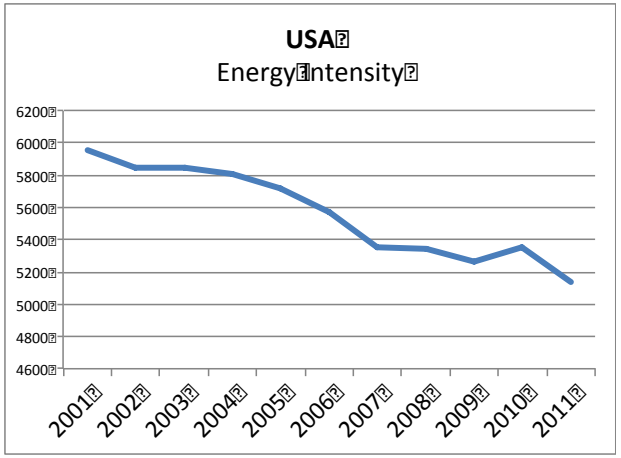
- E.g. annual reporting of energy consumption in buildings and industry
- E.g. “Energy Intensity” monitoring of Thailand
- E.g. annual GHG emission stock taking (“GHG inventory”)
- E.g. annual energy balance reporting

The "Inventory Perspective": Statistical Indicators (1)

Statistics and Inventories provide information on:

- Total energy consumption (and/or energy intensity and/or GHG emissions) in a country or sector and their development over time



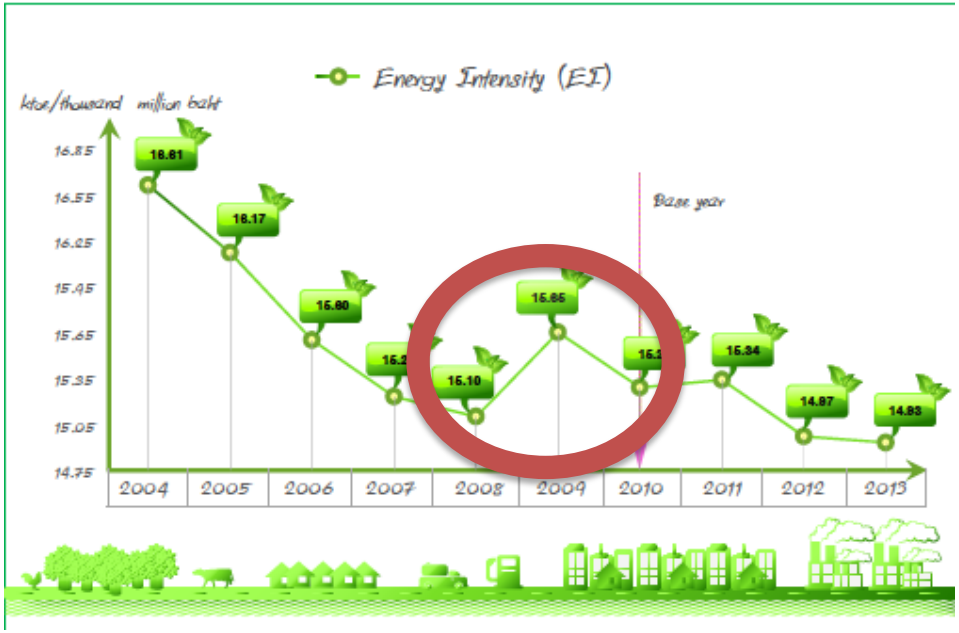


- Total Energy Consumption inventories are good tools for **monitoring overall development** of energy use (and/or intensity, emissions): Where do we stand now, and what has changed during the past years?

The "Inventory Perspective": Statistical Indicators (2)

However: Development of indicators depends on many factors:

- Population
- Economic development
- Structural change of economic sector
- Autonomous Efficiency Improvement
- Policies and Measures (i.e. for energy efficiency)



Source: DEDE 2013

- Development of energy use and intensity can be influenced by many different factors; energy efficiency and policy is only one of them

The "Inventory Perspective": Statistical Indicators (3)

Explaining the changes in Energy Efficiency Indicators from many factors

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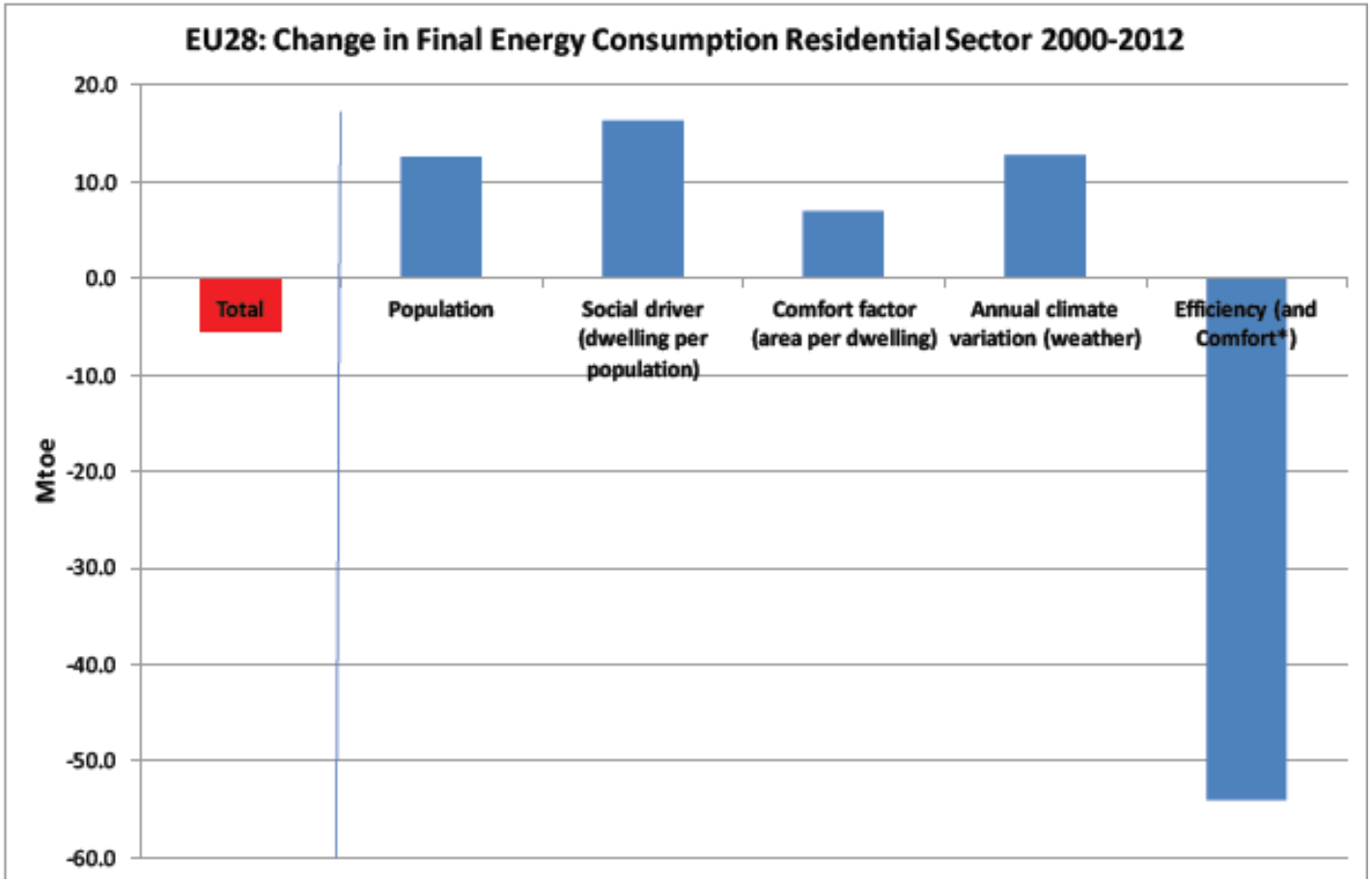
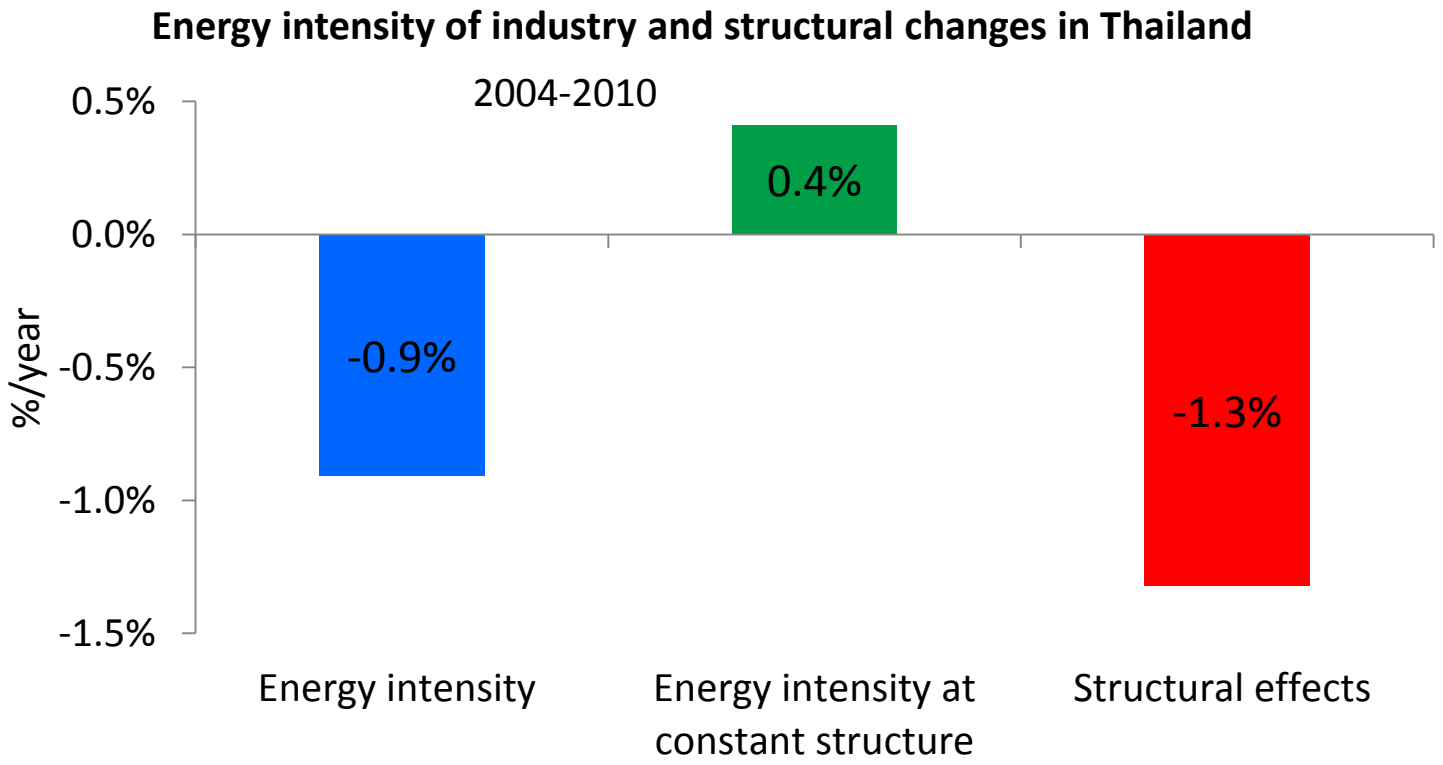
Decomposition



Source:
FhG-ISI 2014

- Decomposition analysis tells us what was the influence of different factors; but how much of the energy efficiency change is due to policy? We will not know the answer without evaluation of policy impacts

Inventory perspective example 2: EEI in Thailand



- Energy intensity of industry decreased by 0.9%/yr (2004-2010)
- Decrease of energy intensity is caused by change in industry sector: more low energy intensive industry, less energy intensive

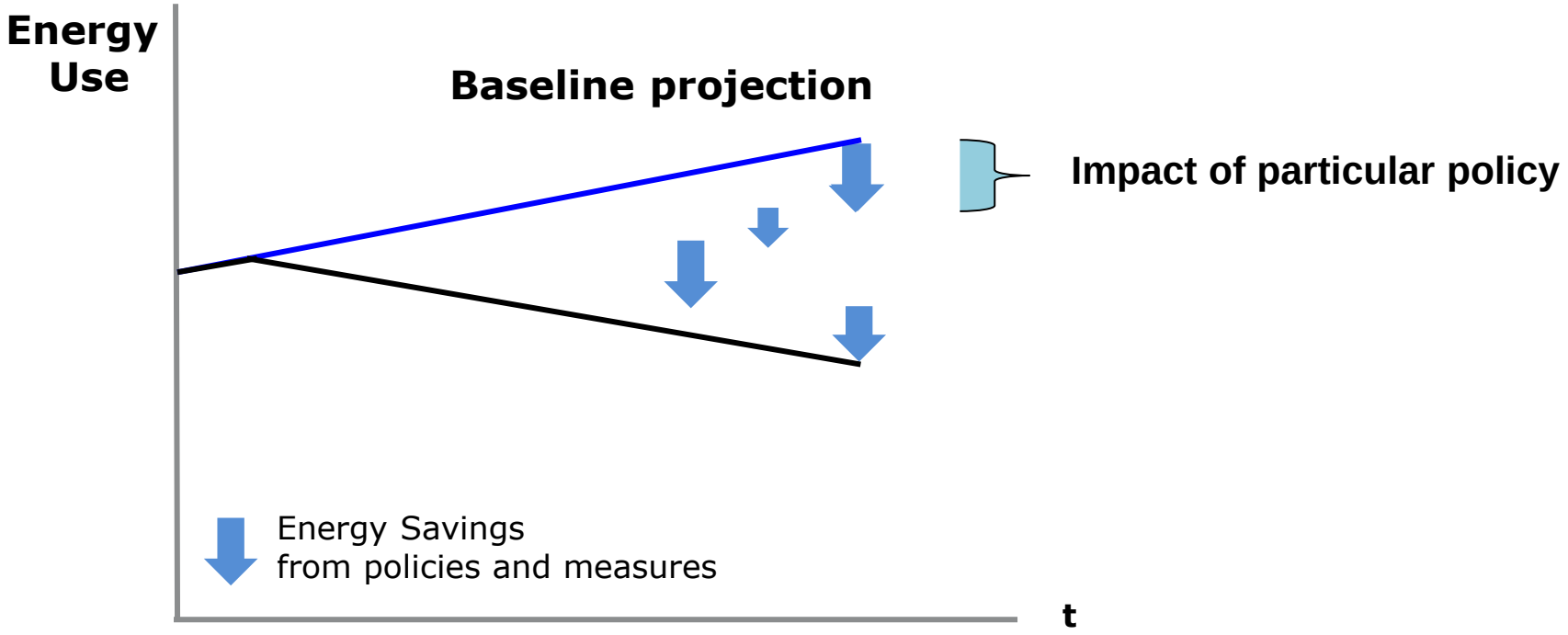
Inventory perspective: conclusions

- Inventories are good tools for **monitoring overall development** of energy use (and/or intensity, emissions):
  Where do we stand now, and what has changed during the past years?

- Decomposition analysis of statistical indicators can tell us what was the influence of different factors; but how much of the energy efficiency change is due to policy?

- Inventory perspective is an important element in monitoring if those policy targets that are expressed in indicator values were achieved;
- but it can not answer all the questions, particularly not, what was the contribution of policy to reaching the target: policy impact evaluation is needed for that.

“Policy Impact Evaluation”: linked to policy impact targets



- Policy impact evaluation aims to assess the impact/effect of one particular policy measure, e.g. „What energy savings were realised by the DSM Bidding programme?“
  Total energy savings vs. the baseline projection should be the sum of the energy savings from the different policies and measures

Policy Impact evaluation

What is the impact of a particular
Policy or Measure?

Impact of particular policy

Main impact of interest for evaluation:

- **How much energy** (or carbon) **did the policy save**?
- Especially, did it reach its savings or other operational targets?
  => Using **bottom-up methods**: summing up savings from individual equipment or projects induced by the particular policy

Other possible impacts that could be evaluated:

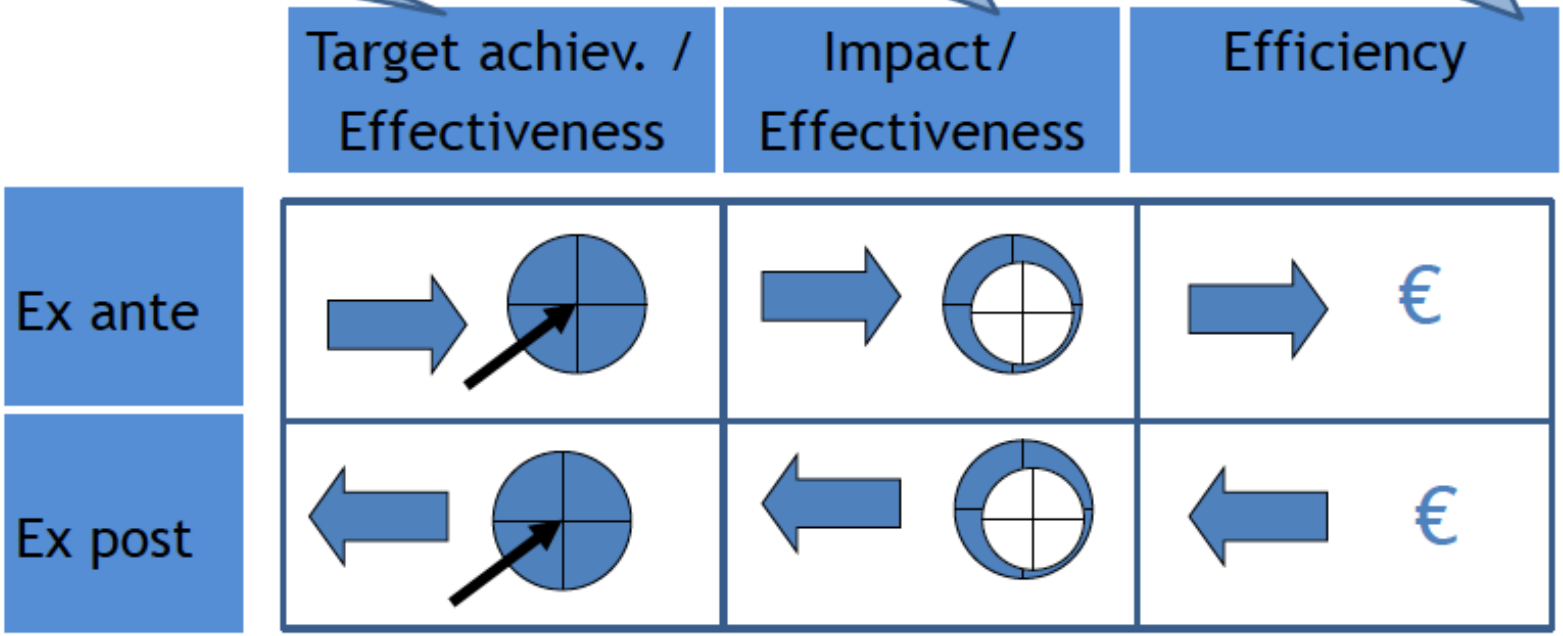
- Costs and benefits (energy cost savings, other financial benefits)?
- Macroeconomic impacts / jobs created?
- Other societal benefits (local air pollution reduced etc.)

What do we typically evaluate in impact evaluations?

To what extent are policy targets being met?

To what extent did policy instruments make a difference in meeting the targets compared to the situation without the policy instruments in place?

What was the cost effectiveness of the policy instruments, and could targets have been reached against lower costs?

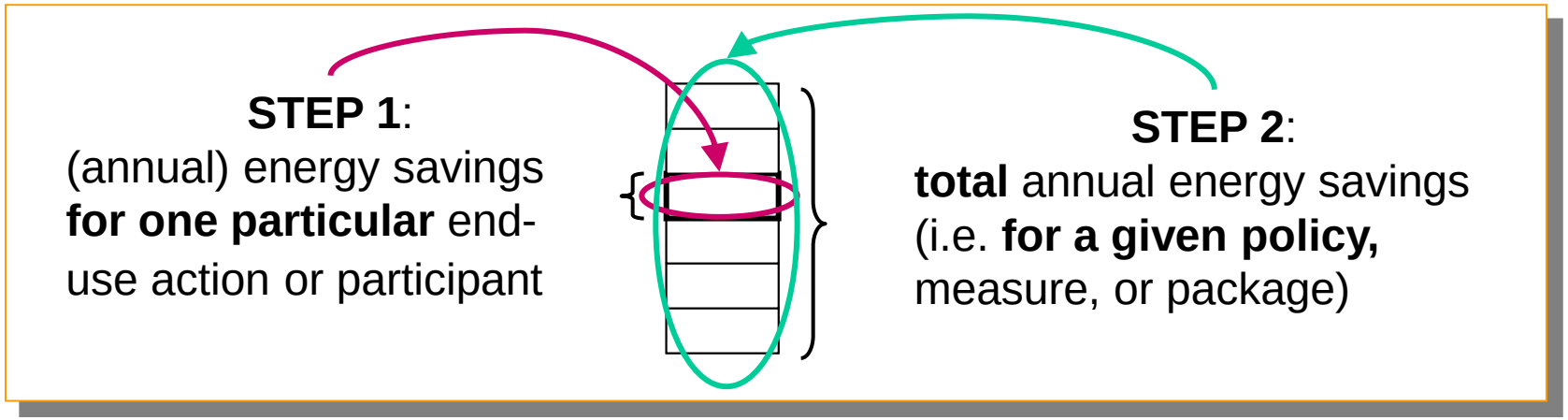


Source: http://www.harmelinkconsulting.nl/publications.php

Bottom-up methods

summing up savings from individual equipment or projects

- **step 1**: (annual) energy savings per unit of action vs. a specific baseline ➔ an energy-efficient air-conditioner receiving an SOP subsidy, a building constructed according to Building Energy Code, or a DSM bidding project
- **step 2**: total annual energy savings ➔ summing up



- E.g., 1,500 kWh/year average savings from an efficient AC unit
- E.g., 150 GWh/year savings from 100,000 efficient AC units (monitoring number of subsidies)

Example: KfW „Energy Efficient Construction“ Programm - Impacts

Concept: Investors receive soft loans to increase energy efficiency of new buildings **beyond** German minimum standard

Actions (data are for 2011 only)**:**

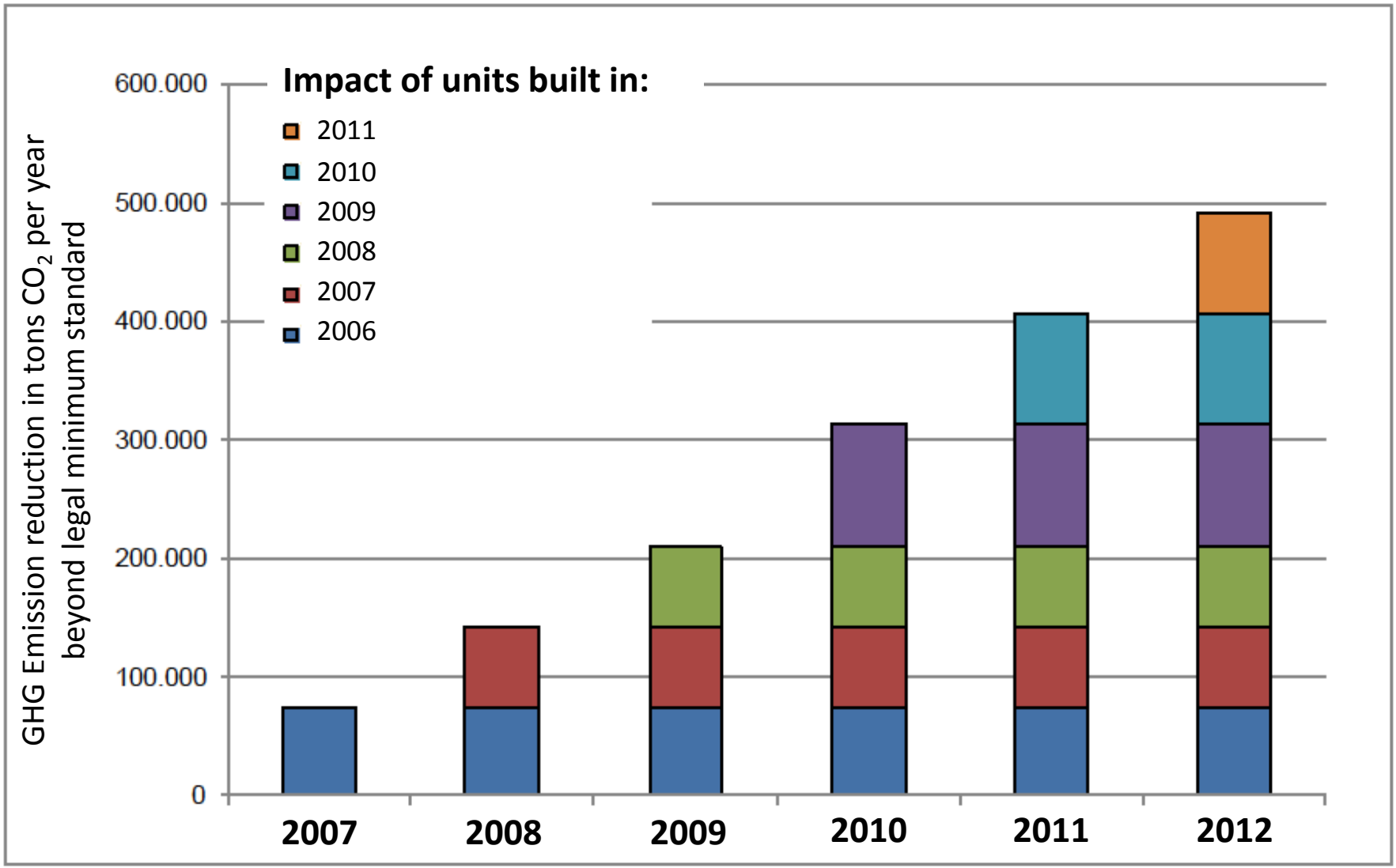
- 81.000 units supported (apartments or houses), i.e. 41% of all new dwellings
- Soft loans issued: 3.6 billion € (150 billion THB)
- Total investment: 14,5 billion € (600 billion THB) (approx. 3 to 5% of this for energy efficiency)

Impacts (of 2011 actions only)

- CO2 reduction: 85.000 tons per year
- Energy saved: 292 GWh per year
- Energy cost savings: 36 million € per year (1.5 billion THB)
- Effect on job creation: up to 200.000 person years

More information on: http://www.bigee.net/en/policy/guide/buildings/policy_examples/25/

Example: KfW „Energy Efficient Construction“ Programm – Impacts – CO_2 Emission reduction over time



More information on: http://www.bigee.net/en/policy/guide/buildings/policy_examples/25/

Example: KfW „Energy Efficient Construction“ Programm – Monitoring and Evaluation

Monitoring of parameters

- No of households
- Funds allocated
- Deemed energy savings

Policy Impact Evaluation

Survey among recipients

- Sample of 635 households
- 8 pages questionnaire
- Real energy savings

Calculation / Estimates of:

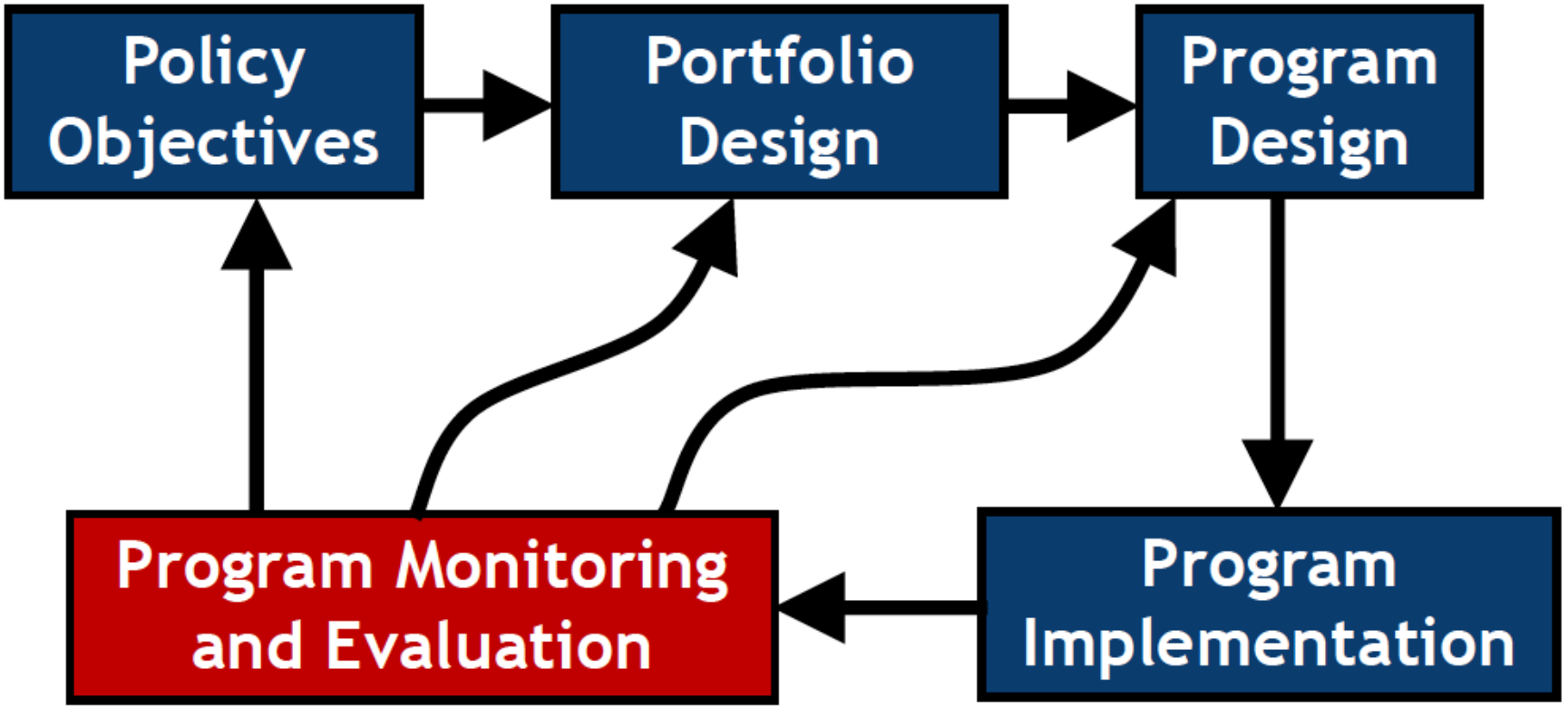
- Total Energy Savings
- Energy Cost Savings
- Total GHG Emission reductions
- Economic Impacts / Jobs created

Types and targets of policy evaluation – not only impacts!

Evaluation type	Description	Uses
Impact evaluation	Quantifies direct and indirect benefits of the program/policy	Determines amount of energy savings, emission reductions and in some cases possible co-benefits
Process Evaluation	Indicates how the program/policy implementation procedures are performing from both administration and participant perspective	Identifies how program/policy process can be improved
Market Effects Evaluation	Indicates how the overall supply chain and market have been affected by the program	Determines changes that have occurred in markets and whether they are sustainable with or without the program/policy
Cost-effectiveness evaluation	Quantifies the cost of program implementation and compares program/possible benefits	Determines whether the energy efficiency program/policy is a cost-effective investments as compared to other programs and energy supply resources

Source: National Action Plan for Energy Efficiency Leadership Group (2007)

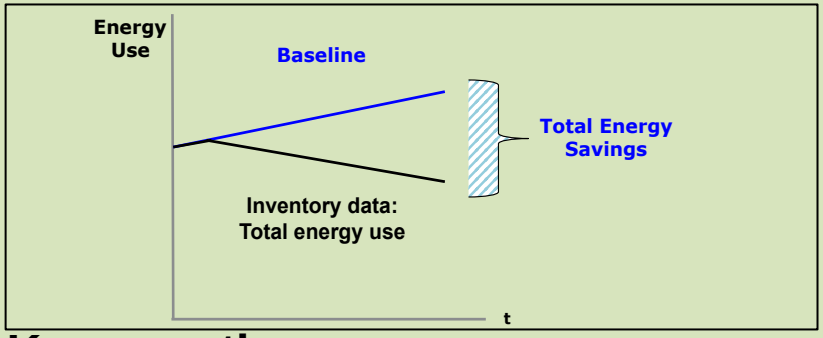
Policy Evaluation and its role in the policy cycle



CONCLUSIONS

Summary – Two Perspectives

Sector / Inventory / Change



Key question:

- **What is the overall energy use?**
  - the sum of all trends & actions
  - status quo and historic development
- Related to **change towards value targets** for total energy use or intensity (e.g., EEDP) (or GHG emissions)

Policy / Measure / Impact

Key question:

- **What is the impact of one specific policy or measure?**
- Related to **policy impact targets** (e.g., ENCON fund programmes, supported NAMAs)

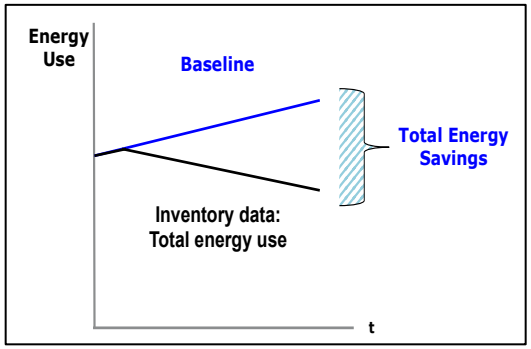
Application of statistical indicators and policy impact evaluations

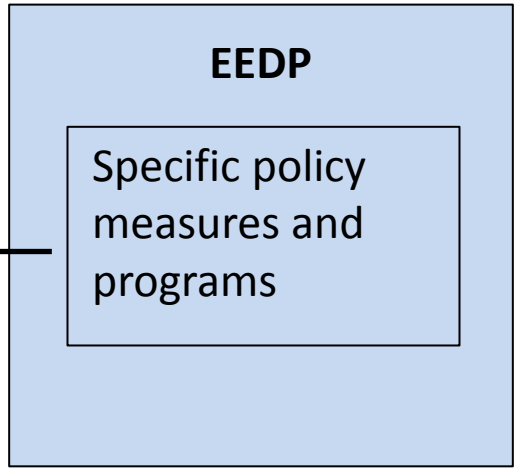
Inventory perspective

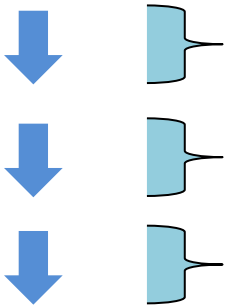
Policy impact evaluation

Energy Savings from

Top-down indicators on energy intensity for EEDP overall energy intensity target







Impact of particular policies

Bottom-up methods

- Statistical indicators of energy intensity tell us if the intensity target has been met
- Total energy savings vs. the baseline projection should be the sum of the energy savings from Policy impact evaluation of all policies and measures

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Thank you for your attention!

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