Energy Efficiency Indicators

Best practice and potential use in policy making in developing countries

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Objective of the review

- Inform about the state of the art in development and application of energy efficiency metrics;
- Review critical issues in using such metrics to assess and benchmark country and sector-level energy efficiency performance;
- Delineate implications of using such metrics to formulate and evaluate progress of EE policies in developing countries.

Focal areas

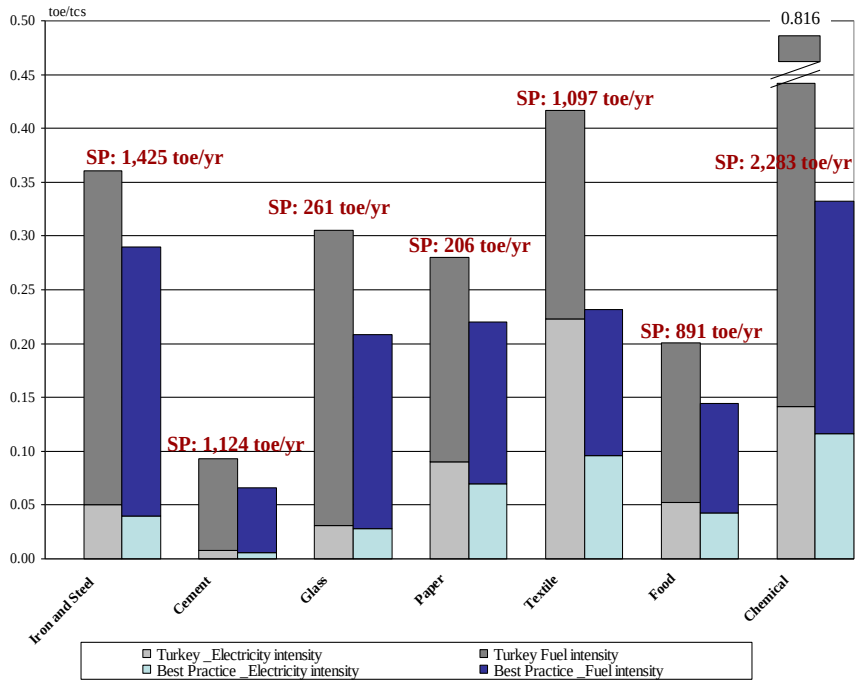
1. State of EE Indicators development and application and lessons learned
2. Use of EE Indicators for design and evaluation of programmes and projects
3. Needs Assessment for Developing Countries to establish capacity to effectively apply EE Indicators
4. Next steps and role of International (Development) Agencies

1. Energy Efficiency Indicator Initiatives

- IEA Indicator project
  - IEA Indicator database (& publications)
  - Plus Five Countries project (with World Bank)
  - (APEC project on Indicator capacity building)
- WEC – ADEME project on Energy Efficiency Indicators and Policies
- Application of indicators in World Bank's country reports on energy efficiency
- (ODYSSEE project)

World Bank EE country reports

- Shows potential role indicators in policy discussions in countries in varying stages of development
- Indicators used to put national circumstances in international context and prioritise policy attention
- Starting point for further analyses of improvement potential, implementation bariers and policy recommendations



Lessons learned - indicators

Key observations

- Sufficient knowledge, methodologies, tools and materials for indicator development are available internationally
- Developing countries mostly lack energy end use and activity data, limiting indicators to top(2) level in indicator pyramid

Lessons learned

- Setting up and maintaining indicator systems in developing countries will require significant time, effort and resources to strengthen capacity, starting from data gathering & validation and energy balance development
- International organisations can play a role in this given their knowledge, local presence and resources

Some resource indications (ADEME)

ODYSSEE resources (EU27+2)

- 1 Meuro/yr from European Commission (for last 15 years)
- 25-30% by national energy agencies
- Set of ~200 indicators, also source for IEA data for EU
- Some new Member States capacity comparable to developing countries
- Takes about 4 yrs to get up to speed (to deliver half of the indicators)

ADEME bilateral activities

- Tunisia
  - 7yrs cooperation with energy efficiency agency
  - 1 dedicated person
  - 60 indicators, produce own report interpreting indicators
- Algeria
  - 2 dedicated people
- 7 Mediteranean countries (non-EU)
  - 200kEuro
  - 2yr project

2. Lessons learned - policies

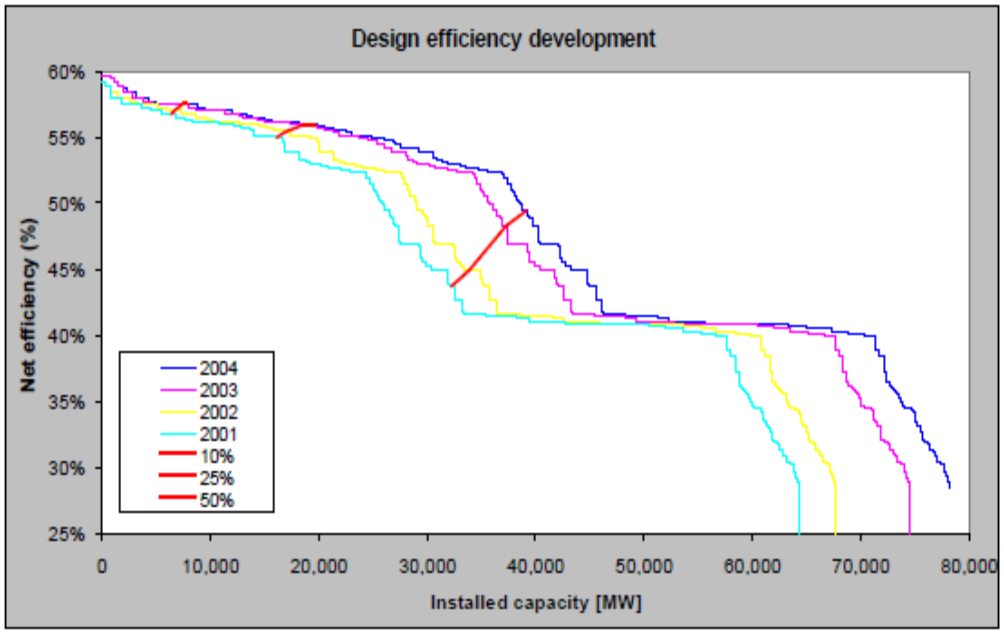
Key observations

- Indicators are mostly used for focussing policy attention and monitoring high-level trends, less for policy design
- Successful policy making requires more than the availability of good energy efficiency indicators, 'success factors' for effective policy making can be identified

Lessons learned

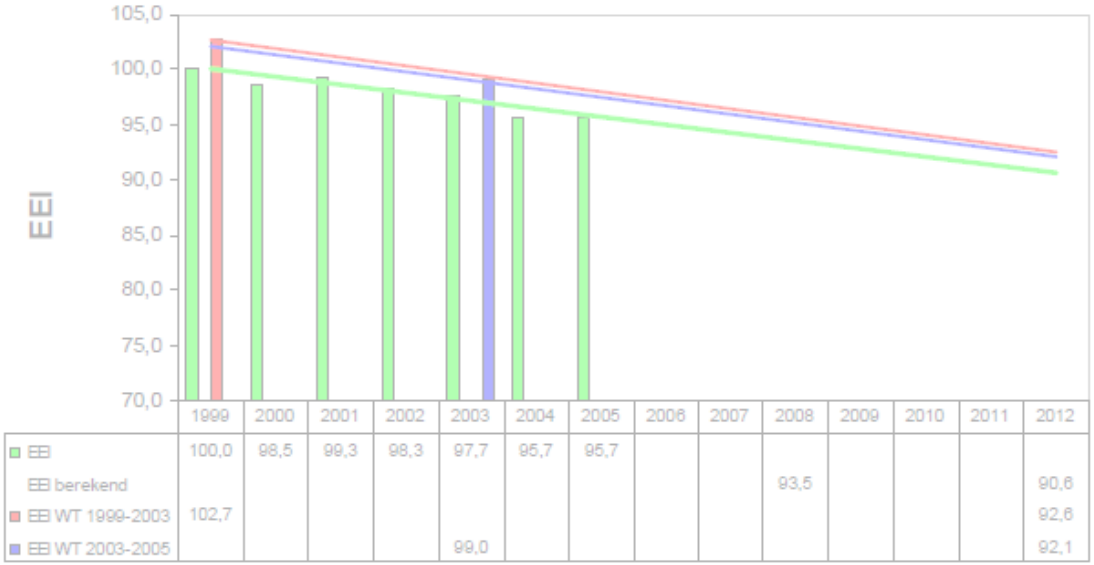
- Cross-country comparisons of success factors in policy making would increase understanding and help countries implement effective policy design & implementation frameworks
- Capacity strengthening on interpreting indicators and how to use in policy making is also needed

Example of using EEIs in policy design & monitoring



Target-setting

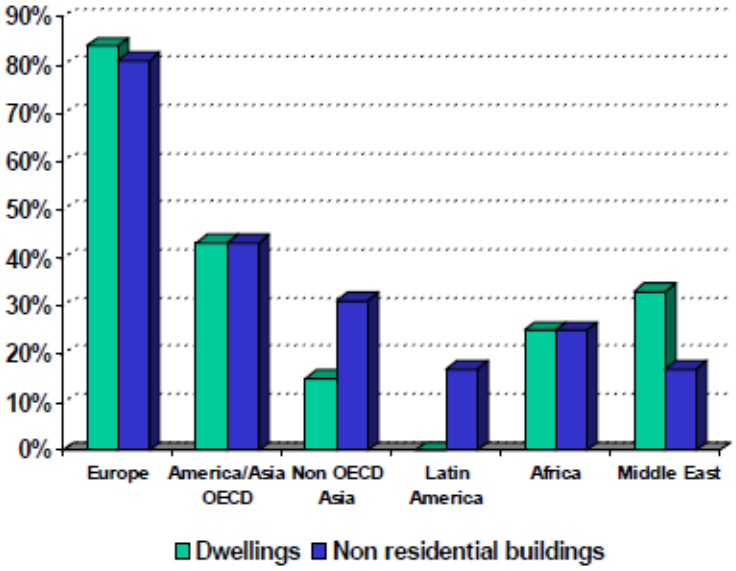
Monitoring



Benchmarking agreement in the Netherlands

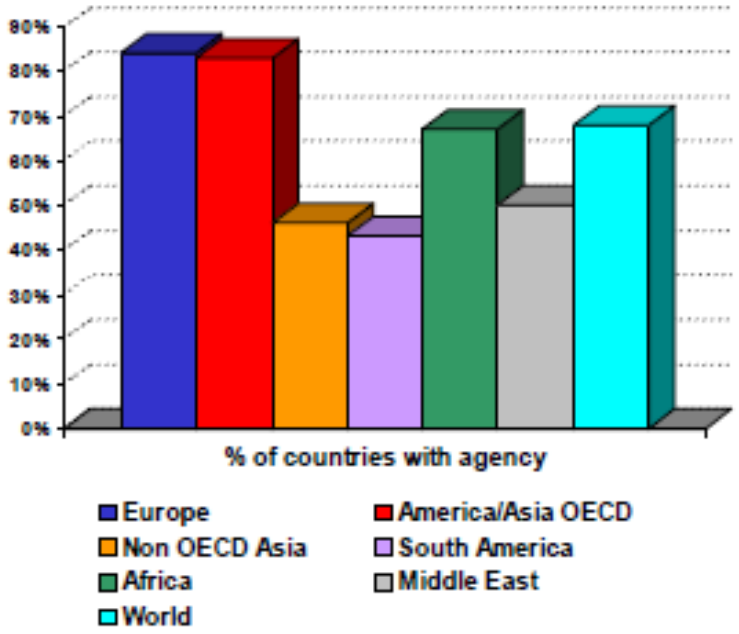
WEC – policies

- Survey and case studies of energy efficiency policies
- Identification of policy indicators and success factors



Regions with building standards

Regions with an energy agency



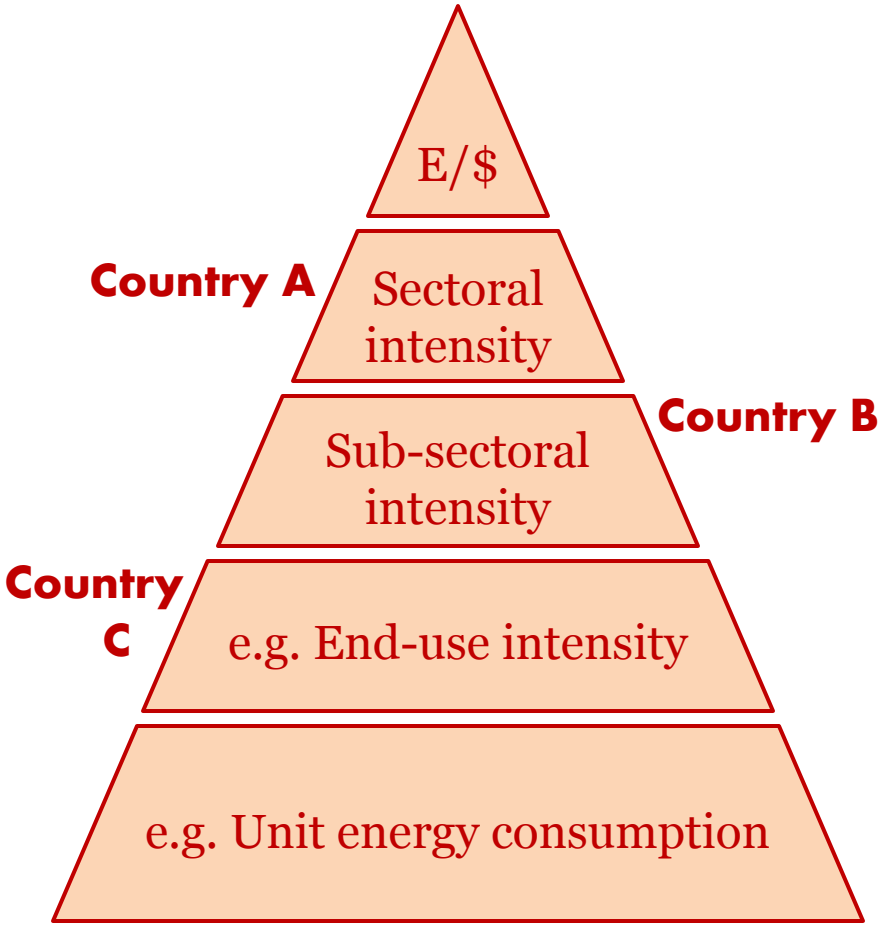
Some examples of policy indicators that help further understanding of trends in EEIs

3. Needs assessment DCs

Experience so far suggest strengthening the capacity to set develop and use energy efficiency indicators requires:

- Dedicated EE agency with dedicated staff
- Capacity building for staticians, analysts, policy makers and local consultants
- Funding for capacity building and data gathering (at least in the beginning)
- Political commitment
- Flexibility in how to participate and which type of indicators to develop/use to accomodate political sensitivities
- Longer term perspective (several years)
- Follow-up/accompany indicator development by development of policy & implementation framework

Steps needed in developing countries



Development/strengthening of

- End-use data gathering procedures
- Full energy balance
- Identification of available activity data, surveys for additional data
- Capacity and tools for data validation and filling data gaps
- Understanding of policy messages conveyed by indicators
- Framework for selecting the most effective policy instrument
- Policy implementation framework (success factors or policy metrics)

4. Role international organisations

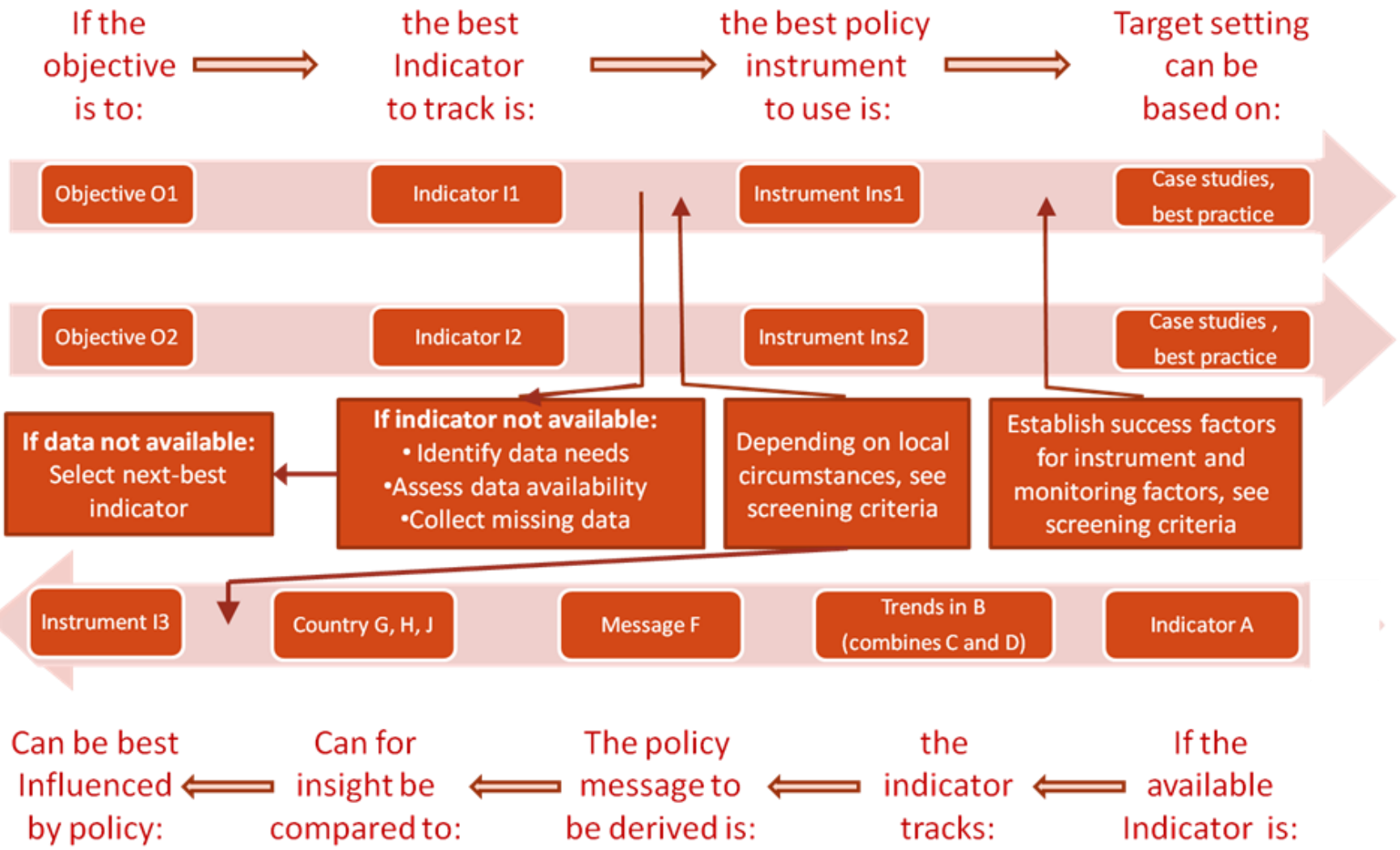
- Support capacity strengthening technically and financially
- Support capacity strengthening technically for development of energy balances (IEA), indicator development (IEA, ADEME, IDAs) and application (World Bank, WEC, IDAs)
- Coordinate harmonised indicator development and application and development of instutional set-up
- Develop a ‘two-directional road map’ for indicator and policy instrument selection
- Create synergy with other activities of international (donor) organisations and funding
- Increase political support among governments

Potential institutional set-up and roles

Experience so far suggests a central organisation coordinating combined with domestic participation might work best

- Central organisation could e.g. by IEA (and/or ADEME), supported by regional groups (ADEME, APEC, OLADE, etc)
- IEA: capacity strengthening energy statistics, energy balances
- IEA, ADEME, regional organisations to support capacity strengthening on indicator development (training)
- World Bank, WEC to support development of stronger linking of indicators to policies and selection of indicators and policy instruments (e.g. road map for indicator & policy selection)
- IDAs to support capacity building financially and technically, and incorporate indicators in its operating procedures
  - Develop institutions, systems for indicator development (w IEA)
  - Follow-up on policy design & implementation framework
  - Follow-up with investment support

Two-directional roadmap



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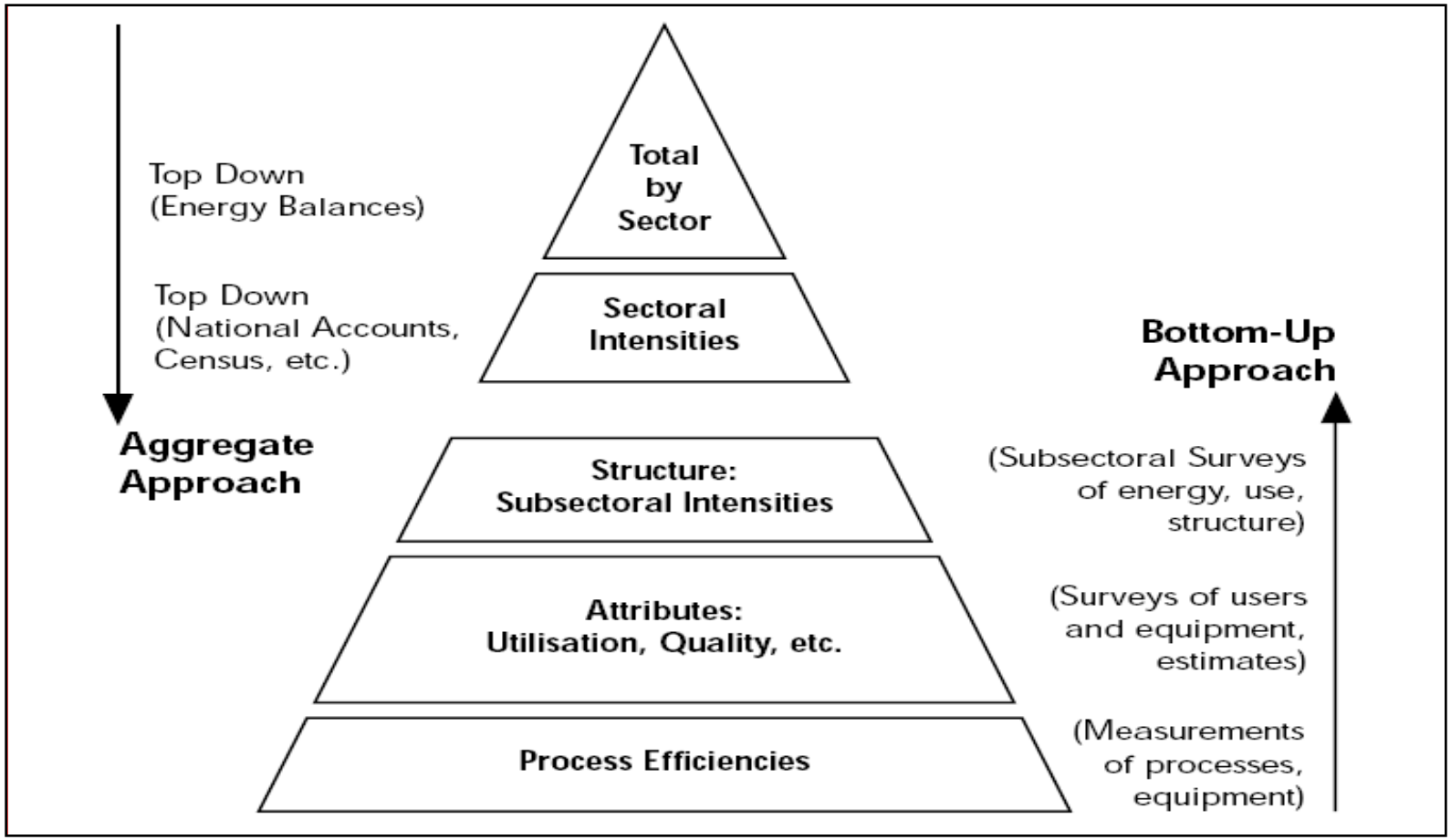
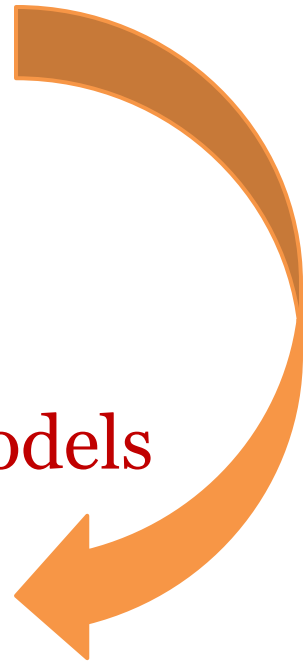
Energy Efficiency Indicator Pyramid



Energy efficiency Indicator use

- Historical trend analysis
- Benchmarking
  - Cross-country comparisons
  - Comparison with best practice
- As input to economic and technological models



- To focus policy attention and effort
- To design policy and monitor progress overtime

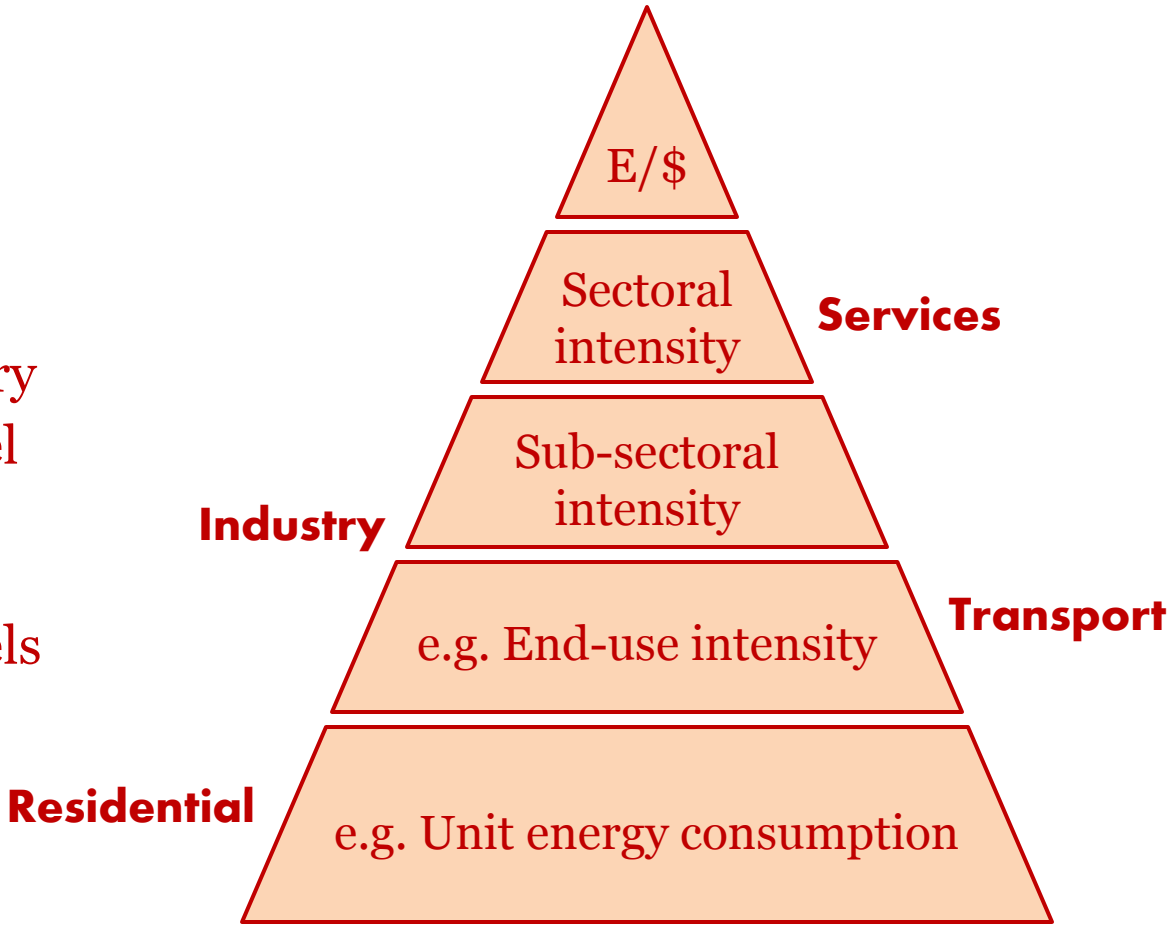
Crucial:
Means must match end!

Indicators must match policy objectives and drivers

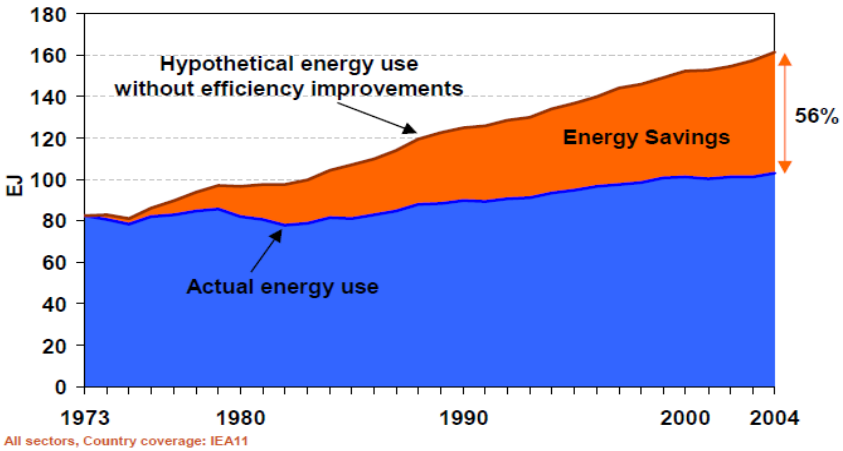
Monitoring must match objectives and drivers

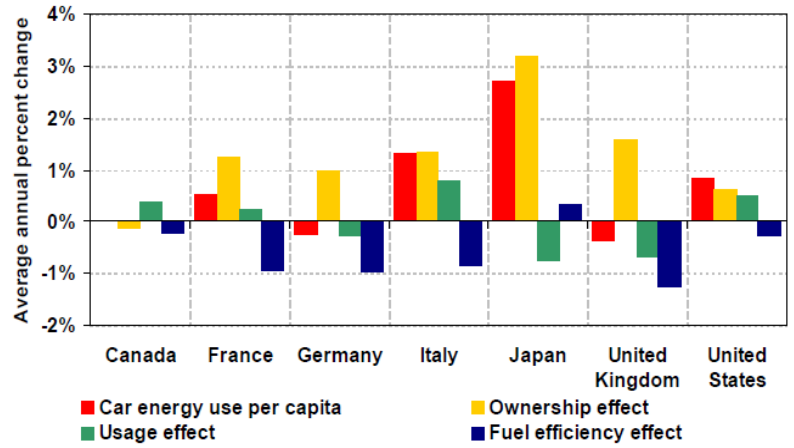
IEA Indicator Project - development

- Data available at disaggregated level for residential and transport sector, increasingly for industry
- Lower aggregation level achievable for less countries
- Lower aggregation levels depends more on surveys, dedicated analyses, not on regular statistics



IEA Indicator project - application





- Indicators used for:
  - Historical trend analyses
  - Benchmarking across countries and compared to best practice (industry)
- No tracking of the effect of individual policies, but overall trends combining effects of sets of policies and socio-economic trends
- Areas where further indicators and data gathering are needed are indicated
- Indicators “important to analyse link economy – energy use – emissions”, “particularly relevant for targeting and evaluating energy efficiency policies”

IEA and developing countries

Plus Five Countries Project

- Gleneagles G8+5 countries: Brazil, China, India, Mexico, South Africa
- Aim to develop a common set of energy efficiency indicators for Plus Five countries
- Development of methodology booklet and data gathering template, assessment of data availability (started)
- Stopped because of political and data issues

APEC capacity building

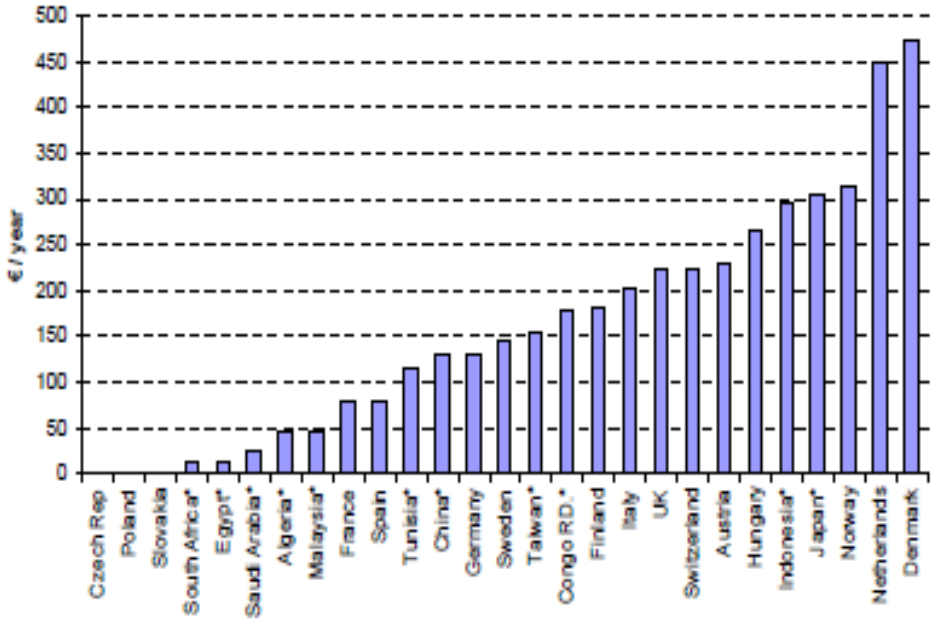
- Training workshop Sept '07
- Endorsement of IEA template (with adjustments)
- 8 APEC economies have energy balances, can provide comprehensive set indicators
- Proposal of priority indicators (mostly energy, not energy efficiency indicators)
- Development of indicators was not feasible due to lack of consistent data

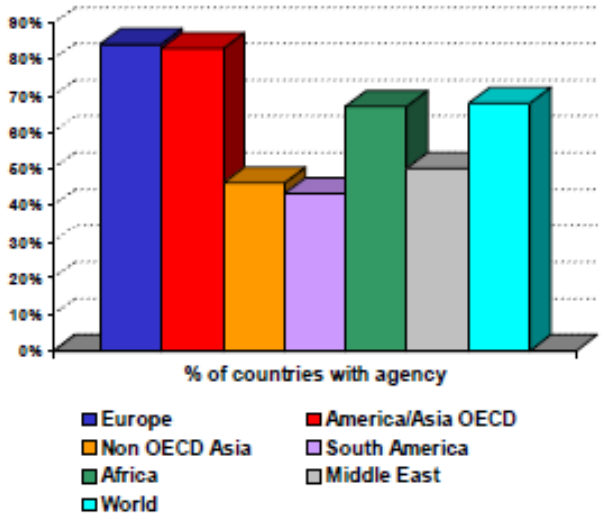
WEC – ADEME - development

- Indicators at regional level (incl regions China, India)
- Indicators at high aggregation level because of limited data availability for non-IEA countries

- Link to e.g. energy prices
- Survey and case studies of energy efficiency policies
- Benchmarking of policy indicators and success factors

Annual taxes on cars

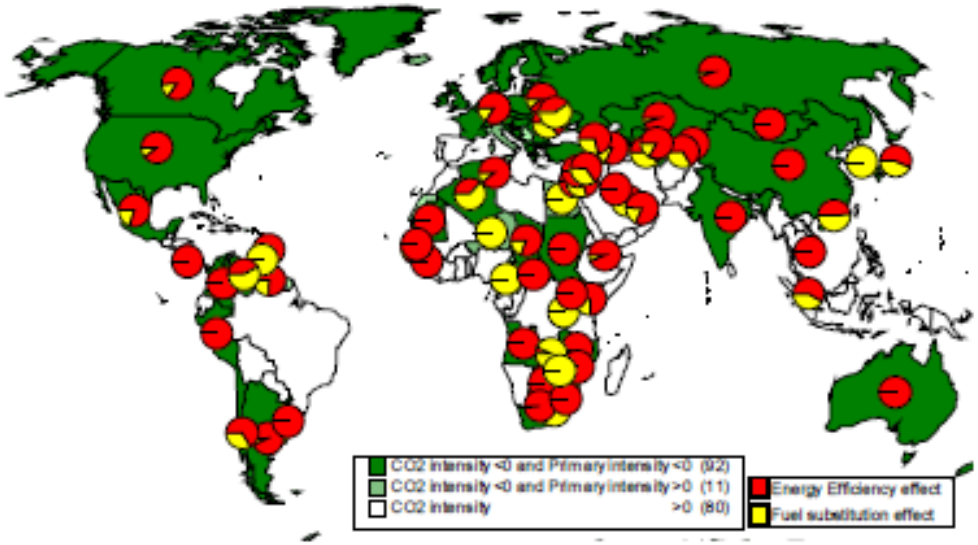




WEC – ADEME application

- Indicators used for trend analyses and cross-regional comparisons
- Energy efficiency indicators are not linked to policies because of high aggregation level
- Lessons learned from best practice policies are identified

Figure 2.30: Impact of fuel substitutions on the CO2 intensity variation[34]
Effet des substitutions d'énergie sur la variation de l'intensité



World bank – application

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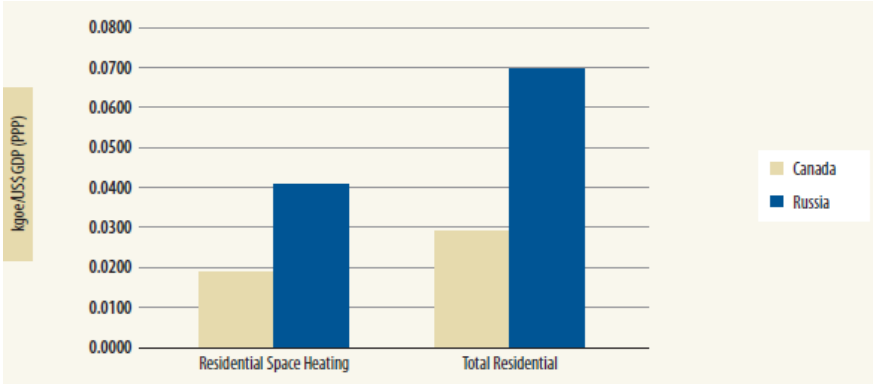

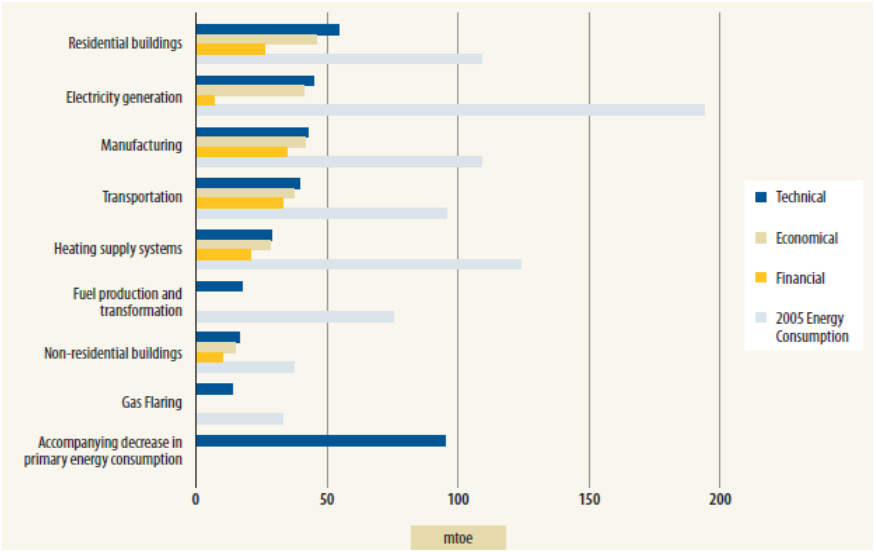

Lessons learned - indicators

- Energy efficiency indicator initiatives are expanding both in geographical scope and level of detail
- Much is available in terms of experience, information, methodologies and tools
- The more disaggregated the indicator, the more insight into underlying drivers, allowing closing in on energy efficiency
- In developing countries, data often only available at higher aggregation levels, limiting conclusions on energy efficiency
- WEC-ADEME shows what is achievable in developing countries on the basis of (international) statistics
- Further disaggregation requires more dedicated surveys, analyses and involvement of local stakeholders
- Setting up and maintaining indicator systems requires substantial and sustained effort

Lessons learned - policies

- Use of indicators in policy mostly to focus policy attention or to track high level (combination of) trends
- Indicators more difficult to use for policy design and monitoring effects of individual policies (causal effect)
- All indicators can convey a policy message, effective policies require matching indicator with appropriate message, policy objective
- High level indicators are not suitable for designing or monitoring effects of policies that operate at lower aggregation levels
- Using indicators for *energy efficiency* policy design and monitoring is easier in certain areas (industry, energy) than others
- In addition to availability of indicators, many other institutional-regulatory criteria must be met for successfull policy implementation

Lessons learned – developing countries

- Interest in indicators driven by different interests (self sufficiency, efficiency, emissions), which should be accomodated
- Data availability limits the extent to which indicators can currently be used for *energy efficiency* policy design or monitoring in developing countries
- Energy balance is main starting point for indicators, requires further work in many developing countries
- Energy end use data and activity data are mostly lacking
- Benchmarking (and therefore harmonised indicators) are politically sensitive, use for monitoring national trends less so
- Many international organisations are active in developing countries, offering opportunities for synergy (support establishing institutions, indicator systems, policy development, investment support)

2. Indicators, programmes and projects

Indicators can be used in policy making for:

- ☑ Prioritizing and focusing of policy efforts
  - Designing policy instruments, identifying the most appropriate instrument and target-setting
- ☑ Monitoring trends and the progress towards identified policy targets
  - Monitoring the impact and efficiency of policies

Trend or causal relation?

Ideal policy cycle

- Formulation of policy objective
- Selection of most appropriate indicator to monitor progress
- Selection of most appropriate policy instrument
- Establishment of success factors for policy implementation (implementation infrastructure)
- Monitor indicator to assess progress to target
- Reiterate policy cycle if necessary

See discussion Road map

Policy design and implementation infrastructure assessment

Currently indicators are of limited use for designing policies and assessing implementation infrastructure

Policy objectives should be SMART:

- S: Specified, as concrete as possible
- M: Measurable
- A: Acceptable
- R: Realistic but ambitious
- T: Timed

Indicator and policy should have corresponding aggregation level