Evaluating Energy Efficiency Policies and Measures
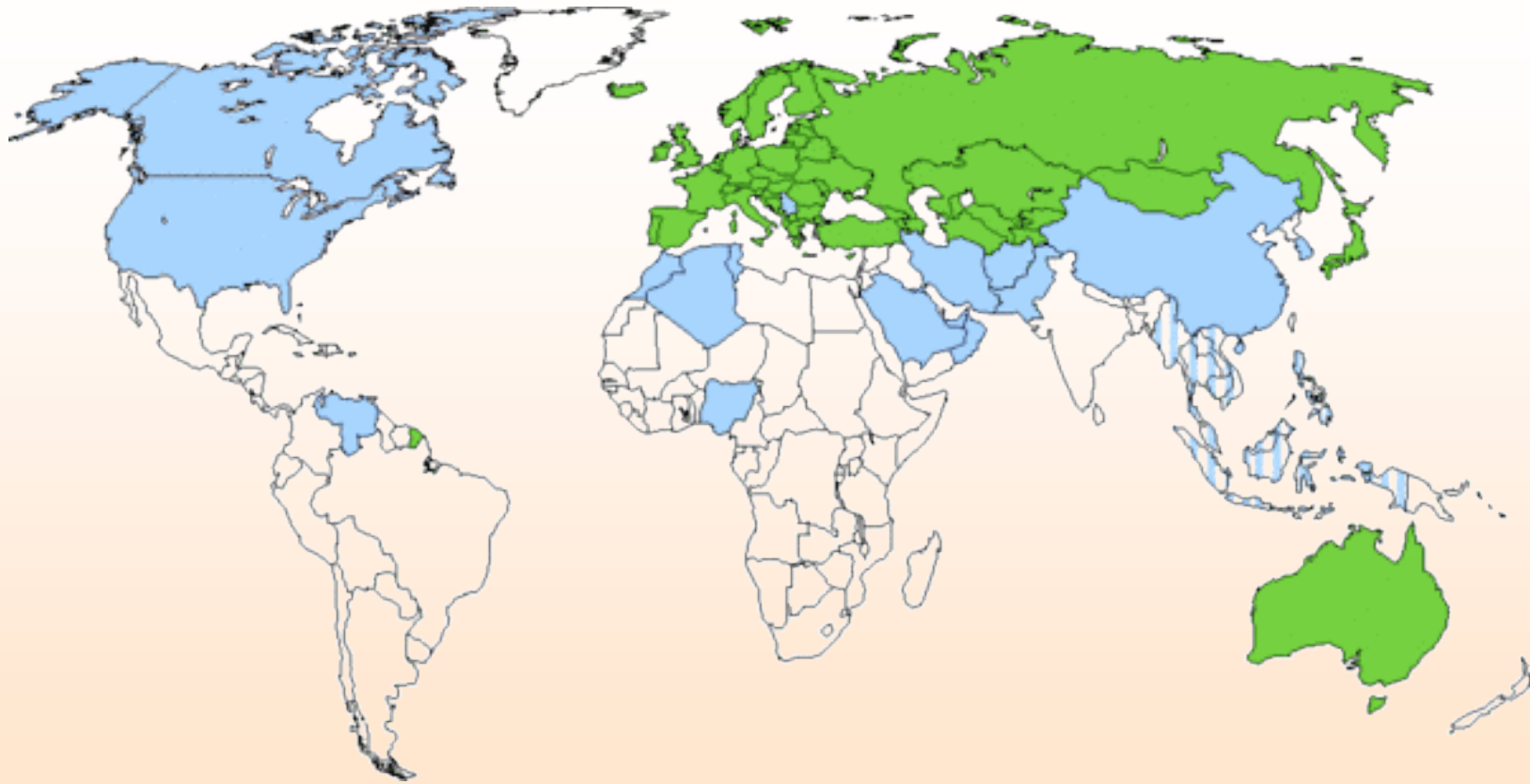
Tudor Constantinescu (ECS) and Rod Janssen

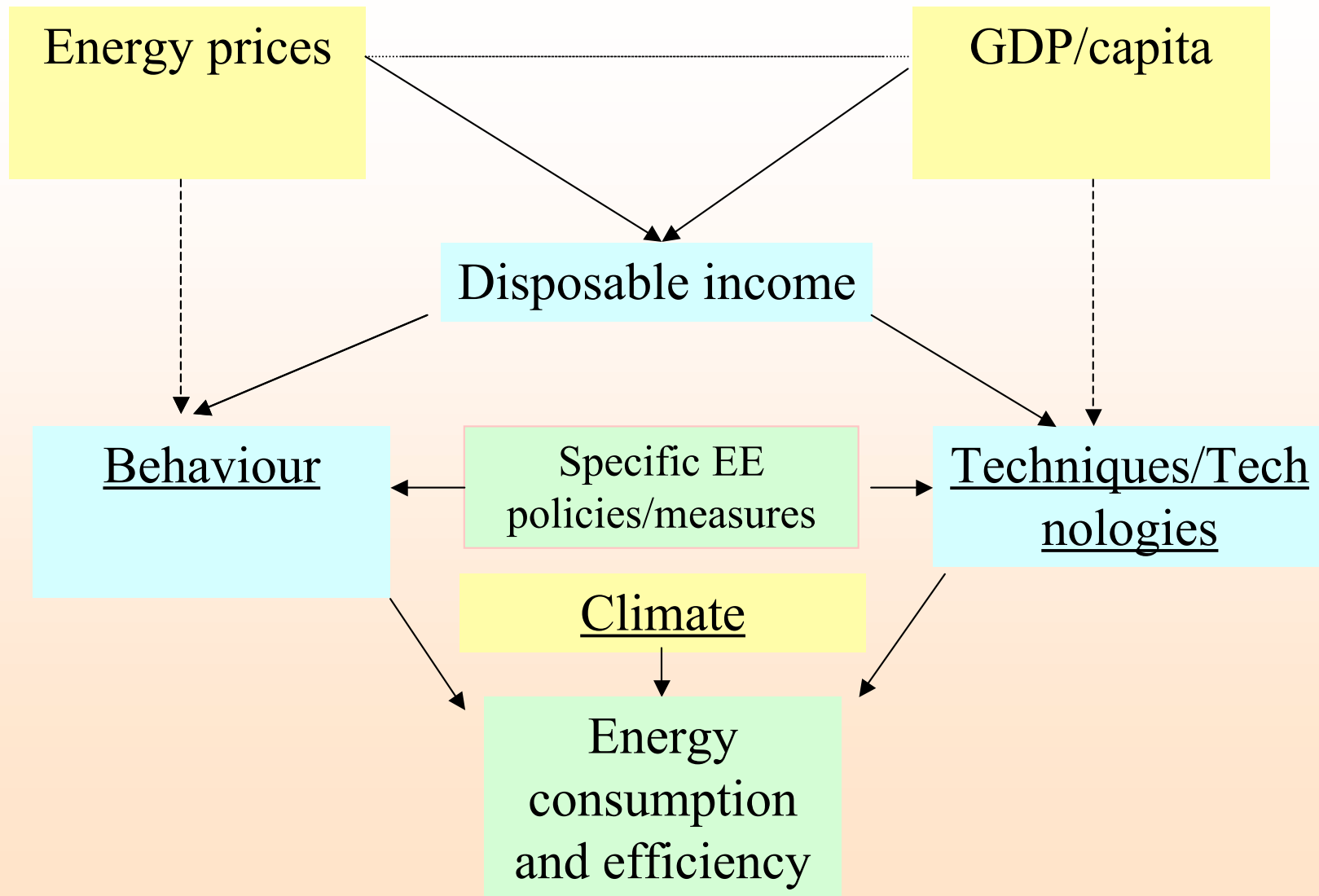### ECEEE June 2007

Energy Charter Constituency

Interactions
Residential Energy Consumption
Heating, Lightening, Cooking, El Appliances

Energy prices

GDP/capita

Disposable income

Behaviour

Specific EE policies/measures

Techniques/Technologies

Climate

Energy consumption and efficiency

Developing an Energy Efficiency Strategy
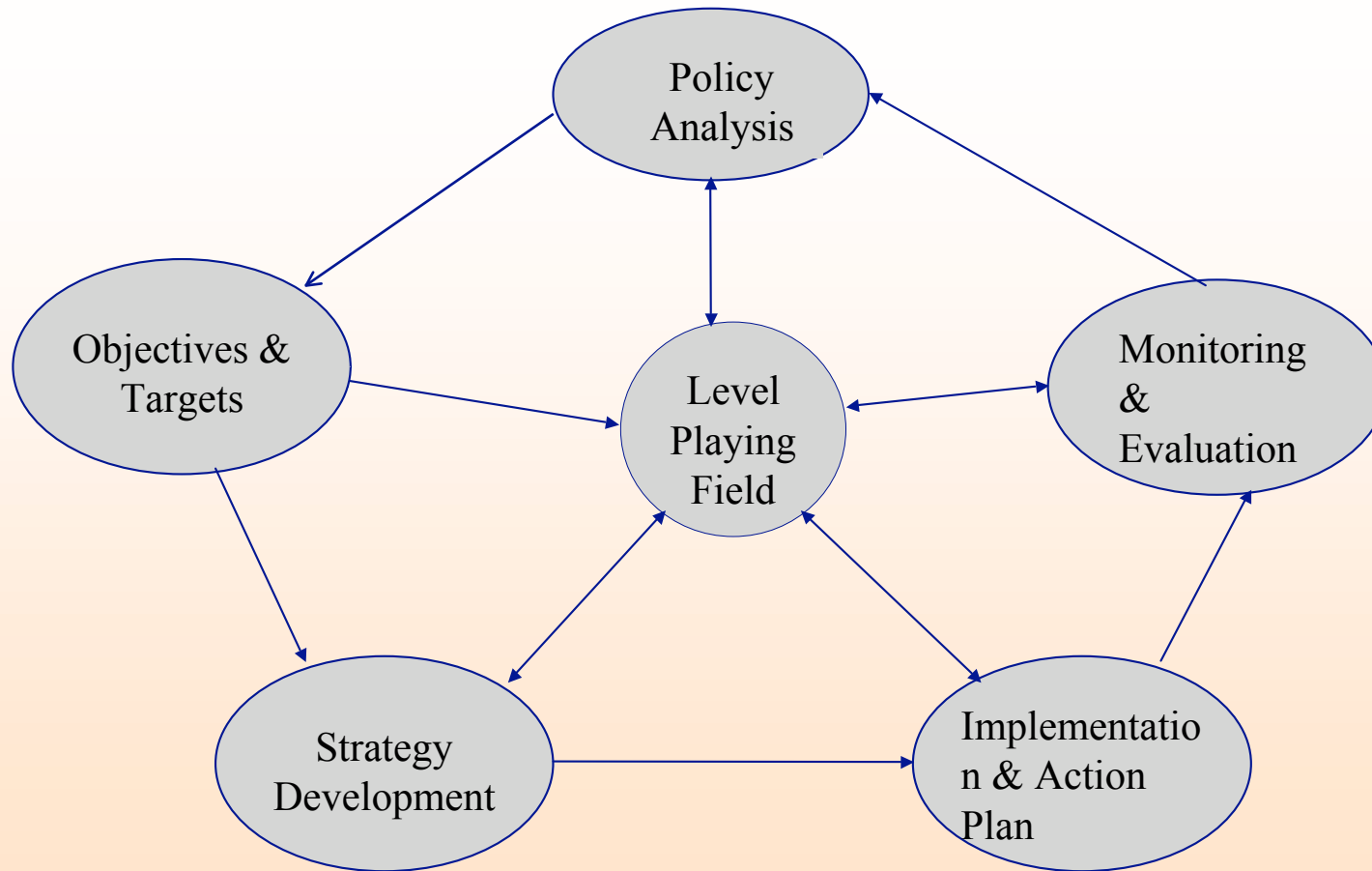
Categories of instruments and measures

- Regulatory;
- Information/Awareness;
- Economic/Financial;
- Education/Training
- Voluntary Agreements; and
- R&D.

The choice of instrument depends on a variety of factors, including:

- Cost and ease of delivery;
- "Strength" and "durability" of effectiveness in overcoming barriers and providing energy efficiency improvements in the short term and long term;
- Public, political and administrative acceptability; and
- Effectiveness in improving energy efficiency.

Why Evaluation is Important

1. rational management of the public budget;
2. cost-effectiveness of energy efficiency goals achievement

Policy measures can be improved by the assessment of issues such as[1]:

- Where energy savings are being achieved - which measures, end-uses and customer segments are providing the greatest benefits;
- The cost at which the impacts are being achieved;
- Which customers, dealers, builders, manufacturers and other market trade allies participate and why;
- Which customers are not participating and why; and
- Which marketing methods are reaching the target audience

[1] Hagler Bailly Consulting, 1995, http://dsm.iea.org/NewDSM/Prog/Library/Upload/139/Evaluation-violette.doc

A Review of Evaluation Techniques

The Logical-Framework approach considers:

- efficiency - whether the policy is a good use of resources (eg, whether consumers would have made the investments without a grant) - efficiency is often measured through cost-benefit analysis techniques;
- effectiveness - whether the policy achieves its immediate goals - such as a certain number of households insulating their roofs;
- impact - whether the policy achieves its specific objective - such as reducing energy consumption in participating households by 20%;
- sustainability - whether the benefits of the policy will be sustained when the subsidies or grants end or tax policies revert to normal.

Key Methodologies and Techniques Utilised

- **Evaluations Before (ex ante) and After (ex post) Implementation**

- **Qualitative and Quantitative Analysis**

- **Backcasting** (The backcasting simulation method compares the modelled energy savings due to the policies and measures enforced within a period to the actual energy savings data from that period).

- **Market Transformation** (Market specific analysis tends to be top-down and looks at market indicators such as sales of energy efficient appliances or changes in manufacturer products lines).

Cost Benefit Analysis

- Boundaries – it may be hard to establish which costs and benefits should be included in the analysis;

- Data – there may be a lack of reliable data for some of the impacts;

- Illusory precision – allocating a value to unquantified impacts can suggest more confidence in the accuracy of its value than warranted;

- Proper representation of important impacts – quantifiable impacts may be given more weight in the calculation than unquantified impacts that may be just if not more important.

Indirect Impacts on/from Energy Efficiency Policies

Issue	Transportation	Buildings - appliances	Industry
Rebound effect	- Improving fuel economy increas es mileage - Power purchase increase turn to long distance travel	Better insulations leads to higher temperatures	Better efficiency could lead to higher production volumes
Spill-over	- Bus systems spread the world - SUV model applied in developing Countrie s (Chinese cars bigger than US)	Appliances are retailed on a global market (almost...)	Technology transfers, cross participations, joint ventures...
Split Incentive	Car user is not its purchaser (case in Belgium e.g.)	Landlord -Tenant issue	Subsidies or E TS money flow to the wrong people
Free rider	Subsidy for old cars scrapping	Existing replacement market also benefits the grants	Effect of voluntary agreements?
Absence of options	No alternative infrastructures. City planning (distances, density…)	Refu rbishment not always possible (because architecture...)	
Unavailability of information	- Sub-optimal modal choice - Car fuel efficiency - Congestion "traps"	- Unawareness of opportunities - Inconsistent retrofitting levels	Use of irrelevant economic indic ators

Evaluation in Practice *

- Netherlands
  - Evaluated every 4 years by external consultants
- Belgium
  - Most have been general and simple
- Denmark
  - All energy savings activities evaluated, often by utilities
- France
  - Generally ex post, using aggregate indicators
- Italy
  - Developed in 2001 – a new energy policy framework
- Sweden
 - All ex post, variety of techniques employed

  *Peter Wooders study for the ECS

Evaluation in Practice

- Ex Ante Evaluation
  - Swiss Residential, Netherlands White Certificates
- International Assessments
  - IEA DSM Handbook (theory, effort, case studies); WEC
- EU Studies and Programmes
  - MURE-Odyssee network (policies; indicators)
- Costs of Evaluation (3-10%)
- Institutional Capacity
  - 32 of 51 had energy efficiency agencies (WEC, 2001)

Evaluation effort level

(of the 42 case studies in the IEA DSM handbook)
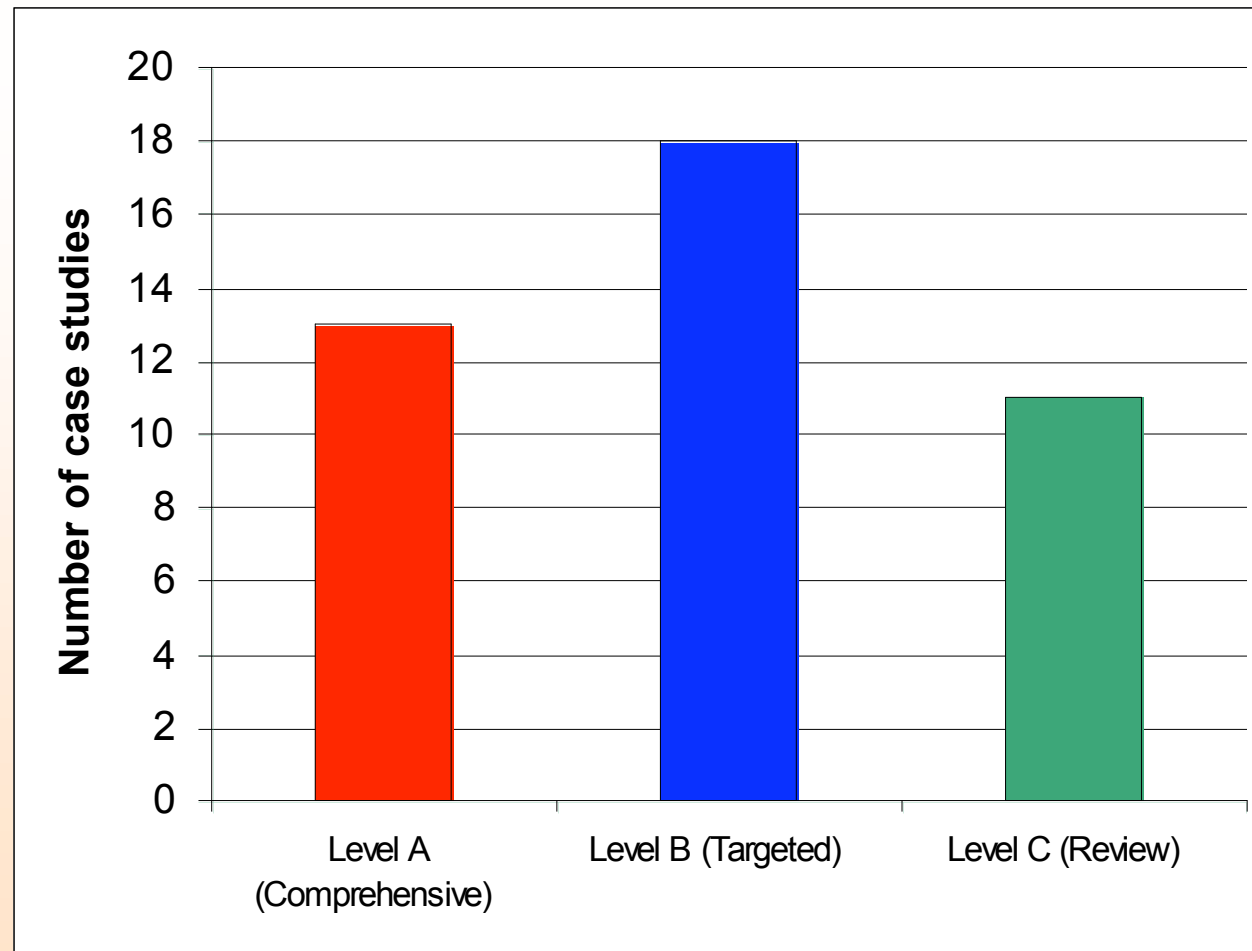
Main conclusions

Evaluations as an instrument of planning and of monitoring integrated in the policy cycle

- Realistic targets and plans are established; neither to demanding to discourage action nor to lax to allow no action
- Results of ex-ante evaluation of policies and measures should be seen as guiding, and not binding
- Indicators for supporting monitoring and evaluation effectiveness are developed in the beginning of the implementation stage
- Flexibility in the implementation of various policies and measures is allowed, if intermediate evaluations bring evidence of the need to change
- Results of ex-post evaluations are considered in the development of new similar types of policies and measures