DSM - a way to improve the performance of energy systems

Overview of IEA DSM Activities

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Chairman of the IEA DSM-Programme

The IEA DSM Programme

- Work begun in 1993
- With 20 Countries (India joined in January 2007, South Africa is preparing membership. Discussions with, Ireland, Germany and Egypt. China has been recommended to join)
- Influenced by, but not limited to, the (Monopolised) Utilities role on the market
- Basically an issue of “least cost” application to make best use of resources

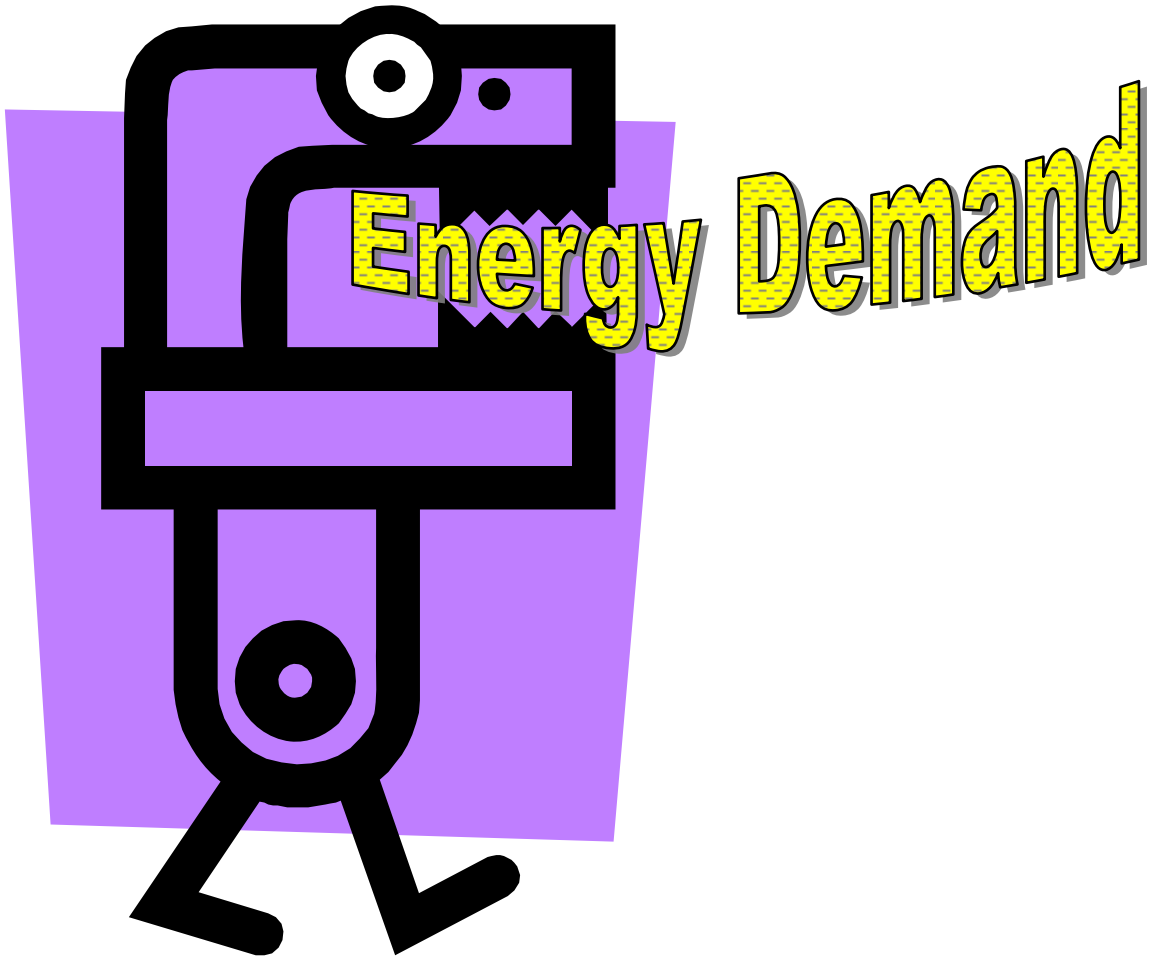
The problem is not one but several!

- **Load level** (Emissions and waste from too much supply for an inflated demand)
- **Load shape** (Too high peaks, too little reserve capacity and bottlenecks in the transmission)
- **Market responsibilities and market design** (who is the owner of the problem?)

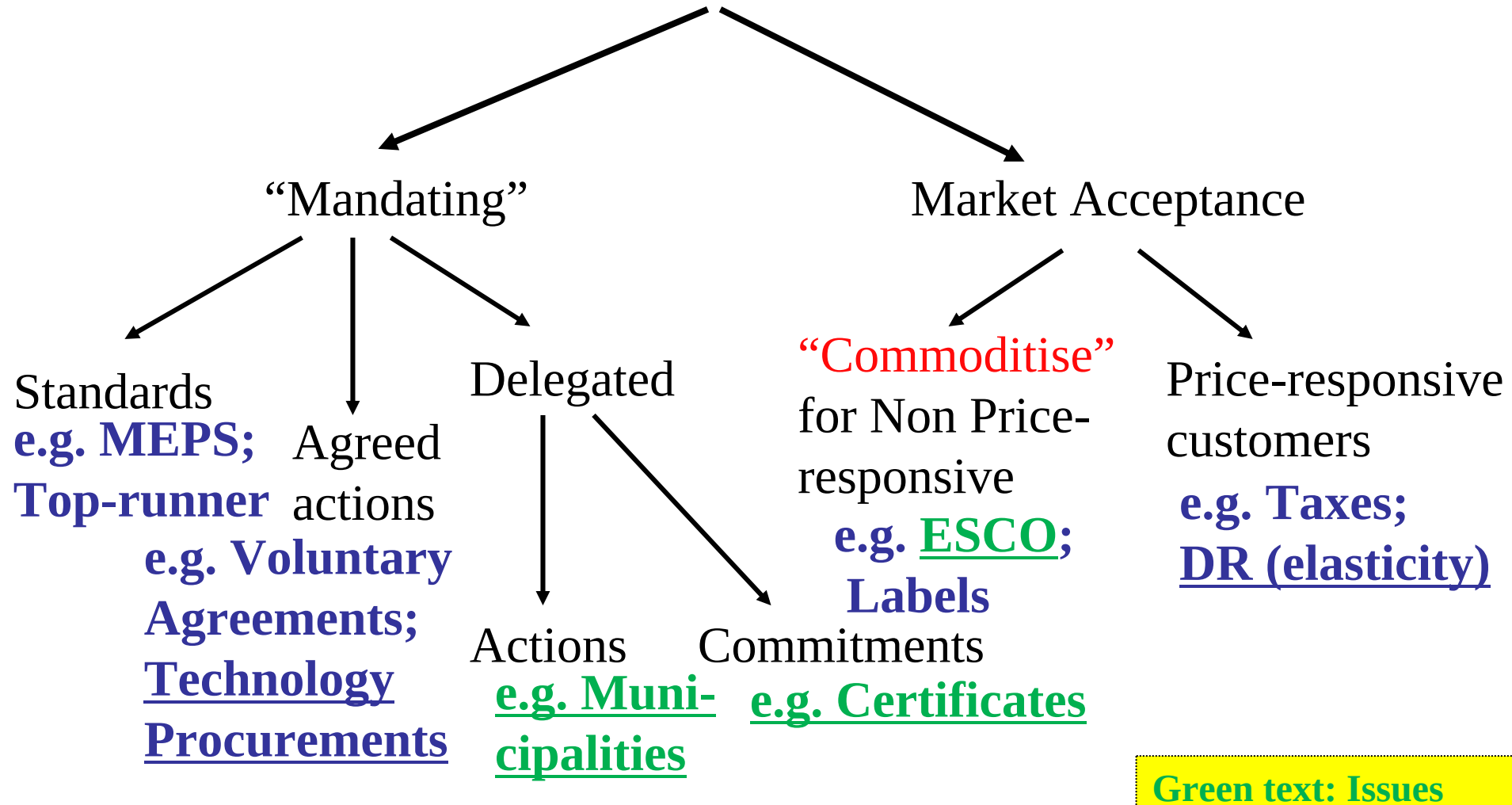
DSM is universal and does not only apply to utilities, electricity or monopolies!!

"*The planning and implementation of those (**utility**) activities designed to influence the customer use of **electricity /energy** in ways that will produce desired changes in the (**utilitiy´s**) load shape - i.e. changes in the pattern and magnitude of a (**utility´s**) load.*"

DSM is a tool to make large scale energy efficiency possible



LARGE-SCALE ENERGY EFFICIENCY



Green text: Issues Covered by the EU Services directive

The EU Energy Services Directive

(1% additional saving per annum for 9 years)

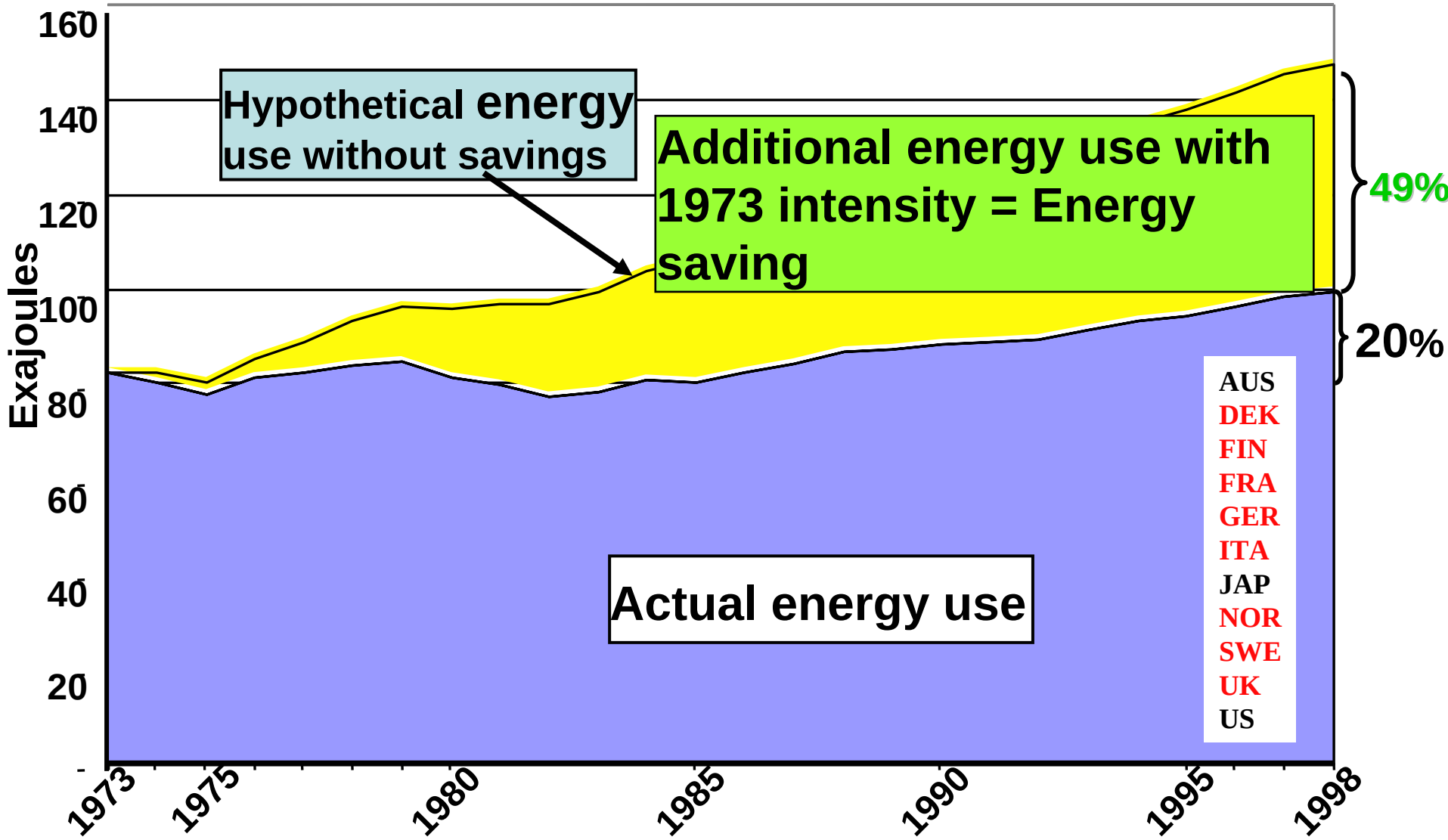
- Energy [utilities] can **improve energy efficiency** in the Community if the energy services they market include efficient end-use,….
- Profit maximisation for [utilities] thus becomes more closely related to **selling energy services** … than to selling as much energy as possible
- Member States shall submit to the Commission… **EEAPs every 3rd year** beginning 2007
- **Leverage funding** from utilities for implementation (PBC?)
- **The public sector** should set a good example

US DOE recommends regulators and state agencies

- Long term commitment to **cost-effective ee** as a resource
- **Utility ee programmes** (infrastructure, funding)
- **Complementary policies** to utility programmes (standards, codes, tax)
- Ee as a **high-priority resource** (e.g. IRP, regional resource adequacy)
- Formal **evaluation programmes** for utility programmes
- Ee **performance requirement** or minimum **energy saving targets**
- Sufficient and stable **funding** (e.g. rate-base, surcharges etc.)
- Modifying policies to align **utility incentives**
- **Integrating customer education** with utility ee programmes
- Modifying **ratemaking practices**

Report to the U.S. Congress, March 2007

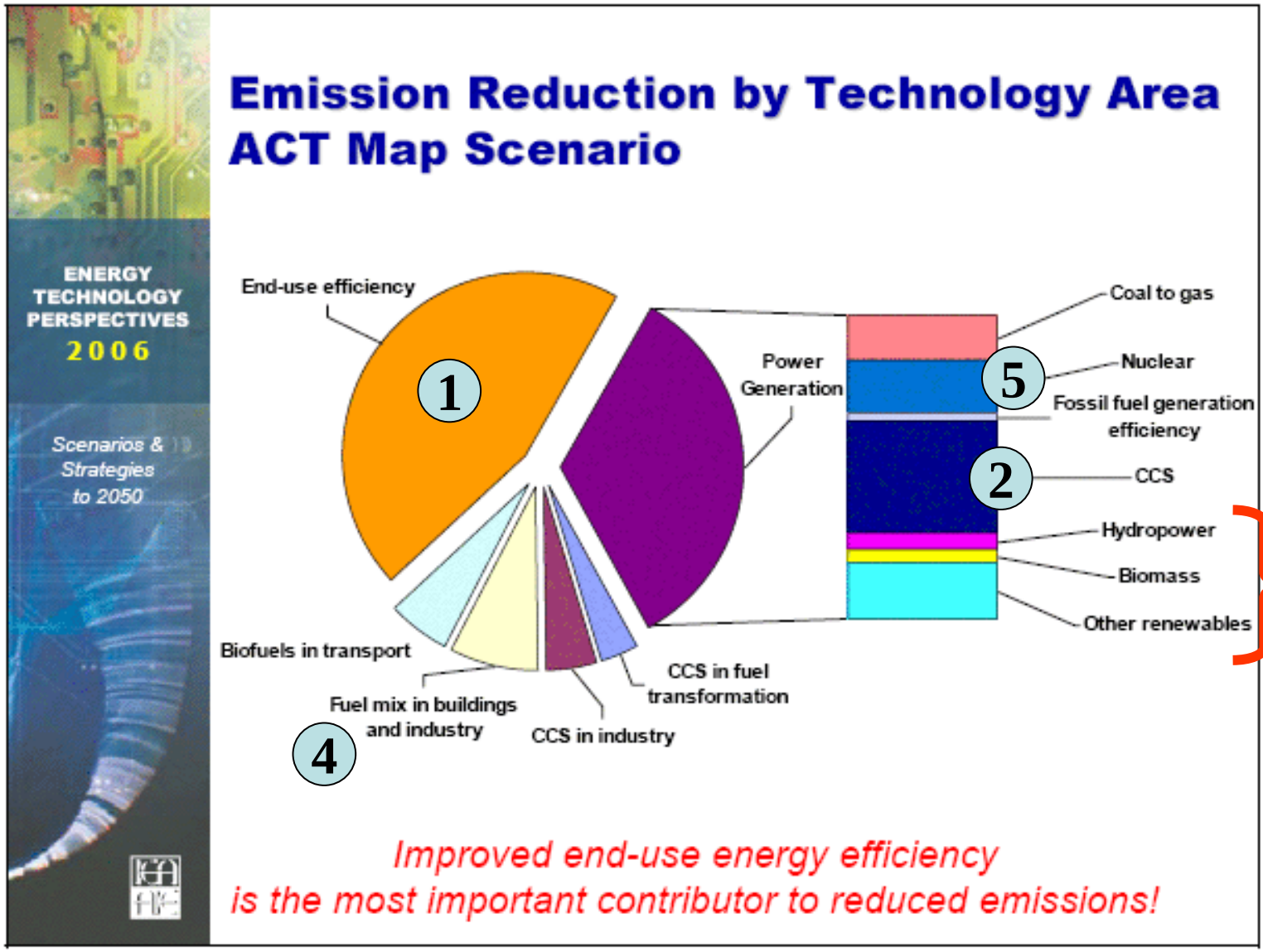
Energy-use in the IEA-11



Source: 30 years of energy use in IEA countries

The rise in welfare depends more on energy efficiency improvements than on growth in energy use!

Energy efficiency – The most important means to reduce GHG

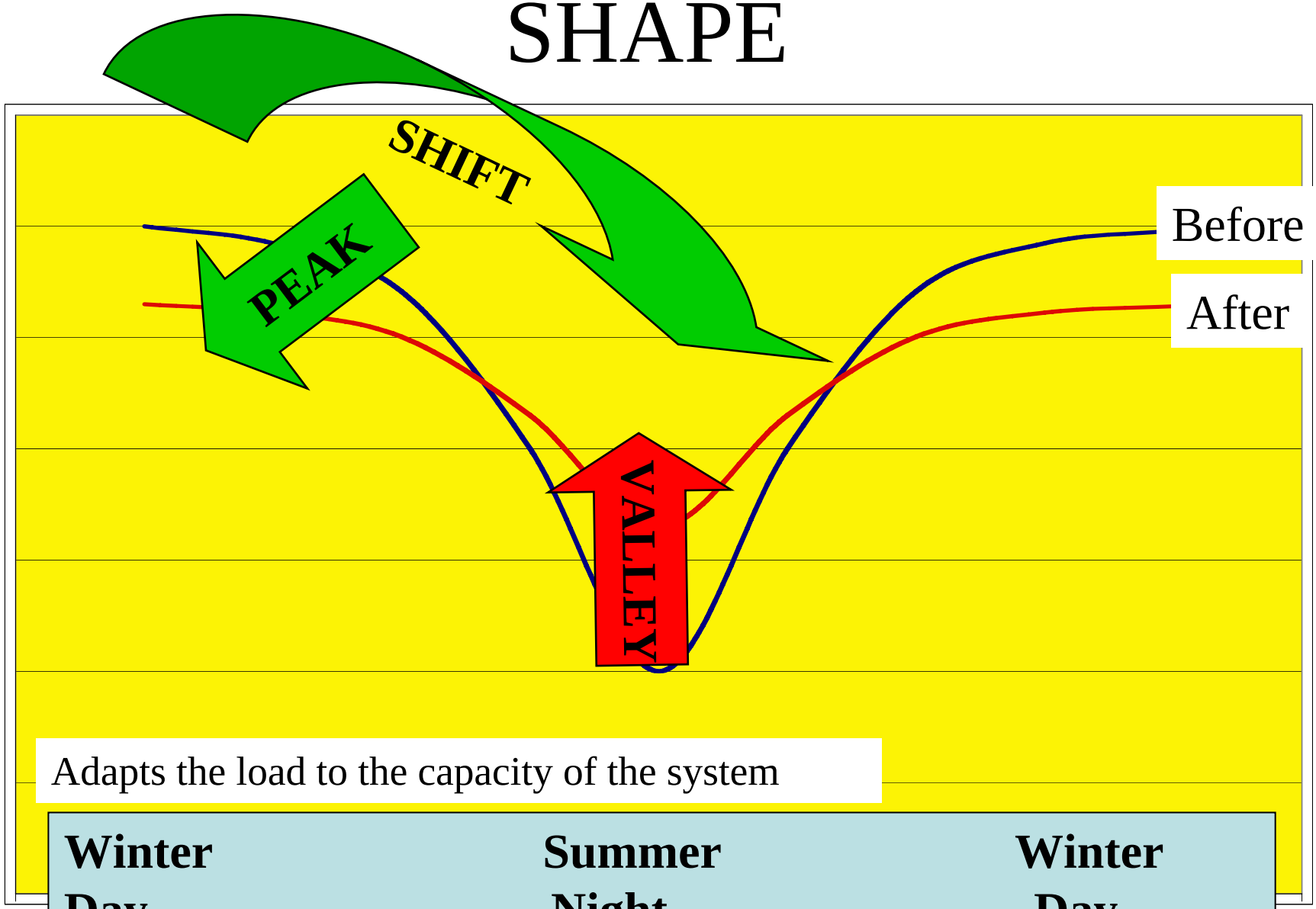


Energy Efficiency has multiple dividends

- **Cost**
- **Environment/Climate**
- Employment
- Industrial development
- Poverty alleviation
- Holds back prices in supply
- Reduces pressure on supply reserves

The Mechanics of DSM

DSM can Change the LOAD SHAPE



Adapts the load to the capacity of the system

Winter Day	Summer Night	Winter Day

The IEA_DSM work on LOAD SHAPE

FINALISED

- II. Communication Technologies
- VIII. Demand-Side Bidding in a Competitive Electricity Market

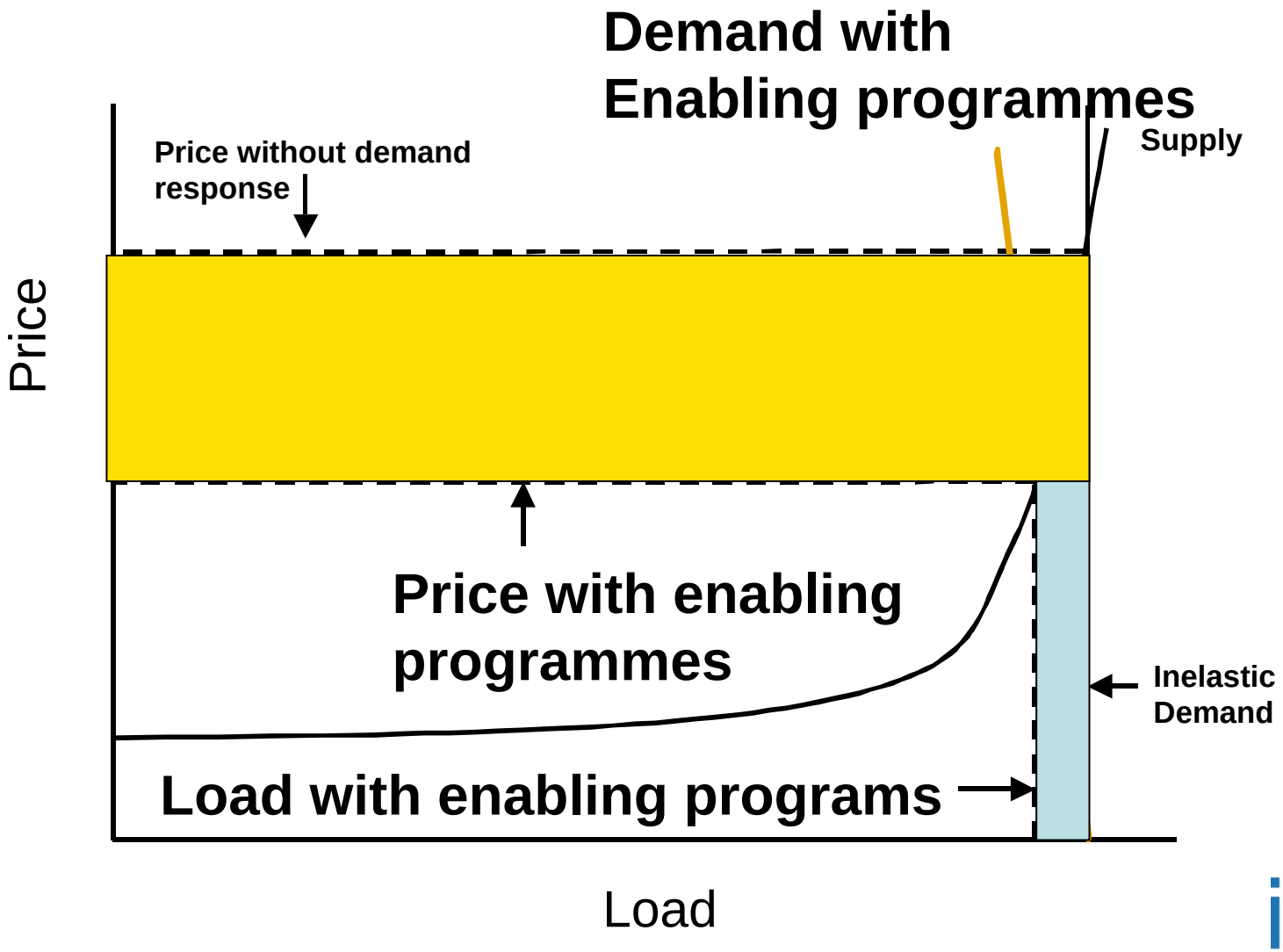
ACTIVE

- **XI. Time of use pricing**
- **XIII. Demand response Resources, DR**
- **XV. Network driven DSM**
- **XVII Integration of DSM, Renewables and Distributed Generation**

IN PREPARATION and DISCUSSED

- **Advanced Metering Infrastructure**
- **Rate-design**

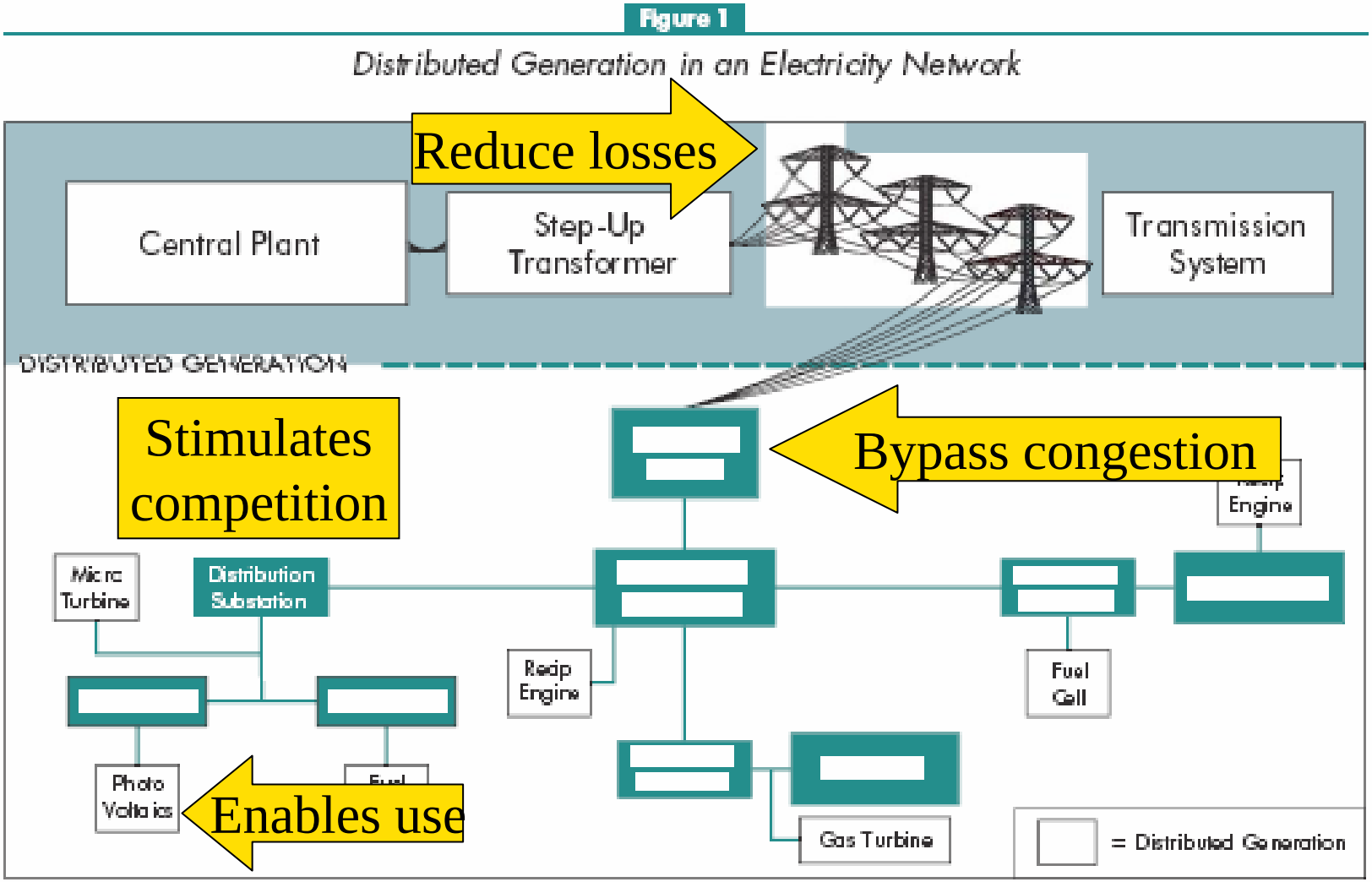
DR and price volatility



Load Shape Technology

- Meters …….AND
- Communications ……..AND
- Software for calculation, billing, verification, settlement ……AND
- Pricing structure……AND
- Institutional models……..AND
- End use capacity to accommodate (e.g. Storages)

New paradigms – Distributed Generation



Source: Distributed Generation In Liberalised Electricity Markets. OECD/IEA 2002

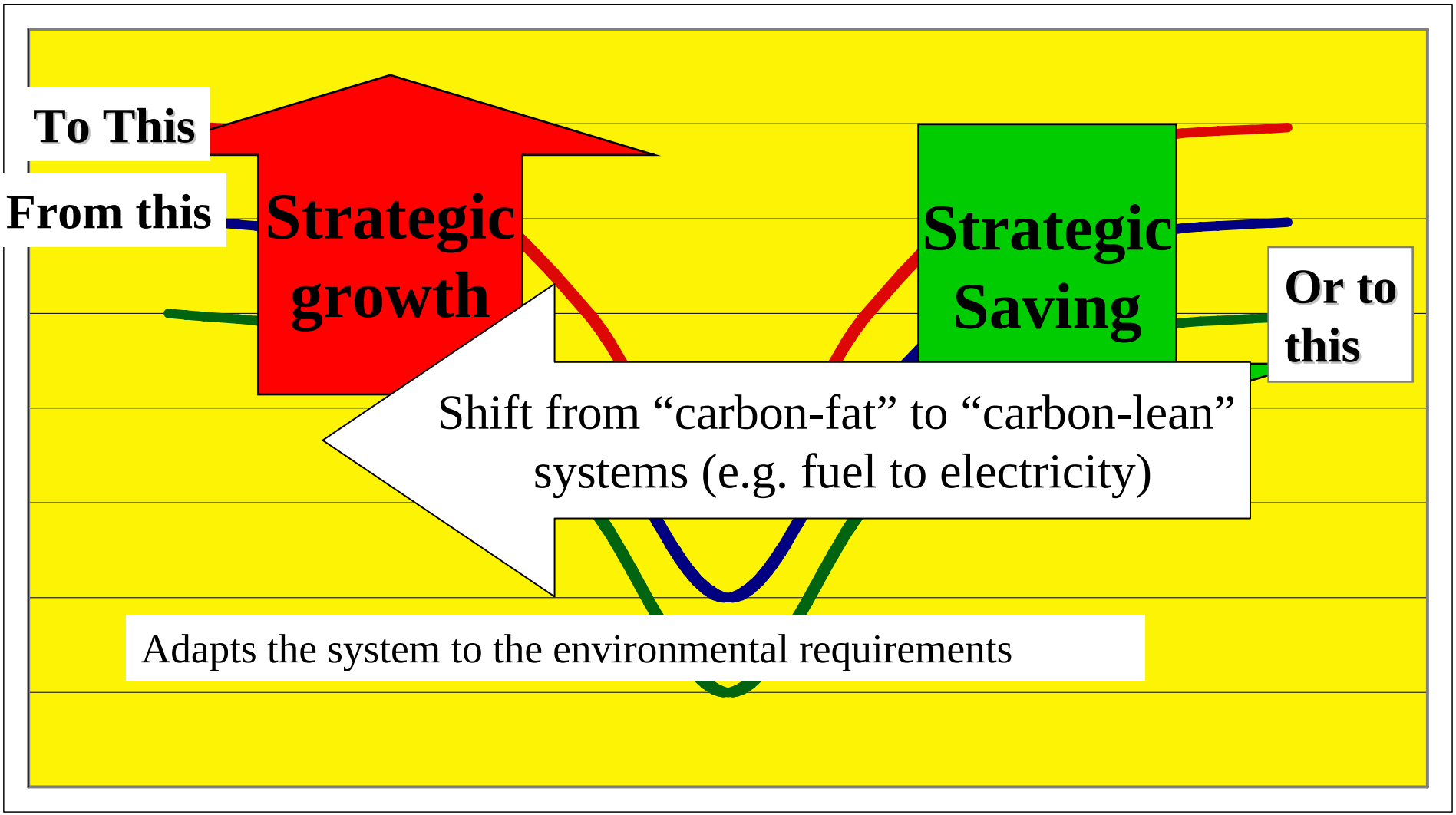
Policy guideline for load shape

Develop a regulatory regime that appoints responsibility for the resource adequacy

DELIVERS

- **Less Price Volatility** by improving short term price elasticity
- Improved **System Reliability** by reducing peaks and adding to safety margins
- Enhanced **System security** by reducing dependency on vulnerable supply resources
- Improved **Restoration capacity** by dispatching in/after emergency situations
- **Less costly network reinforcements** since energy efficiency measures will be active alternatives
- **Distributed generation** as alternative to transmission lines.
- Improved **operation and use of flowing renewable** sources
- **Elastic response** as complement to competition

DSM can change the LOAD LEVEL



The IEA-DSM work on LOAD LEVEL

FINALISED

- I. Database on DSM (INDEEP) + **Evaluation Handbook for Kyoto-related projects**
- III. Cooperative Procurement
- IV. Methods for Integrated Resource Planning
- V. Implementation of DSM in the Market Place
- VI. DSM in a changing Electricity Business environment
- VII. “Market Transformation”
- IX. The role of municipalities in a liberalised system
- X. Performance Contracting (ESCO)

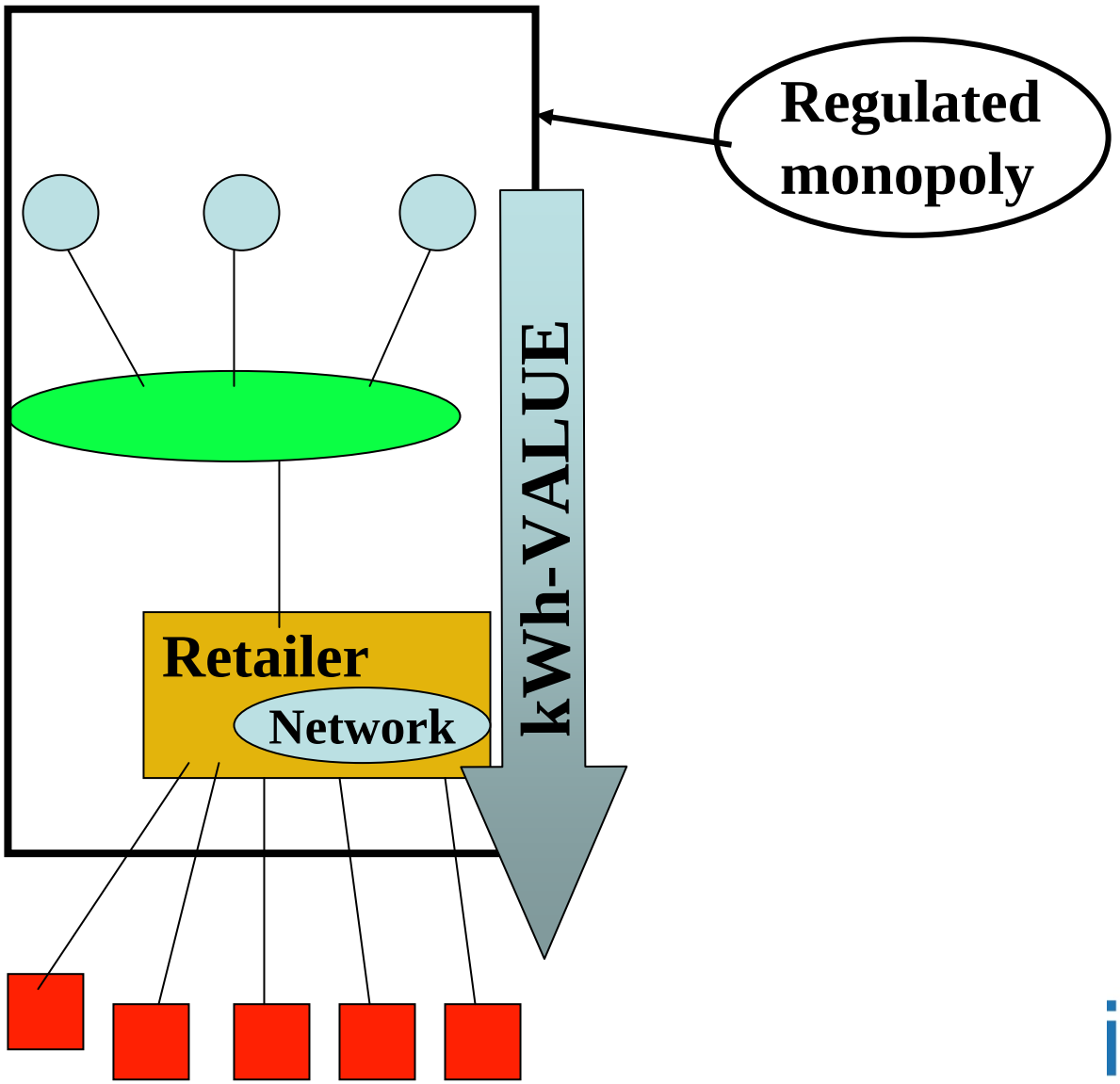
ACTIVE

- **XII. Standards and labels (Pending)**
- **XIV. White Certificates**
- **XVI Competitive Energy Services**

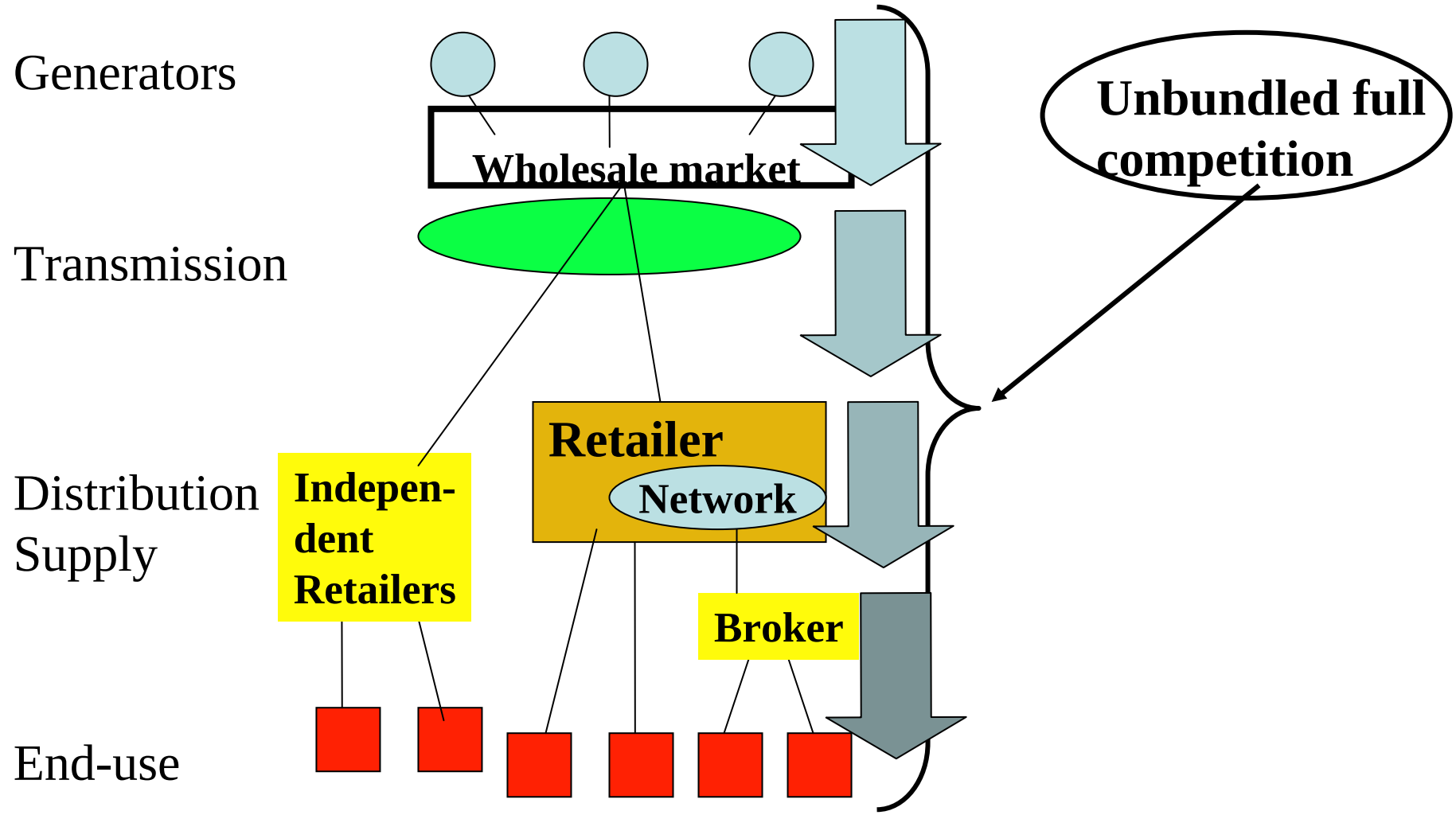
IN PREPARATION and DISCUSSED

- **Advanced lighting programmes**
- **DSM Participation in System Operations**
- **DSM and Climate Change**

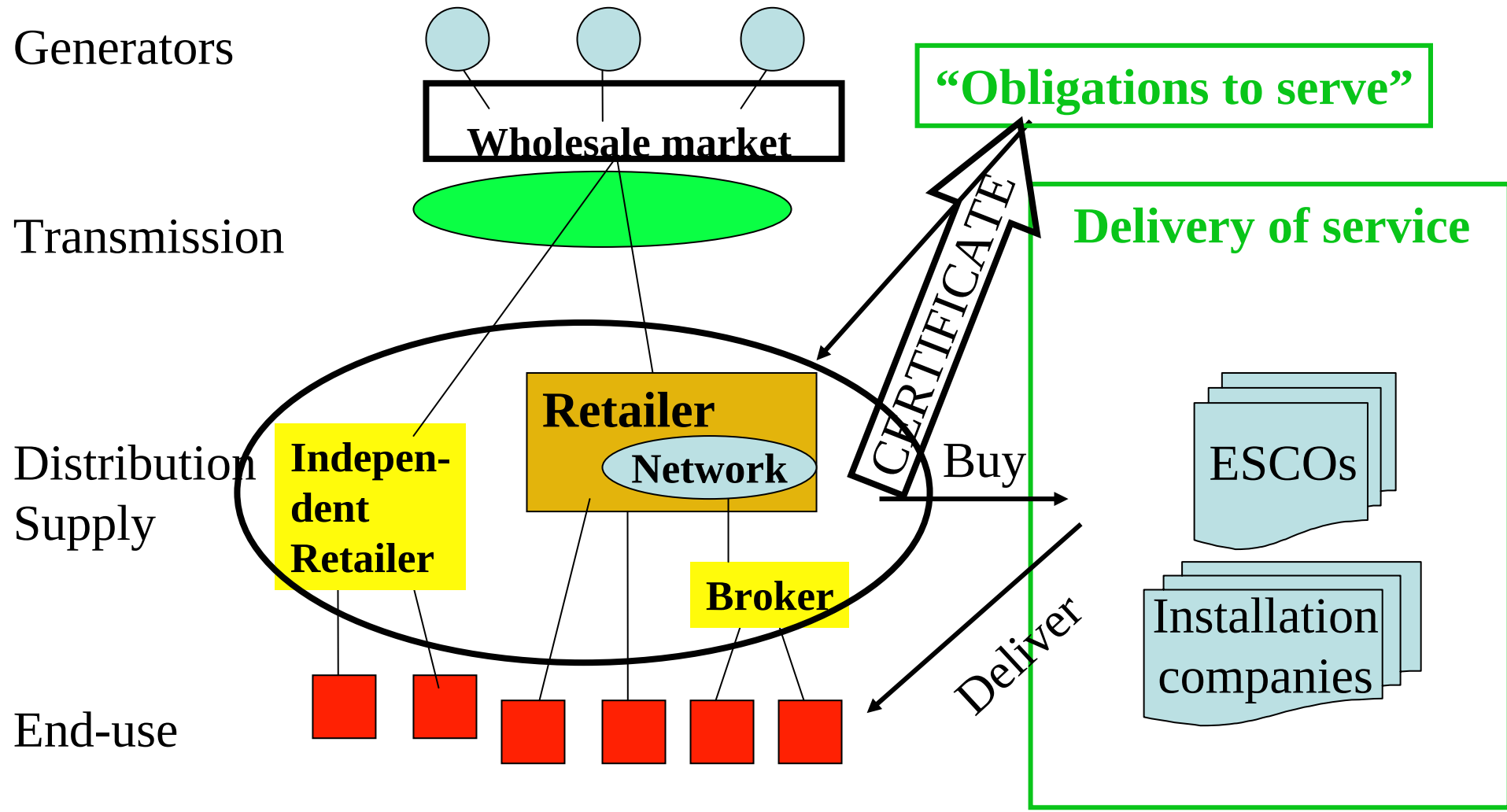
The value chain used to be vertical..



…but with liberalisation the value chain is fragmented



Creating a certificates market (Commitments)



Policy guideline for load level

Assess the least-cost delivery of energy services that includes both the demand and supply side.

DELIVERS MOTIVES FOR

- **Energy service companies** and performance contracting
- **Allocation of commitments and obligations** that mobilises the actors
- **Organisation and targeting of support programmes** for energy efficient products
- Improved allocation of **obligations for reduction of GHG-emissions** between sectors and countries
- Improved use of **market communication mechanisms**, e.g. standards and labels
- Input to how further **research and support** mechanisms should be distributed among actors.

The new DSM agenda

1. Market Re-design Options (Demand Response, Certificates opportunities, regulatory issues)

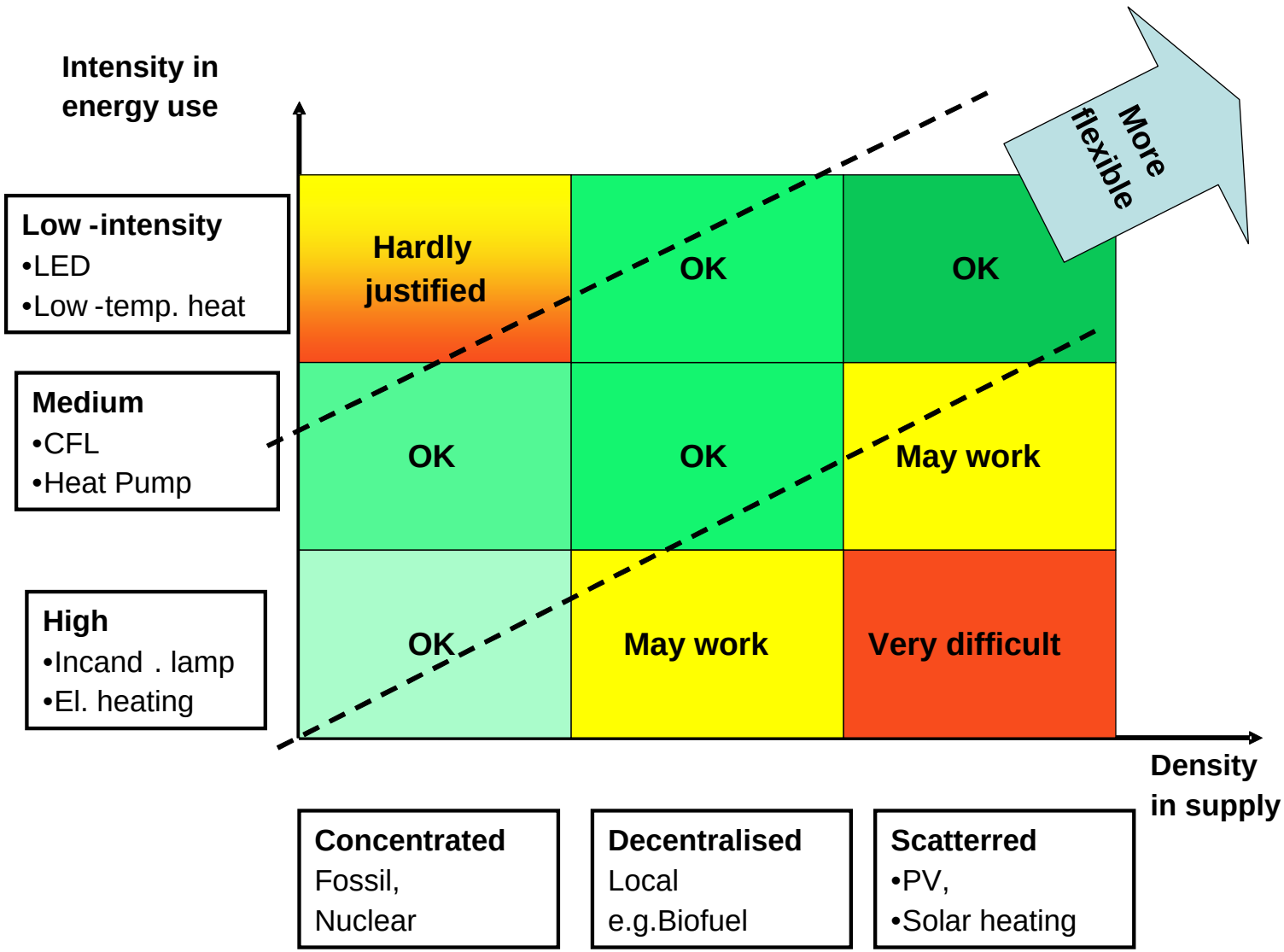
2. Models and initiatives for boosting technologies (Aggregated Procurements, Dynamic top-focused standards, Clearinghouses for programmes and projects e.g. CDM/JI related)

3. Networking and initiatives to reinforce services and promotions (ESCOs, Marketing, Municipality involvement; Auditing)

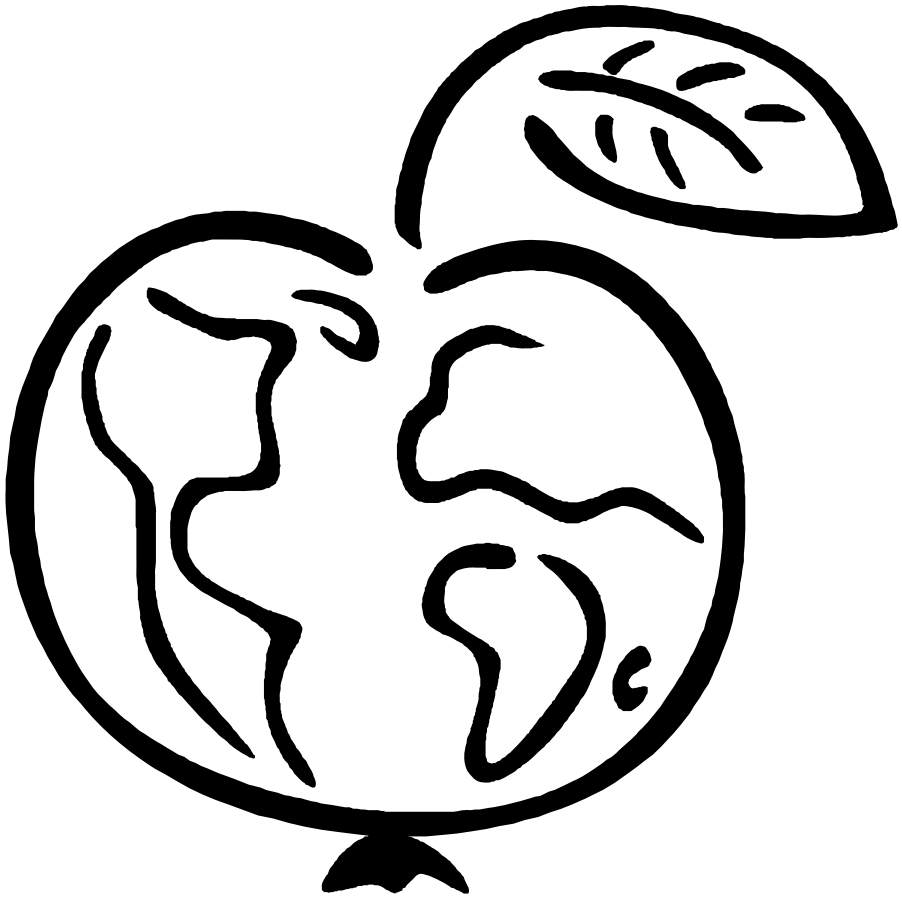
4. Technology roll-outs, development and market learning (Lighting development; distributed generation; smart-grid functions, vehicle to grid concepts)

5. Tailoring Programmes and Measures (Assistance, training and peer design)

A sustainable system combines energy efficiency and renewable energy



Is sustainable growth possible…



..without DSM and without global co-operation?

http://dsm.iea.org