Integration of Distributed Generation in Electricity Supply Systems in Europe in the Medium and Long Term

Regulatory and business strategies

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Introduction & Topics

Introduction

- Drivers for Change:
  - Sustainability policy
    - Greenhouse gas emission reduction
    - Renewable energy
    - Energy saving
  - Electricity Market Liberalisation
    - Full market opening in 2007
    - Electricity distribution and supply unbundled (→ Distribution System Operator; DSO)
- Distributed Generation (DG)
  - Electricity from renewable energy sources (RES)
  - Combined heat and power (CHP)
  - Medium and small scale, connected to the distribution grid

Topics

Results from two EU Research Projects:

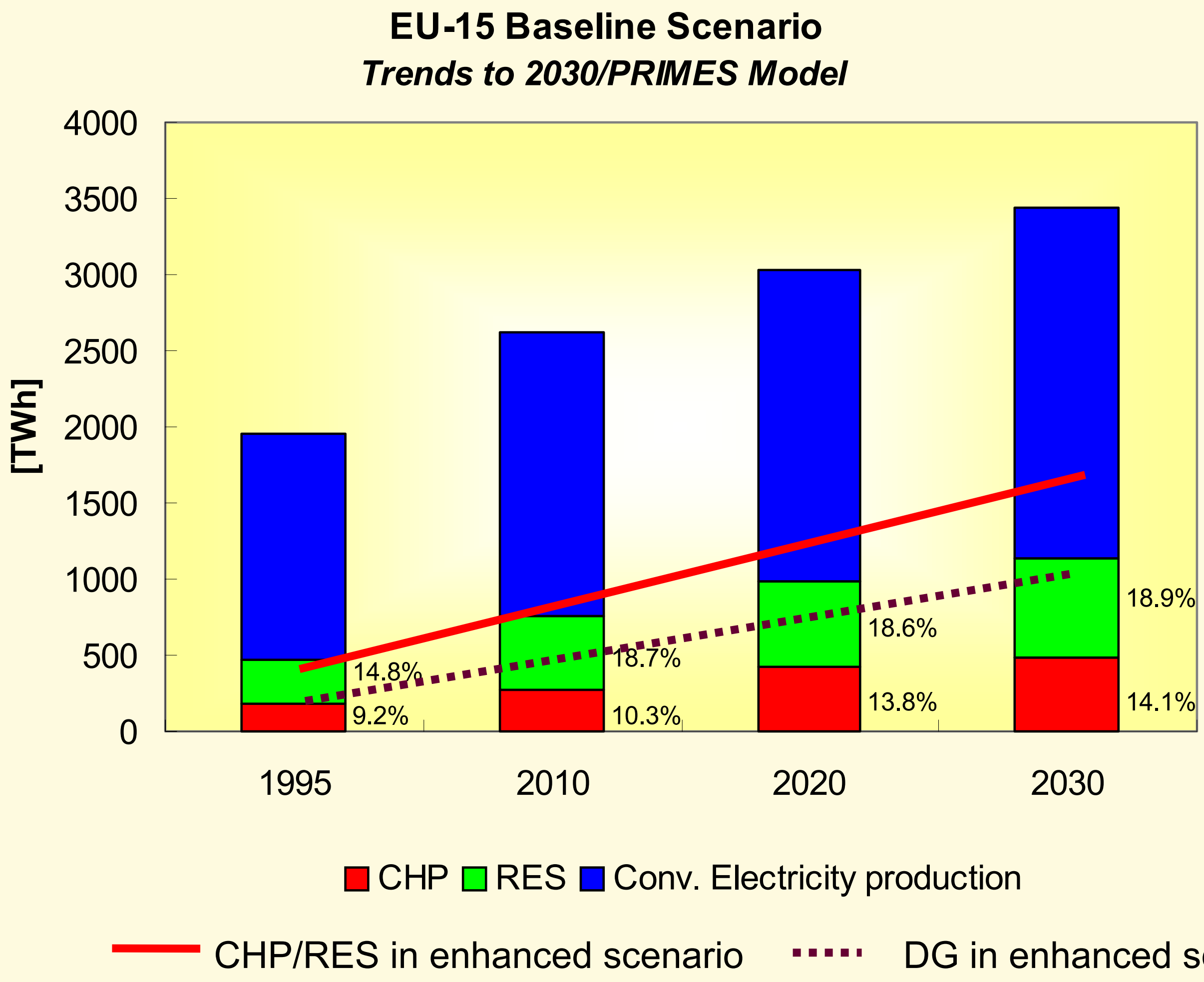
1. Regulatory Roadmaps

   SUSTELNET
   www.sustelnet.net

2. Business strategies for DSOs

   DISPOWER
   www.dispower.org

Drivers for Change: Sustainability

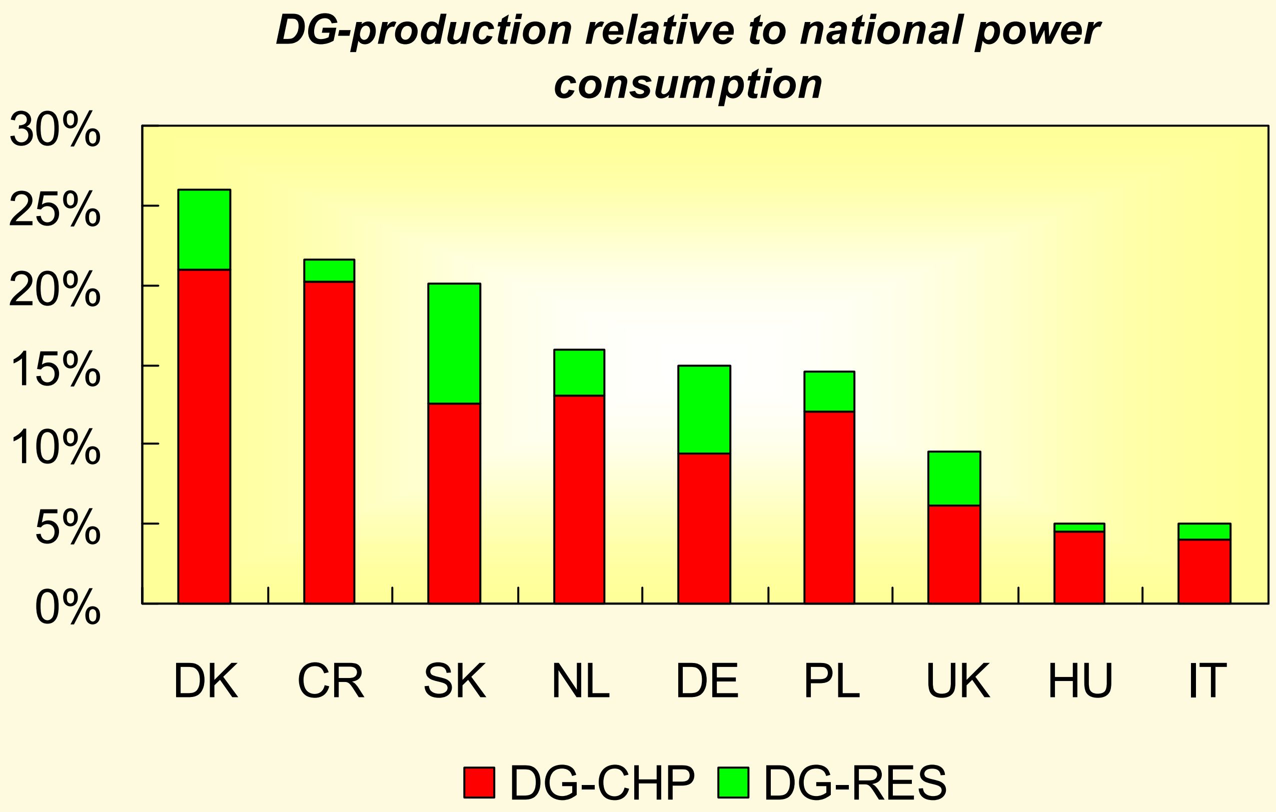


The Policy Targets:

- GHG-emission reduction
  - Kyoto-target EU-15 (2008-2012): -8% relative to 1990 emissions
  - Post-Kyoto target ?
- RES-target
  - 2010: 22% relative to electricity consumption
  - 2020: 20% of total energy supply; 40-50% of electricity supply ?
- Energy end-use saving: 1% per annum

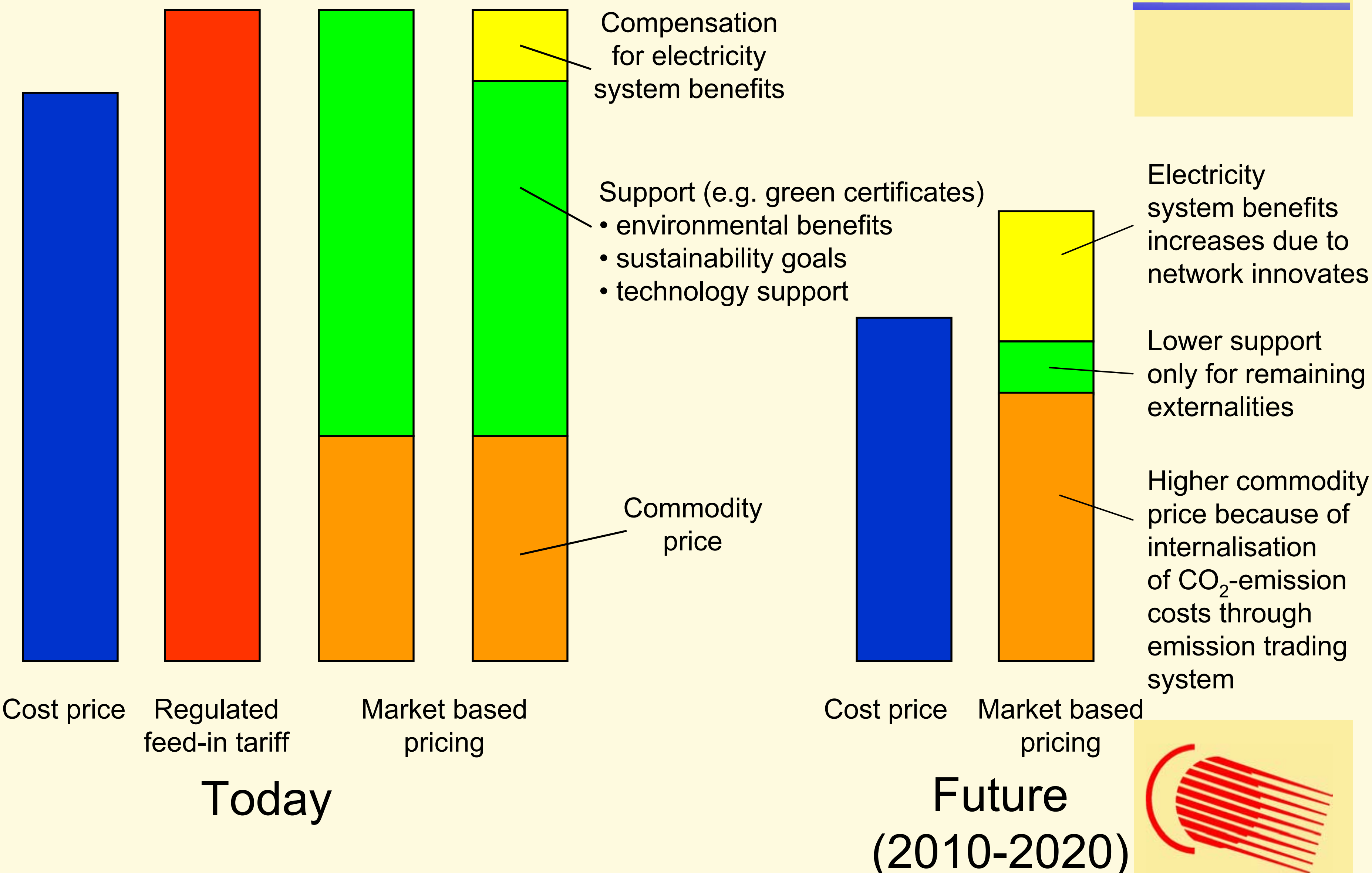
Distributed Generation

Indicative DG-shares in Selected EU Member States



DG: medium and small CHP (<50MW); medium an small hydro (<10 MW); on-shore-wind, tidal energy, biomass and waste, solar energy

DG Economics



DG Economics

SUSTELNET:
Creating a level playing field

- correct transfer of values between DG and network operators
- guaranteed market access for DG

Potential benefits to the system*

- *Distribution capacity cost deferral*
- *Ancillary services*
- *Congestion relief*
- *Reliability improvement*

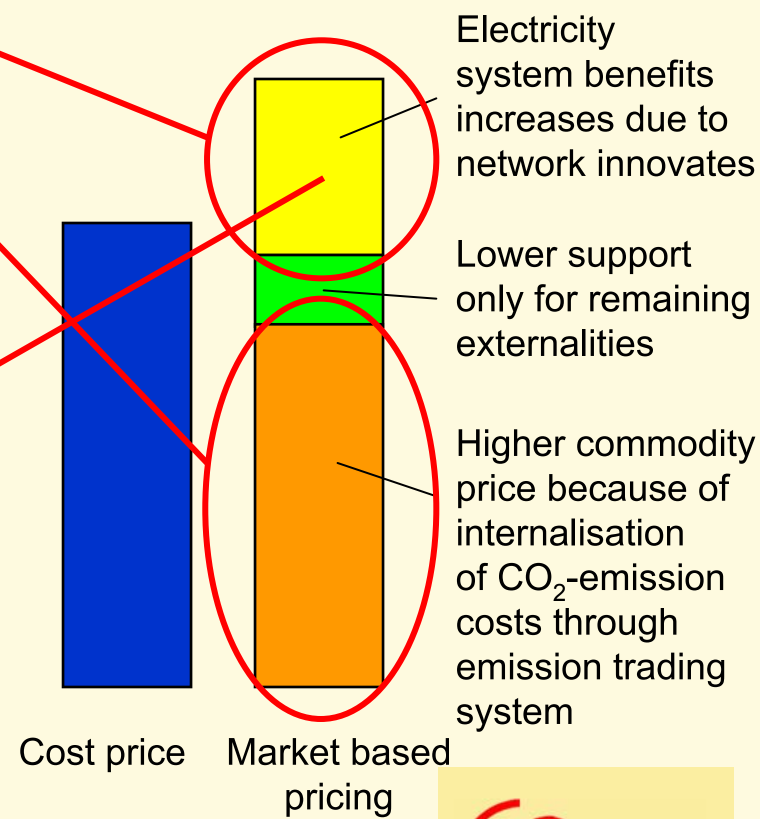
Potential benefits or costs to the system*

- *Line losses*
- *Balancing*

Costs to the system

- *Connection and reinforcement costs*

* Requires 'Active network management'



Future (2010-2020)

Regulatory framework

Characteristics of a typical current regulatory framework

Connection charges: → long term

- Shallow (covering costs for connection to nearest line): ***problem for DSO***
- Deep (covering costs also for reinforcements): ***problem for DG-operator***

Use of System charges: → short term

System costs (e.g. in case of auto producer), no compensations for system benefits

Market access

DG only participates in energy market

Innovation

Incentives for DSO are discouraging innovations

SUSTELNET proposed criteria and guidelines

Shallow costs & positive/negative entry charge (locational signal)

System costs and benefits allocated to individual DG or DG as a group

DG offers local ancillary services to DSO and facilitate access to balancing market

Allow DSOs to experiment with new technologies without direct consequences for their profits

Policy and Regulation

European Commission

- Directive 2001/77/EC (Renewables)
- Directive 2003/54/EC (Electricity Market)
- Directive 2004/8/EC (CHP)

National Government

- National Electricity Law

Regulator

Give correct incentives to DSOs:
- Multiple revenue drivers
- Performance based incentives
- Network optimization in the long run
- DG as an option in managing the network
- Innovations

Distribution system operators (DSOs)

Support schemes only for:
- Environmental benefits (not internalized)
- To achieve sustainability goals (e.g. to meeting renewable targets)
- To support technologies in their infant stage

DG/RES supplier

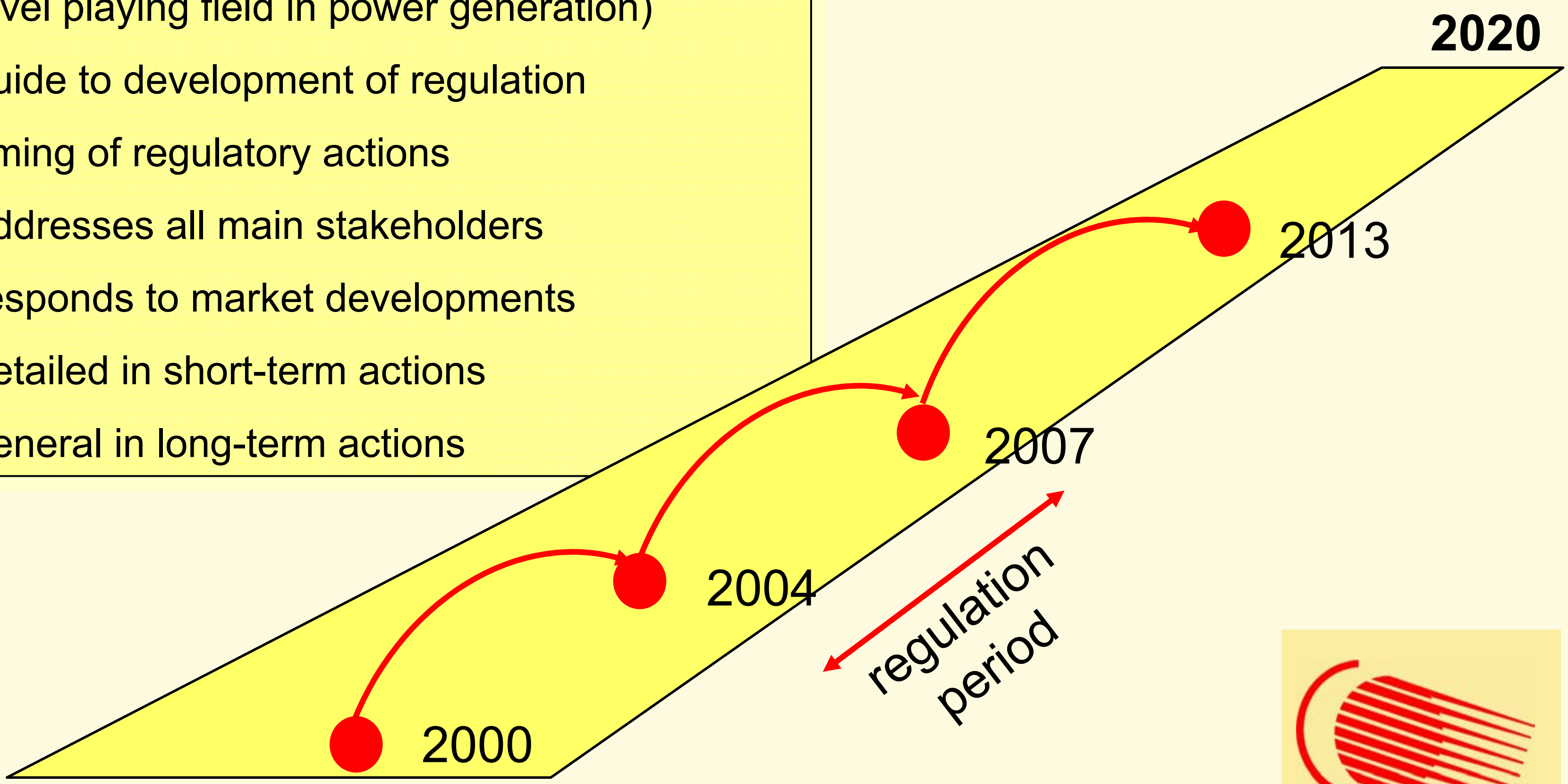
Give incentives to generators and consumers to act economic efficient in short- and long term

Consumer

Regulatory Roadmaps

An instrument for regulatory strategies

- backcasts the regulatory steps necessary to reach a desired future state (i.e. reaching the level playing field in power generation)
- guide to development of regulation
- timing of regulatory actions
- addresses all main stakeholders
- responds to market developments
- detailed in short-term actions
- general in long-term actions



Regulatory roadmap for The Netherlands

Regulatory Roadmaps

Developing regulatory road maps

Market Access

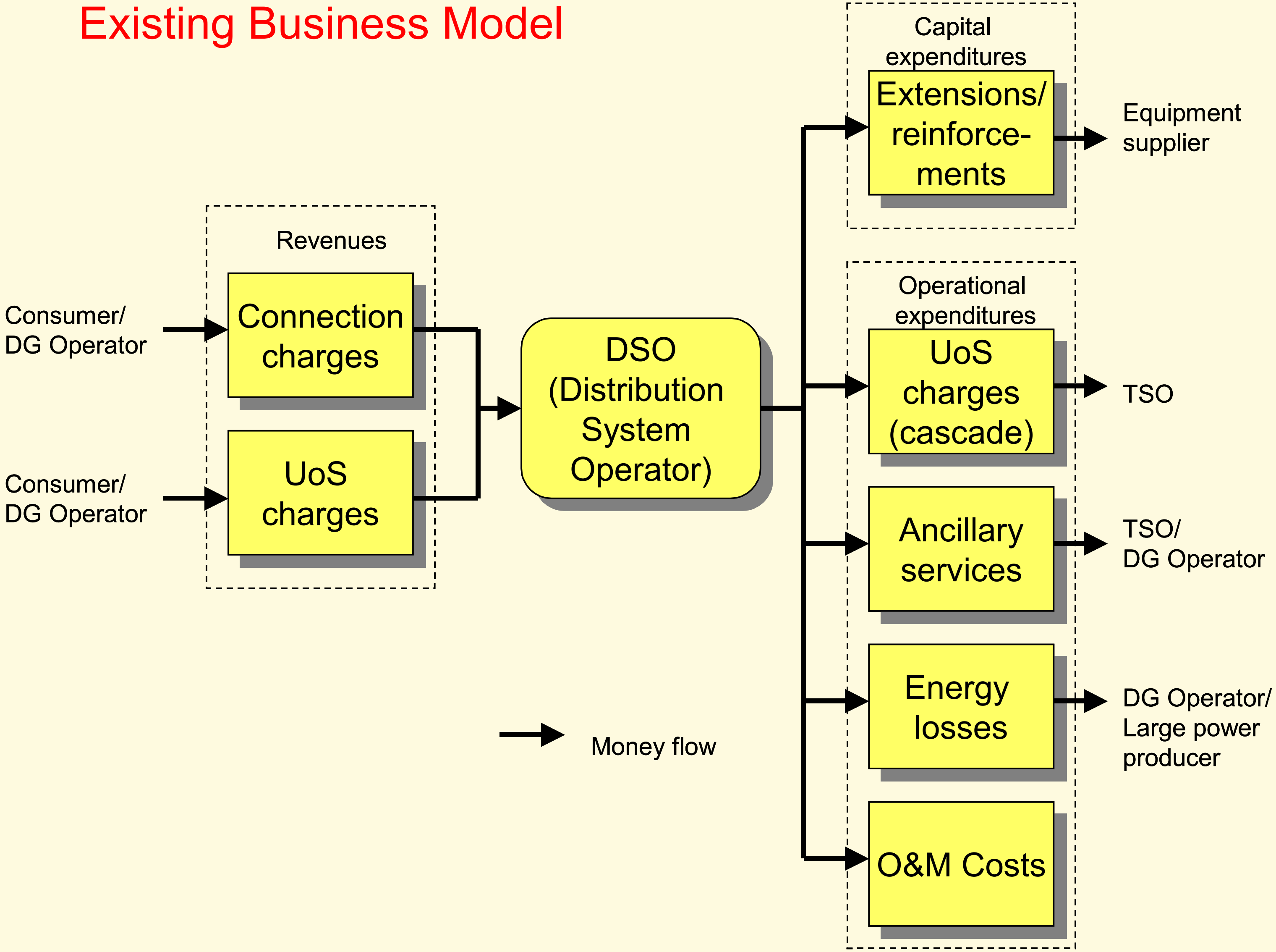
Network Regulation

	protected niche market	DG/RES in wholesale markets	level playing field
no regulation/self regulation			
cost driven incentive regulation		2000	
refinement of cost driven incentive regulation		2004	
innovative regulation		2007	
regulation of active networks			2013

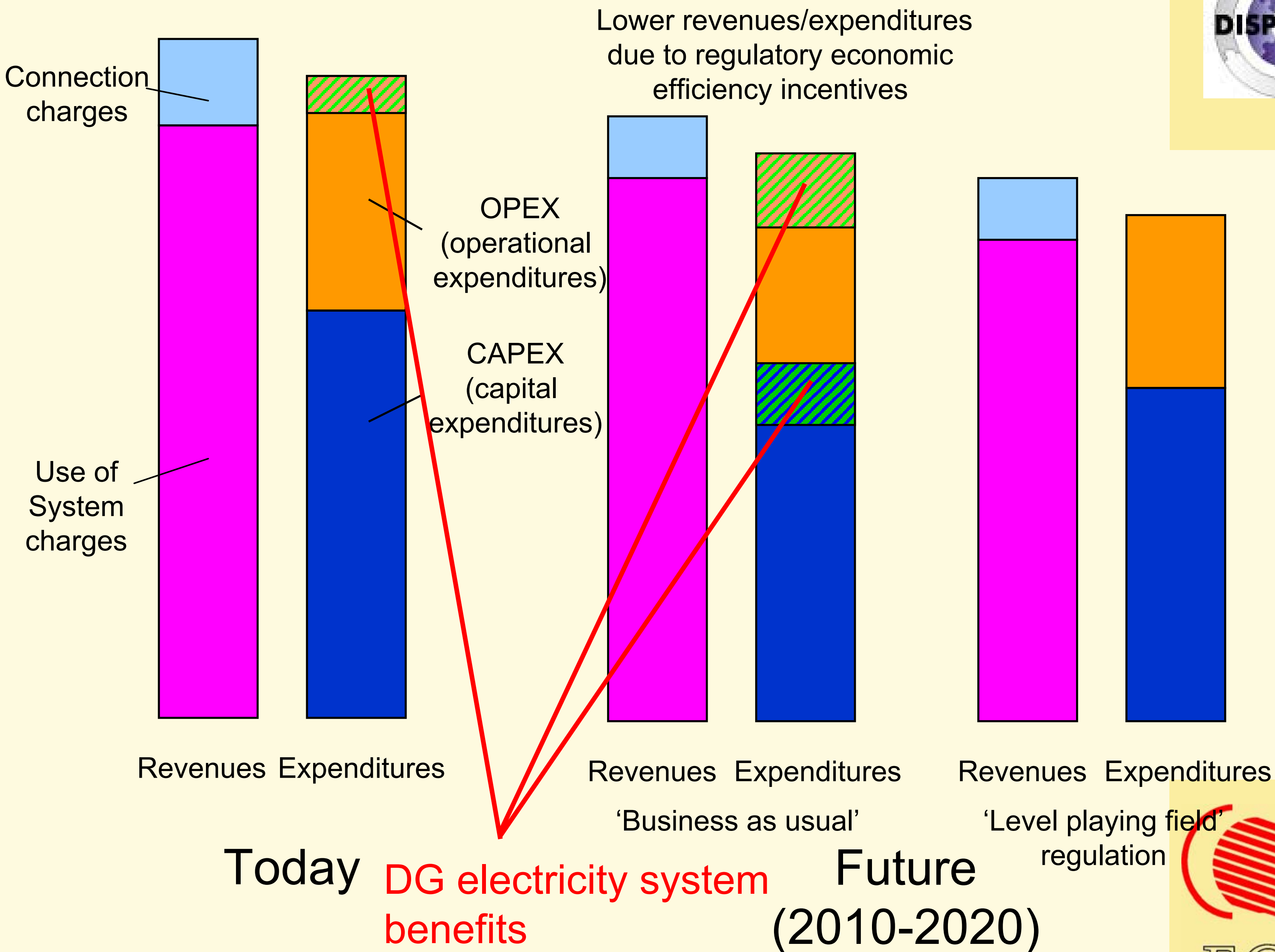
Regulatory roadmap for The Netherlands

Business Model for DSOs

Existing Business Model



Network Economics



DSOs attitudes to DG development

Detractors **Neutral** **Advocates**

Detractors

Focus on:
- Minimising regulatory exposure
- Limiting the development of DG

Neutral

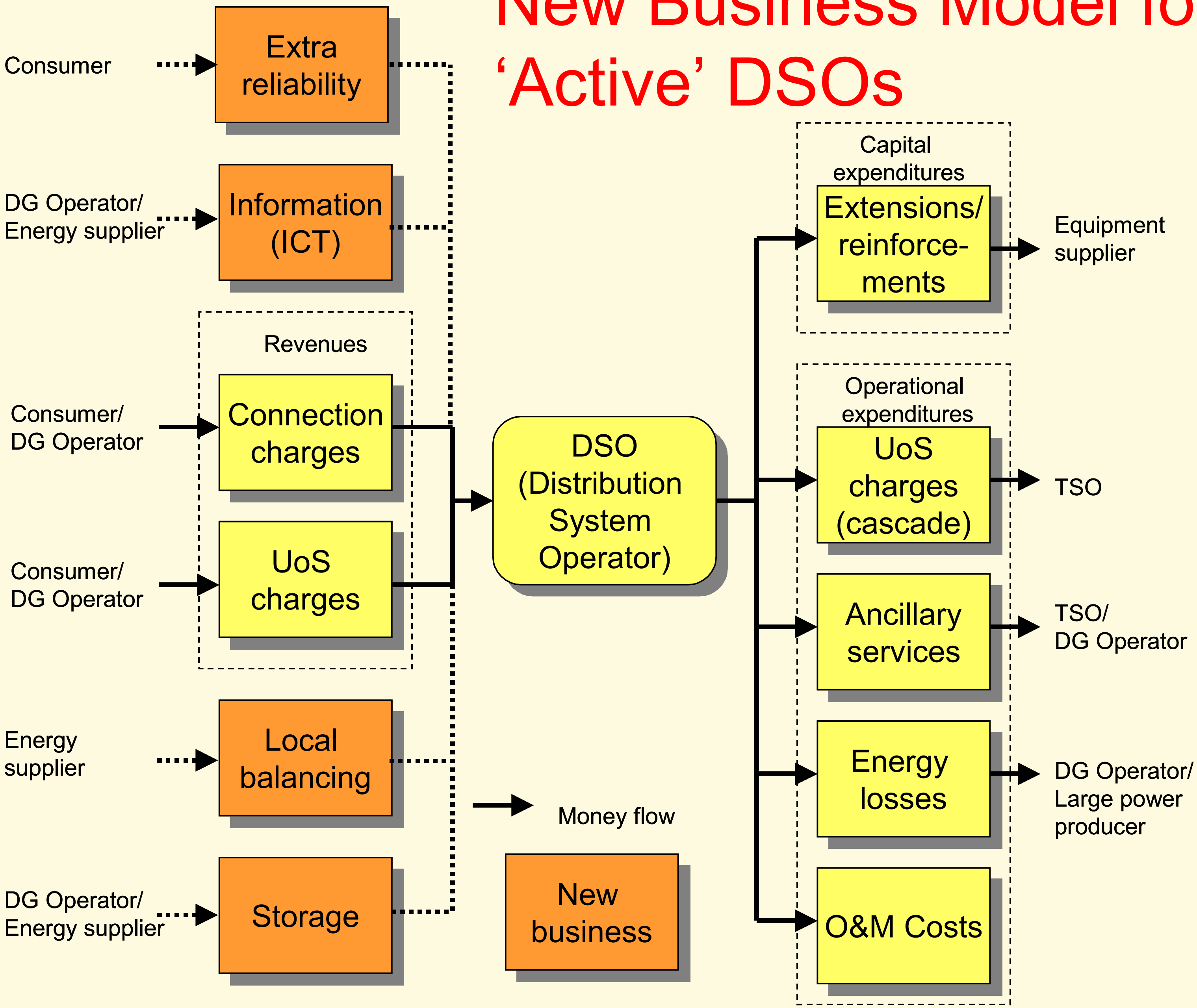
Advocates

Focus on:
- Establishing alliances with DG operators
- Technological advancement
- Market development
- Creating a conducive regulatory regime

Characteristics of the advocates:

- Possess key capabilities required to become an 'active' DSO
- Innovative, entrepreneurial culture
- Able to play and win the regulatory 'game'. A 'first mover'

New Business Model for 'Active' DSOs



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In Summary

- Distributed Generation will play a key role in future sustainable electricity supply systems
- Transition to future sustainable electricity system requires an ‘active’ distribution network management providing generators and consumers with signals to behave efficient in the short and long term
- Regulators:
  - should develop a regulatory strategy for the medium and long term
  - can use a regulatory road map as an instrument to map out the regulatory strategy
  - remove regulation that is harmful for DG deployment
  - give correct incentives to DSOs for economic efficient network development
  - create possibilities for DSO to innovate
- Distribution System Operators (DSOs):
  - should becoming pro-active
  - should be innovative
  - should develop new business

Thank You

Questions?

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Future EU events on promoting DER/RES

- First International Conference on the Integration of Renewable Energy Sources and DER, 1st-3rd December 2004, Brussels
- Organisers: IRED cluster DG projects
- Objectives: Sharing knowledge of EU projects with USA, Japan and OECD
- Info: www.conference-on-integration.com

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