Regulatory challenges in deployment of smart energy systems

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Introduction - different experiences and perspectives

- Policy to promote smart energy systems
  - National - Swedish Coordination Council for Smart Grid
  - International - ISGAN (International Smart Grid Action Network)
- Regulatory challenges –consumers' active market participation and role of DSOs
  - National - Swedish Energy Markets Inspectorate
  - International – CEER (Council of European Energy Regulators)

Smart Grid policy to promote a sustainable energy system – national approach

- Smart grid as part of the wider energy system
- Electricity market design and customer empowerment
- Security and privacy
- Standards and interoperability
- Communication and dissemination
- R&D, innovation and knowledge provision
- Economic growth and business development

The Swedish National Action Plan for Smart Grid

Political framework and market conditions	Customer participation and societal aspects	R&D, innovation and growth
• Ground rules on the electricity market • New conditions for the electricity grid • Cooperation with other parts of the energy market • Long-term development of the policy framework and market conditions	• Smart grid from a customer perspective • Customers' access to measurement data and information • Synergies between smart grids and other societal development (community planning, products and services)	• Knowledge and skills development • Research priorities and cooperation • An integrated smart grid innovation strategy • Conditions for pilot and demonstration projects • Smart grid on a global market

ISGAN is one of thirteen CEM Initiatives

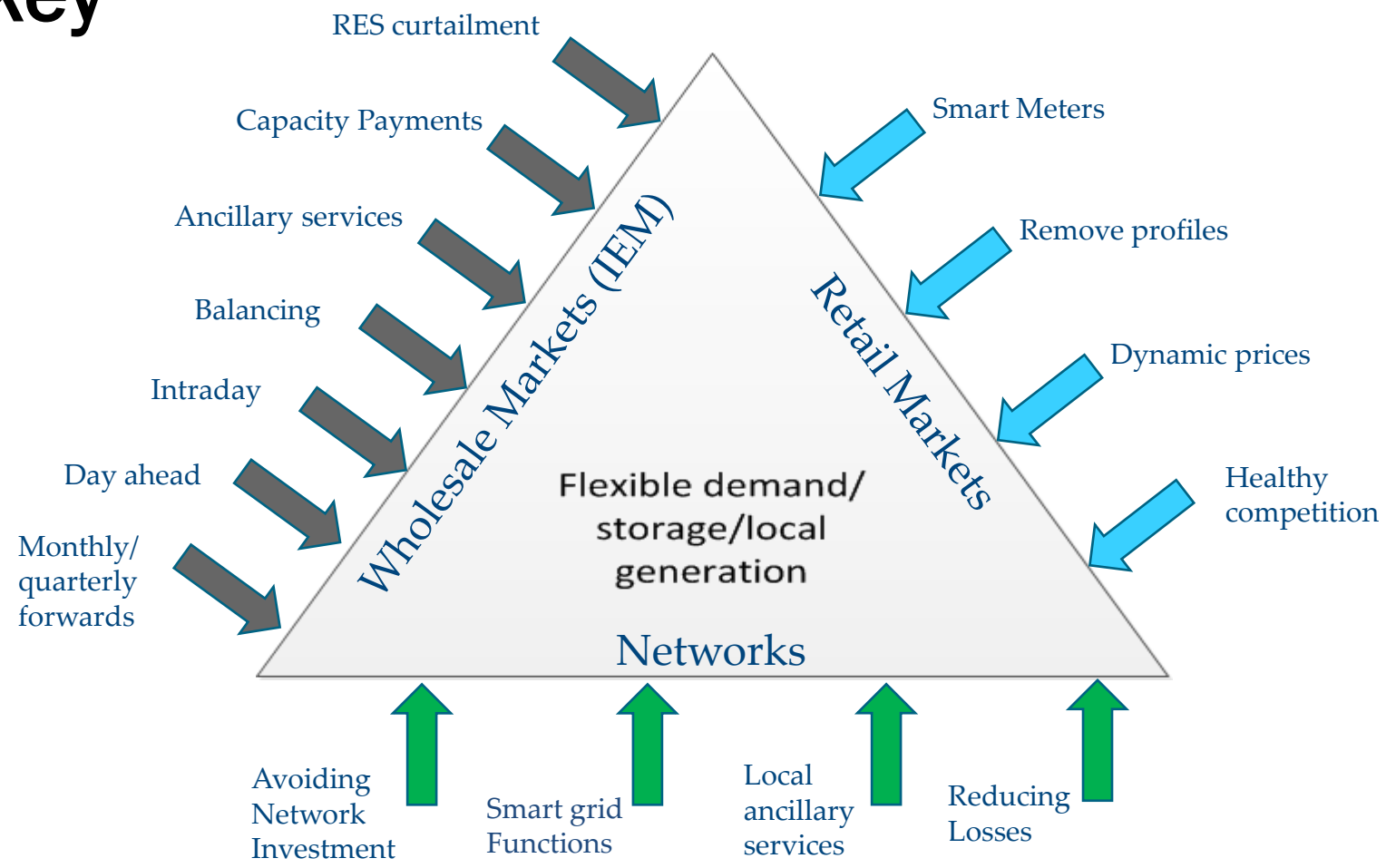
CLEAN ENERGY MINISTERIAL
Accelerating the Transition to Clean Energy Technologies

Energy Efficiency	Clean Energy	Integration	Human Capacity
Super-Efficient Equipment and Appliance Deployment (SEAD) Initative	Bioenergy Working Group	21st Century Power Partnership	Clean Energy Solutions Center
Global Superior Energy Performance Partnership	Sustainable Development of Hydropower Initiative	International Smart Grid Action Network (ISGAN)	Global Lightning Energy Access Partnership (Global LEAP)
	Carbon Capture	Electric Vehicles Initiative (EVI)	Clean Energy Education & Empowerment (C3E) women's Initiative
	Solar and Wind	Sustainable Cities	

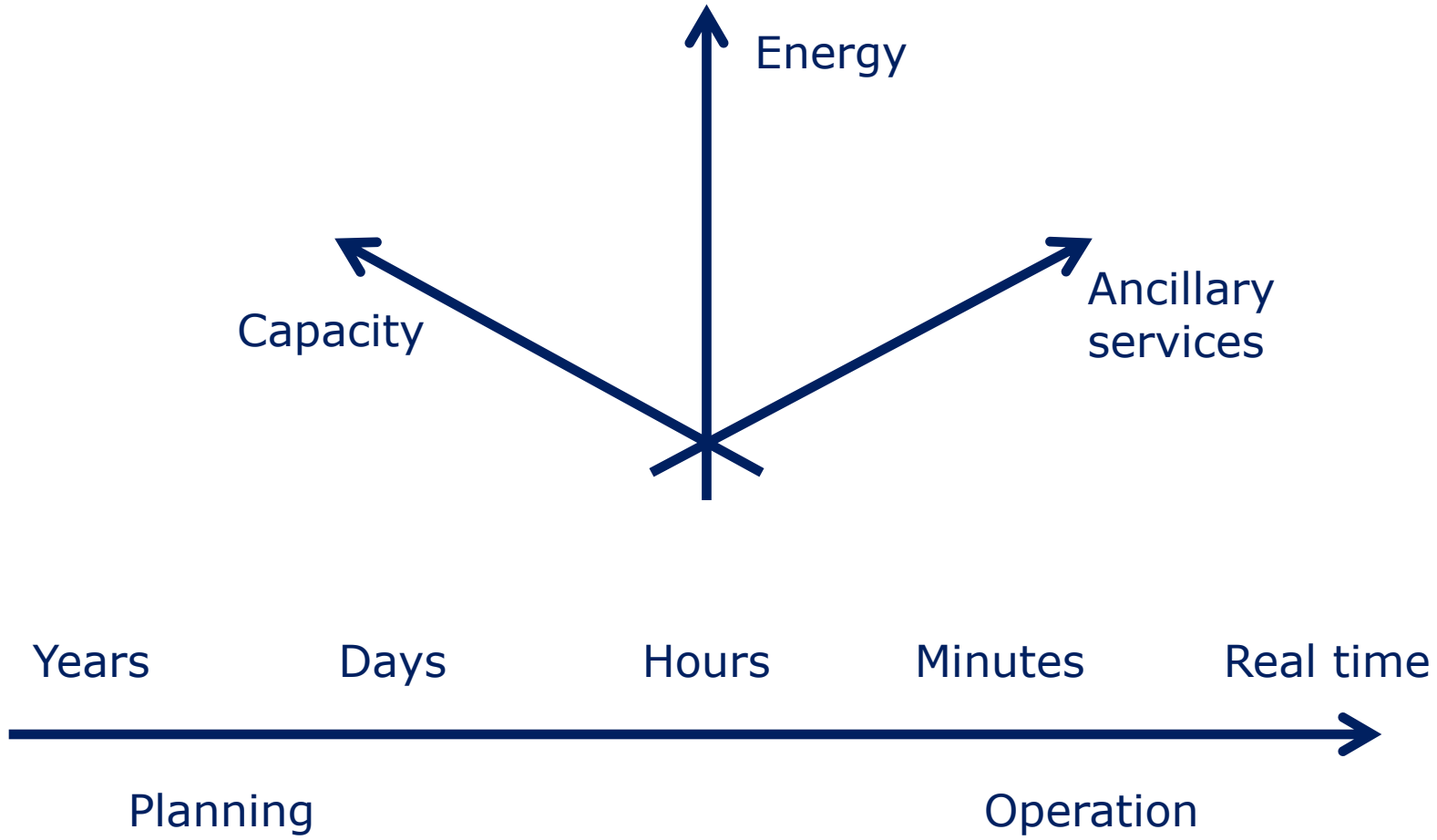
Regulatory Challenges

- Consumers' market participation – demand side flexibility
- Future role of DSOs (Distribution System Operators)
- Grid investments and grid modernization

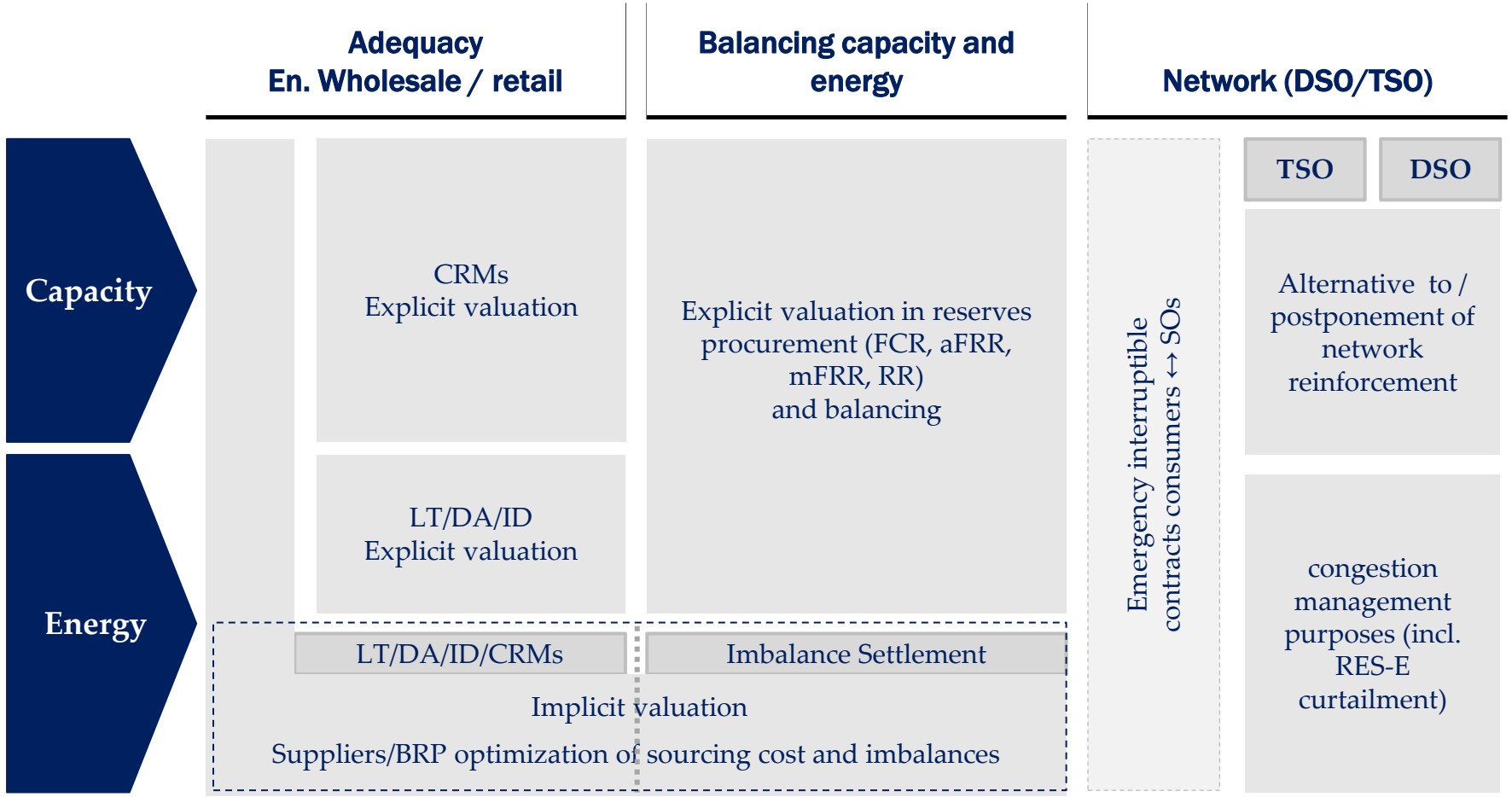
Flexibility is key



Demand Side Flexibility



Demand Side Flexibility Mapping



Source: CEER/ACER

Demand side flexibility – regulatory challenges

- Roles and responsibilities of different actors – regulatory framework, balance responsibility rules, settlement arrangements etc.
- Data management and information exchange - competition issues
- Fair definition of the baseline
- Controllability and reliability of not dispatchable resources - feasibility with large number of small providers
- Relation to management of local networks - network constrains and geographical applicability of aggregated demand response – visibility and monitoring of distributed resources

New opportunities and challenges related to DSOs

- New opportunities for consumers' through active market participation
  - smart meters, data handling and accuracy, storage behind the meter. smart appliances, IoT
  - changing consumption patterns with limited visibility for DSOs - demand response, embedded generation, electrical vehicles
- New opportunities for DSOs through smart grid solutions
  - More efficient use of the network (real time monitoring and control, integration of ICT, etc.)
  - Enhancing network resilience through micro-grids etc.
- Possible impact
  - Change in local congestion patterns - reverse flow and quality problems
  - Change in distribution between operational costs and capital costs
  - Revenue uncertainty - less energy and more capacity needs

Role of DSO - CEER regulatory framework

Core regulatory activity	Grey areas	Competitive non-DSO activity
• Network planning and development • System security, operation and maintenance • Technical data • Network Losses	• Energy efficiency • Storage • Engagement with consumers • Flexibility	• Energy generation and production • Energy trading and supply

Regulatory challenges from an EU perspective

- Regulatory Incentives promoting DSO grid modernization – output based regulation - TOTEX verses OPEX and CAPEX
- Regulatory framework promoting flexibility use at distribution level - distribution network tariffs and procurement of flexibility resources
- The future DSO and TSO relationship – system operation, planning and governance
- Role out of smart meters, consumption data management – privacy and security
- Market arrangements (i.e. settlement procedures) incentivising portfolio management through time of use supply contract

Thank you for your attention!

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Swedish Energy Markets Inspectorate Website: www.ei.se

ISGAN Website : http://iea-isgan.org

CEER Website: www.ceer.eu