febeliec
federation of belgian industrial energy consumers

Industrial Demand Response

Shifting loads
&
Tilting demand curves

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The Role of DSM to Provide Flexibility in Electricity Systems (Brussels, 13/10/2016)

Febeliec represents the industrial consumers of electricity and natural gas in Belgium

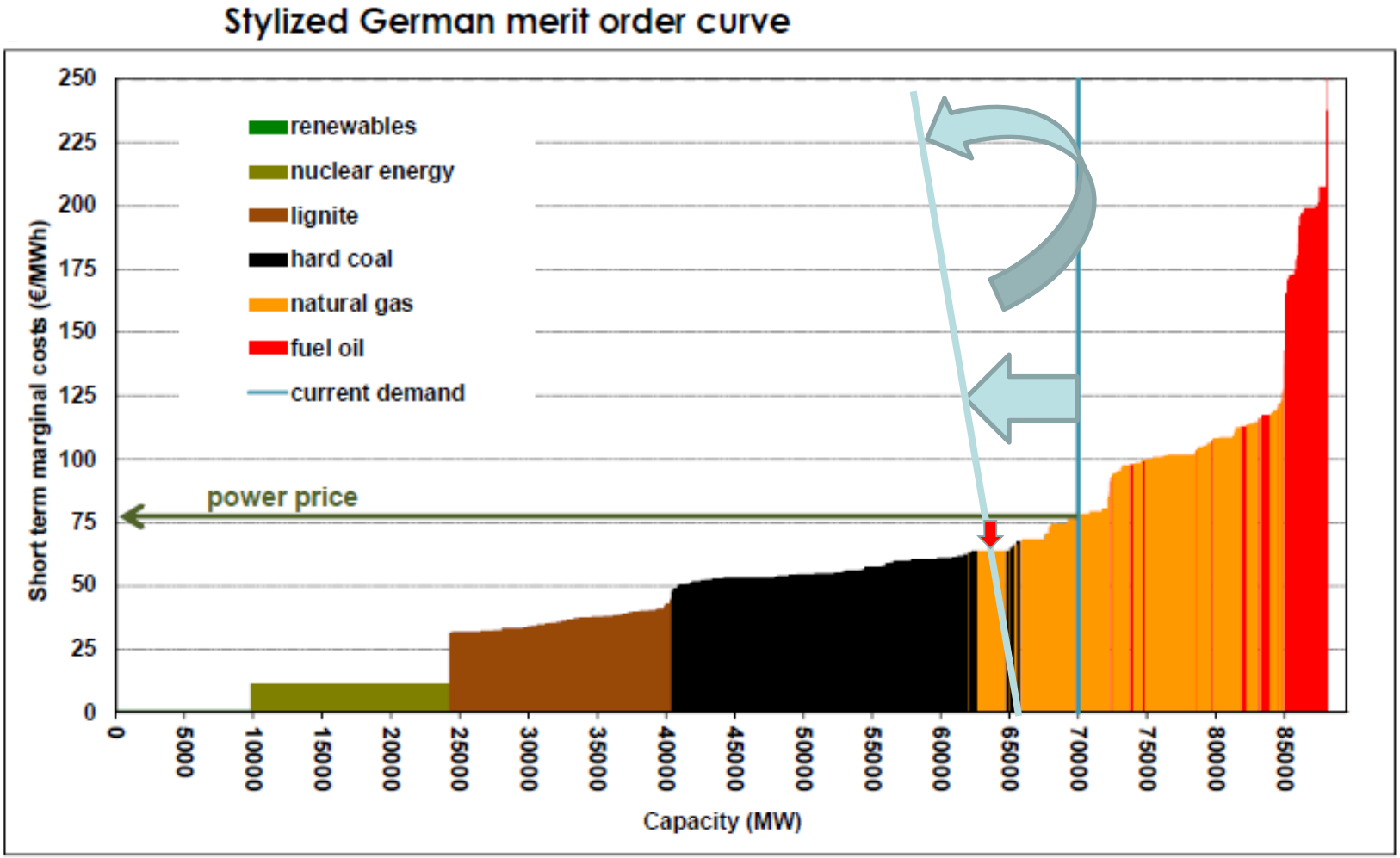
Demand Side Response - background

- Radically changing electricity supply / demand situation
- New unmet challenges in terms of security of supply and competitiveness / prices
- Storage and / or additional (reliable) generation may not be optimal
- Demand response can offer a cost efficient alternative!

Demand Side Flexibility & Response

- **Demand Side Flexibility (DSF)** is *the capacity to change electricity usage by end-use customers (including residential) from their normal or current consumption patterns in response to market signals, such as time-variable electricity prices or incentive payments, or in response to acceptance of the consumer's bid, alone or through aggregation, to sell demand reduction/increase at a price in organized electricity markets or for internal portfolio optimisation* **(CEER)**
- **CEER: DSF has the potential to provide value throughout the energy system, both for markets and networks**
- **Demand Side Response (DSR)** can be defined as the **voluntary activation by a party of its Demand Side Flexibility**

Demand Side Response & Energy Efficiency: Tilting & Shifting!

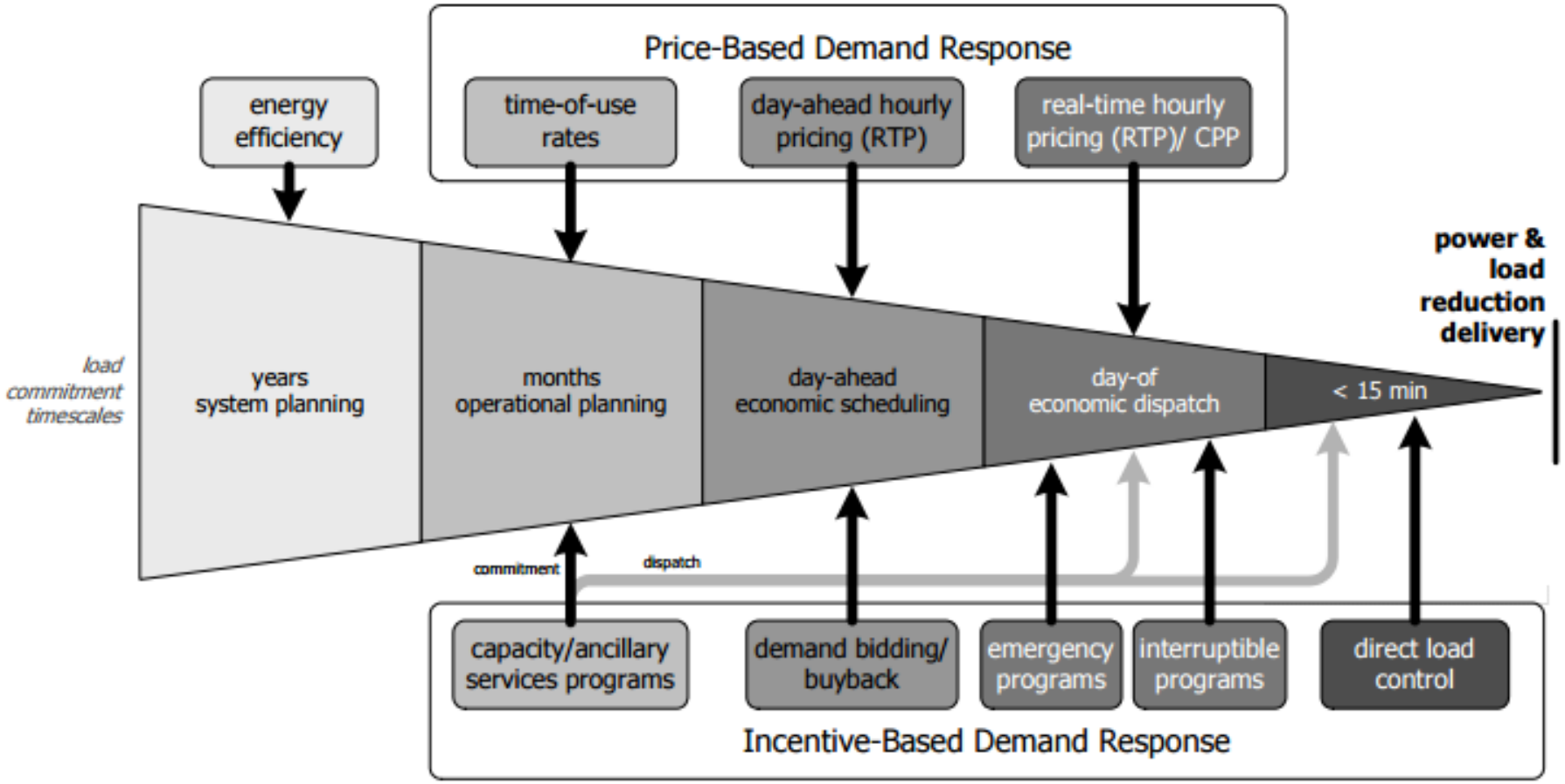


Source: Öko-Institut 2013

Basic principles DSR

- On a voluntary basis only
- Against a fair remuneration (by market or TSO)
- Not primarily for structural generation shortages
- Demand response can play a role in different timeframes and markets:
  - Forward Market
  - Day Ahead Market
  - Intraday Market
  - Strategic Reserve Market
  - Close-to-realtime / Balancing Market

System value of Demand Response



Role of Demand Response in Electric System Planning and Operations (US DoE)

Demand Side Response vs. Energy Efficiency

- **Demand Side Flexibility opportunities must be balanced with other company objectives:**
  - Sustainability
  - Energy Efficiency
  - Emissions Efficiency
- Goal should be **System Efficiency**

First objective of industry is to produce!

DSR: How to make it happen?

- Give **every consumer** the **right to valorize his flexibility**
  - ➢ Solution for Transfer of Energy and Baselining
- Give **visibility :** first objective of industry is to produce!
  - DSR ≠ Negative consumption
  - Changing production planning requires anticipation and has a cost
  - DR potential can be increased via process adjustments requiring investment

  ➔ Need for **a stable framework** with **fair remuneration**
- Enable **cheapest solutions** to emerge ➔ **System Efficiency**
  - Most critical issues are limited in duration
  - Products proposed should enable a whole range of responses via **a proper segmentation of criteria**

➔ **One size does NOT fit all!**

Barriers and solutions

- Lack of **consistency** between legislations/regulations and lack of **visibility/sustainability** of energy policies
- Lack of **harmonization of (national) grid codes**
- Lack of intraday and balancing markets coupling
  - ➢ **Finalize Target Model!**
- Lack of transparency
  - Access to essential information (designed for generators, not for load)
  - Aggregators operations
    - ➢ More transparency required (rules, market impact, …)

Barriers and solutions

- **Lack of incentives to consume more in moments of higher than expected intermittent power generation**
  - Manufacturing / products can be used as “storage”
  - Improve market access
  - Adapt grid tariffs to avoid additional costs / adapt remuneration
- **Commercial and contractual constraints** - Who is the owner of load flexibility ?
  - All flexibility must be able to find its way to the market or to TSO products (balancing / strategic reserve)
  - Legal intervention needed ?
  - Constraints can concern either sourcing (relation with supplier / BRP) or production (internal constraint) issues
- **Level-playing-field**
  - No discrimination between generation/demand response/storage in tendering procedures for flexibility products/markets

Barriers and solutions

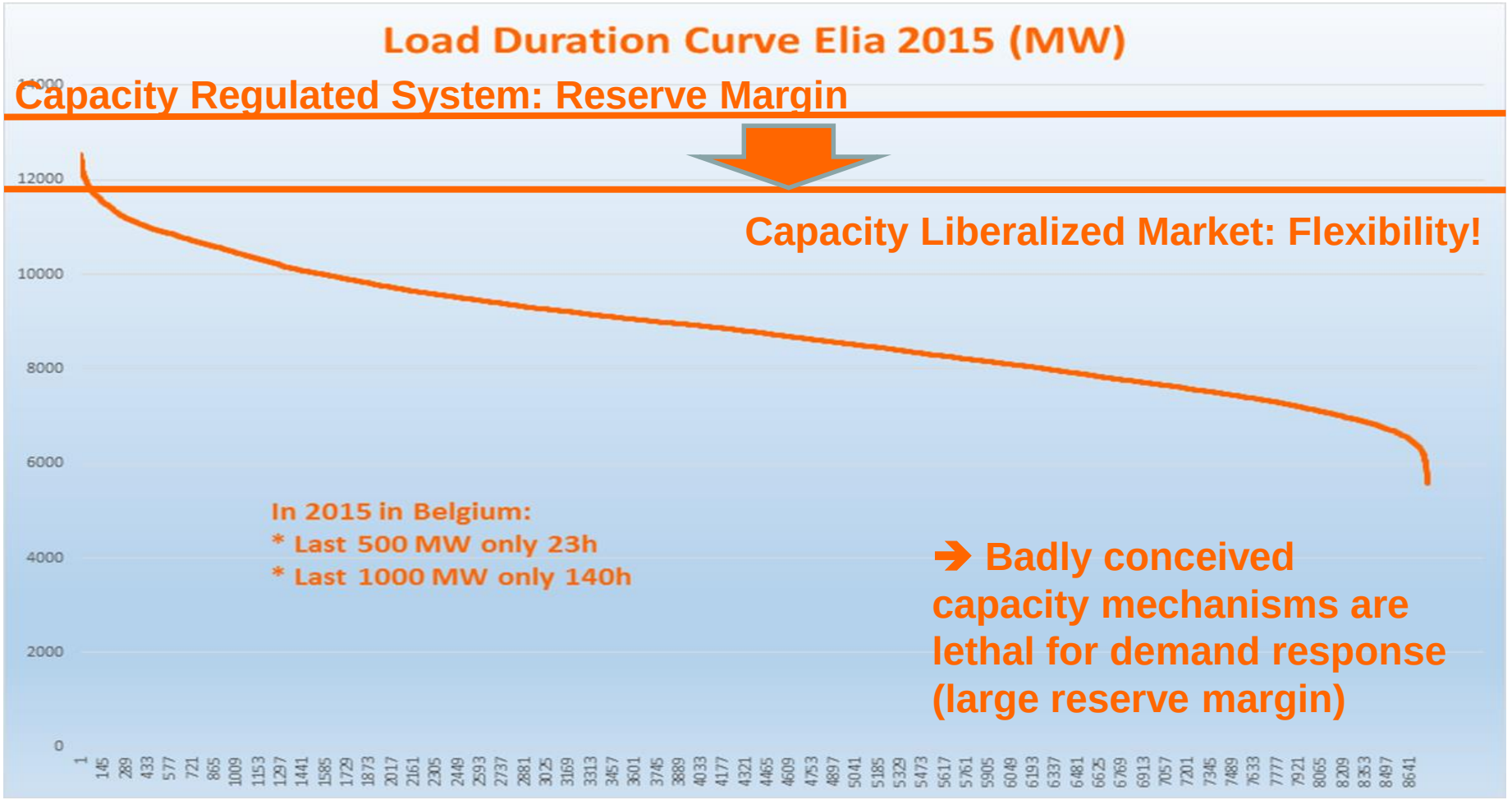
- **Overall (opportunity) costs of DR actions can be very high** (generally a multiple of power price)
  - Very process/sector specific: Diverging preference for variable / fixed remuneration
  - Diverging fixed costs / variable costs
  - Safety aspects (e.g. Seveso plants)
- Grid tariffs & tariff structure: **DSR should not lead to extra grid costs**
  - Deviating from nomination mostly comes with a penalty
  - Catching up lost production later on is penalised
  - No level playing field with generators as often they are not subject to grid tariffs and/or no penalties are applied to them

➔ **Introduce appropriate remuneration (fixed / variable)**
  - Market value (DA/ID)
  - Tariff / remuneration

Network Interaction – Balancing and Congestion Management

- DSR can offers wide range of services to the system:
  - **Adequacy issues**: Energy efficiency investments can solve baseload issues, by structurally reducing demand
  - **Balancing issues**: Consumers can provide flexibility to solve the temporal (peak load) scarcity of the “top” of the (residual) load duration curve
  - **Congestion issues**: DSR can provide flexibility to solve congestion issues, as grids have been developed to fulfill electricity demand. Moreover, DSR can provide flexibility both upwards and downwards

A New World!


Load Duration Curve Elia 2015 (MW)
Capacity Regulated System: Reserve Margin
Capacity Liberalized Market: Flexibility!
In 2015 in Belgium:
* Last 500 MW only 23h
* Last 1000 MW only 140h
➔ Badly conceived capacity mechanisms are lethal for demand response (large reserve margin)
12000
10000
8000
6000
4000
2000
0

Conclusions – Demand Response

- On a voluntary basis only
- Against a fair remuneration (by market or TSO)
- Not primarily for structural generation shortages
- Could contribute to solve tranmission and distribution network issues (adequacy, balancing, congestion, …) and even contribute to a better integration of renewable energy in the market

Overall goal: Lower the overall cost of the system, to the advantage of all users of the system, by allowing the least-costly and most (system-) efficient solution to emerge

CONTACT

Questions?

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