

Industrial Demand Response

Shifting loads & Tilting demand curves

Michaël Van Bossuyt

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



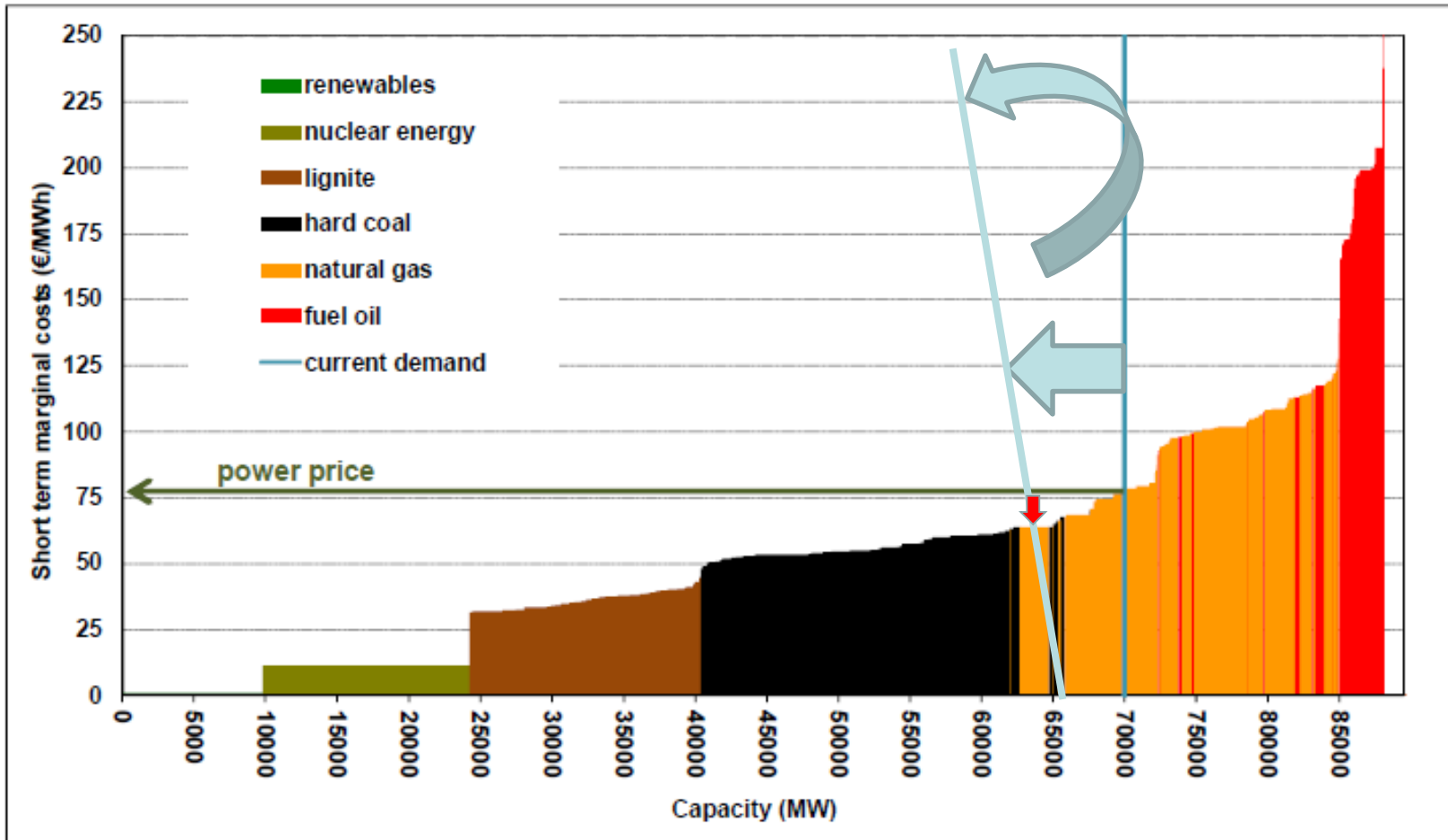
**Febeliec represents
the industrial consumers
of electricity and natural gas
in Belgium**

- **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 (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!

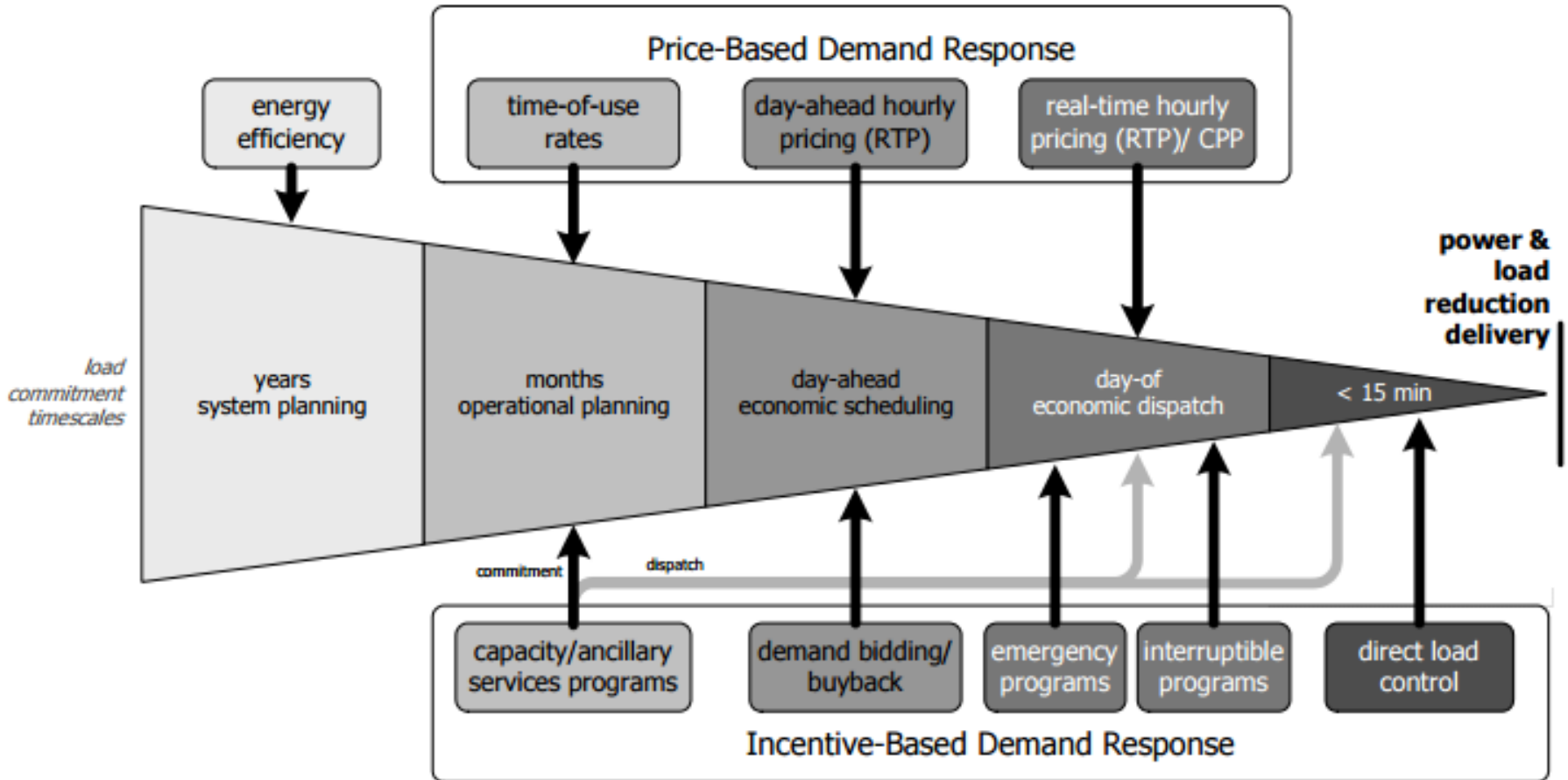
Stylized German merit order curve



Source: Öko-Institut 2013

- 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 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!

- Give **every consumer** the **right to valorize his flexibility**
 - Solution for Transfer of Energy and Baselineing
 - 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!**

- 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, ...)

- **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

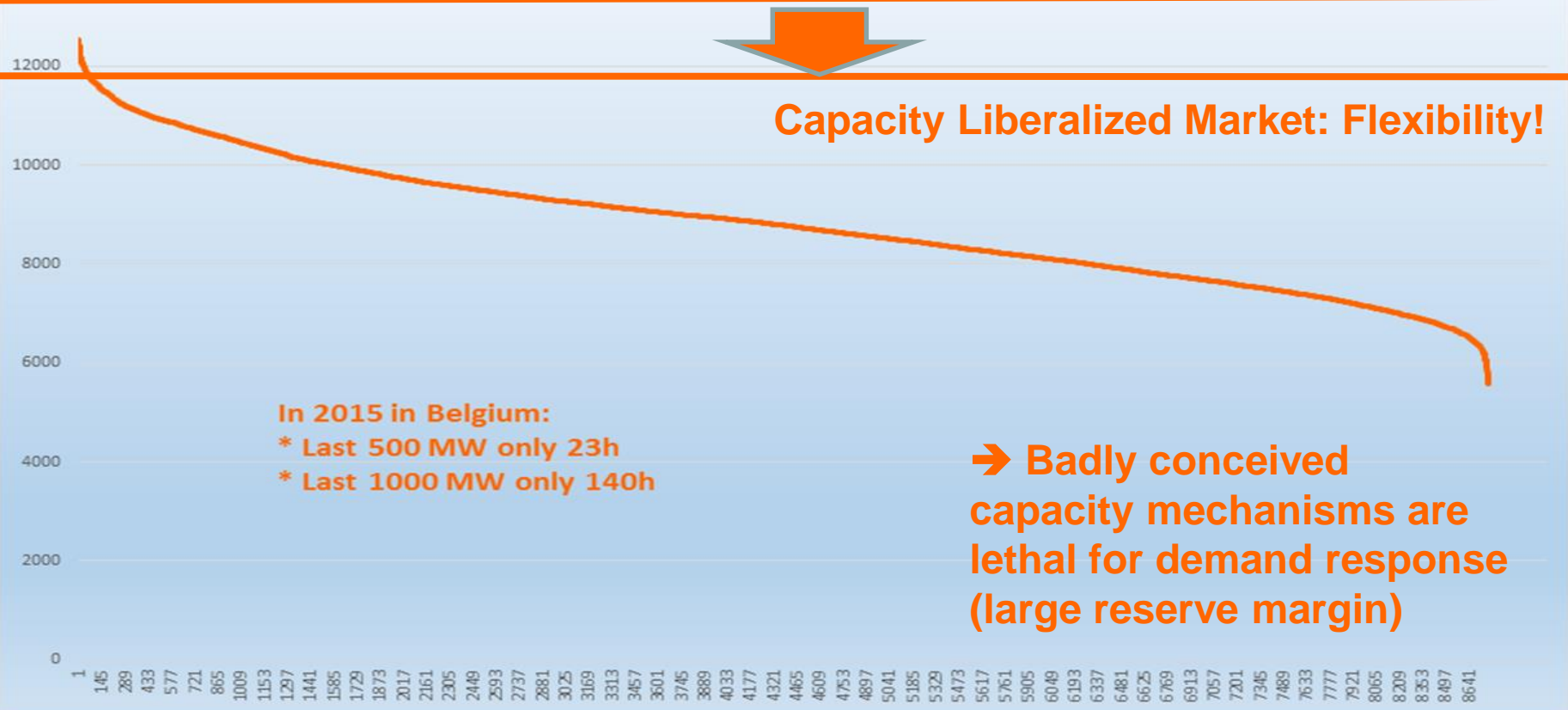
- **Overall (opportunity) costs of DR actions can be very high (generally a multiple of power price)**
 - Very process/sector specific: Diverging preference for variable / fixed remuneration
 - Diverging fixed costs / variable costs
 - Safety aspects (e.g. Seveso plants)
- **Grid tariffs & tariff structure: 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

Load Duration Curve Elia 2015 (MW)

Capacity Regulated System: Reserve Margin



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 transmission 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

Questions?

mvanbossuyt@febeleriec.be

Febeleriec

Diamant Building

Bld A Reyers 80

1030 Bruxelles

+32 473 88 55 83