

Market design for demand response

How should the design and functioning of electricity markets and procurement of ancillary services be adapted to optimally value the potential of demand response?

Workshop on The Potential of Electricity Demand Response

Organised by: the Policy Department A: Economic and Scientific Policy for the Committee on Industry, Research and Energy (ITRE), European Parliament, Brussels

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Presented To:

Presentation of FTI-CL Energy

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KEY FIGURES

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- Technology
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CLIENTS

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- **Gas companies** all along the value chain
- **Equipment and technology suppliers**
- **Lenders and investors**
- **Trade associations**



Context

Principle of demand response

What is demand response?

- In power systems, electricity consumption and production should be balanced at all times
- In general, flexible generation is used to adjust production to consumption
- Alternatively, consumers can adjust their load to balance the system through “Demand Response” (DR). DR is a process through which:
 - **Consumers adjust the amount of electricity** they use at particular times of the day, e.g. peak period,
 - In response to a **signal** or in order to **bid on the electricity market**.
 - The signal could be a **price signal or through various communication and information channels** (remotely controlled device such as meters or boxes, phone call, emails, SMS etc.)
 - These adjustments can be **manual or automated** and can be operated on various devices in industrial, commercial or residential consumption sites.



Households: electric heating, water heating, Internet of things, electrical vehicles



Industries: diverse production machines, etc.



- Demand response can be used to balance generation and load in the power system, as generation
- Different forms of DR exist, and can have different properties, costs, etc.

Value of demand response

What are the values / services provided by demand response?

1

Energy value

> Adapt load patterns to balance supply and demand

2

Capacity value

> Avoid investment in peak generation to ensure adequacy

3

Flexibility value

> Provide flexible/reliable reserves for TSOs to balance the power system

4

Network value

> Balance supply and demand locally to avoid congestion / network invt

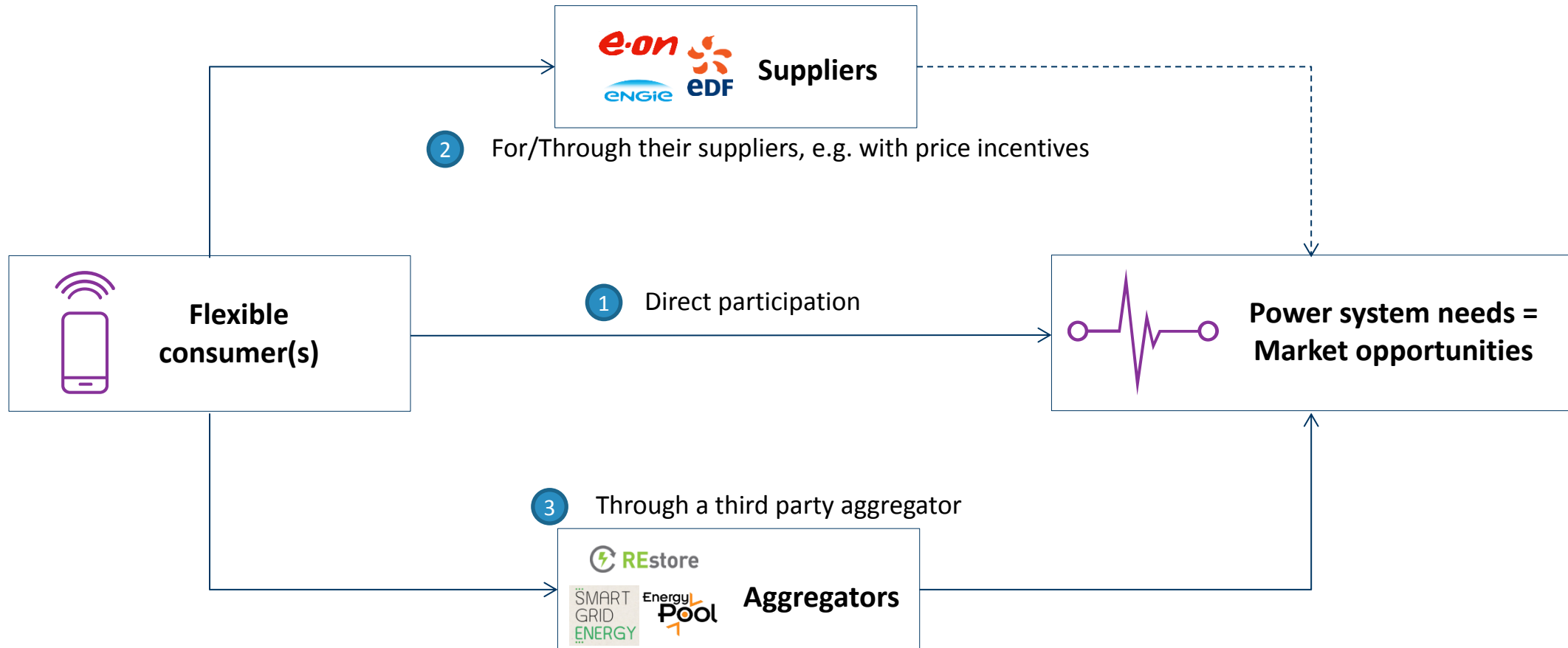


- Demand response has different sources of value
- The services they may provide depend on their characteristics (flexibility, location, reliability, potential frequency of activation etc.)

Market design for demand response

Market design for demand response

Approaches to value demand response



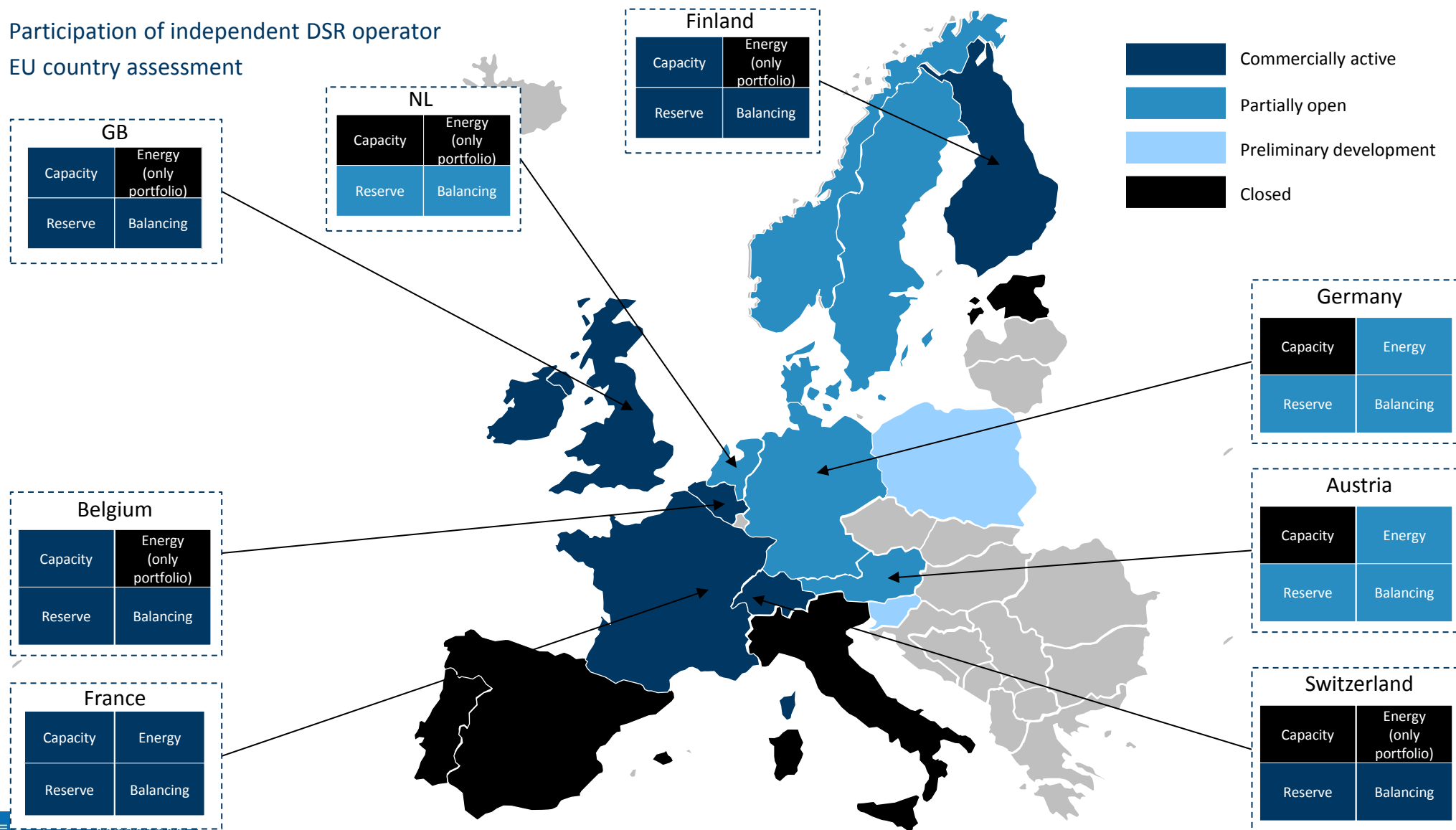
- Different channels are possible for consumers to value their flexibility
- Market design needs may differ

Market design for demand response

Many countries do not have an adequate regulatory framework


Participation of independent DSR operator

EU country assessment



Market design for demand response

Proposal of the European Commission

- The Energy Efficiency Directive, the State aid guidelines (for capacity mechanisms) and now the Electricity Balancing Guideline require (most) markets to be open to demand response participation
 - However, as shown before, a lot of countries still do not have a market design suited for demand response and allowing aggregators to participate
 - To spur the development of demand response, the European Commission has proposed to provide a specific framework in the Electricity Directive:
 - Demand response and aggregators should be allowed in all market segments
 - Aggregators should not have to ask for the consent of the supplier
 - Aggregators should not be required to pay compensation to the suppliers or generators
 - A compensation can be envisaged between aggregators and balance responsible parties (BRPs) if they create imbalance
- 

 - Whereas we support the absence of consent of the supplier, we wonder whether the draft wording regarding a potential compensation is adequate

Market design for demand response

Relation between aggregators and suppliers

- The French Competition Authority has analysed the case of demand response in the context of the French debate
- **The analysis of the French Competition Authority concludes that imposing to DSR operator to contract with the BRP/supplier of the site is problematic with regard to EU competition legislation:**
 - They argue that issuing such agreements would de facto create a **participation agreement market** in every perimeter, within which the **BRP would be in a monopoly position and thus in a dominant position** (as defined in Art.102 of the TFUE), whereas the BRP (often suppliers and integrated utilities) is **potentially in competition with DSR operators** in the balancing mechanism (and power market by extension)
 - **The European Court of Justice** considered several times that a state measure which would provide any private operator the right to deliver participation agreements to competitors to enter the market was likely to break the European community law, if this measure was not limited or controlled. In 2008 (ECJ, *MOTOE*, 1st July 2008 C-49/07), the court relied on Article 82 and 86 (now 102 and 106 TFEU) to express such a judgment.
 - More generally, it would violate the (stricter) **Service Directive** – *directive 2006/123/EC of the European parliament and of the council of 12 December 2006 on services in the internal market* (Article 14) – which forbids the Members States to condition the service activities participation to competitors' direct or indirect intervention.
- Nonetheless, some countries maintain this regime.



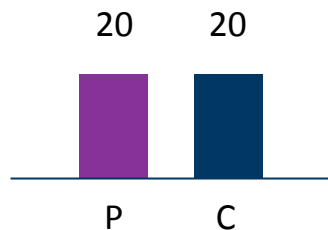
- The proposal of the Commission confirms the analysis of the French Competition Authority and addresses the underlying concerns

Market design for demand response

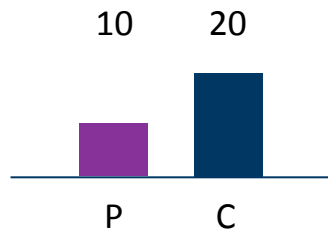
A transfer of energy from responsive consumers to others

Ex-ante situation:

- Balance Responsible Party 1 ("BRP")



- BRP 2

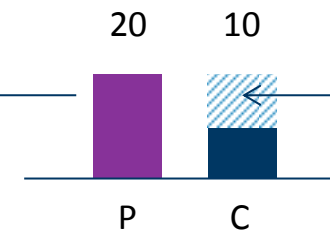


10 MW are missing



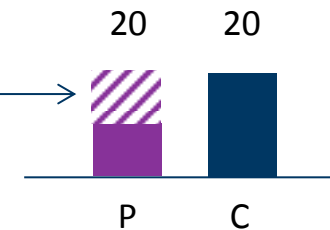
After demand response activation:

- Balance Responsible Party 1 ("BRP")



Consumer 1 reduces its demand by 10 MW

- BRP 2



Production originally for consumer 1 can be transferred and used by consumer 2



- Generated energy is then "transferred" from responsive consumers to others
- If the BRP1 adapts to the changed load of its consumers, the system will remain unbalanced, which shows that it needs to "do as if" its consumers would have consumed
- Market design should address this transfer of energy and value between parties

Market design for demand response

Market arrangements for the transfer of energy

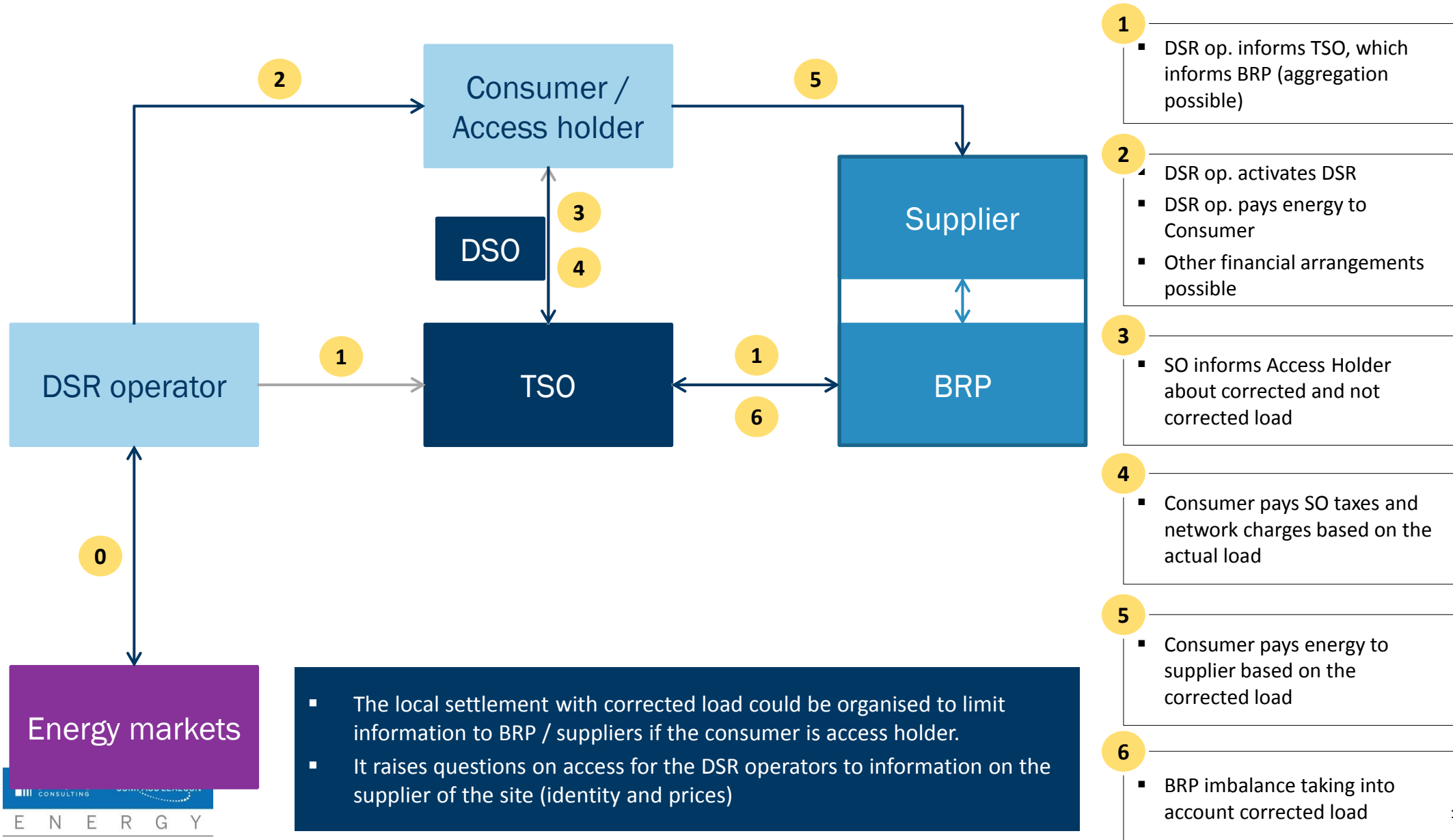
- Activation of demand response induces transfer of energy between parties
- The aggregator uses the energy originally intended for a consumer ready to reduce its load to supply another consumer, who value electricity consumption more
 - The aggregator is an intermediary: somehow it “acquires” the electricity to the supplier (instead of the responsive consumers), which it can then sell either to another consumer, to the TSO or to market participants in the wholesale market
 - It should therefore pay for the energy it has acquired
- The supplier should be remunerated for the electricity provided:
 - The supplier of the responsive consumers should have sourced electricity for their consumers
 - It should maintain its sourcing for demand response to be effective
 - It should be paid for the electricity it has sourced for its consumers, even though they do not consume it due to DR activation



- The supplier should not be dis-incentivised to maintain its sourcing and should be paid for the energy provided
- Different arrangements are then possible to settle financially the transfer of energy

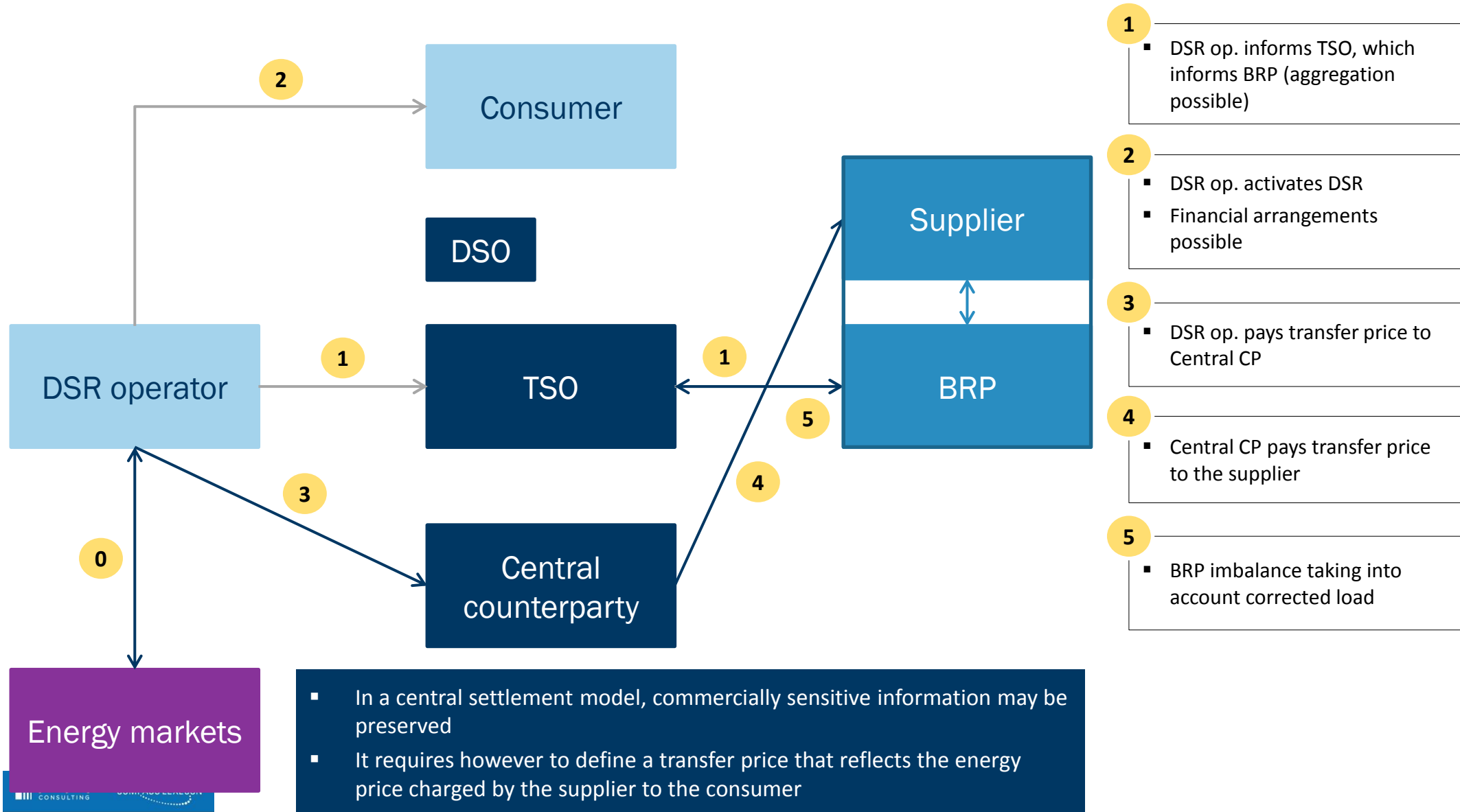
Market design for demand response

Transfer of energy through the consumer



Market design for demand response

Transfer of energy through a central counterparty



Conclusions

Conclusions on market design for demand response

What is the way forward?

1 Demand response can bring significant value in the power system and should be allowed to participate in all market segments

- The Commission's proposal recognises that
- Demand response by aggregators should be allowed

2 Demand response operators (consumers, aggregators) should not have to request the supplier's consent, as it would breach competition law and hamper demand response development

- This was highlighted in 2012 by the French Competition Authority
- This is included in the Clean Energy Package

3 Demand response is a transfer of energy between parties. It is legitimate that the energy initially provided should be paid to the supplier (/BRP).

- The wording of the Commission's proposal should probably be adapted
- Today, most of the value for demand response is capacity-based (« insurance ») through capacity mechanisms / reserves or grid contracts: a pragmatic solution should be developed for the transfer of energy, to allow for a quick and not too costly implementation

4 Beyond these general principles, many aspects of the market design need to be adapted to demand response to effectively allow its development. TSOs and regulators should focus on that.

- Monitoring/verification procedures should be developed for demand response.
- Product design may also need to be adapted to fit to the need of TSOs / market participants while considering demand response specificities.

Experts with Impact

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