A critical view on provisions on demand response (DR) aggregation in the draft Electricity Directive

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DNV GL – Energy, an energy technology powerhouse

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- Technology planning
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- Thermal generation
- Distributed generation
- Renewables

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- Power purchase agreements
- Benchmarking performance

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- Grid hardening & resiliency
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- Resource and turbine measurements
- Support for engineering and implementation of technology
- Software

- Project development & engineering
- Asset operations & management
- Measurements
- Turbine engineering support
- Offshore
- Solar
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- Power system planning
- Project management and technical services
- Operational excellence

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- Power system design and modelling
- Technology implementation services
- Operations and systems optimisation

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- Super grids and micro grids
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- Strategic market planning and due diligence services

Key Services:

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- Regulation, policy, advisory services assess business impact of current and future policy in regulated and deregulated markets
- Business & technology strategy developing sustainable revenues in new markets based on competitive analysis, benchmarking and risk assessed scenarios.
Background of Presentation

The newly drafted EU Electricity Directive (called “Clean energy for all package”, COM(2016) 864 final/2) includes provisions to promote Demand Response activated by Independent Aggregators.

**Article 17 Demand response**

3. Member States shall ensure that their regulatory framework encourages the participation of aggregators in the retail market and that it contains at least the following elements:
   (a) the right for each aggregator to enter the market without consent from other market participants;
   (d) aggregators shall not be required to pay compensation to suppliers or generators;

4. [...] **Member States may exceptionally allow compensation payments between aggregators and balance responsible parties. [...]** must be limited to situations where one market participant induces imbalances to another market participant resulting in a financial cost.
Aggregator’s contribution to power system

Aggregators
- harness flexibility potential
- bundle prosumers & small flex potential

Local Flexibility Market
Congestion management

Balancing Market
Primary, secondary, tertiary reserve & further ancillary services

Spotmarket
Liquidity

DSO

TSO

EEX
Regulation of aggregator’s activation of DR

Need for regulatory framework of aggregator activities

Aim of DNV GL study: evaluate regulatory models according to

- Economic Efficiency
- Compliance with Market Rules & Principles
- Distributional effect on retailers & retail competition
The bulk of energy is traded in the Day Ahead market, closing at 12:30 pm on the day before delivery.

The ID market operates until one hour before delivery, allowing balancing operators to balance their portfolio.

Remaining imbalances are offset by the System Operators via balancing market, charging imbalanced parties afterwards.

Legend:
- €
- kWh

Two wholesale markets complemented by bilateral trading & balancing.
Suppliers Business Model

Day -1 12:30  Day -1 14:30  Day 0 Delivery

Day Ahead Market  Intraday Market (ID)  Balancing Markets (B)

Supplier buys energy in the Day-Ahead-Market (or via bilateral trade), sells energy to final consumer.

Legend:
- €
- kWh
Bulk Energy Issue (I)

Aggregator sells DR on ID Market, withdrawing energy fed-in for final customer. Compensation of the Supplier decreases.
Bulk Energy Issue (II)

- **Day -1 12:30**: Day Ahead Market
- **Day -1 14:30**: Intraday Market (ID)
- **Day 0 Delivery**: Balancing Markets (B)

**Legend:**
- System
- Operator
- Supplier

**Aggregator**
sells DR on Balancing Market

- Reduced energy supply due to DR

**Legend:**
- €
- kWh
Due to DR activation outside of control of Supplier, energy fed into system by Supplier exceeds energy consumed by his customers.
**Imbalance Issue (II)**

Unless the imbalance is physically corrected, **Supplier** is obliged to pay for imbalance to the **System Operator**.

Legend:
- €
- kWh
Supplier is compensated by Aggregator for bulk energy withdrawn by Aggregator.

With sufficiently high prices in ID and B markets, Aggregator can create profits efficiently.
Supplier is compensated by customers for bulk energy withdrawn by Aggregator.

With sufficiently high prices in ID and B markets, Aggregator can create profits efficiently.

With compensation, only economically efficient DR will be activated.
**Imbalance issue (Solution A)**

- **Day -1 12:30**: Day Ahead Market
- **Day -1 14:30**: Intraday Market (ID)
- **Day 0 Delivery**: Balancing Markets (B)

**Legend:**
- Day Ahead Market
- Intraday Market (ID)
- Balancing Markets (B)

**Aggregator** is always balance responsible as any other market participant.

**Imbalance**

**Supplier**

**System Operator**

**Aggregator**

**Notification of System Operator**

**Legend:**
- €
- kWh
Imbalance issue (Solution B)

Aggregator is always balance responsible as any other market participant.

Legend:
- €
- kWh

Imbalance payment by Aggregator
Compensation of bulk energy - necessary for economically efficient DR activation

Economically **efficient** DR activation

<table>
<thead>
<tr>
<th>Electricity market</th>
<th>Supplier</th>
<th>Flexible consumer</th>
<th>Aggregator</th>
<th>MWh</th>
<th>€</th>
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<td>30 €/MWh</td>
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Economically **inefficient** DR activation

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Market Price
- 30 €/MWh

DR Price
- 50 €/MWh
- 25 €/MWh

**Surplus**

**Loss**
Models for compensation of supplier for the bulk energy issue

Compensation scheme

...by Aggregator

Supplier bears all cost (i.e. no compensation)

...by Supplier’s customer with DR flexibility activated by A

...by Third Parties (socialisation)
Evaluation of models

Degree of and responsibility for compensation for the bulk energy issue

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<tr>
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<th>Supplier</th>
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<th>Flexible consumer</th>
<th>Full compensation based on broad cost socialisation</th>
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| Economic efficiency | - | + | (+) | - |
| Sourcing costs paid  | - | + | (+) | - |
| Distributional effect on retailers | - | + | + | + |
Recommendation

We propose changes in **Article 17** of the Draft Directive.

**Solution to bulk energy problem**
- The issue of bulk energy should be resolved by **full compensation of the supplier**. The draft EU legislation should be amended to allow Member States to set the most proper rules at national level to compensate suppliers.

**Solution to imbalance problem**
- The regulator should establish **full responsibility of aggregators for the imbalances they produce**
- The supplier (or his BRP) is compensated for the imbalances caused by demand response activation, unless there are other mechanisms able to neutralize the effect on the supplier (or his BRP).
Thanks for your attention

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