Market Based flexibility for DSO’s (challenges & solutions)

An update from the Netherlands

Enabling customers to monetise their flexibility resources
Agenda

1. Context: What is happening in the Dutch market

2. Market based flexibility for DSO’s: where do we stand today?

3. Future Work Ahead
Agenda

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Objectives of renewable electricity production up to 2030

Significant increase of wind and solar

Committed in National Climate agreement

Target 2030: 84 TWh in 2030 (= 300 PJ):

- Offshore Wind: 4,26 TWh (2019) to 49 TWh (2030)
  
  **Installed Power in the North Sea:**
  
  2019: 1,0 GW
  2023: 4,5 GW
  2030: 11 GW
  Perspective 2050: 60 GW -> 255,6 TWh

- Renewable Energy on land van 16 TWh (2019) to 35 TWh (2030)

  **Energy on land (wind & sun):**
  
  Wind on land: 3,7 GW ~ 12,0 TWh
  Solar fields: 14,4 GW ~ 12,2 TWh
  Solare rooftops PV: 12,7 GW ~ 10,8 TWh
National subsidizing schemes incentive uptake in DER (wind & solar)

.... but its speed creates grid capacity issues
Some regulatory issues ....

- Grid capacity issues blocked some DSO’s in connecting DER

- Based on existing Dutch law, the regulator (ACM) enforced continuation of connecting DER

- DSO went to public court and appeal was approved

- New Energy act, to solve the issue, is expected H2 2021

- DSOs & TSO submitted an update of the national code on congestion management, trying to clarify:
  - To receive approval of “first come first serve”
  - When is procurement of market based flex an option of mitigating congestion? (what are the conditions & boundaries)
  - When are, next to grid expansion, other instruments appropriate (enhanced connection agreements, new grid tariffs, curtailment)

- Fundamental market model issue on financials:
  - When do DSOs financially compensate the market (flex)?
  - When does the market pay for scarcity (economic principle)?

Proces & assesment framework (draft national congestion management code)
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GOPACS: Grid Operator Platform in the Netherlands for market based congestion solutions

Operational since January 2019

Forecast based on:
• Weather data
• Metering data
• Transport prognoses from market

GOPACS:
- TSO/DSO Analysis
- Congestion spread
- Market notification

Available bids with location information
Procurement of spreads
Confirmation accepted spreads

Regular intra-day trade

Market platform 1
Market platform 2
Market platform 3

Regulated domain
Commercial domain

Market party A
Buy orders with location (EAN)

Market party B
Sell orders with location (EAN)

TSO Stedin
DSO Alliander
TSO TenneT
Other DSOs
Product: Intraday Congestion Spread (IDCONS)

- Combination of intra-day bids on a market platform with location information that can be leveraged for redispatch:
  - buy-order from market parties with a connection in the congested area
  - sell-order from market parties outside the congested area.

- The price difference between the buy and sell orders (intra-day congestion spread) is paid by the grid operator. With this, the market platform matches the corresponding orders.

- No BRP license for DSOs needed, Balance Neutral, easy access for market parties through ID market integration

<table>
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<tr>
<th>Sell order</th>
<th>Price: 40</th>
<th>Volume: 5</th>
<th>Location: left</th>
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<tr>
<td>Congestion Spread</td>
<td>Price spread: 10</td>
<td>Volume: 5</td>
<td>Redispatch: left &gt; right</td>
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<tr>
<td>Buy order</td>
<td>Price: 30</td>
<td>Volume: 15</td>
<td>Location: right</td>
</tr>
</tbody>
</table>

Upward area: more production or less consumption

Downward area: less production or more consumption
The process in practice:

1. Preparation by market parties
   - Access to wholesale ID trading platforms
   - Sign-up to unlock orders with location for grid operators.
   - Link to future flexibility register.

2. Identify congestion
   - Analysis as part of daily forecasting by grid operator.
   - Create a “congestion case” in the platform.

3. Request and filter orders from market platforms
   - Publish a market notification
   - Assess effectiveness and create spreads.

4. Activation validation and settlement
   - Confirm buy to market platforms.
   - Validation of delivery and settlement.
Redispatch expenditures TenneT NL in recent years

2015 ~ 15 M€
2016 ~ 65 M€
2017 ~ 45 M€
2018 ~ 55 M€
2019 ~ 61 M€

Geographic needs

Most frequent:

Buy orders (i.e. downward regulation) in areas: Groningen, Friesland, Overijssel, Drenthe, Flevoland (ten noorden Ketelmeer), on all voltage levels

Sell orders (i.e. upward regulation) in areas: Flevoland (ten zuiden Ketelmeer), Gelderland, Utrecht, Noord-Holland, Zuid-Holland, Zeeland, Brabant, Limburg on all voltage levels

Current needs published: https://gopacs.eu/marktberichten/

Costs for using IDCONS for redispatch

<table>
<thead>
<tr>
<th>Month</th>
<th>Basim</th>
<th>TenneT</th>
<th>Lander</th>
<th>Westland info</th>
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<tbody>
<tr>
<td>2020 September</td>
<td>EUR 0</td>
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TSO as Market maker
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Future work Ahead

Regulatory
Solving the regulatory issues:
• Grid capacity issues & solutions in the new energy act
• Adopting the national code on congestion management
• Aligning grid expansion plans with:
  • Regional Energy Strategies (RES) of municipalities
  • Subsiding schemes (SDE)
• Implementing legislation on (cross sectoral) data exchange

Market
• Implementing flexibility options (eg. storage solutions at PV fields)
• Improving BRP Day Ahead forecast data

DSOs & TSO (Tennet)
• DSO’s: Implementing Day Ahead forecast capabilities (GLDPM)
• DSOs: implementing smart meter based allocation & time/usage based grid tariffs
• Tennet: implementing coordination functionality between balancing & congestion management of DSOs and TSO
Thank you

Questions?
Market Grid Interactions
will this be (part of) our evolving landscape?

Markets

EMS/DMS (SCADA)
- BRP forecasts
- Weather data
- Metering data
- Dynamic netmodel
- Request action (deviation actual from forecast)

Day Ahead/ID Forecasting
- Forecast Curves (to validate actuals against)

Flex Procurement (GOPACS)
- Market notification
- Request to match spreads

DERMS
- Monitoring Flex (RT)
- DER-Grid Monitoring
- DER-Grid Control

Netmodel (GIS)
- Static Netmodel
- Static Netmodel

Customer Assets
- Control
- Monitoring

Grid
- Control
- Monitoring

Activating Flex

Receiving bids

Congestion case
- Notification
- Congestion Case solved

Monitoring Flex (RT)

Static Netmodel

Flex Procurement (GOPACS)