Challenges and opportunities
decentralised flex
ISGAN Public workshop

Bob Hebb, Head Ancillary Services
September 12th, 2017
Elia Group, a unique positioning at the heart of Europe

Two TSO Companies with international activities

The Elia Group is expanding its international activities through Elia Grid International

1. Infrastructure management
   Operation, maintenance, planning and expansion of the on- and offshore high voltage infrastructure

2. Controlling the system
   Secure operation and balancing of the whole electricity system, 24/7

3. Developing the EU market
   Front runner in the development of the EU electricity market (NAM & CEE regions) to make the EU energy system more competitive, secure and sustainable

12 September 2017
Context Belgium
Balancing needs vs. means

Balancing Needs
- Variability of the consumption
- Variability of the production, especially renewable sources
- Production incidents

Balancing Means
- Flexible set up of production units (incl. RES)
- Flexible demand (demand response)
- Interconnections
- Storage

Observed historical imbalances

Contracted reserve power 2017

<table>
<thead>
<tr>
<th>Description</th>
<th>MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Containment Reserves (FCR)</td>
<td>+/-70 MW</td>
</tr>
<tr>
<td>Imbalance netting process</td>
<td>-</td>
</tr>
<tr>
<td>Automatic Frequency Restoration Reserves (aFRR)</td>
<td>+/-140 MW</td>
</tr>
<tr>
<td>Manual Frequency Restoration Reserves (mFRR)</td>
<td>+/-770 MW</td>
</tr>
</tbody>
</table>

Belgian Balancing Zone

Activated Energy 2016

- IOCC
- R2
- Non contracted R3
- Contracted R3 & interTSO

Belgian Balancing Zone
Managing flexibility: a multi-dimensional approach

Context
A rapidly changing environment …

RES development
Decentralisation, digitalisation & new players
The regionalisation of the electricity sector

Impact for Grid Operators
… with challenges & opportunities …

Flexibility needs
More important & more volatile

Flexibility sources
New technologies & players

Necessary Answers
… requires an ambitious but pragmatic approach

Keep “needs” under control
• Enforced Balancing Responsible Party (BRP) role
• Dynamic “needs” dimensioning
• Develop robust DA and ID markets

Cover “needs” efficiently
• Cross border integration
• Reserve sharing
• Shorter term procurement
• Open market to all
  • All technologies (batteries, load,…)
  • All players (independent BSP)
  • All voltage levels (TSO & DSO levels)
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Integrating more renewables challenges the way we balance the system

The variability of renewables need to be managed at different time-frames: not only daily but also weekly and seasonal. Need for (more) flexibility in the system is a consequence of the integration of (more) renewables.
Decentralisation: some numbers

Meanwhile total consumption in Belgium has been quite stable since 2010 thanks to Energy efficiency and growth steadiness, the DSO offtake has dropped by more than 10% of Elia Total offtake. This offtake depend on the evolution of decentralized installed capacity.

Sources: – Sales Volumes & Tariffs Department – *FEBEG
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Increased flexibility needs for balancing [MW]

<table>
<thead>
<tr>
<th>Year</th>
<th>FRR+</th>
<th>aFRR+</th>
<th>mFRR+</th>
<th>FRR-</th>
<th>aFRR-</th>
<th>mFRR-</th>
</tr>
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<tbody>
<tr>
<td>2016</td>
<td>924</td>
<td>144</td>
<td>780</td>
<td>140</td>
<td>140</td>
<td>-</td>
</tr>
<tr>
<td>2021</td>
<td>1240</td>
<td>175</td>
<td>1065</td>
<td>1000</td>
<td>175</td>
<td>825</td>
</tr>
<tr>
<td>2023</td>
<td>1240</td>
<td>175</td>
<td>1065</td>
<td>1000</td>
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NEEDS ≠ VOLUMES

| Source: Adequacy study and assessment of the need for flexibility in the Belgian electricity system - April 2016, available on www.elia.be |
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Impact for Grid Operators

Necessary Answers

Product Road maps

Flexibility needs
More important & more volatile

Flexibility sources
New technologies & players

RES development
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Despite higher RES penetration – better system balance due to improvements of balancing market design

Key Improvements:

- Reactive balancing possibility
- Single Marginal Pricing
- Continuously improved published Forecasting Data
- Continuously improved transparency data
Dynamic Determination of System Needs & means
potential future methodology

**AS IS**

### Needs
Yearly statical calculation with Pdef 99.9%
- Extreme condition can set high value for whole year (HVDC/RES)
- Quid extreme sequential conditions for specific days in 0.1% (1% error)

### Means
Needs mainly covered by contracted reserves

**TO BE**

### Needs
- In study/development
- Dynamic daily calculation
- Results
  - Lower Rx volumes for x Days
  - Higher Rx volumes for x Days
  - More reliable and more efficient

### Means
- To be studied/developed
- Dynamic daily calculation
- Results
  - Consider available flex in the system available for balancing
  - Contract only residual part
Product opening

Open our products to all:
• Technologies
• Market parties
• Voltage levels

Market rules harmonization

• Energy bidding rules
• Generic prequalification rules
• Generic activation controls
• Generic Rx performance controls
• Merit order activation

Contractual harmonization

1 standardised contract for all flexibility

Steps in function of regulation / EU discussions

2016

R2 aFRR

R3/mFRR

R1/FCR

2020

EU
Increase of offered volumes and suppliers

Offered volume of mFRR from Non Conventional Units (including demand response) has been growing over the years, in line with product opening/redesign.

# suppliers increases
FCR diversification not only in Belgium but also at EU level.
Conclusion: Making most out of decentralisation to enable the energy transition

Integrating the decentralisation into the power system is a **win-win situation** for the decentral flexibility owner and the community:

- Enables high security of supply for the society: **Reliable system**
- Increases the value for the owner and the system: **Affordable system**
- Promotes decarbonisation and quality of life: **Sustainable system**

Integrating the decentralisation into the power system benefits the entire society.