Electricity Consumption and Production: Is Balance Responsibility “renawables proof”?

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Balance Management: central role of the market participant

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

**Sources**
- Flexible set up of production units
- Flexible demand (demand response)
- Interconnections
- Storage

**Day-Ahead Market**
- Each Balancing Responsible Party (BRP) nominates hour per hour its portfolio in balance based on predictions
- To reach for a balanced portfolio every hour of the day, diverse flexibility needs are deployed, via contracts or own flexibility means

**Intra Day (ID) Market**
- Adjustment of the portfolio based on the new prognoses:
  - via Intra Day Market (until 1 to 2 hours before Real Time)
  - with own flexibility means

**ID to Real Time (RT)**
- Incentivation via Elia’s balancing tariff to keep the portfolio balanced
- Additional deviations (outages, wind …) can still be settled bilateral between market parties or by proper means

**RT Balancing Market**
- Elia regulates the residual global imbalance of the system:
  - with reserves (FCR, aFRR & mFRR) & with "free bids"
  - Elia’s regulation actions determines the Imbalance Tariff that shall incentivise BRPs to stay in balance or to help the system imbalance

**Uncertainty**
- Variability of the consumption
- Variability of the production, especially renewable sources
- Production incidents

**Market Parties/ Balancing Responsible Party**

**Elia**

**Imbalance Tariff**

2 way approach
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.
Flexibility: challenges and opportunity

Context
A rapidly changing environment …

Impact for Grid Operators
… with challenges & opportunities …

Necessary Answers
… requires an ambitious but pragmatic approach

Flexibility needs
More important & more volatile

Estimated increase in reserves
+ 25-40%

Flexibility sources
New technologies & players

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

Cover “needs” efficiently
• Reserve sharing
• Cross border integration
• Shorter term procurement
• Open market to all
  ✓ All technologies (batteries, load,..)
  ✓ All players (independent FSP)
  ✓ All voltage levels (TSO & DSO levels)
Despite higher RES penetration – stable 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
Balance Management: Balancing Products

Automatic Frequency Restoration Reserve (aFRR)
Restores the balance of the control block (and hence restores frequency to 50Hz) within 15’ (automatic activation; response time <7,5min).

Frequency Containment Reserve (FCR)
Stabilizes frequency of the synchronous area. (automatic activation; response time < 30’)

Manual Frequency Restoration Reserve (mFRR)
Manual activated reserve in addition to aFRR (in the event of large imbalances) to restore the balance of the control block. (response time <15min).

Pre-Contracted Volumes
(=Reserves)
availability guaranteed by contract – tendered weekly or monthly

- mFRR “R3 Standard”
- mFRR “R3 Flex”

“Free Bids”
Not pre-contracted; availability only guaranteed during bid validity

- Free mFRR Bids
- aFRR Up
- aFRR Down

- FCR symmetric 100 or 200MHz
- FCR asymmetric up or down

- NA
- NA
Full Market Opening for flexibility

Market players should be able to valorize flexibility:

- Anticipated consumption
- Flexibility in the load curve that can be offered to Elia provided the price is right

Opening Balancing Market to:
- All technologies
- All voltage levels
- All players

Elia’s answer: An ambitious roadmap
- Opening to all technologies & Voltage levels
- Access via ToE

- FCR / aFRR
  - FCR (apr. 2017)
  - aFRR (PoC results dec. 2017)

- mFRR “Free Bids”
  - TSO connected (Jul. 2017)
  - DSO connected: (Jan 2018)

- mFRR R3 Standard
  - (Jan 2017)

- mFRR R3 Flex
  - (Jan 2017)

- Inter TSO
  - Target* April 2018
  - Target* End 2018
  - Target* End 2018

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Managing upcoming offshore generation

With the evolution of offshore installed capacity, the **imbalance risk** on Belgian control area caused by wind speed variations increases.

![Chart showing the evolution of offshore installed capacity in Belgium](chart.png)

No concrete information yet on expected evolution after 2020 however an ambition level of >4GW is often cited by politicians.

Example of wind production cut out due to storm event (03/1/18 and 04/1/18)

To help and incentivize offshore BRPs to respect their balancing responsibilities, ELIA will work on the following aspects:

- **A weather model** dedicated to storm forecasts in North Sea; accessible to all stakeholders via our website.

- **Specific operational processes** between ELIA’s and BRP’s dispatching to coordinate actions dedicated to neutralize the imbalance risk caused by wind variations.

- **Specific process** triggered by ELIA (exhausted reserve process) if imbalance risk could not be neutralized by ex ante actions.

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Some take aways

• For the time being Elia continues to put the BRP at the center of balance management while:
  • Ensuring that as much flex in the system as possible can be unlocked – digitalization should enable further potential in the future
  • Ensuring that the BRP has the right (price) incentives to keep its portfolio balanced
  • Ensuring that, in specific case (e.g. off shore), additional ex ante and ex post operational processes are in place to ensure SoS

• If this approach will be robust towards the future (e.g. beyond 2025-2030) remains to be proven. To assess this, Elia is involved in several studies investigating what the key market design elements should be in an energy landscape with the future anticipated RES and decentralized generation penetration.
Thank you for your attention