aFRR Cooperation Austria - Germany
07.12.2016 BSG
AT-DE aFRR Cooperation Introduction: Main Drivers

Guideline and third Package

- Full in line with EU-targets for (balancing) market opening.
- Full conformity with GL EB and pioneer project in continental Europa.

**Guideline and third Package**

- **Main Drivers**
  - Full conformity with GL EB and pioneer project in continental Europa.
  - Full in line with EU-targets for (balancing) market opening.

**Timeline**

- 2016
- 2017
- 2018
- 2019
- 2021
- 2022
- 2023

**aFRR Cooperation Austria / Germany in operation since 14th July!**

IN... Imbalance Netting
aFRR... automatic Frequency Restoration Reserve
mFRR... manual Frequency Restoration Reserve
RR... Replacement Reserve
TERRE... TSO Cooperation
FCR... Frequency Containment Reserve
IGCC INC/eGCC... Interconnection Capacity

*Mandatory characteres not sure according to GL EB
AT-DE aFRR Cooperation Introduction: Key Points

TSO-TSO Modell

- TSOs keep its national core responsibilities (publication, cost bearing, regulatory issue).
- TSOs remain the interface with the local BSPs for prequalification, monitoring, procurement, activation and settlement.

Key point of current set-up aFRR Cooperation

- Coordinated optimisation for activation of aFRR based on CMOL for Energy.
- No common procurement of aFRR yet (foreseen as next step).
- No common dimensioning of aFRR.

Pre Requisites

- Required harmonisation of the prequalification process.
- Required harmonisation of the business processes & market design (aFRR product; Tender; publication; BSP-Settlement; TSO-TSO Settlement; etc.).

AT Energy-Merit-Order

DE Energy-Merit-Order

DE/AT Common-Merit-Order (CMOL)
(Abruf-Merit-Order Liste, KW34, OffPeak+)
**automatic Frequency Restoration Reserves (aFRR)**

**TSOs**
- APG
- 50Hertz
- TNG
- Amprion
- TenneT

**ACE Netting**
- Input

**Merit-Order Optimization**
- Chosen Bids

**ACE Correction***
- Output

Activation demands are netted before activation

Determination in which Control Area aFRR should be activated.

Transfer of ACE to the respective Control Area.

… Optimizer der TNG.
The correction signal "corrects" the controller input of the CA.

Activation of "corrected" ACE is done locally.

Process runs every 4s!!
AT-DE aFRR Cooperation: the CMOL Common aFRR market & security of supply

Security of supply as background of all aFRR extension activity!
(Conditio sine qua non)

- High requirements for system operation
  → local responsibility, coordination, fallback process

- High requirements for IT communication / security /algorithm
  → 4 seconds aFRR optimisation cycle!
  → Local LFC Controllers must be available all the time!
  → 5 TSO-Partners, about 60 connected BSPs in AT-DE!

→ Pioneer work in CE – first common market for automatic FRR!
Getting fit for Europe

On the way to compliancy with future European legislation

- Full in line with EU-targets for (balancing) market opening
- Full conformity with GL EB and pioneer project in continental Europa

→ Guideline Electricity Balancing puts strong requirements on TSOs

AT/DE cooperation already delivers

- Full market based procurement of balancing capacity (local) and balancing energy.
- Common Merit Order List (CMOL) across CBs for balancing energy.
- Common Activation Optimization Function (AOF).
- Implementation of a TSO-TSO model.
- Harmonization / Standardisation of governance / aFRR products / processes.
- Concept ready for managing TSOs from different bidding zones.

→ Common aFRR market enabling market potential for BSPs.
→ While keeping local systems intact to ensure fall-back procedures.
All TSO benefit

Deemed Positive effects for TSO-community

- Successful project shows a road to compliancy with European legislation.
- Pilot to gain experience for all TSO about international aFRR cooperation.
- Ready to share experiences and learnings with other TSOs.
- Open for extension with further partners.
- Demonstrates efficiency of combined local solutions with only optimization being centralized → Ensuring local fall-back level for emergencies!

- Demonstration of feasible solutions on a large scale:
  - AT/DE aFRR CMOL = ca. 2.200 MW
  - EU aFRR reserves = ca. 8.000 MW
Automatic Frequency Restoration – Organisation of power balancing / Governance

• TSO(s) responsible for SoS of its Control Block need full access to its local BSPs.
• Models enabling common markets needs to consider that basic principle!
• Hence TSO-LSO cooperation model was developed (and agreed during EB GL development)!

Prequalification Procurement Settlement Publication Activation Monitoring

TSOs SoS responsibility

TSOs Control Block responsibility

TSOs market responsibility

Balancing Market

Intraday Market

Day-Ahead Market

Long Term Market

Generation Load

51 Hz 50 Hz 49 Hz

51 Hz 50 Hz 49 Hz

~ ~ ~ ~
Balancing Market governance principle – TSO – TSO cooperation model / Governance

TSOs
(technical parameters; online connection)

Centralised function (enabling CMOL)

Connections to each TSO system controllers (ACE)*

TSOs (market interface)

Bids / Offers („Order Books“)

Capacities (techn. Limits)

AOF
Activation Optimization Function

Prequalification Procurement Settlement
Publication Activation Monitoring

~ ~ ~ ~ ~ BSPs

Bids Offers

TSO 1

TSO 2

TSO 3

Connections to each TSO

~ ~ ~ ~ ~ BSPs

Bids Offers

TSO 1 market

TSO 2 market

TSO 3 market

* Connection to each TSO necessary.
ACE... Area Control Error
Market Coupling governance principle – Successful Role Model / Governance

Centralised function (enabling CMOL)

TSOs (technical parameters)

CCR1

CCR2

CCR3

MCO (Market Coupling Operator)

Bids / Offers („Order Books“)

Order Books

Limits

Bidding Zone 1

NEMO

Bids

Offers

Trader

Bidding Zone 2

NEMO

Bids

Offers

Trader

Bidding Zone 3

NEMO'

s

Bids

Offers

Trader

TSOs (technical parameters)

PXs (market interface)