



aFRR Cooperation Austria - Germany

07.12.2016 BSG

AT-DE aFRR Cooperation Introduction: Main Drivers

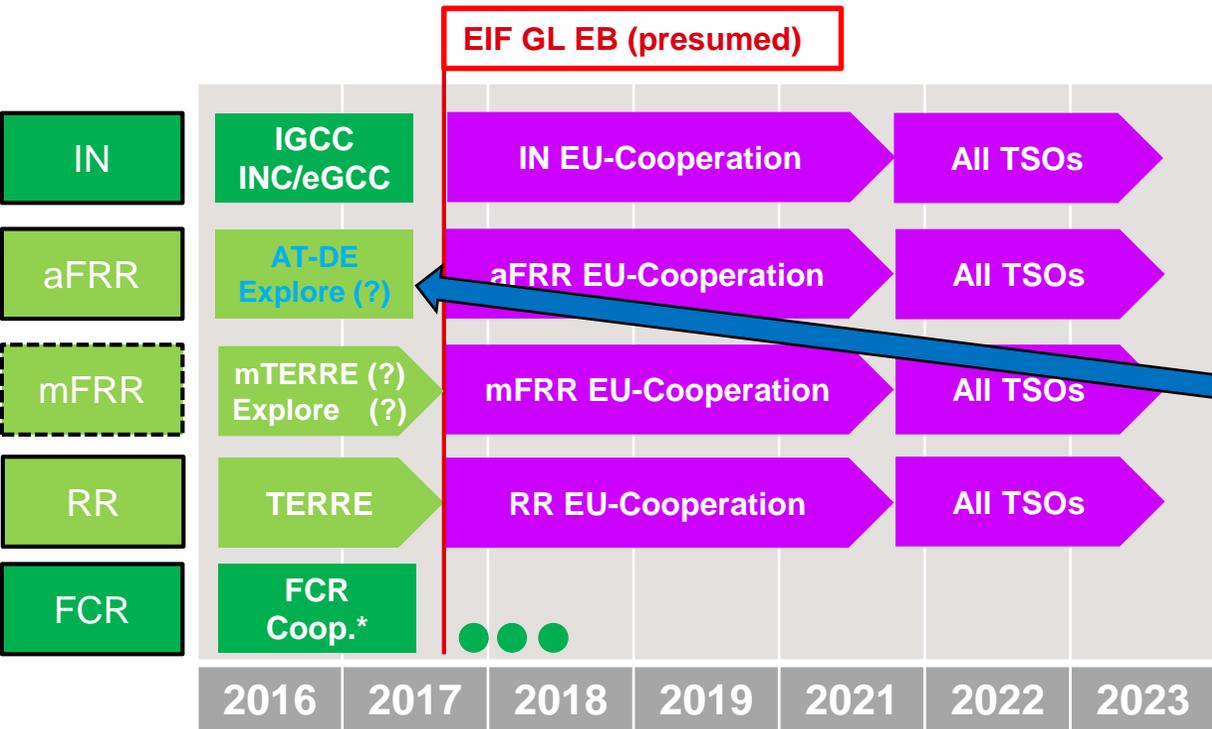


Guideline and third Package

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



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



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.

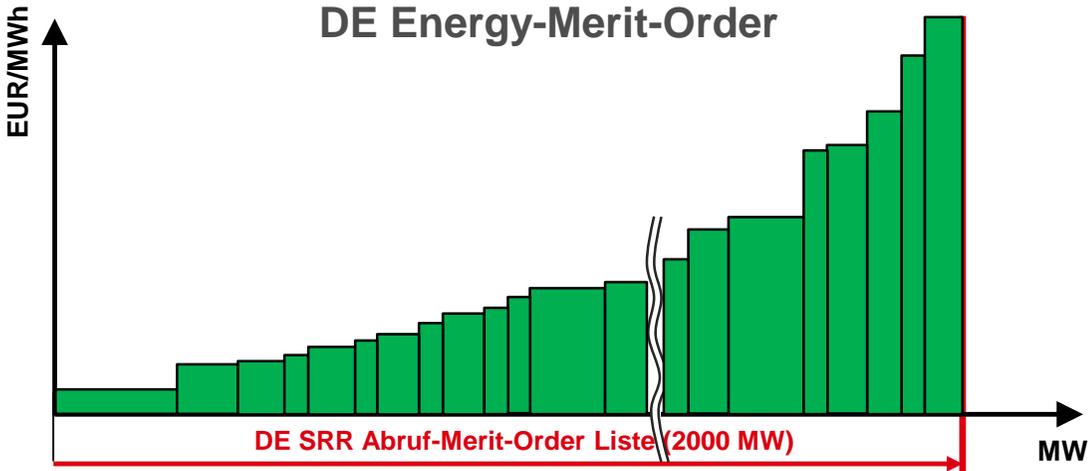
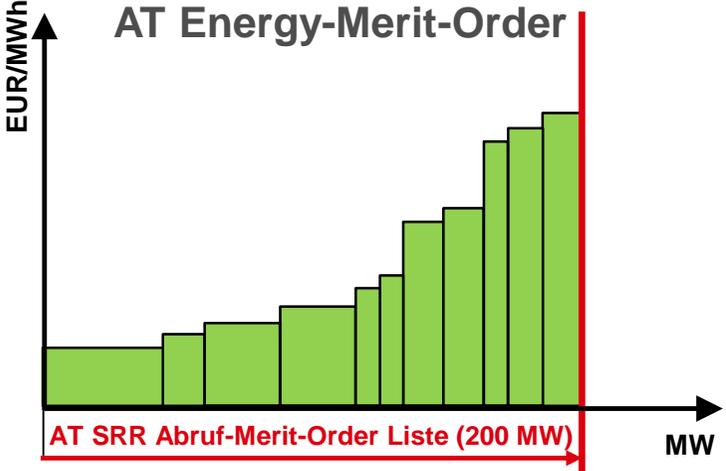
Key point of current set-up aFRR Cooperation

- **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.

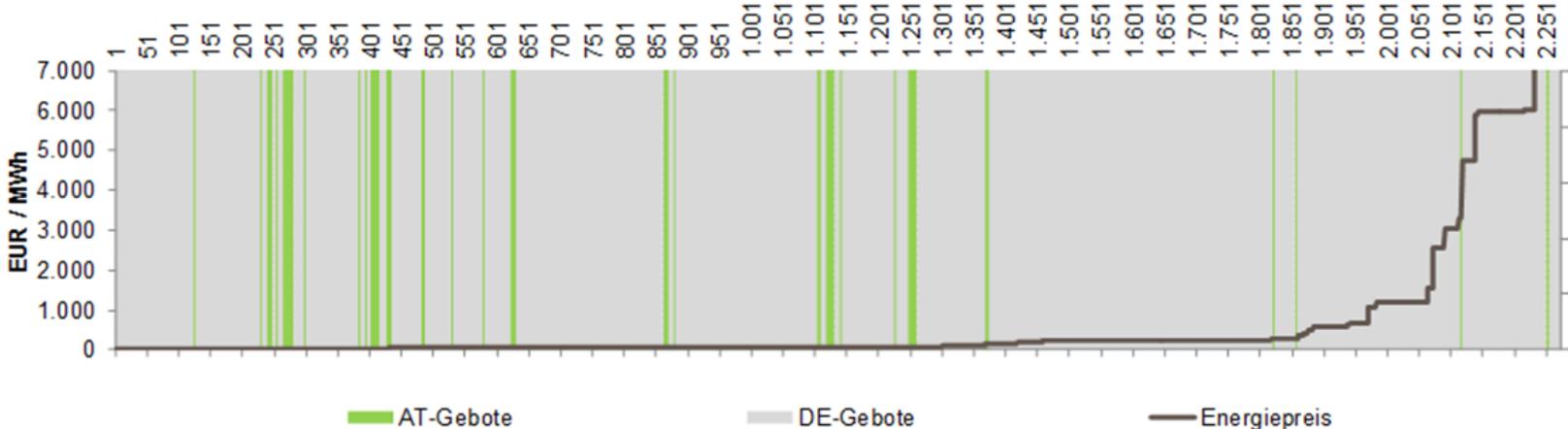
Pre Requisites

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

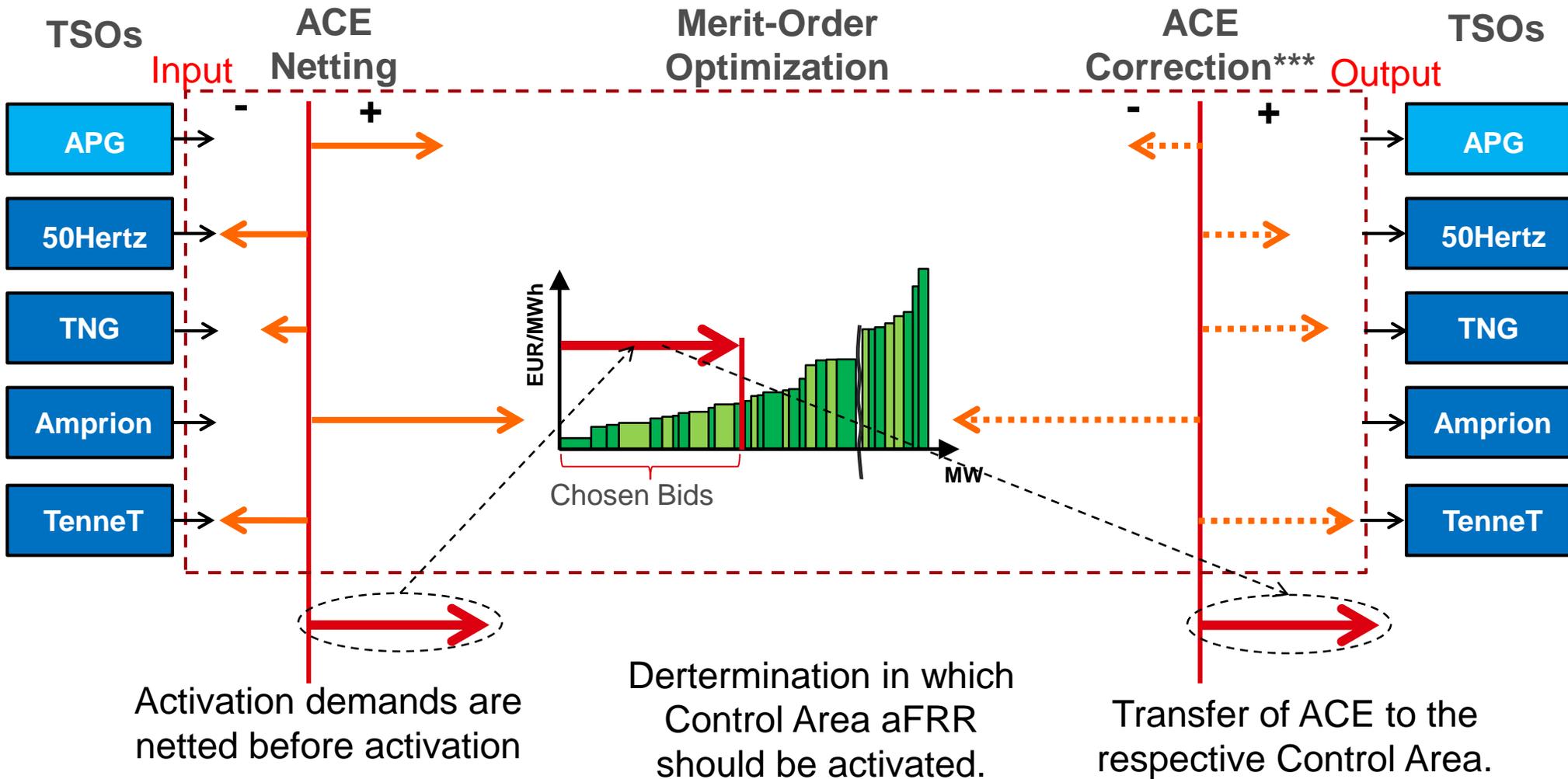
AT-DE aFRR Cooperation: aFRR market „Common Merit Order List“ for Bal. Energy



DE/AT Common-Merit-Order (CMOL)
 (Abruf-Merit-Order Liste, KW34, OffPeak+)



automatic Frequency Restoration Reserves (aFRR)

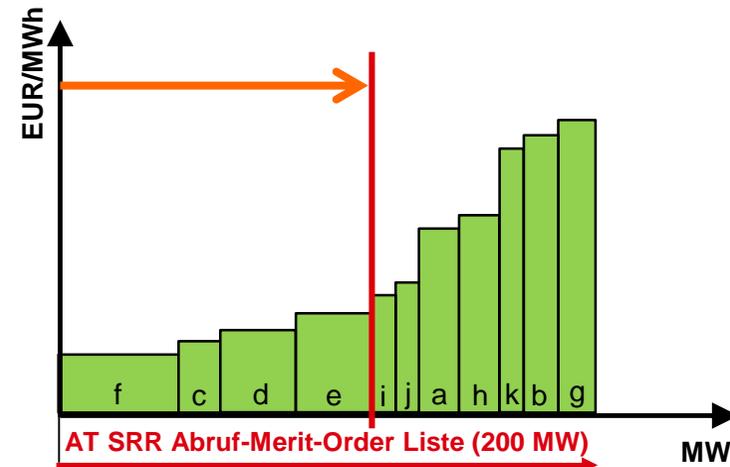
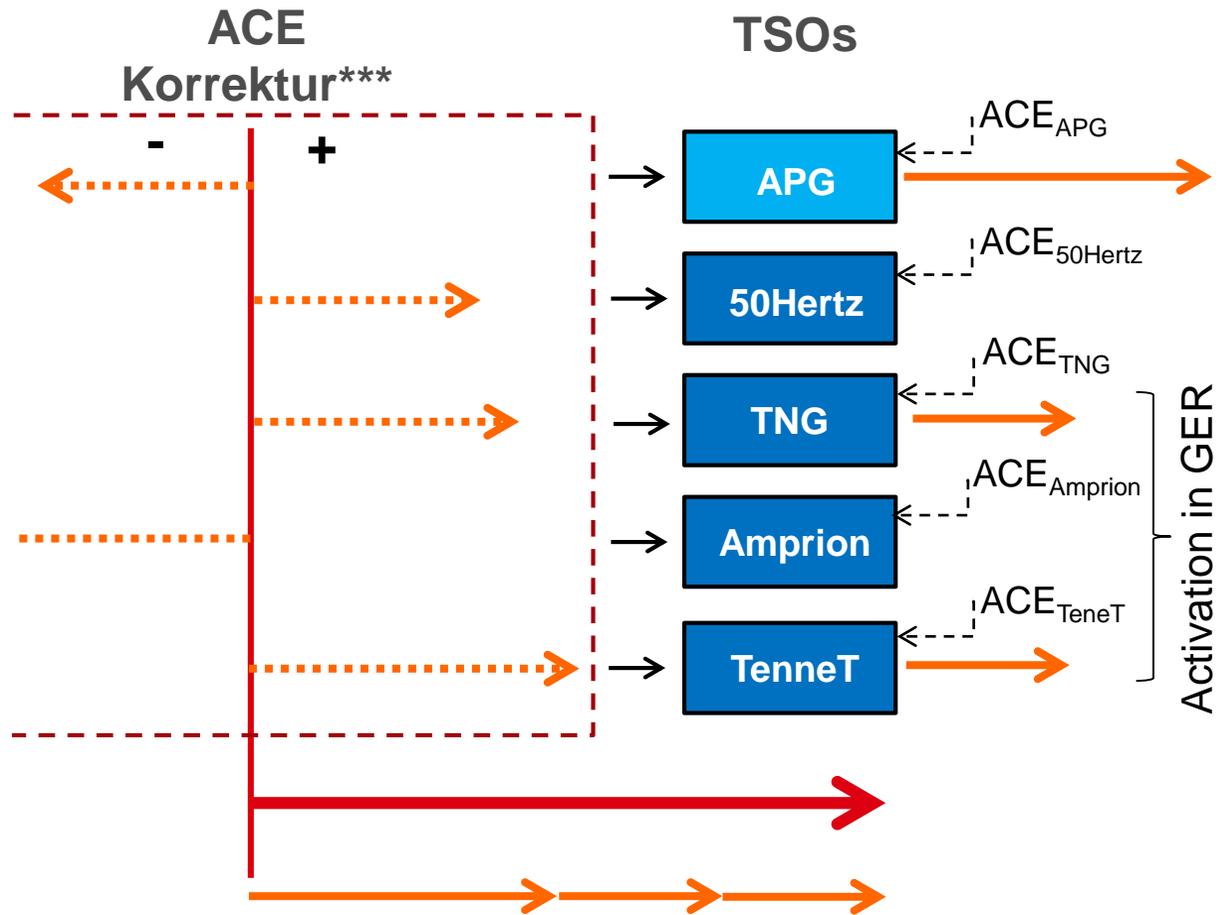


Activation demands are netted before activation

Determination in which Control Area aFRR should be activated.

Transfer of ACE to the respective Control Area.

automatic Frequency Restoration Reserves (aFRR)



- 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



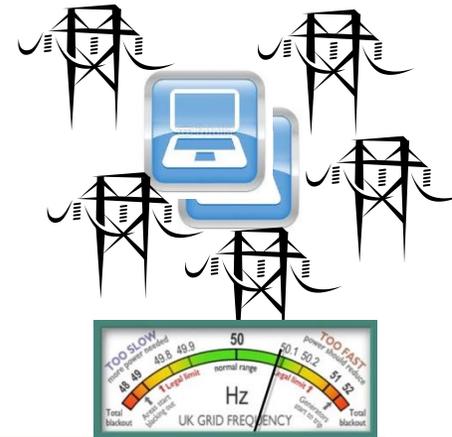
Security of supply as background of all aFRR extension activity!

(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

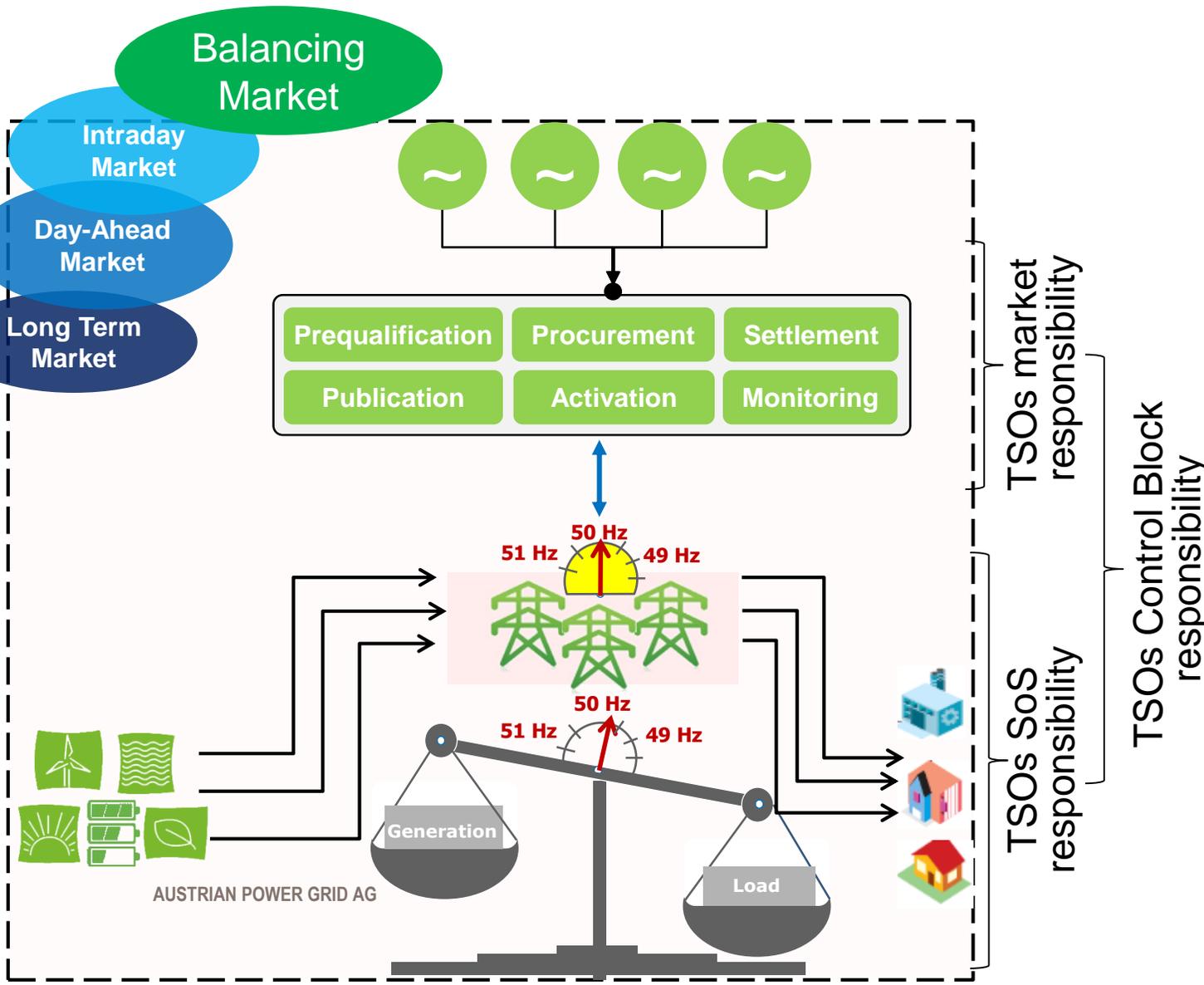


Deemed Positive effects for TSO-community

- 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

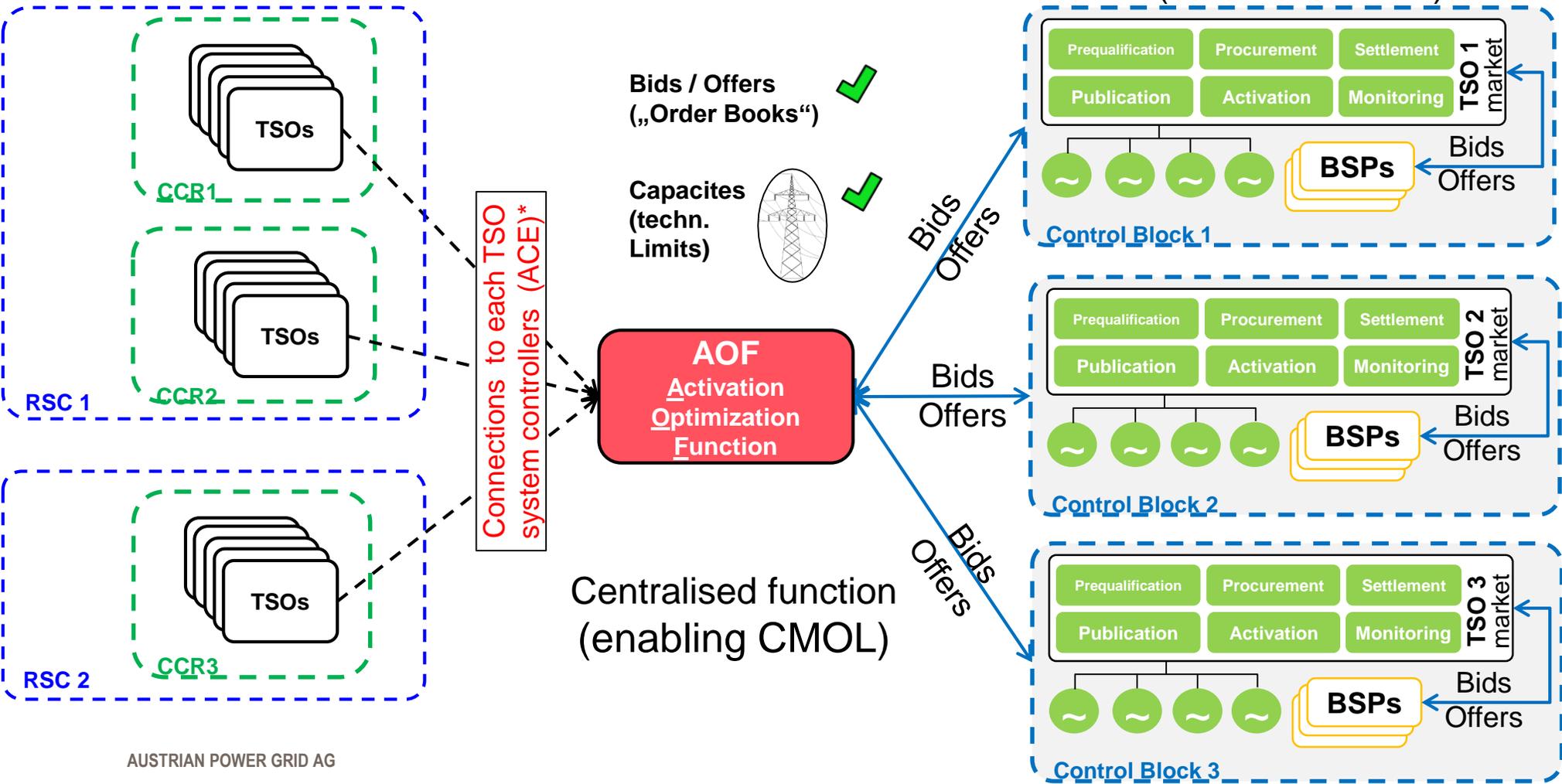


- TSO(s) responsible for SoS of its Control Block need full access to its local BSPs.
- Models enabling common markets needs to consider that basic principle!
- Hence TSO-TSO cooperation model was developed (and agreed during EB GL development)!

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

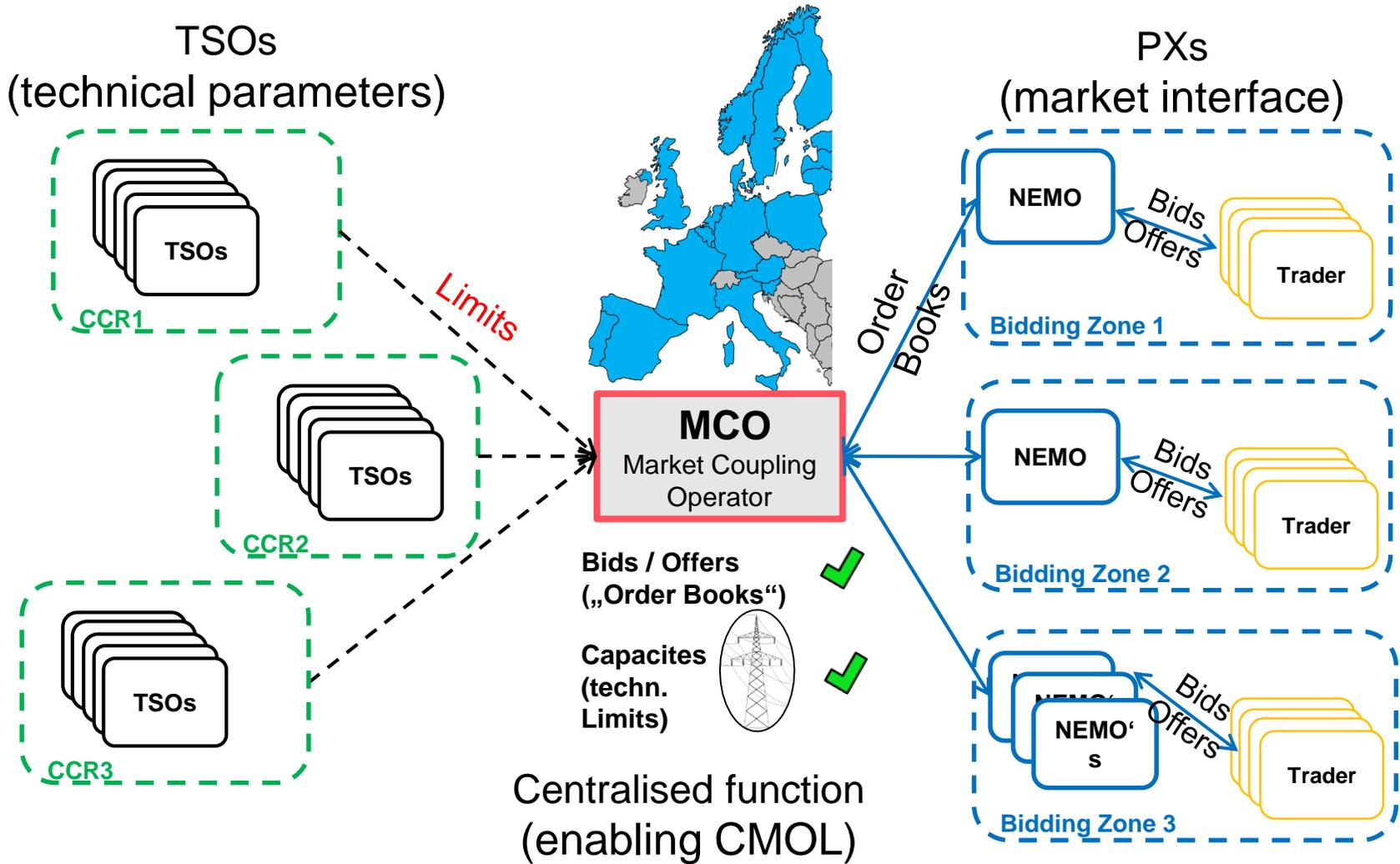
TSOs
(technical parameters; online connection)

TSOs
(market interface)



* Connection to each TSO necessary. ACE... Area Control Error

Market Coupling governance principle – Successful Role Model / Governance



AUSTRIAN POWER GRID AG

MCO... Market Coupling Operator

Bidding Zone... Single price area

NEMO... National Electricity Market Operator

CCR... Capacity Calculation Region