• All tasks and obligations on TSOs from Regulation 714 still apply
• TSOs serve as enablers for trade of electricity across the EU
  • Via market coupling in the day-ahead time frame
  • Via continuous matching in the intraday timeframe
• TSOs main tasks focus on pre- and post-coupling processes
• Formally, the obligation to allocate cross-zonal capacity lies with the TSOs, despite CACM GL introducing the entity of the Nominated Electricity Market Operator (NEMO)
Tasks for TSOs Explicitly Listed in CACM GL

- In accordance with CACM GL Art. 8 (2), TSOs are to:
  - Perform capacity calculation
  - Send cross-zonal capacities (and allocation constraints) to the market coupling operator(s)
  - Verify results from single day-ahead coupling
  - Calculate scheduled exchanges (where required)
  - Share congestion income
  - Establish and operate fallback procedures, in case market coupling fails
Explicitly highlighted tasks for TSOs in CACM GL

• Furthermore, TSOs are to:
  • Draft terms, conditions and methodologies pursuant to CACM GL Art. 9
  • Organise day-to-day management of market coupling together with NEMOs
  • Coordinate and cooperate among them and with NEMOs
  • Conduct a bidding zone review after initiation
  • Respect the objectives of CACM GL (i.e. Art. 3)
Pre-Coupling, Coupling and Post-Coupling

**Pre-Coupling**
- Calculation of cross-zonal capacities
- Regional (i.e. per capacity calculation region)
- Based on common grid models
- TSOs

**Market Coupling**
- Market Coupling
- Pan-EU
- Computation of market clearing prices and net positions
- NEMOs

**Post Coupling**
- Clearing and Settlement
- Per Bidding Zone border
- Scheduling of flows
- NEMOs and TSOs
Simplified Process for Single Day-Ahead Coupling

**NEMO Functions**

- Market Participants
- Collect Orders
- Market Coupling Operator
- Orders for Matching
- Net Positions
- Central Counter Party
- Executed Orders
- NEMO
- Shipping Agents

**TSO Functions**

- TSO
- Individual Grid Model
- Cross-Zonal Capacity
- Allocation Constraints
- Coordinated Capacity
- Coordinated Capacity Calculator
- Price Coupling Algorithm
- Common Grid Model
- Cross-Zonal Capacity
- Scheduled Exchange Calculator
- Generators and Loads
- Generation and Load Data Provision

**Pre-Coupling**

- Collect Orders
- Orders for Matching

**Coup**

- Market Coupling Operator
- Net Positions
- Single Clearing Price per BZ
- Single Net Position per bidding zone

**Post-Coupling**

- Scheduled Exchanges between areas
- Scheduled Exchanges
- Cross-Zonal Capacity Validation
- Common Grid Model

- Generation and Load Data Provision
- Capacity Calculation
Pre-Coupling Processes – Capacity Calculation

- Data Provision
  - Forecasts for:
    - load
    - generation
    - RES
    - grid topology

- Preparation of inputs:
  - Individual Grid Model
  - Generation Shift Key
  - Remedial Actions
  - (Allocation constraints)

- Capacity Calculation:
  - Based on Common Grid Model
  - Following coordinated NTC or flow-based approach

- Sending results to market coupling operator and publication
  - Cross-zonal capacities
  - (Allocation constraints)

- DSOs, HVDC, generators, loads
- TSO
- Coordinated Capacity Calculator
- TSO
- Validation
- Coordinated Capacity Calculator

- Performed one time in D-2 for single day-ahead coupling
- Performed n times in D-1 and D for single intraday coupling
Pre-Coupling Processes – Other Tasks

- TSOs are to use the latest available information and forecasts at any of the stages.

- Additional tasks for TSOs are:
  - Organize the merging process for individual grid models
  - Set-up of a coordinated capacity calculator
  - Review of capacity calculation processes every other year
Post-Coupling Processes

Verification of results
- Check that all inputs to market coupling were respected and not violated

Scheduling cross-border and internal
- Calculation of scheduled exchanges
- Updating individual grid models

Coordinated Security Analysis
- Based on Common Grid Model
- Detection of overloads

Redispatch and Countertrading (RDCT)
- Determine required volume of RDCT resources

Cost Sharing for RDCT
- Splitting of costs
- Settlement

- Performed one time in D-1 after single day-ahead coupling
- Performed n times in D-1 and D after single intraday coupling
Coordination among TSOs

- Coordination among TSOs takes place on several levels
  - Pan EU: involves all (EU) TSOs (e.g. common grid model)
    - Coordination through ENTSO-E
  - In a capacity calculation region: involves the TSOs of a capacity calculation region (e.g. capacity calculation, redispatch and countertrading)
    - Separate governance structures
  - In regions to be defined (e.g. complementary regional auctions, bidding zone review)
    - Separate governance structures
Formally tasks of ENTSO-E

- Biennial report on capacity calculation and allocation
- Technical report on current bidding zone configuration
- Report on the progress and potential problems with the implementation of single day-ahead and single intraday coupling
- Report on effectiveness of the operation of the price coupling algorithm and of the continuous trading matching algorithm (together with NEMOs)
- Report on effectiveness of the criterion concerning the estimation of the value of lost load
- Review of the methodology for calculating scheduled exchanges resulting from single day-ahead coupling

All necessary data must be provided by TSOs for

- The reports listed above
- Monitoring obligations on NRAs and ACER
Duties implicitly stemming from CACM GL and FCA GL

- **Contracts**
  - Among TSOs for different regions and tasks
  - Among TSOs and NEMOs

- **Upgrade of IT infrastructure and communication systems**
  - To enable data exchange
  - To facilitate more coordinated processes
  - To enable multiple NEMOs in one bidding zone (where applicable)

- **Set-up and upgrade of platforms to**
  - Meet transparency requirements (e.g. JAO website, ENTSO-E website)
  - Perform auctions for long-term timeframe (e.g. JAO)

- **Respect interdependencies among the network codes and guidelines, both when drafting terms, conditions and methodologies and during implementation.**
Challenges for TSOs in Performing Their Tasks

- General reluctance to change
  - Passing on the performance of tasks to other entities (e.g. coordinated capacity calculator)

- Fostered coordination and cooperation

- Coping with being in more than one capacity calculation region
  - Assigning resources with exclusive access to CCRs (e.g. sharing of remedial actions among CCRs)
  - Sharing of power flow capabilities on grid elements

- Mistrust and different cultures among TSOs

- Increased efforts towards increased transparency
  - In conjunction with flow-based capacity calculation, a lot more data is made available to the public
Questions?

Happy Adopting! 😊
Contact

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