Role of PXs in coupling the markets & NEMO function

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AGENDA

I. European Day-Ahead Market Coupling
   1. Relevance of market coupling
   2. How does day-ahead market coupling work?
   3. Short history of day-ahead market coupling

II. Guideline on Capacity Allocation and Congestion Management (CACM)
   1. What is CACM all about? What is its position in the EU regulatory framework?
   2. How are power exchanges impacted by CACM?
   3. Who are the main players under CACM? How do they interact?

III. The role of Nominated Electricity Market Operators (NEMOs) under CACM
   1. The Market Coupling Operator (MCO) function vs. NEMO tasks
   2. The MCO plan
   3. NEMO terms and conditions or methodologies

IV. Regulated Competition or Self-Interested Cooperation?
European Day-Ahead Market Coupling
Relevance of market coupling

- Optimal use of interconnectors facilitating congestion management
- Reduction of price volatility
- Price convergence of market areas in case of sufficient border capacity
- Smoothing effect on negative or positive price spikes
- Dissemination of signals of extreme weather conditions (i.e. cold wave, storm front) to other market areas
- Higher security of supply through market integration and no longer depending on the individual country

>> increase of overall welfare
How does DA market coupling work?

The diagram illustrates the process of market coupling between different regions. It involves regional PXs (Power Exchange) and TSOs (Transparency System Operators) interacting through interfaces for grid and hub positions data. The key components and steps are as follows:

1. Regional TSOs-PX interface for grid & hub positions data
2. Regional PX Trading System
3. Price coupling algorithm
4. PCR Cloud
5. Participating PXs
6. Rotation: Coordinator, Backup & Operators

Each region has its own COORDINATOR or HOT BACKUP COORDINATOR, with a Price coupling algorithm for market coupling. The PCR Cloud facilitates data exchange and coordination among the regions.

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How does DA market coupling work?
Short history of DA market coupling

- CWE Market Coupling + Interim Tight Volume Coupling with Nordics (2010)
- NWE Price Coupling (02/2014)
- Single European Price Coupling (05/2015)

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Guideline on
Capacity Allocation and
Congestion Management
What is CACM all about?

Overview Network Codes/Guidelines

- System Operation related Guidelines
  - Operational Security
  - Operational Planning & Scheduling
  - Load Frequency Control & Reserves
  - Emergency & Restoration

- Grid Connection related Guidelines
  - Requirements for Generators
  - Demand Connection Code
  - HVDC Connection Code

- Market related Guidelines
  - Capacity Allocation & Congestion Management
  - Forward Capacity Allocation
  - Balancing Network Code
What is CACM all about?

Superordinate goal:

DA/ID Market Coupling

- Capacity Calculation Regions
- Bidding Zones
- Nominated Electricity Market Operators
- Common Grid Model
- Single Market Coupling
- Coordinated Redispatch/Countertrading
How are power exchanges impacted?

<table>
<thead>
<tr>
<th>NEMO (D-A / ID)</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPEX SPOT</td>
<td>LU, DE, FR, GB, NL, AT, BE, DK, SE, PL, FI, EE, LV, LT</td>
</tr>
<tr>
<td>NORD POOL</td>
<td>DK, EE, FI, LV, LT, SE, AT, FR, GB, NL, DE, BE, PL, IRL</td>
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<tr>
<td>EXAA</td>
<td>Austria</td>
</tr>
<tr>
<td>POLPX</td>
<td>Poland</td>
</tr>
<tr>
<td>EIRGRID, SONI</td>
<td>Ireland, Northern Ireland</td>
</tr>
<tr>
<td>BSP</td>
<td>Slovenia</td>
</tr>
<tr>
<td>CROPEX</td>
<td>Croatia</td>
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<tr>
<td>OMIE</td>
<td>Spain*, Portugal*</td>
</tr>
<tr>
<td>GME</td>
<td>Italy*</td>
</tr>
<tr>
<td>HUPX</td>
<td>Hungary*</td>
</tr>
<tr>
<td>OTE</td>
<td>Czech Republic*</td>
</tr>
<tr>
<td>OKTE</td>
<td>Slovakia*</td>
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<tr>
<td>OPCOM</td>
<td>Romania*</td>
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<tr>
<td>LAGIE</td>
<td>Greece*</td>
</tr>
<tr>
<td>IBEX</td>
<td>Bulgaria*</td>
</tr>
</tbody>
</table>

*Legal monopoly
How are power exchanges impacted?

- Power Exchanges are formally recognized in the third energy package for the first time
- Market coupling is formally recognized and becomes subject to European regulation
- The terms Nominated Electricity Market Operator and Market Coupling Operator (Function) are created – they are not fully consistent with the concept of a power exchange
- A new form of cooperation between NEMOs at European level needs to be established
Who are the main players under CACM?

<table>
<thead>
<tr>
<th></th>
<th>Authorities</th>
<th>System Operators</th>
<th>Marketplaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>European</td>
<td>EU COM, ACER</td>
<td>ENTSO-E</td>
<td>INC</td>
</tr>
<tr>
<td>Regional</td>
<td></td>
<td></td>
<td>NEMOs</td>
</tr>
<tr>
<td>National</td>
<td>NRAs</td>
<td>TSOs</td>
<td>NEMOs</td>
</tr>
</tbody>
</table>

- Who is foreseen to be in charge of the main deliverables?
- Who is considered the approving body/authority?
- What kind of escalation route is provided in the various cases?
- What are the first experiences with CACM?
Who are the main players under CACM?

- **Market Coupling**
  1. TSOs calculate and submit cross-border capacity
  2. NEMOs receive orders and submit order books
  3. NEMOs calculate results:
     1) Prices
     2) Net Positions
  4. TSOs validate results
  5. NEMOs validate results
  6. Calculate scheduled exchanges
  7. Act as central counterparty for clearing and settlement of energy

- **Pre-Coupling**
  - Capacity Calculation Methodology
  - MCO Plan
  - Algorithm Proposal
  - Product Proposal
  - Maximum and Minimum Price Methodology

- **Coupling**
  - Back-up Methodology
  - Fallback Procedures
  - Multi NEMO Arrangements

- **Post-Coupling**
  - Congestion Income Distribution methodology
  - Scheduled exchange calculation methodology
The Role of Nominated Energy Market Operators under CACM
The NEMO tasks

- Implementing the Market Coupling Operator (MCO) functions
- Establishing collectively all requirements for the single intraday and single day-ahead coupling and the respective algorithms
- Determining maximum and minimum prices
- Making anonymous and sharing the received orders
- Assessing and validating the result calculated by the MCO function
- Publishing results and informing market participants
- Acting as central counterparty for clearing and settlement
- Establishing jointly back-up procedures for national or regional markets
- Providing jointly cost forecasts and cost information the NRAs and TSOs
The MCO function

- Develop and maintain algorithms, systems and procedures for single day-ahead and intraday coupling
- Process input data on cross-zonal capacity and allocation constraints
- Operate price coupling and continuous trading matching algorithm
- Validate and send single day-ahead and intraday coupling results to the NEMOs
The MCO plan

• Introduction
• Definitions
• General principles for NEMO cooperation
  • All NEMO Committee (All NEMO Cooperation Agreement: cooperation, escalation & decision-making)
• Implementation timeline (milestones and go-live dates)
• Day Ahead cooperation (different options and roles, daily sequences)
• Intraday cooperation (matching process and daily sequences)
• Expected Impact of CACM methodologies on MCO plan
# NEMO Methodologies

<table>
<thead>
<tr>
<th>Methodology</th>
<th>1st proposal</th>
<th>2nd proposal</th>
<th>NRA decision</th>
<th>ACER escalation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backup</td>
<td>✗</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Products</td>
<td>✗</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Min/Max Prices</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>Algorithm</td>
<td>✗</td>
<td>✗ / ?</td>
<td>✗</td>
<td></td>
</tr>
</tbody>
</table>

*Backup, Products, Min/Max Prices, and Algorithm are compared across three tables: 1st proposal, 2nd proposal, and NRA decision. ACER escalation indicates whether a process is completed.*
NEMO Backup Methodology

- General rules (stress tests, avoidance etc.)
- Communication systems: at least one alternative connection for file exchange mechanism & different alternative mechanisms to exchange anonymous input/output
- Datacentres: minimum performance requirements and secondary centres on voluntary basis
- Backup Coordinator
- Algorithm computation process: pre-tested alternative configurations
- Results confirmation: commonly agreed procedures to address rejections
- Timings
NEMO Products Methodology

• Agreement on market time unit

• Complex orders:
  • economic conditions addressing a minimum income or a maximum payment condition

• Block orders:
  • linked block orders
  • exclusive groups of block order

• Other order types (merit orders, PUN orders)
NEMO Min/Max Prices Methodology

**DA prices**

+3000/-500 EUR/MWh as starting point and automatic adjustment of price cap by +1000 EUR/MWh in case 60% of max price has been reached once.

Implementation timeline for increased cap: next day, but implementation in bidding zones 5 weeks after trigger event; further increase by +1000 EUR/MWh in case 60% of the new max price cap has been reached in the meantime.

**ID prices**: +/- 9999 EUR/MWh: increase in case the DA price reaches the ID level
Regulated Competition or Self-Interested Cooperation?
**Competition or cooperation?**

*Which changes have been introduced by CACM?*

- No voluntary cooperation anymore
- New regulatory layer
- New form of competition introduced by the concept of shared liquidity

*In which regard are PXs/NEMOs forced to cooperate?*

- Operation and implementation
- Methodologies
- NEMO committee

*What about competition?*

- Different situation across Europe (monopolies, market evolution)
- Prices/Service quality/additional products and services

*What are the effects of this piece of regulation?*