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Electricity market functions – short overview and description

Online capacity-building material

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The EU4Energy Initiative covers all EU support to improve energy supply, security and connectivity, as well as to promote energy efficiency and the use of renewables in the Eastern Partner countries Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine. It does this by financing projects and programmes that help to reform energy markets and to reduce national energy dependence and consumption. Over the longer term, this makes energy supply more reliable, transparent and affordable, thus reducing energy poverty and energy bills for both citizens and the private sector.

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- ACER - European Agency for the Cooperation of Energy Regulators
- CACM – Regulation 2015/1222 establishing a guideline on Capacity Allocation and Congestion Management
- DSO – Distribution System Operator
- MCO - Market Coupling Operator
- MO – Market Operator
- NRA – National Regulatory Authority
- PX – Power Exchange
- TSO – Transmission System Operator
- NEMO – Nominated Electricity Market Operator

European Agency for the Cooperation of Energy Regulators - ACER

The Agency for the Cooperation of Energy Regulators (ACER)¹, was created by the Third Energy Package to further progress the completion of the internal energy market both for electricity and natural gas. As an independent European structure which fosters cooperation among European national energy regulators, ACER ensures that market integration and the harmonization of regulatory frameworks are achieved within the framework of the EU's energy policy objectives. The latter aim to create:

- A more competitive, integrated market which offers consumers more choice;
- An efficient energy infrastructure guaranteeing the free movement of energy across borders and the transportation of new energy sources, thus enhancing security of supply for EU businesses and consumers;
- A monitored and transparent energy market guaranteeing consumers fair, cost-reflective prices and the deterrence of abusive practices.

National Regulatory Authority - NRA

In accordance with the provisions of the EU legislation, each EU country should establish the national energy regulator. The regulator's are providing the circumstances for development of competitiveness in the energy market and ensuring its operation by taking into account the requirements for sustainable, reliable and high-quality supply.

The regulator's tasks defined by the EU legislation (Third Energy Package, Clean Energy Package) and can be summarized in the following areas:

- regulation of the network activities, which covers economic regulation of all electricity system operators and the regulation of the network with respect to issuing consents to the general acts
- promoting the production of electricity from renewable sources and cogeneration
- promoting efficient use of energy
- monitoring of electricity supervising the providers of energy operators' activities
- protecting the rights of consumers

In order to act in the interest of all market participants, the regulator must be politically and financially independent.

¹ <https://www.acer.europa.eu/en>



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Transmission System Operator – TSO

TSO is an entity who carries out the function of transmission of electricity on high-voltage network and is responsible for operating, maintaining and developing the electricity transmission network in a given area and, where applicable, its interconnections with other systems, and for ensuring the long-term ability of the transmission network to meet reasonable demands for the transmission of electricity.

Distribution System Operator - DSO

DSO is an entity who carries out the function of distribution of electricity on medium-voltage and low-voltage network with a view to its delivery to customers and is responsible for operating, maintaining and developing the electricity distribution network in a given area and for ensuring the long-term ability of the distribution network to meet reasonable demands for the distribution of electricity.

Unbundling

Network operators (TSO and DSO) shall be unbundled from activities on the generation (production) and supply of the electricity and/or gas. It is not prohibited the operation of a combined transmission and distribution system operator, it also should be compliant with the unbundling requirements.

Market Operator - MO

In the EU and also other electricity markets there is a lot of confusion when using the term “market operator”. While terms such as “Transmission system operator” (TSO or “system operator”, with subvariant ISO (independent system operator) and others – related mostly to the ownership of assets) and “Distribution System Operator” (DSO) are clear and mostly uniform in meaning, the meaning of “market operator” is clearly not.

The term “**market operator**” mostly refers to an entity which performs certain “system” roles in the electricity market, which may not even exist in every country (usually tasks performed by the TSO), like balance scheme management, recording of closed contracts and operational forecast, balancing the market, imbalance settlement. Although not universal it is quite common². Examples (as a separate legal entity) include Borzen (Slovenia), ELEXON (UK), SEMO (Ireland), APCS (Austria), HROTE (Croatia), OKTE (Slovakia), OTE (Czech Republic), OPCOM (Romania) – and others (e.g., COTEE (Montenegro)).

*In the Network Code on Electricity Balancing and the Network Code on Emergency and Restoration the functions of traditional “market operators” were recognized as “third parties”. While in the Clean Energy Package (Electricity Regulation (EU) 2019/943 on the internal market for electricity), they have been recognised as “**delegated operators**”³. The definition of delegated operators (also called third-party market operators) and their role in the electricity market is an acknowledgement of existing arrangements in certain Member States, whereby specific tasks, such as imbalance settlement, are*

² For more information, see for example a communication from Europex on this matter: <https://www.europex.org/position-papers/the-essential-tasks-of-third-party-market-operators-facilitators-in-the-electricity-market/>

³ Article 2(33), Article 3



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assigned or delegated to a non-TSO third party by a Member State or a Transmission System Operator (TSO).

The market operators' tasks can be summarized in the following areas:

- the administration of the bilateral electricity market,
- calculation of the imbalances of the balancing responsible parties in accordance with the final daily schedule and the measurements obtained from the electricity transmission system operator and the operators of the electrical distribution systems,
- timely submission to the operator of the electricity transmission system all information necessary for the preparation of the final daily schedules for the purchase and sale of electricity
- keeping records of all contracts for market participation concluded with the participants in the electricity market,
- keeping records of all agreements for the establishment of balance groups concluded between the participants in the electricity market and the operator of the electricity market,
- preparation of a daily market plan,
- keeping a register of market participants,
- keeping a register of balance groups on the market,
- timely submission to the electricity transmission system operator of all information for the registered participants in the electricity market,
- concluding purchase and sale contracts, as well as taking a balanced responsibility for the electricity generated by privileged producers using a feed-in tariff.

Power Exchange - PX

Power Exchange is an entity providing a competitive spot market for electric power trading on a day ahead or intraday organized market place. In terms of electricity trading, organized market places complement bilateral physical contracting, often called Over the Counter markets (OTC). OTC markets will always be larger in size since market participants might always need to have tailor-made contracts and products.

However, an organized trading place brings many advantages to the market as well as provides market participants with:

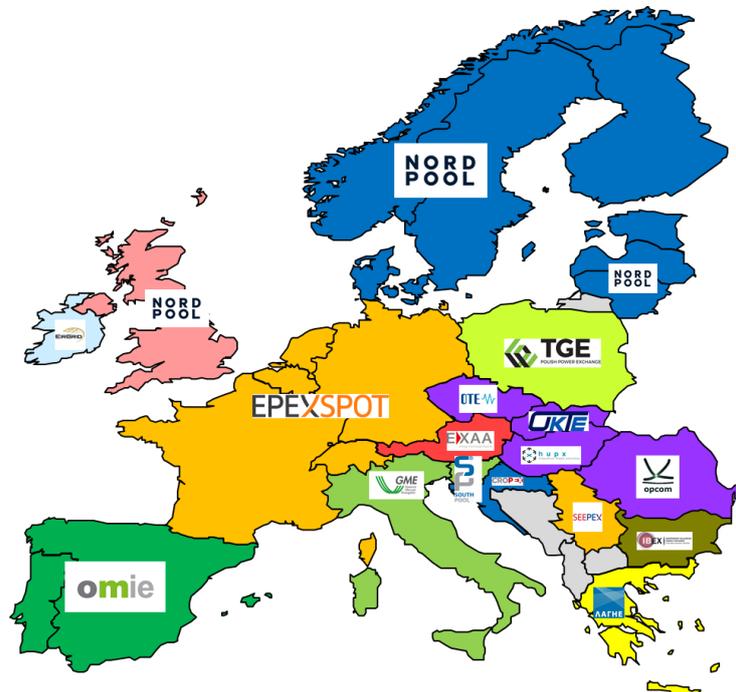
- reliable electricity price index,
- transparency offers more possibilities and higher security for investors,
- it enables a more efficient procurement or sale of electricity (compared to classic public procurement tendering),
- reduced counterparty risk and risk mitigation opportunities,
- a supplementary tool for managing trading risk (creation of a price signal allows operators to take economically rational decisions - buy/sell allowances, production modulation, choice of production),
- a key role in managing transmission system congestion,
- trading activities are more efficient because there is less work involved in closing deals over the trading platform compared to bilateral trading.

Currently, there are currently 15 organized market places (Power exchanges) across the EU.

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Picture 1: Power exchange overview in Europe

Main principles of power exchanges:

- Liquidity - Power exchange liquidity is measured in the distribution of bids and offers provided by market participants and are reflected as power exchange market resilience to drastic price changes in case of increased market participants bids and offers volume. The liquidity is a key measurement for small markets in development with one major producer where one can manipulate the price of electricity with overbidding other smaller market participants. Liquidity is provided to the power exchange market by an increased number of active market participants and with the integration of neighboring markets via a market coupling mechanism.
- Competition and open market - fully opened and liberalized electricity market is necessary for the successful power exchange market. If there are only one or two major market participants with special treatment by authorities the organized exchange market will be distorted. A large number of market participants, the market share of the biggest two, three, four and absence of any special market fees and exemptions for privileged participants are important for successful power exchange operation and the reliable price index for bidding zone.
- Non-discriminatory treatment and anonymity - in comparison to bilateral power trading between trading companies directly, power exchange trading enables all market participants the nondiscriminatory and anonymous access to a trading platform where bids and offers are matched anonymously. Therefore all stakeholders are secured with transparent and non-distorted trading with transparent price formation which enables all stakeholders a secure business environment.
- Clearing and settlement - All transactions between market participants on the organized power exchange market are cleared and settled by a central counterparty, being power exchange itself

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or independent entity performing clearing and settlement service on behalf of power exchange. The central counterparty core role is to become the middle entity between seller and buyer. With robust clearing and settlement system design with utilizing different types of collaterals, market participants are always fully secured, and the risk of late payment and insolvency of the counterparty is reduced to a minimum.

Commission regulation 2015/1222 – CACM guideline

Commission Regulation (EU) 2015/1222 establishing a guideline on capacity allocation and congestion management (hereby CACM⁴) was adopted on July 24th 2015 with the entry into force date August 14th 2015. The entry into force date is key date whereas all CACM deadlines are referring to and are important for implementation deadlines for all involved stakeholders.

The main purpose and objective of the CACM are to establish effective, secure, optimal, fair and competitive internal electricity market with equal treatment between all electricity market stakeholders.

The core objectives of the CACM are (CACM, Article 3):

- a. promoting effective competition in the generation, trading, and supply of electricity;
- b. ensuring optimal use of the transmission infrastructure;
- c. ensuring operational security;
- d. optimizing the calculation and allocation of cross-zonal capacity;
- e. ensuring fair and non-discriminatory treatment of TSOs, NEMOs, the Agency, regulatory authorities and market participants;
- f. ensuring and enhancing the transparency and reliability of information;
- g. contributing to the efficient long-term operation and development of the electricity transmission system and electricity sector in the Union;
- h. respecting the need for a fair and orderly market and fair and orderly price formation;
- i. creating a level playing field for NEMOs;
- j. providing non-discriminatory access to cross-zonal capacity.

Nominated electricity market operator - NEMO

'Nominated Electricity Market Operator' (NEMO) is a market operator designated by the competent authority of the European Union Member State to participate in single day-ahead or single intraday coupling⁵. Article 7 of the revised Regulation stipulates that: *transmission system operators and nominated electricity market operators shall jointly organize the management of the integrated day-ahead and intraday markets based on market coupling as set out in Regulation (EU) 2015/1222. Transmission system operators and nominated electricity market operators shall cooperate at Union level or, where more appropriate, on a regional basis in order to maximize the efficiency and effectiveness of Union electricity day-ahead and intraday trading. The obligation to cooperate shall be without prejudice to the application of the provisions of Union competition law. In their functions relating to electricity trading, Transmission system operators and nominated market operators shall be subject to regulatory oversight by the regulatory authorities pursuant to Article 59 of Directive (EU) 2019/944 and ACER pursuant to Articles 4 and 8 of Regulation (EU) 2019/942.*

⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R1222&from=EN>

⁵ Article 2 (23) of the CACM



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Pursuant to Article 4(1) of Regulation (EU) 2015/1222, each Member State electrically connected to a bidding zone in another Member State shall ensure that one or more NEMOs are designated to perform the single day-ahead and/or intraday coupling. Pursuant to Article 4(10) of Regulation (EU) 2015/1222, the designating authority shall inform ACER of the designation and revocation of NEMOs. The list of designated NEMOs is maintained in the form of the electronic database by ACER on its website (as well as information regarding NEMOs status and where they operate)⁶.

The key operational feature of the NEMO design is that NEMO designated in one EU Member State have (with limited exceptions) the right to offer day-ahead and intraday trading services with delivery in another EU Member State. The trading rules in the latter Member State apply without the need for designation as a NEMO in that Member State.

The NEMO function of fundamental importance is the operating the single day-ahead coupling and the single intraday coupling algorithms.

NEMOs act, moreover, as market operators in national or regional markets. Their tasks include:

- receiving orders from market participants,
- having overall responsibility for matching and allocating orders in accordance with the single day-ahead coupling and single intraday coupling results,
- publishing prices and
- acting as central counterparties for clearing and settlement of the exchange of energy resulting from single day-ahead and intraday coupling, according to relevant participant agreements and regulations.

With the adoption of CACM which introduced the term “nominated electricity market operator” (NEMO), meaning de facto a power exchange in connection to market coupling, additional confusion arose, especially since traditional “market operators” were not recognized in EU legislation.

While the NEMO is obviously always an exchange, some “market operators” might be as well: examples are OKTE, OTE, and OPCOM who are also NEMOs; “market operators” in some other market (US, Australia, New Zealand, etc.) as also usually associated with exchange-like functions on central dispatch style markets (e.g., PJM).

Market Coupling Operator - MCO

Market coupling operator (MCO) function is the core function of performing market coupling by NEMOs. The day-ahead MCO function includes development of the algorithm used for a day-ahead coupling, development of the systems, used for market coupling, operating the day-ahead market coupling using input data from market participants (bids and offers) and cross-zonal capacities from TSOs (ATC⁷ or FB⁸ values) and market coupling result management (provision and validation).

Joint cooperation between NEMOs for development and operations of MCO function shall be based on the principles of non-discrimination and shall ensure that no NEMO, competitive or monopoly can benefit

⁶ https://acer.europa.eu/en/Electricity/MARKET-CODES/CAPACITY-ALLOCATION-AND-CONGESTION-MANAGEMENT/Pub_Docs/NEMO%20list.pdf

⁷ ATC – Available Transfer Capacity

⁸ FB – Flow-based



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by participation in MCO function. This particular requirement is a key agreement enabling the Power Exchange to be nominated as NEMO and participate in day-ahead market coupling and in the same time have the option to participate in the MCO function or delegate some of its MCO tasks to another NEMO, according to a bilateral service provision agreement.