

THE ROLE OF THE DISTRIBUTION SYSTEM OPERATOR IN THE ELECTRICITY MARKET



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1. The role of the Distribution System Operator (DSO) in the electricity market

The DSO has a critical role – ensuring the distribution of electricity from generation/transmission to demand (consumers) by controlling and operating the distribution grid and managing information related to the distribution of electricity.

As we move towards a low carbon economy, the role of the DSO must also evolve due to regulatory changes driven by ambitious policy targets, advances in technology (new ways to use electricity), the increase in local and decentralised production of electricity, as well as customers' changing behaviour as they gain more information and control in their electricity usage and become active participants in the energy market.

There is no 'one size fits all' model for the regulation of DSOs at EU level as there are significant differences between the 2,750 electricity DSOs active across Europe. They are very diverse in terms of size, voltage levels, ownership, penetration of distributed generation and activities¹. Any future EU legislation should take into consideration the different realities throughout Europe. The future role of the European distribution grid is critical for the future European energy market. This creates challenges but also opportunities for distribution networks.

2. DSOs' core activities

- **Network operation and asset management** means ensuring the smooth flow of electricity from source of generation/transmission to point of demand (consumer).
 - **Network investments and maintenance.** This means making sure the necessary infrastructure (e.g. power lines/connections) is in place to accommodate supply/demand and maintain it efficiently. This also includes grid planning, construction and maintenance of lines, sub and transformer stations, connection of electrical installations, metering the distributed electricity and capacity used and other related activities required to efficiently distribute electricity in the grid.
 - **Grid operation.** Security and quality of supply, congestion management, etc.

¹ CEER Conclusions Paper "The Future Role of DSOs", 13 July 2015 - www.ceer.eu

This includes the following DSO core activities:

- ensure quality of electricity supply
 - provide customer services (e.g. as the point of contact for all questions related to the electricity grid, including conditions and terms for connection)
 - connect customer installations to the electricity grid
 - operate and maintain the electricity grid
 - ensure the safe operation of the grid
 - be able to detect failures in the power grid and to remove them quickly and efficiently
 - collaborate with neighbouring DSOs and TSOs
 - protect the grid against cyber security threats
 - have detailed emergency plans in place
 - provide the electricity needed to cover network losses
 - provide accurate information to customers on the costs of connection, and distribution of electricity (directly or indirectly through the supplier depending on the retail market model)
 - connect and disconnect customers at the request of the electricity supplier and/or the customer
 - enable customer switching
- **Managing the information needed to facilitate the electricity market –DSO as market facilitator – Data management** (smart metering, data exchange, privacy etc.).
 - **Metering:** the role of the DSO in managing information for the distribution of electricity includes in most EU countries (with the exception of UK and Germany) responsibility for metering where and when electricity enters and leaves the grid. This includes:
 - collect, validate and distribute metering data
 - report metering data needed for billing and settlement and other services, making data available for customers to promote energy efficiency and participation in the electricity markets (e.g. demand response), either straight to the market or via a centralised or decentralized data hub(s)
 - safeguard metering data from cyber security threats

With the roll-out of smart meters, more accurate information becomes available about customer electricity usage and this leads to the DSOs – in most Member States – handling large amounts of data which must be managed appropriately. This also presents a wonderful opportunity for the grids and the energy market to be developed using innovative technologies, in addition to the traditional approach to building networks.

- **Data Management and Data Handling:** depending on the market model, the DSO will have different obligations to handle information regarding customers, suppliers, balancing responsible parties (BRPs), etc. The DSO must behave neutrally towards suppliers, aggregators and other market parties. This is safeguarded by the provisions of the Third Energy Package and implemented by Member States.

Being a neutral regulated entity with no commercial interest in consumers' data, the DSO is best positioned to be the market facilitator (data hub), managing and storing grid data while providing customers and third parties with secure and non-discriminatory access to customer data through a central/decentralized data hub(s) or/and via a standardised interface on the smart meter. At the same time, it can ensure data privacy for the customer, which is an essential safeguard for consumers and will enable consumer trust. Metered data can be stored and managed in other different ways, depending on the market model.

There are many advantages if the DSO is responsible for the entire metering system, including meter installation, operation, meter reading and data management. Access to and management of smart metering data is essential for DSOs to further optimize the operation and planning of distribution networks. Any restrictions in accessing advanced meter readings would be a barrier to the DSO to fulfilling its main mission – system stability – but also undertaking new tasks.

There is no need to restrict a DSO's right to serve its customers in providing metering data as long as the DSO does not misuse its special position against other service providers, which is ensured by the appropriate regulatory framework.

- **Customer's main point of contact in grid related issues:** Despite diverse retail market models across Europe, **GEODE** supports the DSO being the customer's main point of contact in grid related issues. DSOs connect customers to the grid and therefore the link between them needs to be maintained.

The paragraphs above describe DSOs' current tasks and activities which are performed today by the DSO. Therefore the challenge the DSO is now facing is not about performing completely new and different tasks, but rather, that existing tasks require an evolution and expansion.

3. Evolving activities / role of DSOs

The role of the DSO is evolving and the need for new DSO activities will arise. DSOs will need to become active network operators. However, DSOs live under variable conditions and there has to be a flexible framework for the role of DSOs, without undue legal restrictions, to enable DSOs to cope with upcoming challenges including electric vehicles, energy storage, prosumers, local intermittent production etc. We can not be certain what the network will look like in the future and therefore the role of the DSO must be allowed to evolve.

GEODE sees it as important that DSOs, when participating in new activities, operate in a way that does not hamper the functioning of the market. However, there are some activities where the most beneficial solution to society is to allow both, DSOs and markets, to have a role. In these cases, a clear market model and definition of conditions (e.g. traffic light approach) is needed to avoid any market distortions.

The DSO can, under certain circumstances, as described above, have a role in the following activities:

- **Electric Vehicles (EVs):**

- to build a competitive market for EV charging, it might be necessary to facilitate a close cooperation between authorities and market players until a critical mass is reached. In this regard, it might be an option in some Member States that DSOs are allowed to invest, own and operate charging stations to overcome this obstacle².
- DSOs need to have the possibility to influence the charging processes in order to minimize the impact on the distribution grid and safeguard grid stability (smart/coordinated charging). Coordination of DSOs' needs can be carried out with enhanced smart metering solutions.
- DSOs should be allowed to have direct contracts with customers and the operators of charging stations to be able to influence charging processes (procure flexibility services) as an appropriate management tool, because of local dimension of the DSOs' requirements.

² GEODE Fact Sheet E-Vehicles - June 2016 – www.geode-eu.org

- **Storage of electricity for the grid operation:**

- DSOs should be allowed to use, own and operate storage connected to the distribution grid in order to fulfil their core activities and to guarantee the security of supply in their area of responsibility³.
- DSOs should be able to obtain access to commercial storage to fulfil their network requirements. For practical reasons, the end user's storage capacity should be known by the DSO.

- **Flexibility:** it is vital to allow DSOs access to the flexibility services of customers, to handle local congestion. A general principle should be that market actors can act freely, as long as the distribution grid is not put at risk (the traffic light grid status is green⁴). In all other situations a priority access to flexibility services is crucial for the DSOs to fulfil their core tasks as the party responsible for grid stability and secure grid operation⁵.

Therefore, from a grid perspective the DSO should, at times when required from the grid functionality point of view (traffic light yellow or red), be allowed to:

- control the use of electricity through direct contracts with the customer
- control the local production and storages through direct contracts with the customer

- **Energy efficiency services:** DSOs should be allowed to provide customers with information in a non-discriminatory way, for example e.g. providing hourly consumption data which is a mandatory DSO online service offered to customers in Finland. However, this is difficult to do in Member States where DSOs do not have the data, e.g. in GB.

³ GEODE Position Paper on Energy Storage, May 2016 - www.geode-eu.org

⁴ The traffic light system – M490 WG Methodology Annex B – German Association of Energy and Water industries (BDEW)

⁵ GEODE Report on Flexibility in Tomorrow's Energy System – DSO's Approach, May 2014 – www.geode-eu.org

4. Capacity Remuneration Mechanisms (CRM)

Some Member States have decided to implement CRMs to allow for the recovery of fixed costs that are not recoverable in energy and balancing markets, thus ensuring security of supply.

The decision to supplement an energy market with a CRM is a regulatory design choice. The challenge with the design is how to allocate risks between the system operators and the Balancing Responsible Parties (BRPs). In Member States that have decided to implement CRMs, the need for balancing capacity at a reasonable cost in the distributed energy system has to be taken into account in the design⁶.

GEODE will follow developments closely and participate in the policy work when these issues are assessed by the European Commission.

⁶ GEODE Position Paper on Electricity Market Design and Capacity Mechanisms in Europe, June 2015 – www.geode-eu.org

5. DSOs' Regulatory framework

National Regulatory Authorities (NRAs) or national governments (still the case in some Member States) determine what the reasonable revenue for the DSOs' regulated activities should be.

An adequate regulatory framework should be set to assure the recovery of all costs involved in the DSOs' activities. It is important to set up incentive regulation to promote innovative grid investments to facilitate the development of the network operations according to the needs of customers and the upcoming future challenges (increasing number of decentralised generators and storage, electric vehicles, changes in consumers' behaviour etc.)⁷ Investments in cyber-security should be promoted as it is crucial that grids are protected from this kind of threats.

One key step to help deal with the challenges described is the development towards future-proof grid tariffs:

- It should be possible to establish grid tariff structures for demand side response and other "smart grid" related topics which support the network usability and optimise network development.
- Future network tariff structures should reflect the nature of distribution businesses and ensure fair cost allocation across customer classes.
- Network tariff structures should promote new business models that can encourage customers to provide services to support the operation of the network.
- A combination of more capacity based grid tariffs and energy based supply pricing will provide customers with incentives to optimise their consumption and production while contributing to the efficiency of the whole energy system.
- Methodology decisions on grid tariffs by NRAs should be kept stable for the longer term. Changing the rules within a regulatory period should be kept to a minimum.
- Network tariffs must recognise the real costs involved in DSO activities. The use of real costs to calculate tariffs is essential to address the new challenges the DSO must meet. Thus a regulatory model applying estimated costs and average costs, as this is the case in some Member States (e.g. Spain), cannot assure the full recovery of DSOs' costs.

⁷ GEODE Key Messages on Network Tariff Design – June 2015

6. Conclusions

- The future role of the European distribution grid is critical for the future European energy market. This creates challenges but also opportunities for distribution networks.
- There is no one size fits all model for the regulation of DSOs at EU level.
- The challenge the DSO faces today is not about performing completely new and different tasks, but that current tasks require an evolution and expansion.
- DSOs' current core activities:
 - Network operation and asset management (grid planning and maintenance).
 - Metering – the DSO is, in most EU countries, the responsible actor for metering.
 - Data management and data handling – the DSO must act neutrally towards suppliers, aggregators and other market parties.
 - Customers' main point of contact in grid related issues.
- DSOs' evolving activities:
 - The DSO can – under certain circumstances and without hampering the functioning of the market – have a role in the following activities: electrical vehicles, storage of electricity for grid operation and flexibility.
 - In the activities mentioned above, it would be the most beneficial solution to the whole energy system to allow both DSOs and market players, to have a role.
- Grid tariff structures should be stable for the long-term, promote innovative grid investments, support demand side response, and promote new business models while ensuring fair cost allocation.

7. RECOMMENDATIONS

Any future EU legislation should take into consideration the significant differences between the 2,750 electricity DSOs across Europe, that are very diverse in terms of size, voltage level, ownership, penetration of distributed generation and activities.

...

There should not be a rigid framework for the role of DSOs, as it is not known what the network will look like in the future and therefore the role of the DSO must be allowed to evolve.

...

There is no need to restrict the DSO's activities in data management and data handling, thus its right to serve its customers in providing metering data, as long as the DSO does not misuse its special position against other service providers –which is ensured by the appropriate regulatory framework–.

...

A clear market model and definition of conditions – e.g. traffic light approach – is needed to avoid any market distortions when DSOs have to play a role in flexibility, storage and electrical vehicles for grid operation purposes.

- **Flexibility:** a priority access to flexibility services is crucial for the DSOs to handle congestion, maintain grid stability and secure grid operation.
 - **Storage:** DSOs should be allowed to use, own and operate storage connected to the distribution grid in order to fulfil their core activities and to guarantee the security of supply in their area of responsibility.
 - **EVs:** DSOs should be allowed to have direct contracts with customers and the operators of charging stations, as an appropriate grid management tool.
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Incentive regulation needs to be set up to promote innovative grid investments to facilitate the development of the network operations according to the needs of customers and the upcoming future challenges (increasing number of decentralised generators and storage, electric vehicles, changes in consumers behaviour, etc.).

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The use of real costs to calculate network tariffs is essential to face the new challenges that DSOs must fulfil. Estimated costs and average costs do not fully assure the recovery of DSOs' real costs.

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A combination of more capacity based grid tariffs and energy based supply pricing is GEODE's recommended approach to provide customers with incentives to optimise their consumption and production while contributing to the efficiency of the whole energy system.

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Forsgren, Henrik – Göteborg Energi, Sweden

Gimeno, Carmen – GEODE Secretary General

Hallinder, Jonathan – Krafringen, Sweden

Lehto, Ina – Finnish Energy, Finland

Lunn, Elizabeth – Energy Networks Association, United Kingdom

Pedersen, Jan – Agder Energi, Norway

Pettersson, Anders – Swedenergy, Sweden

Pylvänäinen, Jouni – Elenia, Finland

Taus, Hans – Wiener Netze, Austria

Voss, Jan Ole – BBH-Berlin, Germany





The Voice of local Energy Distributors across Europe • Avenue Marnix 28 • 1000 Brussels
Tel. +32 2 204 44 60 • Fax +32 2 204 44 69 • info@geode-eu.org • www.geode-eu.org