E.DSO Position paper on the Revision of the EU's electricity market design

Brussels, February 2023

Introduction

While Europe's integrated electricity market has resulted in more competition and available choices for European customers, Russia's war on Europe has exposed vital vulnerabilities with the current market structure that needs to be addressed to facilitate the energy transition. Therefore, the rationale behind this paper is to explains the role of European Distribution System Operators (hereinafter DSOs) in the exponential electrification of society and identify the measures, related to their activity, to be implemented in support this gigantic task.

The aim of this position paper is therefore to elaborate on the following:

1. Vast acceleration of grid investments, smartification and coordination are vital to facilitate the energy transition in the most effective and efficient manner.
2. New incentives to enable demand-side response from the fast-growing residential DER such as EVs and Heat Pumps distributed flexibility are crucial to create the flexibility needed for security of supply.
3. Exponential upscaling as well as regulatory conditions enabling DSOs as market facilitators that ensure optimal size, location and functioning are necessary to unlock battery storage's full potential.

1. Acceleration of grid investments and coordination are vital

To tackle the current crisis, as well to facilitate the European energy transition, the European DSOs see the quick and enormous impact this has on the existing grids and therewith the need for an energy system that can cope with a higher level of flexibility.

Further, and to ensure a sustainable energy system and economic growth, while preventing congestion, lower quality of grid-infrastructure, curtailments and enhanced delays in customer connections, the value of timely and efficient investments in electricity distribution networks is of

utmost importance. The investments however must go hand in hand with a sound development of flexibility markets.

DSOs seek ways to increase the investments in the grid, with the aim to fix the existing challenges, but also foreseeing the additional increase of demand in grid-capacity. Therefore, we strongly believe and advocate for regulators to ensure economic regulation of grid operators that is dependable, stable and with sufficient economic return (WACC) to ensure for investments to be feasible. In assessing investment plans of grid operators, regulators should enhance this procedure to stimulate proactive expansion of electricity grids anticipating demand. In addition, Member States should be instructed to immediately remove regulatory barriers that work against the needed update of electricity grid, as well as provide enough security to maintain solid credit ratios.

An integrated market that provides sustainable, renewable energy at the lowest cost for EU customers requires integral planning of electricity networks. By doing so, the necessary extensions and reinforcements in grid infrastructure shall be deployed following cost-efficient criteria among all available solutions. This requires a firm mandate for DSOs to coordinate an optimal design of our future energy system.

Moreover, DSOs must receive a clear mandate to prioritise grid expansions and new grid connections, to accelerate the deployment of renewable energy or to reduce carbon emissions. We also argue that Member States should make use of the European proposal to streamline permit-granting for the integration of renewable energy into the system both on the production and on the consumption side. Finally, the European Union must increase intra-state mobility of critical technical workers to achieve optimal allocation in a way to ensure the realisation of investments in grid infrastructure.

2. Incentives for increased distributed flexibility are essential

This section presents the perspective of the DSOs regarding the CAPEX/OPEX and congestion management and distributed flexibility.

2.1. CAPEX/OPEX

With the energy transition in mind, remuneration models for DSOs should be based on an optimal CAPEX/OPEX balance as the most efficient solution to provide affordable, secure, and renewable energy, considering the long-term benefits for the whole system. Although the urgent necessity to increase capacity for the connection of new distributed generation and loads has demonstrated that grid investments are a non-regret option, the very nature of the energy system is changing and CAPEX/OPEX regulation should adapt in accordance with these changes to provide efficient outcomes.

The EU shall enable decisions that find the optimal balance between grid investments and flexibility use. Due to the volatile and decentralised nature of wind and solar, as well as the vast electrification of industry, mobility and the built environment, peak demand of grids may under specific circumstances grow tenfold in some areas.

To optimize the optimal choice for the expansion of electric grids, to adapt to ever increasing electrification with higher peak demand and to protect the security of supply by shifting energy demand, renumeration models for distribution system operators should provide an adequate incentive to use and promote flexibility markets facilitating the integration of demand-side response from lowest grid voltages.

2.2. Congestion management and distributed flexibility

The procurement of flexibility, i.e., for congestion management, through organised local flexibility markets are options already under consideration; however, the need for market-based instruments such as **non-firm capacity agreements and time-constrained contracts** should also be considered. It gives the grid-users the option of reducing usage of the distribution network during peak times, whilst still being able (during off-peak) to use the electricity needed for the customers' purposes.

Time constrained contracts enables customers to access the grid during only off-peak hours and so incentivise deployment of flexible demand side resources behind the meter such as V2X and storage. This requires to be able to adjust grid capacity dynamically to avoid delaying EV charging or PV curtailment while taking advantage of distributed flexibility resources (such as storage or V2X). This can be achieved by further deployment of the Article 32(1) of the Electricity Directive allowing also for rule-based procurement of flexibility until functioning local flexibility markets can be established.

Regulatory reforms should include specific mandates for regulators to incentivise the use of OPEX to remunerate distributed flexibility also allowing DSOs to accelerate the needed digital investments to be able to transact with these resources located behind the Smart meter interface. Incentives could easily be designed as a percentage of the system savings obtained by using flexibility resources. This would be a better alternative to a full TOTEX approach, as it is extremely cumbersome and hard to manage, as experienced in the UK.

DSOs are in favour of developing a tariff system that ensures a level playing to all grid users. Regulatory approaches such as netting offsite generation from metered consumption at any time, not only ignore constraints happening into the distribution grid, but also lead to an unfair economic transfer from some customers to other customers that have the means to invest in offsite generation of energy, thus yielding a negative distributional effect among customers.

Due to the pace at which *electric vehicles, heat pumps, storage and smart appliances*, distributed flexibility will soon largely be located through distribution low voltage systems providing new opportunities to foster demand reduction and shift demand during energy peak times as well as to encourage customer storage during high renewable peaks that would normally lead to curtailments. However, to unlock this potential and to avoid systemic risks, multiple criteria must be met.

- DSOs should have the mechanisms to produce the technical and economical optimal outcome from the combination of grid reinforcements and local flexibility use. Further research is needed to be able to merge short-term OPEX tools (flexibility) and long-term capex tools (grid expansion)

- DSOs should facilitate the necessary multi direction data exchange, as is happening in some European countries already. This eases the standardised exchange of data and eases the path to more flexible consumers and standardise flexibility resources interfaces such as for smart charging or residential storage.
- All appliances offering flexible demand side response through an aggregator flexibility must be guarantee their compliance to a uniform European cybersecurity standard as to prevent hacks at the grid edge which could impact the European energy system.
- Specific demand response capacity mechanisms that would apply in periods of crisis should be introduced into the Electricity Regulation.

3. Upscaling and conditions for storage

This section presents the perspective of the DSOs regarding the role storage systems can play in the future and on innovative solutions that could lead to a cost-effective management and operation of the energy system, to better cope with the acceleration of the energy transition and the energy market reform. It is our opinion that for a solution to be implemented, no matter if it is market-based, asset-based or a regulated one, it should always be to the most cost-effective solution.

3.1. The role of storage in the energy system of the future

Our energy system is greening in a fast pace with a growing share of solar and wind energy. This means our climate goals are coming in sight, but also that our energy market becomes more dynamic with a volatile and intermittent energy supply. Energy storage can be used in different applications (*for different technologies and in different time frames*) as it closes the gap between the surplus of energy on windy days and the shortage of energy on windless days or it can store solar energy for its later use at night. The surplus of energy will be stored in batteries or other storage systems and used when needed. In a "green" energy system, storage is essential to guarantee system security.

3.2. Use of storage in electricity grids

Batteries can be used as an essential component of our electricity grids, notably to promote the overall efficiency of the system through local balancing, with direct benefits on available capacity, congestion and curtailment mitigation, quality of service, and technical losses. The intermittency of green energy production can be reduced by charging and discharging (as a service of) the battery systems. Placing battery systems at medium voltage level ideally spread in several units, provide not only the same services for transmission as if the batteries were in the transmission grid, but also a number of services for the distribution grid such as congestion management and voltage support.

3.3. The use of storage in the Clean Energy Package

In principle DSOs are not allowed to *own, develop, manage, or operate* energy storage facilities (Article 36 Directive (EU) 2019/944). There are two derogations possible, as a Fully Integrated Network Components and through a tendering procedure, At least the tendering procedure is difficult to comply with and it is mainly temporarily.

3.4. The (regulatory) needs of DSOs in future legislation

Mandatory Non-Firm Connection Agreements for battery owners

In most Member States DSOs have the obligation to connect battery systems to the distribution grid and reserve capacity on the grid for the full charging and discharging capacity of battery systems. This reservation of capacity can lead to grid congestion because it is unpredictable when the battery is charged or discharged. While batteries can help the system, they might sometimes worsen the congestion situation. DSOs could be helped with a regulatory framework which makes sure battery systems are connected 'grid neutral'. Grid neutrality means the grid congestion will not be caused or worsened by connecting the batteries. Thus, if DSO's have the possibility to connect batteries with such Non-Firm Connection Agreements, the battery owners contribute to the reliability of an affordable electricity grid and save the cost of paying for expensive connection reinforcements.

Neighborhood storage

On the one hand, local production and consumption is very supportive for the grid and on the other hand, owning a large enough storage facility for the customer is still very expensive. If the DSO could help and invest in neighborhood storage, customers can store their own surplus of electricity locally. When customers consume more than they produce, they can first use their own energy from the neighborhood storage. The business case for such a solution depends heavily on the price a customer gets for the electricity fed into the grid. This also depends on the regulatory regime of the Member State. But it is very likely that the timing of the production and the consumption of electricity will significantly determine the price of it in the future. There is a strong economic case for this kind of business model because small local storage (batteries) is much more expensive than larger batteries (>500 kWh) therefore the price for renting this neighborhood storage is likely to be much less than the individual solution. Furthermore, the use of a single larger battery by several users introduces an additional efficiency when there is simultaneity between surplus from some users and withdrawals from others.

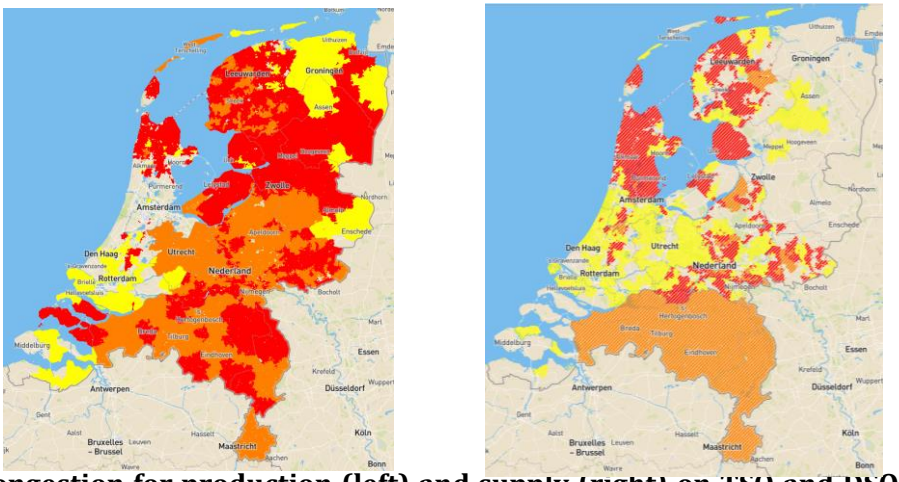
The locational aspect of it is very important for the DSO. A DSO neighborhood storage could in some situations reduce the need for grid reinforcements, which is beneficial for all stakeholders and also prevents a vendor lock in for customers. However, this is only possible if the DSO is allowed to own, develop, and operate such a local energy storage facility.

A small-scale storage as part of the connection

A small-scale storage facility can reduce the need for a large(er) connection for individual customers. It would be beneficial for the DSO and the customer if the DSO could offer a small-scale storage unit as part of the connection to the customer. If the capacity peak of the customer is restricted to a limited duration and a limited frequency, possibly a storage unit can handle the peak. The benefit for the customer is that a smaller capacity of the connection is sufficient. A smaller connection is usually cheaper than a larger connection. The benefit for the DSOs is that less capacity is required which reduces the need for immediate grid reinforcements. Specifically in areas where there is a threat of a shortage of capacity an offering of the DSO of small-scale storage as part of the connection could be beneficial for the customer and the DSO.

ANNEX I

Exemplary case: The effects of (European) policy on Dutch energy systems



Grid congestion for production (left) and supply (right) on TSO and DSO level on 1-2-2023

In the past ten years, the Netherlands has made a severe effort in order to realize the energy transition, primarily by increasing renewable energy from solar and wind, as well as electrolyzing energy demand of industry, mobility and the built environment. Despite these efforts, the current regulatory framework of the European electric market is now at risk of paralyzing both the energy transition, economic growth as well as tackling of other domestic issues such as reducing nitrogen pollution and the housing crisis. This is, because renewable energy and sustainability targets have resulted in an exponential growth of the demand for grid capacity and grid connections. Although investments in grid expansion will continue to redouble over the next years, the processing time of realizing these expansions (5-8 years incl. permits) surpass the processing time of renewable projects as well as electrification (2-3 years incl. permits). This bottleneck has caused congestion (as demonstrated above), reduced quality of service and reliability as well as delays in connections to the grid. Furthermore, restraints in available critical technically skilled workers, materials, space and financial boundaries may escalate problems even further if (European) policies and market regulation remain unchanged.