Network Development Plans for DSOs in accordance with article 32(3) and (4) of the Electricity Directive

Eurelectric recommendations

June 2021

Eurelectric represents the interests of the electricity industry in Europe. Our work covers all major issues affecting our sector. Our members represent the electricity industry in over 30 European countries.

We cover the entire industry from electricity generation and markets to distribution networks and customer issues. We also have affiliates active on several other continents and business associates from a wide variety of sectors with a direct interest in the electricity industry.

We stand for

The vision of the European power sector is to enable and sustain:
- A vibrant competitive European economy, reliably powered by clean, carbon-neutral energy
- A smart, energy efficient and truly sustainable society for all citizens of Europe

We are committed to lead a cost-effective energy transition by:

investing in clean power generation and transition-enabling solutions, to reduce emissions and actively pursue efforts to become carbon-neutral well before mid-century, taking into account different starting points and commercial availability of key transition technologies;

transforming the energy system to make it more responsive, resilient and efficient. This includes increased use of renewable energy, digitalisation, demand side response and reinforcement of grids so they can function as platforms and enablers for customers, cities and communities;

accelerating the energy transition in other economic sectors by offering competitive electricity as a transformation tool for transport, heating and industry;

embedding sustainability in all parts of our value chain and take measures to support the transformation of existing assets towards a zero carbon society;

innovating to discover the cutting-edge business models and develop the breakthrough technologies that are indispensable to allow our industry to lead this transition.

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KEY MESSAGES

- Eurelectric has identified a number of minimum requirements that the Network Development Plans for DSOs, (hereafter: NDP), should include as outlined in Article 32 (3) and (4) of the Electricity Directive. All DSOs are free to exceed these minimum requirements.

- Eurelectric has identified criteria that need not be included in the NDP, such as details of required flexibility services, which will be determined later in a tendering procedure, if the market solution is the one chosen.

- Eurelectric has given an interpretation of what "flexibility services" means in the framework of network planning at distribution grid level in the absence of a European definition, taking into account the relevant provisions from the Electricity Directive (EU) 2019/944. Flexibility services are services for congestion management as well as non-frequency ancillary services. However, the procurement of these services in the market may be derogated by the NRAs. In this case, instead of market-based procedures, the application of rules, connection agreements and tariffs are always possible.

- Member States and their National Regulatory Authorities (NRA) should provide the necessary regulatory framework to allow and provide incentives to DSOs to procure flexibility services. The cost of market-based solutions (e.g. cost for running the competition and ongoing administrative charge afterward) and the risk of the flexibility procured should be considered in the contracting and remuneration scheme and in the design of the future flexibility markets by DSOs and NRAs.

- The DSO can choose to either use flexibility, to extend/improve its network, or adopt a combination of both following an internal assessment. The NDP will only consider flexibility that can be procured in a market-based way, unless otherwise stated.

- The ability of the DSO to use improved and innovative flexibility products will be enhanced by increased visibility and control of the network through digitalisation and modernisation.

- Flexibility solutions are possible at all voltage levels. However, lower voltage levels pose a particular challenge for developing 5-to-10-year plans, as they are driven by customer connections, as well as other investments in low-voltage network – such as in renewal and automatization plans so as to provide observability and controllability - and thus needs to take a different form within the NDP compared to higher voltages. There is more network monitoring and visibility at the higher voltage levels.

- The NDP will be made available and disseminated for public consultation. DSOs acknowledge the necessity of making it as simple as possible for all stakeholders and the importance of avoiding unnecessary costs for network users by not creating unnecessary bureaucracy. This will help flexibility providers identify opportunities to support the electricity system.

- TSOs and DSOs shall elaborate and coordinate their respective plans as equal partners at the national level.

- To develop all the above, DSOs must improve and refine their forecasts since their network should be expanded in cost effective manner using smart solutions and intelligent asset development as appropriate to meet the requirements coming from the CEP. In this respect, new tools and procedures will be required and their accompanying costs should be properly considered as part of the CBA.

Objectives of this paper

- DSOs fully support the objectives of the Clean Energy Package (CEP) and are committed to enabling the decarbonisation of heat, transport, and electricity generation along with enabling customers to become prosumers and play an active role in the energy transition.
- DSOs seek to facilitate DER development and utilise their possibilities, at all voltage levels, in the development of the Distribution Networks. DSOs fully support the publication of NDPs every two years, and this paper seeks to outline a pragmatic approach which will meet the objectives of all stakeholders.
- While DSOs have produced NDPs for decades, there are various types depending on the national and local requirements. This paper aims to provide guidance and direction on the key elements required in the NDP as laid down in the article 32 (3) and (4) of the Electricity Directive (EU) 2019/944.

What should be tackled in the Network Development Plan (NDP) and how?

Art 32.3 of the Electricity Directive (EU) 2019/944

The development of a distribution system shall be based on a transparent network development plan that the distribution system operator shall publish at least **every two years** and shall submit to the regulatory authority. The network development plan shall provide transparency on the medium and long-term **flexibility services needed**, and shall set out the **planned investments for the next five-to-ten years**, with particular emphasis on the main distribution infrastructure, which is required in order to connect new generation capacity and new loads, including recharging points for electric vehicles. The network development plan shall also include the **use of demand response, energy efficiency, energy storage facilities or other resources** that the distribution system operator is to use **as an alternative to system expansion.**

There is a wide range of network development plans (hereafter "NDPs") that Distribution System Operators (hereafter "DSOs") currently produce both in terms of content, voltage level and interval. To reduce the ambiguity surrounding the aforementioned provisions, this paper outlines our understanding of the general requirements for DSOs to produce NDPs, and provides recommendations for an adequate implementation in accordance with this article. These requirements are to be interpreted as a baseline, which can be exceeded by DSOs depending on the national specificities of their activities.

Main challenges to implement the article

- **Development of Flexibility in the scope of the Network Development Plans.**

Although NDPs should be the result of a procedure that gives an overview of a complete grid development, with emphasis placed on the main distribution infrastructure required to connect new generation capacity and new loads, the explicit reference to flexibility services in article 32.3 makes it necessary to understand the role of flexibility in these plans.
The term "Flexibility service" is not defined in the Electricity Directive, however the following legal provisions are included:

- Member States shall provide the necessary regulatory framework to allow and provide incentives to distribution system operators to procure "flexibility services, including congestion management" in their areas. (Art. 32, par.1).
- Member States shall ensure that transmission system operators and distribution system operators, when procuring ancillary services, treat market participants engaged in the aggregation of demand response in a non-discriminatory manner alongside producers, based on their technical capabilities (Art.17, par 2).
- The distribution system operator shall procure the non- frequency ancillary services needed for its system in accordance with transparent, non-discriminatory, and market-based procedures (Art 31, par.7)
- 'Ancillary service' means a service necessary for the operation of a transmission or distribution system, including balancing and non-frequency ancillary services, but not including congestion management (Art 2, no 48)

- 'Non-frequency ancillary service' means a service used by a transmission system operator or **distribution system operator** for steady state voltage control, fast reactive current injections, inertia for local grid stability, short-circuit current, black start capability and island operation capability. (art. 2, no. 49).

Based on the above, we understand that DSOs are allowed to procure "non-frequency ancillary services" and services for congestion management. However, the procurement of these services in the market may be derogated by the National Regulatory Authorities (hereafter "NRA") if "the procurement of such services is not economically efficient or that such procurement would lead to severe market distortions or to higher congestion" (art 32.1).

There is a mandatory provision that the DSOs shall procure "non-frequency ancillary" and congestion management services under market-based procedures[1], unless NRAs have specifically determined otherwise. In this case, instead of market-based procedures, the application of rules, connection agreements and tariffs are always possible. (Art. 31, par. 6 and 7 and Art 32, par 1). An example of a rule-based mechanism is the obligation for demand and generators to be compensated when their production or demand is modified in a non-voluntary setting. A rule-based approach might be justified, for example when there are not enough voluntary offers.

Static ToU tariffs improve cost-reflectiveness thereby reducing grid losses, reinforcement needs and congestion costs and deferring investment costs. Flexibility markets, combined with static Time of Use network tariffs, which provide signals for an efficient use of the network, could contribute to optimising network management costs and investments.
There are other mechanisms like connection agreements or interruptible tariffs that can be used in certain Member States.

As a conclusion, in certain cases the DSO can choose to use flexibility, to extend/improve its network, or a combination of both following its internal assessment. A flexibility solution may not be appropriate in all cases, e.g. when considering the criticality or timeliness of the connection. In this sense, infrastructure investments such as digitalisation can sometimes be the only solution and be seen as a key enabler to foster demand participation and the development of new flexibility services. It can also be assumed that the NDP's flexibility services refer to those services which the DSO has to procure in a market-based way, unless otherwise stated.

For each network development case, DSOs will have to analyse the feasibility and cost-effectiveness of any flexibility solution. DSOs will compare the current capacity of an asset or assets on the network with the projected load in the future. Therefore, when the load exceeds the capacity of the asset or assets, the DSO can determine when and what intervention (in the form of flexibility procurement or conventional reinforcement) is required.

The costs of market-based solutions (e.g., costs to the DSO for running the competition and an ongoing administrative charge afterwards) should be acknowledged by the regulatory framework. The risk of flexibility procured via a market-based solution will be higher than the risk of actions that only depend on DSOs' own activities. This risk will also have a price that should be acknowledged by the regulatory framework. Traditional grid reinforcement has well-known outcomes such as lower losses, greater reliability, ability to quickly connect new loads, provision of

[1] Market based procedures refers to liquid markets where there are enough offers to have an unhindered price building process.

rapid increase in capacity, higher short circuit levels and greater voltage regulation. The risk of opting for market-based flexibility services should be therefore considered in the contracting and remuneration scheme and in the design of the future flexibility markets.

When the flexibility procurement scheme results in effective savings for end consumers, and when DSOs succeeded in organising a market-based procurement approach, Eurelectric supports that part of the savings may be returned to the DSOs through specific incentives to balance the DSOs incentive towards using flexibility market options (which do not include any return on investment as it happens in the traditional network development alternative).

NRAs should consider the transfer from a solution with known expense (CAPEX) to one comprising of both capital and operational expenditure, with a highly variable expense (flexibility as OPEX), and that penalties for non-delivery of contracted flexibility which may not fully cover the incurred costs in case the provision of flexibility fails.

The ability of the DSO to use more fine-tuned and innovative flexibility products will be enhanced by increasing visibility and control of the network through digitalisation, automation and modernisation.

<u>Given the above, the NDP should at least include:</u>

- A brief scenario[2] on which the NDP is based, or a reference to an existing scenario including regional or national variations. This takes into account TSO scenarios at a macro level.
- Grid planning principles as part of the grid development, with particular emphasis on the main distribution infrastructure.
- Identifying the major technical characteristics of main investments, especially investments which have technical and economic potential[3], to be deferred/replaced by flexibility. This information once published, gives an indication to flexibility service providers of the potential flexibility services needed.
- The type of "main distribution infrastructure projects", that can include "thematic plans," due to load growth (consumption and generation), as referred in article 32.3 should be considered at national level.

The aforementioned requirements should be listed as *a minimum requirement* in the NDP. Hence, any DSO is free to exceed them.

<u>The NDP does not need to take into account:</u>

- Investments made for other reasons such as asset replacement[4] (e.g. due to age, safety, automation, environmental compliance, etc.), as these investments are not typically replaceable by flexibility.
- Non-market-based procurement (rules, tariffs, etc.) of flexibility services **on a detailed level** (e.g. grid user-specific)**.**
- Economic comparison data on the forecasted investment, as this will be done later when the competition for flexibility provisions is run.
- The details of the flexibility services needed will be determined in a tendering procedure in a later stage, if the market solution is the one finally chosen.

[2] By scenario we mean the overarching assumptions for the development of the NDP such as national load growth, renewable connections, level of electrification, and any other relevant national development or directives

[3] We assume that the DSO does not necessarily know all economic flexibility potential in the region when submitting the NDP.

[4]DSO's may include all required investments into one overall Network Development plan

- **Voltage levels to be included in the Network Development plan**

While DSOs carry out different types of plans for different voltage levels, flexibility solutions are possible at all voltage levels.
NDP's should cover the "main distribution infrastructure", thus the network at the higher voltage levels. Due to the different topography of the network the scale of the DSOs and the characteristics of the information shared with NRAs and regional/local authorities in various Member States, it may be appropriate to acknowledge the differences, particularly at Medium and Low Voltage and for the DSOs to determine the type of plan required.

Lower Voltage levels pose a particular challenge for developing 5-to-10-year plans, as typically this is driven by customer connections, as well as other investments in low voltage networks – such as in renewal and automatisation plans, so as to provide observability and controllability – and thus needs to take a different form in the NDP compared to higher voltages. There is more network monitoring and visibility at the higher voltage levels. As a minimum, NDPs for lower voltage levels should focus on the planning principles applied and any proposed changes to standards or design (such as changes to ADMD - After Diversity Maximum Demand - or minimum cable size), which are required to accommodate the electrification of heat and transport, along with enabling distributed generation and active customer participation. Those projects related to specific policies may take place also at MV or LV levels and could be included in the NDP potentially at higher granularity.

It will be important for DSOs to improve and refine their forecasts for electrified heat and transport so as to proactively determine the development of the distribution system. New tools and procedures will therefore be required. DSOs need to ensure that the capability of the distribution system is expanded in a cost-effective manner using smart solutions and intelligent asset development, as appropriate, to meet the requirements of the clean energy package. The costs, enabling and supporting any network flexibility option, should be considered properly as part of the cost-benefit analysis.

DSOs will develop sophisticated tools to forecast the grid's state and the flexibility demand in a specific area. DSOs will also engage in determining the appropriate products for flexibility services and mechanisms to procure such sources. As stated in art. 32.2, DSOs shall be adequately remunerated for the procurement of such services to allow them to recover at least a reasonable amount of corresponding costs, including the necessary information and communication technology expenses and infrastructure costs.

- **Roadmap to include flexibility in the Network development plan**

The article 32.3 states that "*The network development plan shall also include the use of demand response, energy efficiency, energy storage facilities or other resources that the distribution system operator is to use as an alternative to system expansion.*"

Since the procurement of flexibility services through a market-based approach is currently in its infancy in most Member States, the first NDPs will likely include very little information on flexibility services demand but the amount might increase over time as markets become more liquid. Thus, the NDPs should include plans for the next 5 to 10 years, where feasible, as stated in the Directive while taking into account the impact of the flexibility sources on the investment tasks selection. The plans could include the amount of flexibility (MW) that has been contracted with market parties. However, it is not intended to disclose the contract details and flexibility service providers in the NDP. For transparency, if required, it may be published throughout another mechanism.

Art 32.4 of the Electricity Directive

The distribution system operator **shall consult all relevant system users and the relevant transmission system operators** on the network development plan. The distribution system operator shall publish the results of the consultation process along with the network development plan and submit the results of the consultation and the network development plan to the regulatory authority. The regulatory authority may request amendments to the plan.

• Coordination with TSO (Scenario building)

It is important to emphasise that, by 2030, over half of the installed power generation capacities in Europe will be decentralised and connected at distribution grid level (70% of which will be new solar and wind capacity). European distribution grids will need investments of €375-425 billion until 2030[5].

Article 57 of the Electricity Regulation (EU) 2019/943 states that "*Distribution system operators and transmission system operators shall cooperate with each other in planning and operating their networks. In particular, distribution system operators and transmission system operators shall exchange all necessary information and data regarding, the performance of generation assets and demand side response, the daily operation of their networks and the long-term planning of network investments, with the view to ensure the cost-efficient, secure and reliable development and operation of their networks*."

Therefore, and in accordance with the aforementioned provisions TSOs and DSOs shall elaborate and coordinate their respective plans as equal partners at national level, cooperating and exchanging information on equal footing. This is increasingly relevant since the DSOs could contract units connected to their grid with long term contracts while at the same time the TSOs could also use the same resources for different purposes. Coordination is therefore required.

In developing the NDP, the load growth assumptions used of DSOs should take into consideration TSO scenarios at a macro level. It may be also relevant for TSOs to take into account DSO's input and their NDPs. However, on a more granular level, DSOs could have different assumptions: for example, demand in urban areas may be growing faster than in rural ones. Forecast scenarios from both parties are essential for better design of NDPs.

• Coordination/consultation process with "relevant system users"

Article 32(4) of the Electricity Directive states that DSOs shall consult relevant system users as well as the TSOs on the network development plan. The category of relevant system users will be most likely be defined at national level. However, system users shall at least include generators, suppliers, flexibility providers or their relevant associations. Consultations should be made public e.g. via visible announcement on a DSO website.

Such consultation will allow market parties to have transparency in the process and an overview of the outcomes of DSO decision making. By providing more information to the growing distribution flexibility market about current and future network requirements, DSO's will help flexibility providers identify the opportunities to support the electricity system and bring forward investment in green technologies.

[5] Eurelelctric / EDSO Grid Investment Study "Connecting the dots" January 2021

While the principle is that the consultation shall be run by the DSO in its area, local specificities should be taken into account to consider different options to implement it, for the sake of efficiency, upon the decision of the DSO (e.g., local authority as a single point of contact or common DSO platform, NRAs as single point of contact, etc.)

Moreover, and to simplify the process, it may be beneficial for regional authorities to take part in the consultation on behalf of the customers since they will likely have a good understanding of the local developments in their region. The level of consultation for the NDP may vary depending on the type of infrastructure (e.g., regarding the voltage level) and the associated relevant system users**.** The consultation process should be defined at Member State level to be as simple as possible, not creating unnecessary bureaucracy for the DSOs, NRAs or customers, and to avoid unnecessary costs for network users in the end.

The consultation results will be considered by DSOs in the further planning process.

Eurelectric pursues in all its activities the application of the following sustainable development values:

Economic Development

- Growth, added-value, efficiency

Environmental Leadership

- Commitment, innovation, pro-activeness

Social Responsibility

- Transparency, ethics, accountability

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