DSO ENTITY
DSOs FOR EUROPE

DSO Entity's identified good practices on Distribution Network Development Plans

Working Paper: A GUIDE BY DSO ENTITY'S TASK FORCE Ten-Year Network Development Plan (DRAFT) | June 2024

Preface and Disclaimer

This report was prepared by DSO Entity's Task Force Ten-Year Network Development Plan (TF TYNDP), which represents a collaborative effort of approximately 25 experts from 16 European member states. The document aims to identify prevailing practices and propose initial insights into Distribution Network Development Plans (DNDP) as outlined by various European Distribution System Operators (DSO).

It is important to note that the contents of this report are intended to serve as a preliminary platform for further detailed discussion and exploration into the subject of DNDPs. The perspectives presented herein are derived from an initial view of national practices and are shaped by the collective expertise and regional representation of the TF TYNDP members. Additionally, feedback has been solicited through surveys and informal exchanges with external stakeholders, including ENTSO-E, SmartEN, AVERE, ChargeUp Europe, GEODE, the European Investment Bank (EIB), and the European Association for Storage of Energy. We are grateful for their contributions and have endeavored to integrate their valuable insights as comprehensively as possible.

This report does not claim to cover all aspects or potential strategies related to DNDPs. It is a foundational step, designed to spark subsequent detailed analyses and foster ongoing dialogue among all stakeholders interested in the advancement and sustainability of European DSO infrastructure.

The findings and recommendations expressed in this report are those of the TF TYNDP and do not necessarily reflect the official policies or positions of the individual DSOs, DSO Entity, or the aforementioned stakeholders. The TF TYNDP looks forward to engaging in further in-depth exchanges and collaborative work on the topic of DNDPs in the upcoming months.

This is an evolving topic; thus, the work and discussions regarding DNDPs are just beginning and will continue to develop in scope and depth. We invite all interested parties to join in these important discussions to enhance and refine the future of European energy distribution networks.

Executive summary

The Distribution Network Development Plan (DNDP) is a strategic document mandated by the EU Directive 2019/944 to be developed, published, and updated biennially by European Distribution System Operators (DSOs). This report, prepared by the Task Force Ten-Year Network Development Plan (TF TYNDP) under the DSO Entity, aims to provide an initial guide to DNDPs from DSOs of all sizes, incorporating insights from various European member states and stakeholders. DSO Entity reacts with this report to action point 3 of the EU Grid Action Plan (GAP) COM/2023/757. Furthermore, DSO Entity believes that increased visibility and transparency on distribution network planning will help to address action point 13 of the GAP.

Key Highlights from this initial investigation:

1. Purpose and Scope:
    - The DNDP outlines medium to long-term plans for addressing grid needs, focusing on flexibility services and investment in essential distribution infrastructure.
    - It serves as a strategic document to align with National Energy and Climate Plans (NECPs) and supports the expansion of renewable energy, electrification of consumption, and demand flexibility.
2. Planning Principles:
    - The DNDP is based on detailed scenario planning to forecast future energy consumption and production trends.
    - Key principles include business objectives, climate and sustainability goals, identifying and addressing bottlenecks, investment portfolios, national implementation plans, and stakeholder feedback.
3. Stakeholder Engagement:
    - Effective DNDPs involve comprehensive stakeholder consultations, including system users, transmission system operators (TSOs), and national regulatory authorities (NRAs).
    - Stakeholder Engagement ensures that the DNDPs are aligned with broader energy transition goals and reflect a shared understanding of future grid needs.
4. Investment and Infrastructure Development:
    - The DNDP details planned investments in distribution infrastructure, including projects aimed at improving resilience, increasing connection capacities, and enhancing service quality.
    - It provides transparency on ongoing and future investments, facilitating better planning and decision-making for system users and stakeholders.
5. Future Directions and Recommendations:
    - The report emphasizes the need for anticipatory investments to accelerate grid development and support renewable energy integration.
    - It calls for better alignment of scenario development timelines and proposes to investigate how information from the DNDPs can be made easily accessible and used on a European level.

Conclusion:

This DNDP guide represents a foundational step towards a unified approach to distribution network planning across Europe. By fostering transparency, stakeholder engagement, and strategic investment planning, DNDPs play a crucial role in advancing the sustainability and reliability of European energy distribution networks. The TF TYNDP invites all stakeholders to participate in ongoing discussions to refine and enhance DNDP practices, ensuring a robust and future-ready energy infrastructure.

Table of Contents

1 Introduction

1.1 DNDP throughout Europe

The Directive on common rules for the internal market for electricity (EU) 2019/944 requests, in article 32(3) and (4), the European Distribution System Operators (DSO) to develop, publish, and update a transparent distribution network development plan (DNDP) every two years, which is also submitted to the national regulatory authority (NRA). The DNDP details medium to long-term flexibility service needs and planned investments for the next five to ten years, focusing especially on essential distribution infrastructure to support new generation capacities and loads. Furthermore, DSOs are required to consult with all relevant system users and transmission system operators (TSO)s on the DNDPs, publish consultation results, and submit these alongside the network development plan to the NRAs.

The transposition of (EU) 2019/944 article 32(3) and (4) into national law varies largely between member states. The following examples showcase some of the current practices.

An overview table is added in the **Annex**.

1.2 What is the purpose of this document?

This document provides guidance and support to DSOs across all EU Member States to develop their Distribution Network Development Plans (DNDPs) on a strategic level. It also serves as a foundation for further discussions on DNDP requirements with relevant third parties. Developed through a collaborative effort by experts from the DSO Entity, this document marks an initial step towards establishing a unified European approach and understanding of DNDPs.

As the EU moves toward a more integrated energy market, DNDPs will offer insights for TSOs, governments, National Regulatory Authorities (NRAs), investors, and market participants on future network development based on clearly identified network needs. Effective DNDPs—characterized by reliability, comprehensiveness, consistency, and transparency—are vital for accelerating the energy transition. They support the expansion of renewable energy sources, the electrification of consumption, demand flexibility, and the reduction of future connection requests at a European level.

Further exchanges on DNDPs will facilitate the creation of a European perspective and promote a more commonly shared 'DNDP language'. This will enhance mutual learning, data exchange, and understanding of the plans and best practices among neighboring system operators.

2 Key considerations for developing a comprehensive DNDP

2.1 The purpose, content and application of the DNDPs

DNDPs outlines DSO's **strategic approach** to address existing and emerging challenges in compliance with regulatory requirements. The primary aim of these plans is to provide both short-term and long-term planning, development guidelines, and cost estimates, taking into account factors unique to each DSO, such as size, location, and managed voltage levels. Through the DNDP, a DSO demonstrates alignment with the objectives of National Energy and Climate Plans (NECPs).

The DNDP is primarily a **strategic document**, not intended to detail individual DSO investments, which are typically addressed in other operational documents. Instead, it offers a strategic overview of investment categories, such as consumer and producer connections, as well as grid reinforcement and modernization. As a **non-binding** guide, the DNDP outlines anticipated investments based on realistic connection scenarios, aligning with National Energy and Climate Plans (NECPs) or other official frameworks and scenarios. These projections include estimated investment amounts.

The DNDPs are meant to be updated biennially, providing an opportunity for comprehensive discussions among DSOs, TSOs, National Regulatory Authorities (NRAs), and system users. These discussions focus on the scenarios, methodologies, and specific challenges encountered by the DSOs.

DNDPs typically comprise several key sections: an introduction to the current state of the grid, a presentation of anticipated future scenarios for consumption and production, an assessment of emerging grid needs, and a conclusion outlining the necessary measures to address these evolving requirements. Additionally, the DNDP may include various other sections and information.

The forecasting period for DNDP scenarios typically ranges from 5 to 10 years, varying by country due to different energy distribution and regulatory contexts. Authorities may sometimes specify shorter or longer timelines, influencing the depth and focus of investment discussions. A longer timeline increases uncertainties, making short-term investment plans more detailed and reliable compared to long-term scenarios. The DNDP's transparent presentation of grid expansion measures can serve as a foundation to expedite permitting processes and enhance broad social acceptance, ultimately supporting the goal of achieving climate neutrality.

The document shall be made available on the website of the operating DSO and, if required, on the NRA's website, ensuring it is accessible to those interested. A summary in English may also be provided to facilitate a wider understanding and impact across Europe. All relevant information of the DNDP should be published following the FAIR (Findable, Accessible, Interoperable and Reusable) principle for example in a separated annex document to the DNDPs.

Good practice: DNDP translation to English	**France**
ENEDIS translated its complete DNDP to English in 2023. The DNDP can be found here. Translating the DNDP to English enables easier access to information to a larger group of relevant stakeholders. Translating at least relevant parts of the DNDP, like summaries, data descriptions, graphs, etc. to English may help international stakeholders to access relevant information.	

Recommendation: Increased accessibility to DNDPs
DNDP will help to quantify and communicate identified and anticipated grid needs. Bringing together the information from the DNDP to the European level will support bringing DSO into the spotlight in Brussels. Currently, DNDPs are predominantly published in the native languages of the issuing DSOs, which restricts their accessibility to stakeholders from other countries. While translating entire DNDPs into English may not be practical, we recommend that crucial elements of these documents be made more accessible to an international audience. A practical approach would be to provide an executive summary of each DNDP in English. This summary should encapsulate the key strategies, findings, and planned actions, offering a clear and concise overview of the document's contents. Additionally, vital information, knowledge, and data could be compiled in a separate annex, also translated into English. This would ensure that essential content is not only more accessible but also adheres to the FAIR principles—Findable, Accessible, Interoperable, and Reusable—widely recognized in the management of research data. It may be worse investigating, if it would be possible to share a common template for such a generalized annex between all European DNDPs.

2.2 On scenarios?

Scenarios are a crucial component of each DNDP, providing a framework for assessing infrastructure needs. In this context, a scenario is a detailed projection of possible future developments in energy consumption and production. It includes various assumptions and variables to forecast potential changes and challenges in the distribution network over a specific period. Scenarios guide strategic planning and investment decisions by illustrating possible future states of the energy system.

Given the inherent uncertainty in predicting the future, it is advantageous to develop multiple scenarios within a DNDP. The further into the future we look, the more likely it is that actual outcomes will differ from current expectations. Scenario planning enables us to consider not just the most probable future, but a range of potential outcomes based on varying assumptions about technology adoption, customer behavior changes, and other factors. By examining different scenarios, we can test the resilience of our investment plans and strategies. Moreover, these scenarios facilitate meaningful discussions among stakeholders, helping to build a common understanding of the implications of different assumptions and the risks involved if future conditions differ from our forecasts.

Scenarios may be developed with the support or with the feedback of external stakeholders. An early engagement with key stakeholders as part of the scenario development seems beneficial.

Scenario development is generally a complex and labor-intensive process. Consequently, some DSOs base their DNDPs on available scenarios from external sources, such as:

- National Energy and Climate Plans
- TYNDP Scenario from the ENTSOs
- National TSO scenarios
- Scenarios by independent entities

Additionally, depending on the structure of the DSO, input from municipalities and regional planning authorities may be considered to better define the DNDPs.

In this context, scenario development should also explore innovative approaches to achieving energy transition goals, including the adoption of new technologies. Both national and European perspectives should be taken into account annually to evaluate emerging scenarios and trends.

Good practice: Scenario rotating between TSO and DSO annually	**Netherlands**
In The Netherlands, DSOs and the TSO work together on the Integrated Infrastructure outlook 'II3050', a joint energy system study by TenneT, Gasunie and the regional system operators to explore pathways towards a climate-neutral energy system in 2050.	

Recommendation: Critical cross check external scenarios	
When a DSO bases its DNDP on external scenarios, it is essential to thoroughly understand and critically evaluate these scenarios. External scenarios may not fully align with the DSO's self-drafted scenarios or understanding of the regional reality. Therefore, a DSO utilizing existing scenarios must be aware of their limitations and ensure they are adequately adapted to the specific context and needs of the DSO.	

2.3 DNDP process – Stakeholder inclusion and alignment on scenarios

Stakeholder engagement differs from country to country and depends on what NRAs established and/or the approach the DSO utilizes. However, DSOs, before publishing their DNDP scenarios, may involve various stakeholder (TSOs, Authorities, Producer Parties, Gas Entities, Local Administrations, heating industry, EV charging, etc) in order to elaborate on joint input parameters on scenario development and achieve the best configuration of the intervention also considering other parties.

Moreover, to commit all the parties to the DNDP it is necessary to share information and to coordinate future initiatives and activities to facilitate the energy transition goals.

Stakeholder engagement can be conducted both online and in-person, potentially through multiple sessions. The DSO could briefly present the draft DNDP or parts of it, while the other parties may provide their point of view or other needs about the information contained in the plan.

Good practice: Stakeholder workshops engagement	France
Before publishing its final DNDP –, Enedis organized 3 ad hoc workshops that were held within the French electricity distribution network user committee, focusing on the themes of renewable energy sources, flexibilities, and electric vehicles. These workshops aimed to engage with the most involved stakeholders on these topics, discussing the trajectories, methods, and key messages planned for the DNDP. Following these workshops, a report was drafted to document this initial consultation phase. These workshops allowed Enedis to understand the issues and points of interest of the various stakeholders, and in some cases, adapt the final content of the NDP.	

3 The Model Distribution Network Development Plan

Every Distribution Network Development Plan (DNDP) serves as a strategic blueprint, providing transparency about a DSO's consideration in managing and evolving their networks to meet future. While there are various approaches on DNDP, they generally comprise four essential sections:

1. Description of the Current State of the Distribution System: This section provides a comprehensive overview of the existing infrastructure, detailing the physical assets, performance metrics, and any current challenges or limitations within the system.
2. Planning Assumptions and Scenario Building: It outlines the foundational assumptions and scenarios used to anticipate future states of the energy market and consumption trends. These scenarios help in projecting possible changes in demand and supply, facilitating strategic planning.
3. Planning Principles: This part identifies the specific needs of the distribution system, derived from the scenario analysis. It focuses on areas requiring attention such as capacity enhancement, reliability improvement, and compliance with regulatory standards.
4. Concrete Measures, Projects, and Programs: The final section details the actions the DSO plans to undertake to address the identified needs. It includes scheduled projects and programs aimed at upgrading, expanding, and modernizing the infrastructure to ensure the distribution system can meet future requirements.

3.1 Present the current state of the Distribution System

Electricity DSOs manage and maintain the distribution network that delivers electricity from the transmission system and from distributed generation installations to consumers. Their development plans for the grid are primarily influenced by customers' connection demands, changes in flow patterns, and the need for resilience and performance improvements. Each DSO prioritizes differently based on their unique context and characteristics. For this reason, an initial section describing the context, specifics and challenges facing the DSO is important.

Here is a list of essential information that may vary among distributors and influence the management and operation of their networks:

1. Network Infrastructure and configuration:

- Length of distribution lines: total kilometers of both overhead and underground lines, for high voltage (HV), medium voltage (MV), and low voltage (LV).
- Numbers of primary and MV/LV substations.
- Network configuration: radial, mesh, etc.
- Voltage levels used within the network, such as low, medium, and high voltage.
- Geographic description of the service area: city, region, or entire country; presence of urban and rural areas.
- Total number of consumer customers on voltage level.
- Distributed generation: number and installed capacity of generation plants, categorized by types (e.g. wind, solar).
- Smart meters: extent of smart meter deployment and their role in network operation.

2. Network operation framework

- Ownership structure: whether the DSO owns the distribution infrastructure or operates as a concessionaire.
- Decision-making process for investments, in the context of ownership or concession.
- Regulatory framework.
- Relationship of this Network Development Plan (NDP) with other operational or strategic documents concerning investments.

3. Additional considerations

European DSOs commonly strive to ensure security of supply with an adequate level of quality while, at the same time, integrating distributed energy resources like solar photovoltaics, and keep pace with technological advances such as energy storage and smart grid capabilities. They also aim to improve Key Performance Indicators (KPIs) for reliability, efficiency, sustainability, and customer satisfaction. The emphasis on these objectives and challenges can vary based on each country's specific circumstances, policy goals, and regulatory frameworks.

The introductory chapter provides a foundation for understanding the current state of the network and addresses the challenges that will be explored in later strategies within the plan. It also helps contextualize planning decisions and the need for investments in network modernization or expansion.

3.2 Planning assumptions and scenarios building

Scenarios are the base for the DNDPs. They provide a structure, information and data for the analysis of current and future grid needs. Scenarios are founded on planning assumptions. Some of the most important aspects to be considered in the planning assumptions are:

- Energy consumption trends and forecasts
- Energy production trends and forecasts
- Increase in grid connections
- Increase of number of energy storage facilities, EVs charging points and HPs (at voltage level, if available)
- Environmental aspects
- Available flexibility options
- Connections to other system operators TSO or DSO
- Quality of service

The level of detail may be differentiated considering the voltage levels or other criteria.

In this perspective, DSOs have to consider the impact of scenario building on their grid (both for producers, consumers and prosumers) should critically look at trends coming from stakeholders, giving their own perspective on the scenarios and elaborating forecasts and planning action.

HV grid planning is more accurate for long-term scenario development, as these interventions require longer planning and implementation periods. In contrast, MV and especially LV grid planning often have much shorter time horizons and are influenced by external factors, such as small customer connections, which are difficult to predict and manage with a high degree of confidence.

The scenarios of a DSO are linked to the context of the DSO itself (managing an urban or extra-urban grid, different voltage levels, etc) and may vary depending on external inputs and constraints. Non-exhaustive examples of external inputs may be:

- municipalities may change their investment plans during a cycle,
- connection requests may increase due to external factors,
- strategical decisions from ministries, authorities, etc

As a general principle, DSOs take into consideration scenarios of increase of RES connection, electrification of consumption (increase of peak load capacity), extreme climate events, increase of the quality of service. Moreover, a constant renewing of grid components should be planned in order to guarantee the best service to customers and enable future services.

Planning assumptions should, therefore, consider different inputs and depends on the data at the disposal from country to country: scenarios from other stakeholders are merged with data available only from the DSO (grid connections requirements for the following years, connection trends, power at disposal for each substation, etc) in order to complete the analysis of the grid planning.

The “nature” of the DSO influences the grid planning: DSOs managing grids in an urban context may not have issues with RES but may be more affected by an increase of load coming from EV charging and HP spread. Planning assumptions are different depending on the evolution of customers and on the managed grid and considers contemporaneity of production and consumption in order to consider the overlapping of the two aspects.

A more efficient grid requires high levels of reliability: to guarantee a higher quality of service, DSOs are implementing grid renewing actions that, many times, are overlapped with the resilience planning needed to face the extreme climate events that, year by year, are more intense and affect the quality of service.

In this context, the role of digitalization is becoming more and more important and, depending on the characteristic of the DSO, provides useful data to increase management and efficiency of the grid. Planning assumptions from DSOs may take into consideration implementation of digitalization to increase grid observability, data gathering, etc.

Good practice: Clustering region for scenario development	Germany
The expansion of the distribution grids requires long-term coordination between national grid operators. To this end, they should come together in planning regions. The grid operators in a planning region draw up a regional scenario as a common basis for the grid expansion plans of the individual grid operators. As a general rule, in Germany a grid operator only belongs to one planning region, in some cases two. In the regional scenario, the distribution grid operators describe the probable development of electricity generation and consumption within their planning region. They also state the number of existing and expected grid connections. The regional scenario contains a harmonized development path for which the distribution system operators are guided by the government's statutory climate protection targets. [https://www.vnbdigital.de/service/region]	
Recommendation: Align timeline for relevant scenario development activities	
In some member states, DSOs are required to align their DNDP scenarios with external scenarios. However, these external scenarios can sometimes be outdated by the time the DNDP is drafted. Therefore, it is recommended that when scenario development activities from different actors are interdependent, their timelines and publication dates should be carefully synchronized. Additionally, it is advisable that the complex task of scenario development be carried out collaboratively at a regional or national level to ensure coherence and accuracy.	

3.3 Planning principles

The scenario building process helps to identify grid needs. The planning principles provide a general framework for detailing how these needs are identified, prioritized, and potentially resolved. As a guideline, the following planning principles should be considered:

- Business objectives and internal policies
- Climate and sustainability goals
- Identify bottlenecks or constraints in specific scenarios
- Methods to eliminate these bottlenecks and constraints
- Investment portfolio
- National implementation plans
- Flexibility options
- Stakeholder feedback

3.4 Concrete Measures, Projects, and Program

The DNDPs typically outline measures to address grid needs based on an analysis of the baseline situation, projected demand and production scenarios, and key drivers aligned with national energy policy, see previous sections. This section may include the following content:

- Description of investments in the main distribution infrastructure and description of development programs or guidelines
- Ensuring transparency of ongoing and future investments and their impact on increasing connection capacities
- Providing information to system users and stakeholders in the field of spatial and business planning
- Project/program data and descriptions
- Explanation of background and expected effects, such as increased resilience to climate change impacts and improved quality of supply (continuity of power supply, voltage quality, etc.)
- Effects on enhancing network connection and hosting capacity
- Impact on the network of adjacent operators and system operator
- Analysis on the use of flexibility and/or measures to increase the efficiency and utilization of existing infrastructure.
- Estimated volume of investments and dynamics (aggregated on a year-by-year basis)

Good practice: Outline grid programs instead of projects	**France**
Investments for modernization and resilience are described by programs in Enedis' DNDP. One of these programs is the Planned Refurbishment: a cyclical upgrade of the overhead MV network, which allows for the retrofit of all overhead MV lines in a 25 year cycle. This program aims to restore and maintain the overhead MV network reliability to a level close to newly built assets. The eligible networks are prioritized using a large-scale data processing based on incidentology. The plan outlines this program and presents the cumulative network length addressed during the DNDP period.	

4 Next steps and Recommendations

4.1 The link between DNDPs and Anticipatory investments

The new Electricity Market Directive (EMD) introduces the concept of "anticipatory investments" and the central role that regulatory authorities will need to play to promote its public acceptance, "encouraging the acceleration of grid development to meet the accelerated deployment of renewable generation, including where appropriate in designated renewable acceleration areas, and smart electrified demand". In addition, in November 2023, the European Commission published its "EU Action Plan on Grids". This plan includes 14 initiatives to accelerate the development of transmission and distribution grids, from technical, financial, administrative and regulatory perspectives. To address the challenge "III. Introducing regulatory incentives for forward-looking grid build out" the European Commission states that "*The socio-economic welfare losses of delaying the network upgrades necessary to connect renewables and flexible demand will frequently outweigh the additional initial cost of anticipatory investments. Moreover, given the long lifespan of network assets, significant cost reductions can occur in the future when today's investments are done already considering upcoming needs*".

Considering the previous points, there are some aspects that can be inferred regarding anticipatory investments[1]:

- The concept is linked to the need to enable the accelerated development of renewable generation and electrification.
- Network development under the anticipatory investment principles will be based on longer-term expectations rather than actual, shorter-term requests.
- Grid planning including anticipatory investments will be more proactive than reactive, ensuring that grid capacity will be available where a reasonable expectation of grid needs will exist.
- There will be a certain level of risk to be assessed. The ideal level of anticipation will be the one where the benefits of investing earlier outweigh the risk of underutilization of the grid assets.

The DNDPs should indicate which of their planned developments are done under an "anticipatory" approach and how it reflects on grid capacity. In this way, stakeholders consulting the DNDP would be able to know, for example:

- For generators, in which geographies the distribution grid would be able to absorb additional renewable capacity due to the upsizing of its hosting capacity, even considering current connection requests.
- For consumers, where there would be greater potential for electrification (i.e. Industries) due to the greater capacity of the grid.
- For transport operators, what transport corridors would be better fit to develop high power charging infrastructure.

4.2 A European knowledge platform on DNDPs

To provide a helpful guide to all DSOs and involved stakeholders, TF TYNDP proposes to further investigate which information on DNDPs could be collected and published on European level. As a first step, a collection of links to

[1] DSO Entity established a dedicated task force on financial topics (TF FIN) on February/March 2024. TF TYNDP and TF FIN will jointly investigate how DNDPs can support clarifying the topic of anticipatory investments.

published DNDPs could be a helpful starting point for a further in-depth analysis on DNDP good practices. Additionally, a further exchange on method, tools and approaches on scenario development could serve as a useful source of information. The vast knowledge, information and data underlying the DNDPs could be a valuable source to system operators, market parties, NRA's and other stakeholders. In order to increase the accessibility to this knowledge, the DNDPs could apply the FAIR principles on which information and data should be Findable, Accessible, Interoperable and Reusable.

4.3 The link between DNDPs and permitting

Distribution grid operators are obliged by national law to publish the DNDP. It is derived from the national and European energy policy targets for achieving climate neutrality and the NDP of TSO. It describes technical options for implementing a climate-neutral energy system in the regional electricity distribution grid.

Although DSOs are responsible for the grid reinforcement measures identified in the DNDP, there are strong dependencies on approval authorities. Particularly expansion measures in the high-voltage grid, are often delayed by several years. For example, based on the published measures, environmental and nature conservation requirements, could at least be prepared to accelerate the grid expansion to reach the overall goal of climate neutrality. In this context, to promote broad social acceptance for the necessary grid expansion to achieve climate neutrality, politicians, the energy sector, industry, local authorities and associations could collaborate and prepare communication campaigns based on identified regional grid expansion measures identified in the DNDP.

5 Annex A

Country	Min. conns. for a DSO mandatory DNDP[2]	Forecasting horizon	Publication consultation	Frequency	DNDP language	Capacity maps	DNDP Public	Avg. no. of pages
Italy	>100k	3y (5y for future NDP)	Yes	Biennial	Italian	No	Yes	200 + annex
Belgium		10	Yes	Biennial	Dutch	No	Yes	100
France				Biennial	French & English	No	Yes	
Austria	>50.000	10	Yes	Biennial	German	Yes	Yes	
Portugal		5 years	Yes	Biennial	Portuguese	Yes	Yes	1000
Poland				Biennial	Polish	No	Yes	
Finland	None	10 years	Yes	Biennial	Finnish and Swedish	Yes	Yes	30-70
Slovenia	970	10	Yes	Biennial	Slovenian	No	Yes	240
Germany	≥100.000	5/10 and 2045	Yes	Biennial	German	Yes	Yes	10-50
Estonia				Biennial	Estonian	Yes	Yes	
Spain	None	3	No	Annually	Spanish	No	No	
Greece		5 years	Yes	Biennial	Greek	No	Yes	90 + 200 annex
Hungary	None	5 and 10 years	Yes	Annually	Hungarian	No	Yes	~500 + annex
Netherlands		2, 5-10 and 2030-2050	Yes	Biennial	Dutch/English	Yes	Yes	200

[2] The threshold of connections from which a DSO is obliged to publish a DNDP.