

OPINION No 05/2021
OF THE EUROPEAN UNION AGENCY
FOR THE COOPERATION OF ENERGY REGULATORS

(text rectified by corrigendum of 27 August 2021)

of 19 July 2021

on the electricity national development plans

THE EUROPEAN UNION AGENCY FOR THE COOPERATION OF ENERGY REGULATORS,

Having regard to Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity, and, in particular, Article 48(2) thereof,

Whereas:

1. INTRODUCTION

- (1) Article 48(2) of Regulation (EU) 2019/943 tasks the European Union Agency for the Cooperation of Energy Regulators ('the Agency') with providing an Opinion on the national ten-year network development plans ('the NDPs') to assess their consistency with the Union-wide ten-year network development plan ('EU TYNDP'). If the Agency identifies inconsistencies between an NDP and the EU TYNDP, it shall recommend amending the NDP or the EU TYNDP as appropriate. If such an NDP is elaborated in accordance with Article 51 of Directive (EU) 2019/944, the Agency shall recommend that the regulatory authority ('NRA') amend the NDP in accordance with Article 51(7) of that Directive and inform the Commission thereof.
- (2) The Agency's Opinion No 04/2021¹ provides the Agency's assessment of consistency of the projects in the draft EU TYNDP 2020 of the European Network of Transmission

¹ The Agency's Opinion No 04/2021:

https://acer.europa.eu/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER%20Opinion%2004-2021%20on%20the%20electricity%20projects%20in%20the%20draft%20ENTSO-E%20TYNDP%202020.pdf

Operators for Electricity (‘ENTSO-E’) with the projects in the NDPs of the EU Member States and Norway².

- (3) This Opinion provides the Agency’s assessment of the consistency of inputs and of the analytical methodologies of the NDPs of the EU Member States (except Malta), Norway³ and Switzerland⁴. Malta is not included in the assessment as it does not have a transmission system operator (‘TSO’).
- (4) The Agency considers as ‘national ten-year network development plans’ pursuant to Article 48 of Regulation (EU) 2019/943 all relevant electricity network planning instruments, even if they are referred to with a different title (e.g. investment plan) or cover a different time span.
- (5) On 23 December 2020, the Agency invited the NRAs to provide information about their relevant NDPs. The NRAs provided input to the Agency by 12 February 2021 and by follow-up clarifications.

2. GENERAL INFORMATION ABOUT THE NDPs

- (6) The general information about the latest electricity NDPs and of the electricity TSOs preparing the NDPs is presented in Table 1. Additionally, the main TSOs’ shareholders, information about TSOs traded on stock exchanges and the links to individual NDPs are provided in Annex I, in Tables 4 and 5.

Table 1: General information about the NDPs and of the TSOs preparing them

Country	TSO	Unbundling model ⁵	Status and date of the latest NDP	Frequency of the NDP
Austria	APG	ITO	final, November 2020	1 year
	VUEN	OU	final, November 2020	1 year
Belgium	Elia	OU	final, April 2019	4 years
Bulgaria	ESO	ITO	final, October 2020	1 year
Croatia	HOPS	ITO	final, March 2021	1 year
Cyprus	Cyprus TSO	derogation	final, March 2020	1 year

² The geographical scope of the Agency’s Opinion No 04/2021 is different from the geographical scope of this Opinion, because Switzerland did not participate in the activities related to the Agency’s Opinion 04/2021.

³ as a Member of the European Economic Area

⁴The Swiss regulator is participating voluntarily as an observer in the ACER Electricity Working Group on the basis of the signed Memorandum of Understanding between ACER and the Swiss Federal Electricity Commission (ElCom) in 2016.

⁵ Pursuant to Article 9(8) of the Directive (EU) 2019/944, a Member State may decide not to apply any of the three unbundling models, where on 3 September 2009, the transmission system belonged to a vertically integrated undertaking and there are arrangements in place which guarantee more effective independence of the transmission system operator than the provisions of the TSO model.

Country	TSO	Unbundling model ⁵	Status and date of the latest NDP	Frequency of the NDP
Czech Republic	ČEPS	ITO	final, November 2020	2 years ⁶
Denmark	Energinet	OU	final, October 2020	1 year
Estonia	Elering	OU	final, December 2020	1 year
Finland	Fingrid	OU	final, November 2019	2 years
France	RTE	ITO	final, September 2019	2 years
Germany	Amprion	ITO	final, December 2019	2 year
	Tennet DE	ITO		
	TransnetBW	OU		
	50 Hertz	OU		
Greece	ADMIE	OU	draft, January 2021	1 year ⁷
Hungary	MAVIR	ITO	final, February 2021	1 year
Ireland	EirGrid	derogation	draft, April 2021	1 year ⁸
Italy	Terna	OU	draft, January 2020	2 years (from July 2020)
Latvia	AST	OU	final, October 2020	1 year
Lithuania	Litgrid	OU	draft, June 2020	1 year
Luxembourg	Creos Luxembourg	derogation	final, January 2021	2 years
Netherlands	Tennet NL	OU	final, October 2020	2 years
Norway	Statnett	OU	final, October 2019	2 years
Poland	PSE	OU	final, May 2020	3 years ⁹
Portugal	REN	OU	draft, March 2021	2 years
Romania	Transelectrica	OU	final, December 2020	2 years ¹⁰
Slovakia	SEPS	OU	final, April 2021	2 years
Slovenia	ELES	OU	final, January 2021	2 years
Spain	REE	OU	final, October 2015	6 years
Sweden	Svenska kraftnät	OU	final, December 2019	2 years
Switzerland	Swissgrid	N/A	final, February 2015	Not provided

- (7) The Agency examined the unbundling models of the electricity TSOs, as pursuant to Section 3 of Chapter VI of Directive (EU) 2019/944 the Independent Transmission

⁶ It also happened that some approvals took place beyond this timeframe.

⁷ It also happened that some approvals took place beyond this timeframe.

⁸ It also happened that some approvals took place beyond this timeframe.

⁹ The latest NDP was exceptionally elaborated one year after the previous NDP due to important changes in the Polish energy law.

¹⁰ It already happened that some approvals took place beyond the 2-year timeframe and the plans of different years have been combined.

Operator ('ITO') model does not separate the ownership function and requires a stronger regulatory oversight, including consultation and monitoring of the NDPs.

- (8) The Agency identified two changes in the chosen unbundling model in comparison to the unbundling models provided in Opinion No 13/2019: the Latvian TSO's unbundling model changed from the Independent System Operator ('ISO') to Ownership Unbundling ('OU')¹¹ and the Slovakian TSO's from ITO to OU. Therefore, currently about 20% of the Member States which are not derogated from unbundling rules apply the ITO model, while more than 70% of them apply an OU model. Austria and Germany apply both ITO and OU models for different TSOs. The ISO model is no longer applied in any EU Member State.
- (9) The Agency welcomes that regardless of the chosen unbundling regime, in each Member State (except in Malta, where there is no TSO), the TSO develops an NDP, which is essential in facilitating transparent and solid infrastructure planning in Europe. The Agency finds that approximately 40% of the NDPs are developed every year and approximately 45% every second year. About 15% are elaborated less frequently, i.e. every 3 years (in Poland), 4 years (in Belgium) and 6 years (in Spain)¹². With regard to Spain, the Agency finds that their NDP can be subject to later amendments as a result of the TSO's proposal with regard to some specific aspects (e.g. security of supply, economic efficiency, critical infrastructure for energy transition) and that the NRA annually monitors the NDP and submits a report to the Ministry including an assessment regarding the adaptation of the NDP to the EU TYNDP.
- (10) The Agency notes that among the countries where the NDP is elaborated every year, more than one third of the NRAs reported complexities related to longer than expected preparation or approval process of the plan, while for countries with biennial frequency, only 2 out of the 13 NRAs reported such a complexity. Based on this and on its similar previous finding¹³, the Agency concludes that the NDPs which are elaborated every year are more exposed to complexities related to delays in either preparation or approval process than less frequent plans, and suggests to reconsider annual frequencies of network planning to reduce such complexities.
- (11) Pursuant to Article 30(1)(b) and 48(1)(a) of Regulation (EU) 2019/943, ENTSO-E shall develop a biennial EU TYNDP which is built on the NDPs. In the Agency's view the NDPs should also be prepared on a biennial basis¹⁴. This is an optimal timeline to keep the NDPs up to date and achieve greater consistency with the EU TYNDP, without experiencing delays or compromising on the preparation, including proper

¹¹ The Latvian TSO became the sole owner of the electricity transmission system and the change in the unbundling model was completed on 25 November 2020.

¹² For Switzerland, no information has been provided on the frequency of the NDP.

¹³ Cf. The Agency's Opinion No 13/2019, p. 9

¹⁴ Cf. The Agency's Opinion No 13/2019, p. 10

consultation of the draft NDPs and effective consideration of its results. The timing of the NDPs needs to be fine-tuned with the timing of the EU TYNDP in order to provide proper and timely inputs and avoid discrepancies.

- (12) In this regard, the Agency welcomes that compared to the situation in 2019¹⁵, the frequency of the elaboration of the NDP changed in France and Italy, in both instances from an annual to a biennial frequency. In two additional countries (Greece and Lithuania), the introduction of a biennial frequency for the elaboration of the NDP is under consideration. The Agency further notes that since 2014, when only 8 countries reported a biennial frequency of the elaboration of the NDP¹⁶, such frequency has been introduced in 5 additional countries.
- (13) The Agency notes that the binding nature of the NDPs varies across the countries. In most countries it is either binding or at least partially binding (e.g. for projects planned in the next 3-5 years). Detailed information, including the consequences and obligations of the TSOs and the NRAs (or Ministries) related to the binding nature of NDPs (e.g. obligation to build the project, obligation to include the relevant costs in tariffs) that are different across the countries, are described in Table 6 in Annex I.

3. COORDINATION AND ALIGNMENTS OF THE NDPS WITH OTHER NATIONAL PLANS

3.1. Other TSOs of the same country

- (14) Six countries (Austria, Finland, France, Germany, the Netherlands and Sweden) reported to have multiple TSOs¹⁷, in most of them (except in Austria and Germany) only one of the TSOs prepares an NDP, which can be explained by the fact that in most instances only one of the TSOs is operating a transmission network, while the other TSOs are merely operating an interconnection. In Austria, two TSOs (APG and VUEN) issue their own separate NDPs and in Germany, four TSOs (Amprion, Tennet DE, Transnet BW and 50 Hertz) prepare a joint NDP. In this regard, the Agency reiterates its view¹⁸ that each Member State should have a single NDP for electricity infrastructure development.

¹⁵ Cf. The Agency's Opinion No 13/2019, p. 8-9

¹⁶ The Agency's Opinion No 08/2014, p. 6

¹⁷ 3 in Austria (APG, Eneco Valcanale, VUEN), 2 in Finland (Fingrid and Kraftnät Åland Ab), 2 in France (Eleclink and RTE), 5 in Germany (Baltic Cable AB, Amprion, Tennet DE, TransnetBW and 50Hertz), 2 in Netherlands (BritNed and Tennet NL) and 2 in Sweden (Baltic Cable AB and Svenska Kraftnät)

¹⁸ Cf. ACER-CEER Position on the Revision of the TEN-E Regulation and Infrastructure Governance, June 2020, p. 12

https://documents.acer.europa.eu/Official_documents/Position_Papers/Position%20papers/ACER_CEER_paper_on_TEN_E.pdf

3.2. National energy and climate plans

- (15) While the assessed NDPs may have been prepared before the transposition of Directive (EU) 2019/944 into national law, the Agency notes that approximately two thirds of the NDPs are claimed to take the national energy and climate plan (‘NECP’) into account. In most of the remaining countries¹⁹, the NECP is not yet considered in the latest NDPs due to timing (e.g. the latest NDP was elaborated before the NECP), but it is planned to be considered in the next edition of the NDP. In Cyprus, where the NECP is not taken into account because there is no such obligation by law, this will also change in the future when the respective national legislation comes into force, while in Norway, the NECP is not taken into account because the corresponding provisions from the Clean Energy Package have not been included to the European Economic Area Agreement yet. Detailed information about the NDPs that consider the NECPs is provided in Table 7 in Annex I.

3.3. Distribution system operators’ national development plans

- (16) The Agency finds that distribution system operators’ (‘DSO’) electricity development plans are prepared in more than 80% of the countries and in all of them (except in Bulgaria), there is at least some level of alignment between the respective plans. In five countries with DSOs’ development plans, the TSO and the DSOs exchange data regarding scenarios and/or assumptions and in four, there are consultations between these parties. The vast majority of the NRAs also report other kind of alignment (e.g. coordination regarding projects that both parties are involved in). In Hungary, the TSO and the DSOs jointly prepare a single high voltage NDP (for the network >132 kV). Country-specific information on the DSOs’ electricity development plans and their alignment to the TSOs’ NDPs is provided in Table 2.

Table 2: Information about DSOs’ electricity development plans and their alignment to the TSOs’ NDPs

Alignment between the TSO and DSO NDPs	Countries with multiple DSOs			Countries with one DSO	
	Each DSO prepares an NDP	Not all DSOs prepare an NDP ²⁰	None of the DSOs prepare an NDP	The DSO prepares an NDP	No DSO NDP

¹⁹ Austria, Belgium, Bulgaria, Croatia, Ireland, Spain, Sweden, and Switzerland

²⁰ In Estonia, Latvia and Lithuania, only the DSOs which have above 100 000 users prepare an electricity development plan. In Germany, DSOs operating high voltage network are obliged to prepare development plans, submit them to the NRA and publish them on an annual basis. The current draft of the German national implementation of Article 32 of the Directive (EU) 2019/944 foresees that generally all TSOs with 100 000 customers have to establish a development plan every two years. In France, there is one main DSO and more small local DSOs and the DSOs’ electricity development plan is under preparation by the main DSO. In Greece, there are two DSOs (one is only responsible for the Athens’ airport network) and only the bigger one develops a DSOs’

Data exchanges regarding scenarios and/or assumptions	BE, NL	DE, IT, LV	DK ²¹		AT
Consultation between the TSO(s) and the DSO(s)		DE ²² , LV, LT		PT	
Other alignment/joint activities	FI, LU, NL, RO, SK, ES	EE, FR, GR ²³ , NO, PL ²⁴ , CH	CZ	HR, CY, SI	AT, IE
A single high voltage NDP	HU ²⁵				
No alignment	BG		SE		

3.4. Planning of other energy infrastructure

- (17) Based on the information provided by the NRAs, the Agency notes that in none of the countries, the electricity NDP is prepared jointly in order to develop multiple energy sectors (e.g. electricity-gas). This finding is very similar to that observed in 2020²⁶ and 2018²⁷, and does not seem to provide evidence of a shift to a more integrated electricity and gas planning. Only two countries (Denmark and Italy)²⁸ reported a stronger interaction between the planning of electricity and gas sectors. In Denmark, the assumptions and projections used in the analysis are coordinated between gas and electricity and the results are jointly communicated. In Italy, joint scenarios are prepared for the electricity and gas transmission NDPs. The NRAs in three countries

electricity development plan. In Poland, the DSOs that have less than 100 customers and to which less than 50 GWh of electricity per year is supplied, do not need to prepare an electricity development plan.

²¹ The Danish NRA explains that from 2023 and onwards, each DSO should prepare an electricity development plan.

²² The German NRA explains the current national draft of the implementation of the Directive (EU) 2019/944 foresees that TSOs must be given opportunity to comment the relevant DSOs' development plans. The cooperation of DSOs and TSOs is fostered through the foreseen new process, but the process of the DSOs' development plans remains independent.

²³ The Greek NRA explains the TSO cooperates with the DSOs on projects that both operators are involved in, as the expansion of transmission system for the connection of distribution network and the investigation of islands' interconnection to the mainland are either in high (TSO's duty) or medium voltage (DSO's duty).

²⁴ The Polish NRA explains the TSO and the DSOs work together to ensure plans are coherent and schedules compatible and that the DSOs and the TSO are obliged to prepare a 15-years forecast regarding the security of supply. The DSOs also include in their plans the action plans and projects prepared by the TSO.

²⁵ In Hungary, there are multiple DSOs and each prepares a plan that is part of the all network development plan (>132 kV).

²⁶ Cf. The Agency's Opinion No 09/2020, p. 9

²⁷ Cf. The Agency's Opinion No 11/2018, p. 15

²⁸ The Spanish NRA explains the Spanish NDP 2008-2016 covered network development plans in electricity and gas sectors and it is still in force for gas.

(Belgium, Denmark, France²⁹) reported that improvements related to establishment of a multi-sectoral approach were under discussions.

- (18) In order to enhance efficient and consistent infrastructure development across the Member States and the electricity and gas sectors, the Agency recommends that at least one robust EU TYNDP scenario (i.e. with consistent and coherent assumptions across Europe) is taken into account to construct the NDPs' scenarios for electricity infrastructure development and also for other national energy infrastructure planning documents.

4. REGULATORY OVERSIGHT OF NDPS AND THE RESPECTIVE ROLE OF NRAS

4.1. Ability to approve or require amendments of the NDP

- (19) As detailed in the Agency's Opinion No 13/2019, in more than 80% of the countries, the NRA is empowered or obliged to carry out at least some level of scrutiny of the NDP³⁰. In half of the countries, the NRA approves the proposed NDP. In about 20%, the NRA does not approve the NDP, but has a right to require its amendment. Furthermore, in four countries with no approval or amendment rights by the NRA, a non-binding act (e.g. opinion or recommendation) is or can be issued. In the remaining 5 countries (Denmark, Estonia, Luxembourg, Slovenia³¹ and Sweden), the NRA has no effective power and can only play a limited consultative role in the elaboration process of the NDP. Detailed information is presented in Table 3.
- (20) Further, the Agency finds that in 5 countries (Denmark, Estonia, Luxembourg, Norway and Sweden), a project cannot be formally rejected³² by the NRA or a Ministry, while in the remaining countries, the NRA or a Ministry has such powers. The NRAs reported two instances where not all the proposed projects in the NDP were approved during the last scrutiny of the NDP. In Germany, 48 projects out of 162 have not been approved by the NRA, because they did not meet at least one of the test criteria in at least one of the analysed scenarios³³. In Italy, two projects out of more than 200 in the latest draft NDP did not receive a favourable opinion by the NRA due

²⁹ The French NRA reported a multisectoral coordination between the electricity TSO and gas TSOs to work on the development of a basis of common hypotheses is being considered, while respecting a stakeholder consultation process similar to the one of the current NDP.

³⁰ Cf. The Agency's Opinion No 13/2019, p. 18

³¹ In Slovenia where the NRA does not have such powers, the Ministry is requiring such amendments.

³² Including "non-approval" or "non-validation" of a project

³³ Test criteria: effectiveness (project is deemed effective if it's suitable to either cure or significantly reduce grid congestion in normal operation mode or in (n-1) operation cases in at least one hour of the modelled scenario) and necessity (project is deemed necessary if it is at 20% of its capacity in at least one hour of the modelled scenario with the grid being in normal operation mode)

to limited benefits for the Italian energy system and/or insufficiently detailed studies related to the projects' assessment³⁴.

- (21) The Agency welcomes that in Greece, the NRA's responsibility has been increased over the past two years by having been empowered to amend the draft NDP before approving it. Additionally, the Agency welcomes that in Estonia, the planned change of the national legislation also includes an obligation for the TSO to submit the NDP to the NRA and the NRA's ability's to request amendments of the NDP.

Table 3: Scrutiny of NDPs by the NRA

	Countries
The NDP approved by the NRA³⁵	Austria, Bulgaria, Croatia, Cyprus, Czech Republic, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, Poland, Romania
The NRA does not approve the NDP, but has a right to require its amendment	France, Netherlands, Portugal, Slovakia, Spain, Switzerland
The NRA does not approve the NDP, cannot require its amendments, but issues a non-binding act (e.g. opinion, recommendation)	Belgium, Finland, Italy, Norway
No scrutiny by the NRA	Denmark, Estonia, Luxembourg, Slovenia, Sweden

- (22) According to the EU legislation, the stronger NRA scrutiny stipulated in Article 51 of Directive 2019/944 currently applies only for the case of ITOs. However, as pointed out above, the Agency finds that such stronger scrutiny is applied in national laws of many Member States, irrespective of the unbundling status of the TSOs.
- (23) In the Agency's view, in the absence of proper regulatory scrutiny, specific market failures could induce TSOs not to consider specific investments that would bring greater social welfare in the long-run or result in inefficient investments whose costs would be borne by consumers.
- (24) The Agency recalls its recommendation³⁶ that in each Member State the relevant NRA should have the power to approve the NDP, as NRAs are best equipped to ensure the NDPs are fit for delivering a sound infrastructure development and reach a sufficient level of quality. Also, the NRA should have the power to amend the NDP, including the inclusion or removal of specific investments where needed.

³⁴ Previously, some projects did not receive favourable NRA's opinion and were later not approved by the Ministry.

³⁵ In Belgium, Czech Republic, Italy, Portugal, Slovenia and Spain, the NDP is approved by the Ministry.

³⁶ Cf. ACER-CEER Position on the Revision of the TEN-E Regulation and Infrastructure Governance, June 2020, p. 3

- (25) Additionally to the regulatory scrutiny of the planning, NRAs have various powers and obligations regarding the consultation, check of consistency with other plans, monitoring and/or execution of the NDPs. Under certain conditions (i.e. if a TSO is certified under ITO model) such powers and obligations are explicitly required by Article 51 of Directive (EU) 2019/944³⁷. The Agency's finding about to what extent the NRA powers listed in Article 51 are ensured by the national legislative frameworks and whether the respective activities are actually being performed by the NRAs is presented in Table 8 in Annex I.

4.2. Consultation of NDPs

- (26) Pursuant to Article 51 of Directive (EU) 2019/944, TSOs certified under the ITO model shall submit their NDP to the NRA after having consulted all the relevant stakeholders. The NRA shall also consult all actual or potential system users on the NDP in an open and transparent manner and publish the result of the consultation process, in particular addressing possible investment needs.
- (27) The Agency finds that in 15 countries the NRAs have the power or obligation to carry out a public consultation on the NDP and in all of these countries such consultation by the NRA is actually carried out. In 7 out of the remaining 13 countries, a public consultation is carried out by other entities³⁸. In Norway and Slovenia, no public consultation is carried out by any entity, but the TSO has specific (bilateral) consultations at least with some stakeholders, while in Estonia, Sweden and Switzerland, neither public consultation nor any specific or bilateral consultation is carried out. In Luxembourg, only the scenario development part of the NDP is consulted by the TSO.
- (28) Compared to its findings in 2019³⁹, the Agency notes improvements with regard to public consultations and welcomes that during the past two years, public consultations of the draft NDP have also been introduced in Cyprus, Denmark and the Netherlands and that based on the information provided by the Estonian NRA, the upcoming amendment of the national legislation in Estonia will also include a requirement for the NDP to be publicly consulted.

³⁷ Pursuant to Article 51 of Directive (EU) 2019/944, in countries where the TSO(s) is certified under the ITO model, the competent national authorities have an obligation to examine consistency of the NDP with the NECP (Article 51(5)) and the NRAs have:

- obligation to consult all actual or potential system users on the NDP in an open and transparent manner including publication of the results of the consultation process, in particular possible needs for investments (Article 51(4)),
- obligation to examine whether the NDP covers all investment needs identified during consultation (Article 51(5)),
- obligation to examine consistency of the NDP with the EU TYNDP (Article 51(5)),
- ability to require amendments of the NDP (Article 51(5)),
- obligation to monitor and evaluate implementation of the NDP (Article 51(6)),
- obligation to take specific measures in order to ensure execution of specific investment is made (Article 51(7)).

³⁸ by the TSO in Belgium, Cyprus, Denmark, Finland, the Netherlands and Poland and by the Ministry in Spain

³⁹ The Agency's Opinion No 13/2019, p. 14-17

- (29) Additionally, the Agency acknowledges the following improvements in public consultations in the past two years:
- introduction of a new process regarding public involvement in the scenarios in Denmark;
 - introduction of additional public consultation in the process of scenario preparation in Italy, where the electricity and gas TSOs voluntarily performed public consultations via workshops and requests for feedbacks;
 - introduction of two additional public consultations regarding the infrastructure needs assessment in Italy (one consultation on target capacity methodology and one on the target capacity report);
 - a more extensive and longer consultation of the draft NDP in France, in order to allow more time for the stakeholders' feedbacks on a more detailed latest draft NDP in comparison to the previous edition.
- (30) The Agency notes, based on the information provided in Table 9 in Annex I, that in almost two thirds of the countries with public consultation related to NDP (run either by the TSO or the NRA), both the stakeholders' comments and the responses to those comments are published in full version. Solely the stakeholders' comments are published (in full version) in four (Austria, France, Germany and Portugal) and only a summary of the comments in three countries (Bulgaria, Hungary and Spain). Neither the stakeholders' comments nor the responses to them are published in Poland. In Norway the minutes from the stakeholders' meetings are published.
- (31) The Agency welcomes NRAs' increased efforts to appropriately involve stakeholders in the NDP process, and considers it of utmost important in order to improve the NDPs' quality and increase its public acceptance.
- (32) The Agency reaffirms its previous recommendation⁴⁰ that a public consultation on the draft NDP should be carried out in every country, irrespective of the chosen unbundling model. Such consultation shall be carried out before the adoption of the NDP. In more advanced national frameworks, specific consultations on the major building blocks of the NDPs (e.g. scenarios, CBA) could also be considered, so that the stakeholders' inputs are timely taken into account, i.e. before the assessment of projects.
- (33) The Agency recommends that stakeholders' comments from the public consultations and information about their treatment are published.

⁴⁰ Cf. The Agency's Opinion No 13/2019, p. 17

4.3. Examination of investment needs

- (34) The Agency identifies that 19 NRAs have the power or obligation to examine whether the NDP covers all investment needs identified during the consultation and that this examination is actually being performed in 17 countries by the NRA⁴¹. In three additional countries, the examination of the investment needs is performed by other entities⁴².
- (35) The Agency notes that in four countries⁴³, the NRAs' (or Ministry's) examination revealed that the latest NDP did not cover all investment needs identified during the consultation process, and consequently in three countries (Germany, Greece and Spain), an amendment of the NDP was requested⁴⁴. Additional information about investment needs' examination is provided in Table 10 in Annex I.

4.4. Examination of consistency with the NECPs

- (36) According to Article 51(5) of Directive (EU) 2019/944, the consistency of the NDP of an ITO with the NECP submitted in accordance with Regulation (EU) 2018/1999 shall be examined by the competent national authority.
- (37) The Agency's analysis reveals that in about half of the countries, the NRA is empowered or obliged to examine the consistency of the NDP with the NECP and that almost 40% of the NRAs also perform this activity in practice. Additionally, in four countries where the NRA does not have the respective power, this activity is performed by other entities. The Agency notes that among the countries where this activity is not performed by any entity, there are also two countries with an ITO model (Austria and Croatia).

4.5. EU TYNDP-NDP consistency check

- (38) In the framework of the Agency's activity pursuant to Article 48(2) of Regulation (EU) 2019/943, NRAs already carry out a consistency check between NDPs and the EU TYNDP⁴⁵.
- (39) The vast majority of the countries reported that the NRA carries out additional individual consistency checks of the NDPs in their countries with the EU TYNDP. These additional individual consistency checks between the EU TYNDP and NDPs concern mainly the consistency of the outputs (e.g. list of investments and/or projects,

⁴¹ Information for Bulgaria has not been provided and in one country where the NRA has the power, the activity is not performed.

⁴² by the Danish Energy Agency in Denmark and by the Ministry in Slovenia and Spain

⁴³ Germany, Greece, the Netherlands and Spain

⁴⁴ The Spanish NRA explains the request was formulated by a non-binding opinion.

⁴⁵ For the inconsistencies identified by NRAs in the framework of the Agency's activity, please refer to the Agency's Opinion No 04/2021.

expected commissioning dates, status, costs, benefits, projects with relevant cross-border impact, differences in project description) and that of inputs (e.g. scenarios). More detailed information is provided in Table 11 in Annex I. The inconsistencies which were identified in several countries are typically addressed by the relevant TSO in the next edition of the NDP⁴⁶.

4.6. Monitoring the implementation of the NDP

- (40) In 23 countries, the NRA is empowered or obliged to monitor and evaluate the implementation of the NDP and in at least 22 instances⁴⁷, the monitoring has been actually performed by the NRA. The Agency notes that in vast majority of the countries the monitoring is carried out through NRA-TSO collaboration (e.g. the TSO is reporting the progress of projects to NRA, while the NRA is assessing it). In Belgium and Ireland, the infrastructure monitoring is part of the NRAs' tariff review process. In Denmark, the monitoring is carried out by the TSO and the Danish Energy Agency. The Agency welcomes that monitoring of the NDP by the NRA is also planned to be established in Estonia.
- (41) In accordance with the Agency's recommendation on adopting an NDP every two years, the Agency recommends that in the years in between two NDPs, a monitoring update of the NDP is carried out. In the Agency's view such monitoring update should take stock of the investments' progress and reasons for delays or rescheduling. The monitoring update should also take note on any commissioned or cancelled investment.

4.7. Ensuring execution of investments

- (42) In 15 countries the NRA is empowered or obliged to take specific measures in order to ensure a specific investment is executed (as stipulated in Article 51(7) of the Directive (EU) 2019/944). While at least 12 NRAs carry this activity out⁴⁸, the Agency notes that in none of these countries, the NRA has used (or had to use) this power in practice and took the corresponding measures in order to ensure the execution of a specific investment. In three countries where the NRA does not have the corresponding power or obligation, the activity is performed by other entities⁴⁹ and in

⁴⁶ E.g. In France, the NRA requested the TSO to be clearer on the articulation between national scenarios and the EU TYNDP hypotheses in the future. In the Italian draft NDP, the Italy-Montenegro project is presented as a bundle of two steps (first and second pole) and in the draft EU TYNDP 2020, the second pole is separately displayed as project 28. In its opinion 547/2020, the NRA recommended the Ministry not to approve the Italy-Montenegro project and recommended the TSO to present the second leg of the Italy-Montenegro project separately in the next NDP. In Spain, the NRA identified inconsistencies, but it did not require the TSO to amend the NDP, because it does not have such legal power.

⁴⁷ Information for Bulgaria has not been not provided.

⁴⁸ Information for Bulgaria has not been not provided.

⁴⁹ by the Ministry and Danish Energy Agency in Denmark, by the TSO's shareholders in Latvia and by the Ministry in Spain

12 countries (including Croatia and Czech Republic with an ITO model) this activity is not performed by any entity.

5. TRANSPARENCY

- (43) Similar to its finding reported in 2019⁵⁰, the Agency notes that the NDP is published in all but two countries (namely Cyprus and Luxembourg). The Agency welcomes that in Cyprus, the next NDP will be published.
- (44) Additionally, the Agency notes that in approximately 85% of the countries with scrutiny by the NRA (or Ministry), the documents related to such scrutiny (e.g. opinion, approval) are published. Links to these publications are provided in Table 12 in Annex I. In four countries (Ireland, Poland, Slovenia and Switzerland), these documents are internal and not published.
- (45) Based on the information presented in Table 13 in Annex I, the Agency acknowledges that information regarding the cross-border relevance of projects is available and published in almost 80% of the countries. However, in half of these countries, the cross-border relevance is provided only for some projects (e.g. interconnectors, major investments, PCI projects).
- (46) In its Opinion No 13/2019 (p. 48), the Agency identified that in general, public availability of investment cost information in the NDPs was rather limited and it further noted that transparency of this information had not significantly improved compared to previous years. This Opinion also confirms these previous findings. Based on the information provided in Table 14 in Annex I, there are 12 countries where investment costs are publicly available at least on a project level (including the 5 countries where this information is made public only for some projects). Out of the remaining 16 countries where the cost information on a per-project level is not publicly available, this information is available to the NRA in 14 countries, while in two countries, only an aggregated value of costs is available to the public and to the NRA.
- (47) In the Agency's view public availability of the NDP improves transparency and enables efficient infrastructure planning and implementation in Europe. Therefore, the Agency recommends the NDP is published in every country⁵¹. Additionally, the Agency is of the view that for the same reasons, all formal acts on the NDPs, as applicable in each country (e.g. decisions, opinion, consistency analysis, monitoring) should also be published.

⁵⁰ Cf. The Agency's Opinion No 13/2019, p. 45

⁵¹ Cf. The Agency's Opinion No 13/2019, p. 47

- (48) Similar to its previous recommendations⁵², the Agency stresses that, for the sake of transparency and in order for ENTSO-E to facilitate including all cross-border and cross-zonal relevant planned projects from the NDPs in the EU TYNDP, all such projects should be explicitly flagged in the NDPs, by providing the relevant cross-border or cross-zonal capacity increase.
- (49) Regarding cross-border and cross-zonal relevance, the Agency reiterates its view presented in June 2020 in ACER/CEER TEN-E paper⁵³ that a single threshold should be set and applied for the significant cross-zonal impact. In this paper, the presented example of a threshold, i.e. capacity increase of 200 MW compared to the situation without the project, was provided for the purpose of defining the PCI list, while for the NDPs, depending on circumstances and especially existing cross-zonal capacities, less significant cross-zonal impacts, i.e. below 200 MW, may also be relevant.
- (50) The Agency also repeats its previous recommendation⁵⁴ that information on the project costs should be published in the NDPs.

6. PROJECT INCLUSION

- (51) In line with Article 48(1)(b) of Regulation (EU) 2019/943, the EU TYNDP shall be built on the NDPs. The EU TYNDP shall also not discriminate between TSOs and third-party promoters.
- (52) Based on the information provided in Table 15 in Annex I, there are 11 countries where the latest NDP includes third-party project(s), which is similar to the findings in 2019⁵⁵. In 11 additional countries, third-party projects are allowed to be included, but are not present in the latest NDP, either because no such project applied for inclusion or no such project is planned or considered in the country. In the remaining 6 countries⁵⁶, third-party projects are not allowed to enter the NDP.
- (53) The Agency notes that in more than half of the countries where third-party transmission projects are included in the NDP, these projects are subject to the same assessment as the projects promoted by the TSO(s). In three countries (Cyprus, Italy, Switzerland), projects are assessed differently and in two countries (Austria, Slovenia), the third-party projects are not assessed, only listed. Detailed information is provided in Table 15 in Annex I.

⁵² Cf. The Agency's Opinion No 04/2021, p. 19

⁵³ ACER-CEER Position of the Revision of the TEN-E Regulation and Infrastructure Governance, June 2020, p. 16

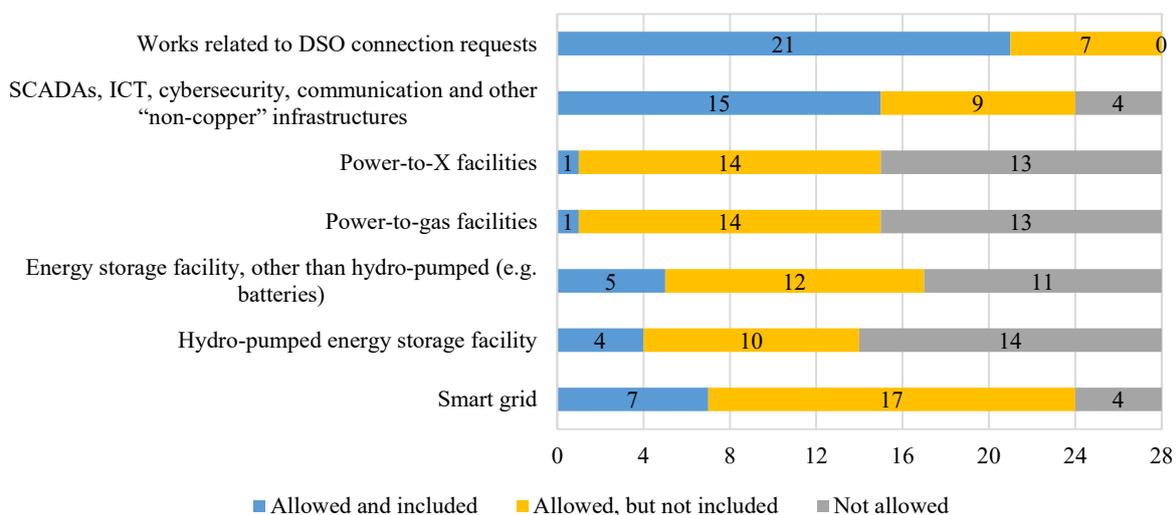
⁵⁴ Cf. The Agency's Opinion No 13/2019, p. 52

⁵⁵ In its Opinion No 13/2019, the Agency identified third-party projects were included or referred to in NDPs of 13 jurisdictions (including Great Britain and Northern Ireland, which do not participate in the assessment in 2021 and excluding Switzerland, which did not participate in the assessment in 2019, but participates in 2021).

⁵⁶ Finland, Hungary, Lithuania, the Netherlands, Poland and Spain

(54) As presented in Figure 1, the Agency reviewed which infrastructure categories⁵⁷ (i.e. smart grid, hydro-pumped energy storage, other energy storage facility, power to gas facilities, power to X facilities, “non-copper” infrastructures⁵⁸, works related to DSO connection requests) are allowed and included in the NDPs. The Agency finds that all NDPs allow inclusion of works related to DSO connection requests and the vast majority also allow inclusion of “non-copper” infrastructures and smart grids. The remaining infrastructure categories are allowed to be included in the NDP in about half of the countries. On the contrary, the shares of NDPs which actually include the listed infrastructure categories are significantly lower. Among all the categories, only works related to DSO connection requests and “non-copper” infrastructures are included in more than half of the NDPs, while relatively few NDPs include smart grid, energy storage and/or power to X facilities. Detailed information about the inclusion of infrastructure categories in the NDPs is presented in Table 16 in Annex I.

Figure 1: Inclusion of project infrastructure categories in the NDPs



(55) The TYNDP 2020 inclusion guidelines require for TYNDP inclusion that the main project’s equipment is either an overhead transmission line designed for transmission voltage of at least 110 kV (in the case of direct cross-border infrastructure), an overhead transmission line designed for a transmission voltage of at least 220 kV (in case of internal infrastructure) or a high voltage underground or submarine cable designed for voltage of at least 110 kV.

⁵⁷ Transmission infrastructure category is not reported, because it is reasonable to assume all the NDPs include such projects.

⁵⁸ e.g. SCADAs, ICT, cybersecurity, communication

- (56) Based on the information provided in Table 17 in Annex I, in more than 80% of the countries, the NDPs include transmission projects on voltage levels 110 kV or above. In 5 countries, the minimum threshold is 220 kV and in 5 under 110 kV. The Agency notes that it is expected that the chosen threshold is defined by the minimum voltage level operated by the TSO, which also differs across the countries.
- (57) The Agency notes that the criteria for inclusion of projects in the NDPs related to project assessment are fixed (namely positive results of the CBA is a prerequisite for project's inclusion) in one quarter of the countries. In another quarter, different rules are applied for different projects (i.e. some projects require positive results of the CBA and some do not), while in half of the countries, positive CBA results are not a pre-condition for project inclusion in the NDP. Detailed information is provided in Table 18 in Annex I.
- (58) The Agency acknowledges that the following changes or updates of the NDPs with regard to project inclusion have been implemented in specific countries in the past two years:
- the time horizon of the NDP in France increased from 10 to 15 years, in order to obtain a wider vision of the future;
 - additional “under consideration” projects were included in the Cypriot NDP;
 - projects of refurbishment and replacement have been included in the NDP in Austria, because such investments significantly contribute to the availability of capacities.
- (59) The Agency reiterates its view⁵⁹ that NDPs can only provide a proper basis for the EU TYNDP regarding the inclusion of projects if third-party projects are allowed to enter the NDP, and it recommends the scope of the NDPs is extended to allow the inclusion of third-party transmission projects where this is not yet the case. In this regard, project promoters should provide the necessary information to the TSO(s) in charge of developing the relevant NDP(s), as well as to the relevant NRA(s).
- (60) Additionally, the Agency is of the view that third-party transmission projects in the NDP should be subject to a proper assessment by the NRA.

7. ENVIRONMENTAL ASPECTS

- (61) The Agency's past monitoring of cross-border relevant projects showed that one of the major reasons for project delays is related to environmental permitting⁶⁰. In this regard, the Agency examined to what extent the NDPs and their projects are subject to environmental assessments and if any specific actions are taken for the purpose of

⁵⁹ Cf. The Agency's Opinion No 13/2019, p. 14

⁶⁰ Cf. ACER consolidated reports on the progress of PCIs, ACER opinions on the implementation of investments in the EU TYNDP

environmental permitting in the processes related to the NDPs. Tables 19 and 20 in Annex I provide detailed information related to environmental aspects and permitting on a per-country level.

- (62) The Agency acknowledges that in approximately 40% of the countries, the national regulatory framework requires the NDP to be subject to strategic environmental assessment ('SEA'). In the remaining share there is no such legal requirement, however in Lithuania, SEA is performed on a voluntary basis.
- (63) The Agency notes that in all countries, at least some projects from the NDP are subject to environmental impact assessment ('EIA'), either during or after the NDP elaboration. In more than half of the countries, EIA is performed for all projects in the NDP. Furthermore, 2 NRAs report that individual projects are subject to EIA, 7 that only projects above defined thresholds (e.g. km of lines, voltage levels) require EIA and 4 that only reinforcements and upgrades are excluded.
- (64) In almost 60% of the countries, public consultations are carried out specifically for the purpose of environmental permitting, however, these consultation might be carried out within or outside the NDP process. Additionally, in order to facilitate the acceptance of projects in NDPs, in slightly less than 30% of the countries, the TSO(s) and/or the NRA (or Ministry) engage with a panel of environmental associations (e.g. by consulting them when preparing the NDP). In about 15% of the countries, environmental impact indicators are included in the NDP.
- (65) The Agency acknowledges and welcomes the actions taken by the TSOs and NRAs (or Ministries) that enable identification of the projects' impacts on the environment as well as the efforts they make in order to improve the related public awareness.
- (66) The Agency is of the view that such steps facilitate transparency and project's evaluation and it recommends that all information related to a project's influence on the environment is publicly available.

8. PROJECT ASSESSMENT

- (67) In 2019, the Agency carried out a detailed assessment of scenarios and of the applied methodologies for the assessment of projects in the NDPs⁶¹.
- (68) Regarding the scenarios, the Agency identified that a multiple scenario approach was widely used across the NDPs and that projects were mostly assessed against more than one scenario and for multiple study years. Furthermore, it noted that vast majority of the NDPs reflected on the EU TYNDP scenarios and more than one third of the NDPs

⁶¹ Cf. The Agency's Opinion No 13/2019, p. 22-44

appeared to use a scenario considering lower economic growth. Study horizons up to the year n+15 were used in most of the NDPs.

- (69) During the past 2 years, the use of scenarios gained additional importance in two countries. In Switzerland, legal framework has been set in the national law and in the Netherlands, it has been further elaborated⁶². Additionally, the use of scenarios has been extended in Italy by application of the CBA also to the study year 2040 for the first time as well as by introduction of new approaches to account for multiple scenarios in the infrastructure gaps identification study⁶³.
- (70) Regarding the methodologies for assessing projects in NDPs, the assessment in 2019 revealed that a formal CBA was carried out in approximately 60% of the countries, but in most of them not for all projects. It also explained that multiple benefits were considered in the countries where a CBA was performed and that both market and network studies were used in about two thirds of countries. During the past two years, in six countries the assessment of the electricity projects has been improved, by either introducing a CBA analysis (the Netherlands), improving network modelling (France⁶⁴, Hungary), carrying out additional studies (Lithuania⁶⁵) as well as improving benefit indicators (Italy⁶⁶) or prioritisation criteria (Croatia⁶⁷).
- (71) Regarding the infrastructure gaps identification, the Agency notes that related studies are conducted in the vast majority of the countries. The Agency welcomes that the Netherlands recently introduced a requirement for infrastructure gaps analysis for the upcoming 10 years in national law. Detailed information about infrastructure gap identifications is provided in Table 21 in Annex I.

9. PLANNED IMPROVEMENTS IN THE NDPS

- (72) The Agency welcomes that improvements related to the development of the NDP are planned or being considered in the vast majority of the countries, targeting better transparency, consistency and robustness of those NDPs.
- (73) The most widely considered improvement is related to transparency, under consideration in more than 40% of the countries, followed by improvement of the infrastructure needs assessment (32%), , coordination with the DSO(s) (29%), the scenario development process (25%), of project assessment methodology (25%) and

⁶² The Dutch NRA explains in the old scheme, the TSO would have to make a sketch of various scenarios and a detailed sketch for the most likely scenario. Following the new regulation, the TSO is obliged to use the scenarios.

⁶³ In the Target Capacity report, a new least regret method to combine the results of different scenarios was used.

⁶⁴ The evolution of the network has been more accurately reflected and consideration of flexibilities' potential has been improved.

⁶⁵ Adequacy study has been introduced.

⁶⁶ The benefit regarding ancillary services has been decomposed in two benefits, one accounting for zonal representation and reserves and one for nodal system modelling and project impact on local constraints.

⁶⁷ Methodology for criteria of determining priority for revitalization of the network has been introduced.

stakeholder involvement (25%) and of monitoring (21%). More detailed information about the planned and considered improvements is provided in Table 22 in Annex I,

HAS ADOPTED THIS OPINION:

1. The Agency considers that inputs and analytical methodologies of the NDPs reviewed in this Opinion are broadly consistent with the EU TYNDP.
2. The Agency welcomes the improvements noted in some countries with regard to NRA scrutiny, transparency, public consultation, NDPs' frequency, NDPs' scope, scenario development, infrastructure gaps identification analysis and/or project assessment compared to the situation two years ago as described in the recitals of this Opinion.
3. In order to increase the robustness, credibility and transparency of the NDPs, the Agency recommends that the parties responsible for their development, review and adoption take into account the following measures and pursue their implementation to the extent it is in their powers:
 - a. Each Member State should have a single NDP for electricity infrastructure development.
 - b. The NDPs should be prepared on a biennial basis, which is an optimal timeline to keep the NDPs up to date and have greater consistency with the EU TYNDP, without experiencing delays or compromising on proper consultation on the draft NDP.
 - c. The Agency recommends that in the years in between two NDPs, a monitoring update of the NDP is carried out, which takes stock of the investment's progress, reasons for potential delays or rescheduling and of any commissioned or cancelled investments.
 - d. In each Member State, the relevant NRA should have the power to approve the NDP and amend it, including the inclusion or removal of specific investments where needed.
 - e. At least one robust EU TYNDP scenario should be taken into account to construct the NDPs' scenarios for electricity infrastructure development and also for other national energy infrastructure planning documents.
 - f. Public consultation on the draft NDP before its adoption should be carried out in every country. In more advanced national frameworks, specific consultations on the major building blocks of the NDPs (e.g. scenarios, infrastructure gaps identification, CBA) could also be considered, so that the stakeholders' inputs are timely taken into account, i.e. before the assessment of projects.
 - g. The stakeholders' comments from the public consultations related to the NDPs and information about the treatment of stakeholders' comments should be published.
 - h. The NDP and all formal acts on the NDP, as applicable in each country (e.g. decisions, opinion, consistency analysis, monitoring) should be published.

- i. All the planned projects from the NDPs with cross-border and/or cross-zonal relevance should be flagged explicitly in the NDP, by providing the relevant cross-border or cross-zonal capacity increase.
- j. For the significant cross-zonal impact, a single threshold should be set and applied for the NDPs.
- k. Information on the project costs should be published in the NDPs.
- l. Third-party transmission projects should be allowed to enter the NDP and they should be subject to a proper assessment by the NRA. In this regard, project promoters should provide the necessary information to the TSO(s) in charge of developing the relevant NDP(s), as well as to the relevant NRA(s).
- m. All information related to a project's influence on the environment should be publicly available.
- n. The Agency also underlines that its additional recommendations listed in its Opinion No 13/2019 on the national electricity NDPs and their consistency with the EU TYNDP (p. 58-59) which are not reiterated in this Opinion, also remain valid.

Done at Ljubljana, on 19 July 2021.

- SIGNED -

*For the Agency
The Director*

C. ZINGLERSEN

Annex: Annex I – Supporting tables

ANNEX I

Table 4: Main shareholders of the TSOs preparing the NDPs

Country	TSO	TSO traded on stock exchange	TSO main shareholders
Austria	APG	No	Verbund AG (100%)
	AGVUEN	Yes	Land Vorarlberg (51%), Voralberger Energienetze GmbH (49%)
Belgium	Elia	No	Publi-T (44.8%), Publipart (3.3%), Belfius Insurance (1.0%), Katoen Natie Group (6.2%), Interfin (3.8%), Other free float (40.9%)
Bulgaria	ESO	No	Bulgarian Energy Holding EAD (100%)
Croatia	HOPS	No	HEP d.d. (100%)
Cyprus	Cyprus TSO	No	The Cyprus TSO has no shareholders. It is a Legal Entity of Public Law.
Czech Republic	ČEPS	No	State owned (100%)
Denmark	Energinet	Yes	State owned (100%)
Estonia	Elering	Yes	State owned (100%)
Finland	Fingrid	No	Finnish State (28.2%), National Emergency Supply Agency (24.9%), Keskinäinen Eläkevakuutusyhtiö Ilmarinen (19.9%), Aino Holdingyhtiö Ky (26.4%), State Pension Fund of Finland (0.03%), Others (0.5%)
France	RTE	No	EDF (50.1%), Caisse des dépôts et consignations (29.9%), CNP Assurances (20%)
Germany	Amprion	Yes	M31 Beteiligungsgesellschaft mbH & Co. Energie KG (74.9%), RWE AG (25.1%)
	Tennet DE	No	the Dutch Ministry of Finance (100%)
	TransnetBW	No	EnBW AG (100%)
	50 Hertz	Yes	Eurogrid GmbH (80% Elia Group Belgium and 20% Kreditanstalt für Wiederaufbau)
Greece	ADMIE	Yes	ADMIE holding (51%), DES ADMIE SA (25%), State Grid Europe Limited (24%)
Hungary	MAVIR	Yes	State owned (100%)
Ireland	EirGrid	No	State owned (100%)

Country	TSO	TSO traded on stock exchange	TSO main shareholders
Italy	Terna	No	CDP Reti (29.85%, it is 59% owned by CDP, whose 82% is with Italian Ministry of Economy), traded on stock exchange (17.5%), LAZARD ASSET MANAGEMENT LLC (5.1%), the rest is fragmented among other institutional investors (around 48%, none of which above 2%)
Latvia	AST	No	Ministry of Finance (100%)
Lithuania	Litgrid	No	The government (97.5%), other small investors (2.5%)
Luxembourg	Creos Luxembourg	No	Encevo S.A. (75%), Ville de Luxembourg (20%), others (5%)
Netherlands	Tennet NL	Yes	State owned (100%)
Norway	Statnett	No	Ministry of Petroleum and Energy (100%)
Poland	PSE	No	State Treasury (100%)
Portugal	REN	Yes	State Grid Corporation of China (25%), Oman Oil Company SAOC (12%), Lazard Asset Management LLC (7%), Fidelidade-Companhia de Seguros, S.A. (5%), Red Electrica internacional, S.A.U. (5%), Great-West Lifeco. Inc (4%), own shares (1%), other (41%)
Romania	Transelectrica	Yes	State owned (58.7%), Oaval Holding (6.1%), Fondul de Pensii Aministerat Privat NN/NN Pensii S.A.F.P.A.P.S.A. (5.5%), other shareholders legal entities (22.3%), private persons (7.4%)
Slovakia	SEPS	No	State owned (100%)
Slovenia	ELES	No	State owned (100%)
Spain	REE	Yes	Spanish Government (20%), other shareholders (having each of them a share below 5%)
Sweden	Svenska kraftnät	No	State owned (100%)
Switzerland	Swissgrid	No	BKW Netzbeteiligung AG, Axpo Power AG, Axpo Solutions AG, Elektrizitätswerk der Stadt Zürich, SIRESO

Table 5: Links to NDPs

Country	Links to NDPs
Austria	APG: https://www.apg.at/api/sitecore/projectmedia/download?id=e3108007-0a11-4b43-81ab-bc00206783e0 VUEN: http://www.vuen.at/de/media/pdf/2020_netzentwicklungsplan.pdf
Belgium	https://www.elia.be/en/infrastructure-and-projects/investment-plan/federal-development-plan-2020-2030
Bulgaria	https://www.dker.bg/uploads/reshenia/2020/res_dprm_2_20.pdf
Croatia	https://www.hops.hr/92136ad3-dfa8-4674-b6aa-3c7a0d41654c
Czech Republic	https://www.eru.cz/documents/10540/7094793/Desetilet%C3%BD%20pl%C3%A1n+rozvoje+p%C5%99enosov%C3%A9%20stavu+2021-2030.pdf/9ecb2170-fd17-42c6-99e5-e6437ed8344d
Denmark	English version of main report: https://en.energinet.dk/About-our-reports/Reports/Long-term-development-power-grid Danish versions including background reports: https://energinet.dk/Om-publikationer/Publikationer/Elnettet-i-2040
Estonia	https://elering.ee/en/publications
Finland	https://www.fingrid.fi/globalassets/dokumentit/fi/kantaverkko/kantaverkon-kehittaminen/main_grid_development_plan_2019-2030.pdf
France	Full version in French: https://www.rte-france.com/analyses-tendances-et-prospectives/le-schema-decennal-de-developpement-du-reseau#Documents Short version in English: https://www.rte-france.com/en/analyses-trends-and-perspectives/ten-year-network-development-plan
Germany	Final draft: https://www.netzausbau.de/bedarfsermittlung/2030_2019/archiv/de.html (the documents under "Netzentwicklungsplan") A short presentation in English: https://www.netzentwicklungsplan.de/en/grid-development-plans/grid-development-plan-2030-2019
Greece	https://www.admie.gr/en/grid/development/ten-year-development-plan
Hungary	http://mavir.hu/documents/10258/15454/HFT2020_A+magyar+VER+h%C3%A1ll%C3%B3zatfejleszt%C3%A9si+terve.pdf/aa68bd24-5bb8-a49e-887d-d273e0d4e601?t=1612963618678
Ireland	https://www.cru.ie/wp-content/uploads/2021/04/CRU21048a-EirGrids-draft-Transmission-Development-Plan-TDP-2020-29.pdf
Italy	https://www.arera.it/it/comunicati/20/200505pds.htm
Latvia	https://www.sprk.gov.lv/sites/default/files/cmaa_files/LemumsN138D2101020_PIELIKUMS_Att%C4%ABst%C4%ABbas%20pl%C4%81ns_2021-2030.pdf

Country	Links to NDPs
Lithuania	https://www.litgrid.eu/index.php/naujienos/naujienos/suderintas-litgrid-10-metu-investiciju-planas/31416
Netherlands	https://www.tennet.eu/nl/bedrijf/publicaties/investeringsplannen/
Norway	https://www.statnett.no/for-aktorer-i-kraftbransjen/planer-og-analyser/nettutviklings-og-investeringsplan/
Poland	https://www.pse.pl/documents/20182/8c629859-1420-432f-8437-6b3a714dda9c?safeargs=646f776e6c6f61643d74727565
Portugal	https://www.erse.pt/media/nx3ittiy/pdirt-2022-2031-mar%C3%A7o-2021-relat%C3%B3rio-final.pdf
Romania	https://www.transelectrica.ro/ro/web/tel/planului-de-dezvoltare-ret-2020-2029
Slovakia	https://www.sepsas.sk/media/3901/sk-national-tyndp-2029.pdf
Slovenia	https://www.eles.si/Portals/0/Documents/SLO/20210126-RNPS2021-2030.pdf?ver=2021-02-02-152524-633
Spain	https://www.boe.es/boe/dias/2015/10/23/pdfs/BOE-A-2015-11398.pdf
Sweden	https://www.svk.se/siteassets/om-oss/rapporter/2019/systemutvecklingsplan2020-2029.pdf
Switzerland	https://www.swissgrid.ch/dam/swissgrid/projects/strategic-grid/sg2025-technical-report-de.pdf (In German) https://www.swissgrid.ch/dam/swissgrid/projects/strategic-grid/sg2025-technical-report-fr.pdf (In French)

Table 6: Legal nature of the NDPs

	Country	Additional information by the NRA
NDP binding for all projects	Austria	The TSOs and NRAs have the duties and powers set by Article 51(7) and (8) of the Directive (EU) 944/2019. There is tariff inclusion in terms of the need of the project, the incurred costs are to be determined in the tariff setting procedure.
	Bulgaria	The NRA approves the NDP every year and the Bulgarian TSO has the obligation to implement it.
	Czech Republic	The TSO is obliged to build the projects in the NDP and the NRA is obligated to include costs in the tariffs. In every subsequent edition, progress of the projects and their necessity are checked.
	Greece	In case of unjustified delay and failure of the TSO regarding the timely implementation of projects which have to be executed in the next three years (except for the cases of force majeure issues), the NRA has the power to force the TSO to implement the projects or impose penalties on the TSO (especially for the case of non-interconnected islands' connection to the mainland) or assign the projects to a third party. However, some projects included in the NDP can be removed from a future NDP, if the infrastructure need is no longer there.
	Latvia	The TSO must develop and implement the NDP. The NRA is entitled to impose a penalty for a TSO, if the TSO does not ensure planning, construction and putting into service of new transmission infrastructure objects and

	Country	Additional information by the NRA
		drafting of NDP in conformity with the requirements of the NRA. The NRA has responsibility to include the projects from the NDP in the tariffs after they are commissioned. It shall also approve the NDP and supervise its fulfilment.
	Netherlands	TSOs have to execute all the projects in the NDP and provide information on realised investments and reasons for possible deviations in the next NDP. Consequences in case of delays or other changes depend on the situation. Investments in the NDP may be included in the tariffs. However, the efficiency of the investments is still judged in tariff regulation. This means that there is no direct relation between investment expenses in the NDP and the tariffs.
NDP binding in the short term and indicative in the long term	Belgium	The projects with commissioning planned in the first five years are binding. The NRA assesses the efficient completion of the NDP as part of the ex-ante tariffs setting and the ex-post tariffs review exercises.
	Croatia	Investments planned for the first 3 years of the NDP are treated firm. During the scrutiny process, the NRA requests the TSO to report on the impact of the investments on the tariffs in the first 3 years of the NDP.
	Hungary	Projects for the first 5 years are mandatory, projects for 10 and 15 years are indicative. According to the National Electricity Act, authorized network operators shall execute the improvements contained in the approved NDP. The justified costs of projects carried out according to the approved NDP shall be recognized for the purposes of price regulation. The NRA shall monitor and evaluate the implementation of the NDP annually.
	Portugal	The NRA issues its opinion on the projects over the next 3-5 years and suggests longer term projects to be reviewed in the next NDP. Binding nature means that TSO shall build the project as scheduled, unless it considers it shall be postponed based on any relevant changes on assumptions behind the NDP. Nevertheless, the TSO shall inform the NRA of any change (date or project itself) and justify it. All projects approved and built are included in asset base and recovered by transmission tariffs, as long as they respect the approved budget and the applied methodology on unitary costs.
	Slovakia	If the TSO fails to implement an investment which was supposed to be implemented under the NDP in the next 3 years and such investment shall be as per the latest EU TYNDP still eligible, the NRA ensures the implementation of the given investment by imposing on the TSO a duty to implement the investment within a period determined by the NRA.
	Spain	The current Spanish NDP has two Annexes. Annex I is binding and includes all the projects to be commissioned until 2020. Annex II is only indicative and includes the projects to be commissioned later than 2020. The Annex II is only used to allow the commencement of the administrative procedure. Only the technical characteristics of the projects are binding in the planning. For the tariff inclusion, a project needs to be included in the planning and also needs a commissioning certificate. There are some mechanisms that allow modification of the planning.

	Country	Additional information by the NRA
Indicative and binding (depending on the projects)	Ireland	Projects become binding once they receive capital approval. The projects by virtue of them being in the NDP are not binding, they can be removed, e. g. if a customer connection fails to materialise or the need is no longer there.
	Romania	Projects contributing to the achievement of interconnection targets, PCIs, aiming at the integration of electricity production of renewable energy sources, ensuring continuity and security of supply or having commissioning date in the first 3 years are considered binding. Indicative projects are projects of rehabilitation and modernization resulting as necessary from the analyses and studies of the regimes and which are scheduled for longer time horizons.
Indicative	Cyprus	
	Denmark	
	Estonia	
	Finland	
	France	The NDP sets the basis for the pluriannual investment program and the NRA can use it to provide orientations on the investment doctrine on the TSO and to impose to the TSO to undertake an investment, if the value of this investment is demonstrated by the NRA's analysis. However, the NDP itself is not legally binding in the sense that not all projects have to be necessarily implemented.
	Germany	The NDP itself or the affirmation document from the NRA are not legally binding in the sense that there is no legal requirement for the TSOs to realize projects mentioned in them. The NRA affirmation document, however, sets the basis for a parliamentary legislative procedure which has to be carried out every four years at the latest. The so called "Bundesbedarfsplangesetz", contains a list of projects whose implementation then is legally binding for the TSOs. The list of approved projects in the NDP sets the basis for the draft of this law, however, its final content is in the hands of parliament and federal council, so deviations are possible.
	Italy	
	Lithuania	
	Luxembourg	
	Norway	
	Poland	The NDP is indicative for all projects in terms of scope of investment tasks, but binding in terms of capital expenditures.
	Slovenia	
	Sweden	
Switzerland		

Table 7: Information on NDPs in countries taking into account NECPs

Country	Additional explanation by the NRAs
Czech Republic	The NDP follows two goals of the NECP: 1) keep exporting/importing capacity in the relation to the maximum load of transmission network at least at the value 30/35% and 2) keep interconnectivity according to Barcelona agreement at 15 %.
Denmark	The NECP is taken into account through the assumptions regarding the consumption and production provided by the Danish Energy Agency.
Estonia	Several power plants will have to be closed in the future due to the NECP and this has been taken into account in the assessment of production adequacy. The development of the network takes into account additional wind farms. The adequacy of external connections is assessed.
Finland	The NDP takes into account the future changes in system needs that are guided by the NECP.
France	A central scenario is defined to reflect the French Multiannual Energy Programme. The Programme was however not finalized at the time inducing some uncertainties on the central scenario. In this context, alternative scenarios ('Volt' and 'Ampere' designed by the TSO) were particularly useful to assess the projects.
Germany	Various input parameters are defined in the scenario definition to facilitate goals, e.g. maximum CO2 emissions, installed renewable energy sources to meet "share of the electricity consumption" goals, number of electric vehicles.
Greece	Content, targets and data of the NECP approved in December 2019 are taken into account.
Hungary	The assumptions and targets of the NECP are important inputs for the NDP.
Italy	The Italian NECP was partly taken into account when preparing the draft NDP 2020. One scenario was developed (although only for the study years 2025 and 2030, not 2040) with assumptions coming from the NECP.
Latvia	The NDP was set taking into account the NECP. In addition to the assessment of the progress in the implementation of the plan, twice during the planning period (in 2024 and 2028), an environmental monitoring report will be prepared and submitted to the State Environmental Monitoring Bureau.
Lithuania	The NDP took into account the NECP. For example, it considered future development of renewable energy resources. The TSO also planned to introduce new environmentally friendly technologies and equipment, leading to energy savings.
Luxembourg	The NDP takes into account the NECP.
Netherlands	The NDP 2020 has explicitly taken into account the Dutch Climate Agreement which is the basis for the CO2 reduction plans of the Dutch government and which also forms the basis of the NECP. It had one scenario based on the Climate Agreement that is used by the TSO and all DSOs. The NDP 2020 scenarios data-freeze happened before the adoption of the NECP. The NRA is currently not certain how the 2022 scenarios will relate to the NECP.

Country	Additional explanation by the NRAs
Poland	The state energy policy contains guidelines in the field of CO2 emissions through goals to be achieved for each year. In this way, it determines the future structure of the generation system (depending on the amount of power demand and the allowed level of CO2 emissions). This influences the reconstruction of the energy system and sets tasks for the TSO in terms of ensuring continuity and stability of the energy supply to industry and customers.
Portugal	A governmental entity shall issue a Monitoring Report on Security of Supply and take into consideration the NECP. When preparing the NDP, the TSO shall take into consideration the NECP and the Security of Supply report (e.g. new renewable generation capacity expected in the next 10 years) and propose or schedule investments accordingly.
Romania	The NDP contains scenarios that include the assumptions and targets set out in the NECP.
Slovakia	The TSO takes the NECP into account when designing the generation mix.
Slovenia	Scenarios of development must be in line with the NECP.

Table 8: The NRA powers related to specific provisions of Directive EU 2019/944 and information on their implementation

	The NRA has the power	The NRA does not have the power	Activity is performed by the NRA ⁶⁸	Activity is performed by another entity	Activity is not performed by any entity
Consultation of the NDP by the NRA	AT, BG, HR, CZ, FR, DE, GR, HU, IE, IT, LV, LT, PT, RO, SK	BE, CY, DK, EE, FI, LU, NL, NO, PL, SI, ES, SE	AT, BG, HR, CZ, FR, DE, GR, HU, IE, IT, LV, LT, PT, RO, SK	BE, CY, DK, FI, NL, PL, ES	EE, LU, NO, SI, SE, CH
Examination by the NRA whether the NDP covers all investment needs identified during consultation	AT, BG, HR, CY, CZ, FI, FR, DE, GR, HU, IE, IT, LV, LT, NL, PL, PT, RO, SK	BE, DK, EE, LU, NO, SI, ES, SE	AT, HR, CY, CZ, FI, FR, DE, GR, HU, IE, LV, LT, NL, PL, PT, RO, SK	DK, SI, ES	BE, EE, IT, LU, NO, SE, CH

⁶⁸ The information on whether activities are performed in Bulgaria has not been provided (except for the consultation of the NDP).

	The NRA has the power	The NRA does not have the power	Activity is performed by the NRA⁶⁸	Activity is performed by another entity	Activity is not performed by any entity
Requirement of amendments of the NDP by the NRA	AT, BG, HR, CY, CZ, FR, DE, GR, HU, IE, LV, LT, NL, PL, PT, RO, SK, ES, CH	BE, DK, EE, FI, IT, LU, NO, SI, SE	AT, HR, CY, CZ, FR, DE, GR, HU, IE, LV, LT, NL, PL, PT, RO, SK, ES, CH	SI, BE	DK, EE, FI, IT, LU, NO, SE
Examination of consistency with NECP	AT, BE, BG, CY, CZ, FR, DE, GR, HU, IE, LT, PL, PT, RO, SK	HR, DK, EE, FI, IT, LV, LU, NL, NO, SI, ES, SE	CY, CZ, FR, DE, GR, HU, IE, LT, PL, PT, RO	DK (TSO and DEA), NL (Ministry), SI, ES (Ministry)	AT, BE, HR, EE, FI, IT, LV, LU, NO, SK, SE, CH
Monitoring of the NDP implementation by the NRA	AT, BE, BG, HR, CY, CZ, FI, FR, DE, GR, HU, IE, IT, LV, LT, NL, PL, PT, RO, SK, SI, ES, CH	DK, EE, LU, NO, SE	AT, BE, HR, CY, CZ, FI, FR, DE, GR, HU, IE, IT, LV, LT, NL, PL, PT, RO, SK, SI, ES, CH	DK	EE, LU, NO, SE
Ensuring execution of investments by the NRA	AT, BE, BG, HR, CY, FR, DE, GR, HU, IE, IT, LT, PT, RO, SK	CZ, DK, EE, FI, LV, LU, NL, NO, PL, SI, ES, SE	AT, BE, CY, FR, DE, GR, HU, IE, LT, PT, RO, SK	DK, LV, ES	HR, CZ, EE, FI, IT, LU, NL, NO, PL, SI, SE, CH

In addition to the information provided in the above table, the NRAs from the following countries provided additional explanations:

- Austria: Regarding the examination of consistency with the NECP, there is only an indirect examination of the EU TYNDP-NDP consistency.
- Belgium: Examination by the NRA whether the NDP covers all investment needs identified during consultation is not explicitly performed. Regarding examination of consistency with the NECP, no entity is appointed by law to perform this activity and also in practice, this activity could not have yet been performed, because the NECP was submitted to the European Commission after the approval of the NDP (while the NDP considered climate targets through the use of the EU TYNDP scenarios).
- Croatia: Provision of the Directive (EU) 2019/944 regarding the NECP has not been implemented in the national legislation yet.
- Cyprus: At the moment, the NRA doesn't have the power to examine the consistency with the NECP, however as per the draft bill for transposing the provisions of Directive 2019/944, a provision concerning this issue has been included and the NRA has been given this competence.

- Czech Republic: The NRA is only empowered to ensure execution of investments for gas projects and not specifically for electricity projects. Change of the national regulation is pending and it should allow ensuring execution of investments also for electricity infrastructure.
- Denmark: Regarding the requirement of amendments of the NDP, the NRA can recommend changes to the NDP based on the consistency check with the EU TYNDP. Regarding the examination whether the NDP covers all the needs identified during consultation, the TSO has to submit responses and the NDP to the Danish Energy Agency. For examination of consistency with the NECP, the TSO prepares a yearly environmental report and submits it to the Danish Energy Agency.
- Estonia: The Directive (EU) 2019/944 has not yet been transposed into Estonian law and most of the provisions will become mandatory for the NRA with the upcoming amendment of the national legislation.
- Finland: The NRA monitors network development, but not specifically implementation of the NDP.
- France: Consistency of the NDP with the NECP is a competency of the Member State in the French law, but it is also looked at by the NRA by comparing the consistency of the scenarios of the NDP with the Pluriannual Energy Program.
- Greece: Article 51(5) of Directive (EU) 2019/944 has not yet been transposed to the Greek legislation, but consistency with the NECP is examined by the NRA.
- Italy: The NRA has the powers to recommend amendments of the NDP. A new requirement of examining consistency with the NECP has not yet been introduced.
- Luxembourg: Transposition of the Directive (EU) 2019/944 into national law is not yet finalized. Regarding the requirement of amendments of the NDP, the NRA may only make recommendations for amendments.
- Netherlands: The Ministry can also request amendments of the NDP.
- Slovakia: The NRA is not obliged to examine consistency with the NECP, but the NRA expects this obligation for the next NDP.
- Slovenia: The NRA has the power to check compliance between the NDP and the TSO's investment plans. In case of non-compliance, the NRA may issue a recommendation to amend the investment plan.

Table 9: Information regarding the publication of stakeholder's comments and of their treatment from public consultations

	Country	Link(s) to the stakeholder's comments from public consultations and responses to them
Published stakeholders' comments and responses	Belgium	https://www.elia.be/en/infrastructure-and-projects/investment-plan/federal-development-plan-2020-2030
	Croatia	https://www.hera.hr/hr/docs/2020/savjetovanje-2020-10_01.pdf
	Cyprus	https://tsoc.org.cy/files/electrical-system/tydplan/consultations/032020/%CE%98%CE%AD%CF%83%CE%B5%CE%B9%CF%82-%CE%A0%CF%81%CE%BF%CF%84%CE%AC%CF%83%CE%B5%CE%B9%CF%82%20%CE%94%CE%A3%CE%9C%CE%9A%20%CF%83%CF%84%CE%B1%20%CE%A3%CF%87%CF%8C%CE%BB%CE%B9

	Country	Link(s) to the stakeholder's comments from public consultations and responses to them
		%CE%B1- %CE%A0%CF%81%CE%BF%CF%84%CE%AC%CF%83%CE%B5%CE%B9%CF%82%20%CE%95%CE%BD%CE%B4%CE%B9%CE%B1%CF%86%CE%B5%CF%81%CE%BF%CE%BC%CE%AD%CE%BD%CF%89%CE%BD%20%CE%94%CE%B9%CE%B1%CE%B2%CE%BF%CF%8D%CE%BB%CE%B5%CF%85%CF%83%CE%B7%CF%82%20%CE%94%CE%A0%CE%91%CE%A3%CE%9C%202021-30.pdf
	Czech Republic	https://www.eru.cz/-/verejny-konzultacni-proces-k-desetiletemu-planu-rozvoje-prenosove-soustavy-ceske-republiky-2021-e2-80-93-2030
	Denmark	analytical assumptions by the Danish Energy Agency on which the TSO based the NDP: https://ens.dk/service/fremskrivninger-analyser-modeller/analyseforudsætninger-til-energinet The TSO's webinar on NDP: https://energinet.dk/Om-os/Arrangementer/WEBINAR-Udviklingsbehov-i-el--og-gasnettet-frem-mod-2040-201120
	Finland	https://www.fingrid.fi/kantaverkko/kehittaminen/kantaverkon-kehittamissuunnitelma/
	Greece	The TSO's public consultation on the draft NDP 2021-2030 (results and responses): https://www.admie.gr/en/grid/development/ten-year-development-plan The NRA's public consultation on the draft NDP 2021-2030 (results): https://www.rae.gr/2020/12/09/%ce%b1%cf%80%ce%bf%cf%84%ce%b5%ce%bb%ce%ad%cf%83%ce%bc%ce%b1%cf%84%ce%b1-%ce%b4%ce%b7%ce%bc%cf%8c%cf%83%ce%b9%ce%b1%cf%82-%ce%b4%ce%b9%ce%b1%ce%b2%ce%bf%cf%8d%ce%bb%ce%b5%cf%85%cf%83%ce%b7%cf%82-6/
	Ireland ⁶⁹	https://www.eirgridgroup.com/site-files/library/EirGrid/TDP-2019-2028-Consultation-Report-including-responses-For-Publication.pdf
	Italy	https://www.arera.it/allegati/operatori/pds/2020pdsTerna.zip https://www.arera.it/allegati/operatori/pds/2020pds_controdeduzioniTerna.pdf
	Latvia	https://www.sprk.gov.lv/sites/default/files/sanaksmes_protokli/Protokols.pdf

⁶⁹ IE: Link to the consultation results of the previous edition of the NDP is provided, because consultation on the latest draft NDP has recently ended and the related documents are under preparation.

	Country	Link(s) to the stakeholder's comments from public consultations and responses to them
	Lithuania	https://www.vert.lt/SiteAssets/posedziai/2021-02-19/litgrid_planas_derinimo_pazyma.pdf
	Netherlands	https://www.tennet.eu/fileadmin/user_upload/Company/Publications/Investeringsplannen/IP_juli_2020/IP2020_NOL_Zienswijze_200701.pdf
	Romania	https://www.anre.ro/ro/energie-electrica/legislatie/documente-de-discutie-ee1/regl-tehnice-regulamente/planul-de-dezvoltare-a-retelei-electrice-de-transport-pentru-perioada-2020-2029&page=1
	Slovakia ⁷⁰	https://www.urso.gov.sk/data/att/ae4/189.0c63c4.pdf?csrt=10818265532939806762
Published stakeholders' comments	Austria	https://www.e-control.at/documents/1785851/1811582/Stellungnahmen-NEP-2020.zip/c935dee3-637a-6b4a-eeac-9a79b578ef28?t=1606900085035
	France	https://www.cre.fr/Documents/Consultations-publiques/schema-decennal-de-developpement-du-reseau-de-transport-de-rte-elabore-en-2019
	Germany	Comments are published if consent is given. General answers are provided in the affirmations document. https://www.netzausbau.de/bedarfsermittlung/2030_2019/archiv/de.html
	Portugal	https://www.erse.pt/atividade/consultas-publicas/consulta-p%C3%BAblica-n-%C2%BA-100/
Published summary of stakeholders' comments	Bulgaria	https://www.dker.bg/uploads/reshenia/2020/res_dprm_2_20.pdf
	Hungary	http://www.mekh.hu/nyilvanos-egyeztetes-a-2020-evi-halozatfejlesztési-tervrol
	Spain	https://www.cnmc.es/expedientes/infde04415 (Annex I)
Published minutes from the stakeholders' meetings	Norway	https://www.statnett.no/om-statnett/moter-og-arrangementer/nasjonalt-kraftsystemmote-22.oktober/

⁷⁰ SK: Link to the previous NDP's consultation is provided, because the latest NDP has been elaborated in April 2021 and the related consultation has not yet started.

Table 10: Additional information about the investigation of NDPs coverage of all investment needs identified during consultation

Country	Additional information by the NRA
Croatia	The NRA identified the latest NDP covers all mature investment needs identified during the consultation. There are specific rules when infrastructure projects for enabling new connections to the transmission grid are included in NDP. Connection agreement should be signed between the TSO and the investor. Therefore, only mature projects for new connections with signed connection agreement and projects planned by TSO for grid reinforcement are included in NDP.
Czech Republic	Public consultation is still running.
Germany	Several projects that had been proposed by the TSOs in older versions of the NDP (and approved by the NRA) were not included in the first draft of the NDP. Network analyses showed that a need for such (or similar) projects in the respective areas of the grid remained and the NRA required the TSOs to amend the second draft NDP accordingly.
Greece	The NRA identified the latest NDP does not cover all investment needs identified during the consultation. Investment needs identified during the consultation process, will be requested to be addressed by the TSO in the final NDP 2021-2030 (currently under evaluation for approval).
Lithuania	The TSO has not yet provided the updated version of the NDP after the consultation process.
Netherlands	The NRA identified that the latest NDP does not cover all investment needs identified during the consultation. The official consultation is a small part of the needs identification. It is clear from different sources that the TSO has to invest a lot and that it cannot keep up. The NDP confirms that and the NRA notified the Minister that the TSO or DSO cannot provide the capacity needed to fulfil all requests for transmission.
Spain	The draft NDP was prepared by the TSO and issued for a hearing procedure during which the parties who had previously prepared development proposals requested missing needs that were summarized in the NRA mandatory opinion. Some of these needs were considered by the Ministry in the final NDP.

Table 11: Scope of EU TYNDP-NDP consistency check

Subject of the consistency check	Countries
Consistency of inputs (national inputs to scenarios)	AT, BE, CZ, FI, FI, DE, IT, LU, NL, PL, PT, RO, ES
Consistency of outputs (e.g. list of investments, expected commissioning date, costs, benefits, projects with relevant cross border impact being part of the TYNDP, differences in project descriptions)	AT, BE, HR, CZ, DK, FR, GR, HU, IE, IT, LV, LT, LU, NO, RO, PT, SK, ES, SE, CH
Consistency of national CBA methodology with ENTSO-E CBA methodology	BE, FR, IT, PT, RO

Subject of the consistency check	Countries
Consistency of modelling used for calculating benefits at national level compared to the modelling used by ENTSO-E for the TYNDP benefit results (e.g. reference grid projects, cross-border energy exchanges, scenarios used, time horizons studied)	BE, FR, RO

Table 12: Links to the latest NRA's scrutiny (e.g. opinion, approval)

Country	Link to the latest NRA scrutiny
Austria	APG: https://www.e-control.at/documents/1785851/1811582/V+NEP+01_20+%5B583605145%5D+Bescheid+-+Austrian+Power+Grid+AG_191120.pdf/44fcdf19-8958-1c6e-2b50-c941c0f050f8?t=1606902748232 VUEN: https://www.e-control.at/documents/1785851/1811582/V+NEP+02_20+%5B
Belgium	https://www.creg.be/sites/default/files/assets/Publications/Advices/A1802FR.pdf
Bulgaria	https://www.dker.bg/uploads/reshenia/2020/res_dprm_2_20.pdf
Croatia	https://www.hera.hr/hr/docs/2021/Odluka_2021-03-03_01.pdf
Cyprus	https://www.cera.org.cy/el-gr/apofasis/details/apofasi-105-2020 (NRA approval of the NDP – only in Greek language) https://www.cera.org.cy/Templates/00001/data/nomothesia/ethniki/hlektrismos/rythmistikes_apofaseis/2020_03.pdf (the NRA Regulatory Decision for the following NDPs)
Czech Republic	https://www.ceps.cz/cs/rozvoj-ps (“ERÚ schválení Plánu rozvoje” under section “Ke stažení”)
Finland	https://www.fingrid.fi/globalassets/dokumentit/fi/kantaverkko/kantaverkon-kehittaminen/energiaviraston-lausunto-kantaverkon-kehittamissuunnitelman-luonnoksesta-julkaistaan-id-204627.pdf
France	https://www.cre.fr/Documents/Deliberations/Decision/examen-du-schema-decennal-de-developpement-du-reseau-de-transport-de-rte-elabore-en-2019
Germany	Affirmation Document from the NRA: https://www.netzausbau.de/bedarfsermittlung/2030_2019/nep-ub/de.html ("Bestätigung")
Greece	The NRA's decision of the NDP's approval (period 2019-2028): http://www.et.gr/idocs-nph/search/pdfViewerForm.html?args=5C7QrtC22wHUdWr4xouZundtvSoClrL8-11WGLkYj8buFUDqazHcNeJInJ48_97uHrMts-zFzeyCiBSQOpYnTy36MacmUFCx2ppFvBej56Mmc8Qdb8ZfRJqZnsIAdk8Lv_e6czmhEembNmZCMxLMtZ6TBQnv3_BgjmR1NFHpZ-PGKC_8K4Y0DBf4I-5rBSMh
Hungary	http://mavir.hu/documents/10258/15454/H_367HFT2020_hat%C3%A1rozat_v%C3%A9gleges.pdf/2233f0c6-c436-bd2b-3f66-8905e351e835?t=1612963617072

Country	Link to the latest NRA scrutiny
Italy	https://www.arera.it/allegati/docs/20/574-20.pdf
Latvia	https://www.sprk.gov.lv/sites/default/files/cmaa_files/LemumsN138D21102020_1.pdf
Lithuania	Opinion on the draft NDP: https://www.vert.lt/SiteAssets/viesosios-konsultacijos/pastabos_2020_spalis/VERT%202020-08-13.pdf Approval of the NPD: https://www.vert.lt/Puslapiai/naujienos/2021-metai/2021-vasaris/2021-02-19/suderinti-strateginiai-investiciniai-projektai-i-perdavimo-sistema.aspx
Netherlands ⁷¹	Public letter by the NRA to the Ministry: https://www.acm.nl/nl/publicaties/acm-informeert-minister-ezk-over-toets-investeringsplannen-netbeheerders
Norway	The NRA's assessment of the NDP being prepared in accordance to the requirements in the regulation: https://einnsyn.no/saksmappe?id=http%3A%2F%2Fdata.einnsyn.no%2Fnoark4%2FSaksmappe--970205039--796--2007&jid=http%3A%2F%2Fdata.einnsyn.no%2Fnoark4%2FJournalpost--970205039--2007--796--94--2020
Portugal	https://www.erse.pt/media/3mufb0qj/parecer-%C3%A0-proposta-de-pdirt-e-2019.pdf
Romania	https://portal.anre.ro/PublicLists/Decizie - Decision no. 2287/9.12.2020
Slovakia ⁷²	https://www.urso.gov.sk/vyhodnotenia-plnenia-planu-rozvoja-prenosovej-sustavy-spolocnosti-seps-as/?csr=10818265532939806762&undefined=undefined
Spain	https://www.cnmc.es/expedientes/infde04415

⁷¹ NL: In the Netherlands where there is no approval or opinion on the NDP, there was a public letter by the NRA to the Ministry describing the NRA's view about the TSO not being able to provide enough transport capacity in the years to come:

⁷² SK: The NDP is not formally approved, but there is some scrutiny by NRA. The link refers to the document for the previous NDP, because the latest NDP is currently under scrutiny and no links are yet available.

Table 13: Publication of information regarding projects' cross-border relevance

	Country	Additional information by the NRA
Information regarding cross-border relevance published for all or most projects	AT, BE, BG, CY, CZ, DE, IT ⁷³ , LT, PT, SK, SI	
Information regarding cross-border relevance published for some projects	FI	Information about transfer capacity is presented for cross-border investments and major national investments.
	FR	Cross-border relevant projects that are flagged are mainly interconnectors.
	GR	The TSO publishes this information for interconnection projects with other neighbouring countries.
	EI	Decisions about interconnectors and their CBA analysis is published on the NRA's website.
	LV	The approval decision includes the description on PCI projects' cross-border relevance.
	NL	The TSO is obliged to publish quantitative data per project with cross-border impact. In the latest NDP, there are no interconnection projects, but there are internal cross-border relevant projects for which the impact on cross-border capacity has not been assessed. For the next NDP, this issue will be discussed between the NRA and the TSO.
	NO	When a project is cross-border relevant, it is described as a part of the investment need.
	PL	Information on project's details and major data are presented and published in the NDP in a separate chapter dedicated to cross-border transfer capacities.
	ES	Information regarding cross-border relevance is published for the projects included in the EU TYNDP and on the PCI list.
	SE	In the latest NDP, cross-border relevance is mentioned for some projects, but it is not quantified.
CH	Cross-border relevance is reported as a part of the project's description in the NDP.	
Information regarding cross-border relevance not published	HR, DK, EE, HU, LU, RO	

⁷³ The Italian NRA explains there is no explicit definition of "cross-border relevance", but the impact on cross-border transfer capacity is available project by project.

Table 14: Availability of investment costs information

	Country
Investment costs publicly available at least on a project level	BE (only for projects also included in the EU TYNDP), BG, DE (only rough estimates of costs per different technologies and rough estimates of projects' scope ⁷⁴), FR (only for bigger and cross-border investments; costs of investment within a 4-years horizon are available to the NRA at least on a project level), GR (only for significant projects; for other projects, investment costs at least on a project-level are available to the NRA), IT, LV, NO, SK, SI, ES (only for some projects), SE
Investment costs available to the NRA at least on a project level	AT, HR, CY, CZ (costs of important investments), EE, HU, IE, LT, LU, NL, PL, PT, RO, CH
Only an aggregated value of costs is available to public and to the NRA	DK, FI

Table 15: Inclusion of third-party transmission projects in NDPs

	Country	Assessment of third-party projects in the framework of the NDP development	Additional information provided by the NRA
Third-party projects generally allowed and at least one third-party project included in the latest NDP	Austria	no assessment	Third-party projects are only presented in the NDP as connection projects by the relevant TSO.
	Belgium	same assessment as TSO's projects	Only PCI third-party projects are included in the NDP.
	Cyprus	PCI's assessment process	Only PCI third-party projects are included in the NDP.
	France	same assessment as TSO's projects	Third-party projects present in the EU TYNDP are reported in the NDP.
	Germany	same assessment as TSO's projects	Only PCI third-party projects are included in the NDP.
	Greece	same assessment as TSO's projects	Only PCI third-party projects are included in the NDP.
	Ireland	same assessment as TSO's projects	Only PCI third-party projects are included in the NDP.

⁷⁴ e.g. cost in EUR/km for a 380 kV overhead line and length of the planned line

	Country	Assessment of third-party projects in the framework of the NDP development	Additional information provided by the NRA
	Italy	assessment based on the available information	The TSO lists third-party projects based on the latest EU TYNDP and runs a process for communication of info by any third-party promoters who are free to provide their data or not. The NRA may evaluate project inclusion in its scrutiny of the NDP.
	Norway	same assessment as TSO's projects	There are no formal criteria for third-party project inclusion. If there is a concrete plan of a third-party project, it is mentioned in the NDP.
	Slovenia	no assessment	Third-party projects are briefly mentioned in the NDP but not further elaborated, neither their investment costs are presented.
	Switzerland	different assessment	
Third-party projects generally allowed, but no third-party project in the latest NDP	Bulgaria	same assessment as TSO's projects	No third-party transmission project applied to be included in the NDP. There is no specific criteria for third-party project inclusion.
	Croatia	no assessment	No third-party transmission project is planned or considered in the country. There is no specific criteria for third-party project inclusion.
	Czech Republic		No third-party transmission project applied to be included in the NDP.
	Denmark		No third-party transmission project applied to be included in the NDP.
	Estonia		No request for inclusion of a third-party project has ever been submitted.
	Latvia		There are no provisions regarding the allowance of third-party projects in the NDP and the TSO only includes its own projects in the NDP. No third-party transmission project applied to be included in the NDP.
	Lithuania	no framework for third party projects	No third-party transmission projects is planned or considered in the country.
	Poland	assessment of third party projects according to internal TSO procedures	No third-party transmission project applied to be included in the latest NDP.
	Romania		No third-party transmission project applied to be included in the NDP and currently, there are no such projects.
Slovakia		There are no provisions related to the allowance of third-party projects in the NDP and the TSO only includes their own investments in the NDP.	

	Country	Assessment of third-party projects in the framework of the NDP development	Additional information provided by the NRA
			No request for inclusion of a third-party projects has ever been submitted.
	Sweden		There are no provisions related to the allowance of third-party projects in the NDP and the TSO only includes their own investments in the NDP. No third-party transmission project applied to be included in the NDP.
Third-party projects not allowed	Finland, Hungary, Lithuania, Netherlands, Portugal, Spain ⁷⁵		

Table 16: Inclusion of infrastructure categories other than transmission in NDPs

	Smart grid	Hydro-pumped energy storage facility	Energy storage facility, other than hydro-pumped (e.g. batteries)	Power-to-gas facilities	Other power-to-X facilities	SCADAs, ICT, cybersecurity, communication and other “non-copper” infrastructures	Works related to DSO connection requests
Allowed and included	BG, HR, FR, LU, PL, RO, SI	BG, GR, IE, PT	BG, GR, IE, LV, SI	BG	BG	BE, BG, HR, CZ, FR, GR, LV, LT, LU, NL, PL, PT, RO, SK, SI	AT, BE, BG, HR, CZ, EE, FR, DE, GR, IE, LV, LT, NL, NO, PL, PT, RO, SI, ES, SE, CH

⁷⁵ Third-party projects are not allowed, but the Government may approve plans related to renewable energy use and energy efficiency in order to promote compliance to the objective derive from the EU membership.

	Smart grid	Hydro-pumped energy storage facility	Energy storage facility, other than hydro-pumped (e.g. batteries)	Power-to-gas facilities	Other power-to-X facilities	SCADAs, ICT, cybersecurity, communication and other “non-copper” infrastructures	Works related to DSO connection requests
Allowed, but not included	CY, CZ, EE, FI, DE, GR, HU, IE, IT, LV, LT, NL, NO, PT, SK, SE, CH	HR, CY, EE, FI, HU, LT, NO, RO, SK, SE	HR, CY, EE, FI, HU, IT, LT, NO, PT, RO, SK, SE	HR, CY, EE, FI, GR, HU, IE, LT, NO, PL, PT, RO, SK, SE	HR, CY, EE, FI, GR, HU, IE, LT, NO, PL, PT, RO, SK, SE	CY, EE, FI, DE, HU, IT, NO, SE, CH	CY, DK, FI, HU, IT, LU, SK
Not allowed	AT, BE, DK, ES	AT, BE, CZ, DK, FR, DE, IT, LV, LU, NL, PL, SI, ES, CH	AT, BE, CZ, DK, FR, DE, LU, NL, PL, ES, CH	AT, BE, CZ, DK, FR, DE, IT, LV, LU, NL, SI, ES, CH	AT, BE, CZ, DK, FR, DE, IT, LV, LU, NL, SI, ES, CH	AT, DK, IE, ES	

In addition to the information provided in the above table, the NRAs from the following countries provided additional explanations:

- Austria: Most of the categories would be possible in the Austrian NDP as works for connection request or in case of substantial impact to any transmission capacity. However, only the TSO’s part of any of those projects would be included in the NDP.
- Belgium: The NDP may include connection to storage, power-to-gas or other power-to-X facilities, but not the facilities themselves. The NDP considers third-party storage facility “iLand” which is included in the draft EU TYNDP 2020 as a PCI storage project.
- Croatia: The NDP also includes costs for preparation of new projects for which it is still not certain they will be realized and the NDP also covers costs for smaller repairs and revitalization of the transmission assets.
- Czech Republic: Only transmission related assets which can be owned by the TSO can be in the NDP.
- Denmark: Projects regarding the interface between the distribution and the transmission system network are not included, but are handled project-specific as they depend on specific projects in the distribution networks.
- France: One storage facility project is included in the NDP, but only as an experiment, because the TSO considered the use of flexibilities as an alternative to the network. Flexibility assets (e.g. storage) that are not direct network assets, are developed by third parties and are outside the scope of the NDP.

- Denmark: Storage and power-to-x facilities cannot be included, because they are not grid assets. Smart grid could in theory be included in some projects, but it is expected to be implemented on the DSO level. Non-copper infrastructure cannot be feasibly assessed in the NDP. DSO's connection request can be found in so called "Punktmaßnahmen", which basically means the construction of new substations to render the further installation of RES in the underlying DSOs' grids possible.
- Greece: Two pilot battery projects were included in the preliminary NDP for the period 2022-2031, however, they were not yet assessed by the NRA. Regarding the hydro-pumped storage facility, only a third-party PCI project is included, while storage TSO's projects are not.
- Italy: The definition in Regulation 347/2013 is too vague to decide whether any NDP project would qualify to be a "smart grid project". Under a more specific definition, smart grid projects are likely in the NDP. Works related to DSO (and other users) connection request are an accompanying document to the NDP.
- Slovenia: The TSO is not allowed to invest in power generation facilities and hydro-pumped energy storage (as well as other power generation modules) are reviewed in the NDP in the adequacy section and are not further elaborated. Additionally, power-to-gas and power-to-X facilities are subject of the TSO's research of cross-sectoral integration studies.
- Spain: The current NDP 2015-2020 only includes transmission grid and connections to facilities (for example connection to storage facilities), but not the facilities themselves. The next NDP 2021-2026 will include smart infrastructures (e.g. Statcom).

Table 17: Voltage level thresholds in NDPs

	220 kV	150 kV	132 kV	110 kV	below 110 kV
Country	BE, CZ, RO, ES ⁷⁶ , SE	DE, GR, PT	DK, HU, NO	AT, BG, HR, EE, FI, IE, LV, LT, NL, PL, SK, SI	CY (11 kV), FR (63 kV), IT (60 kV), LU (20 kV), CH (20 kV)

⁷⁶ except for the islands where the lowest voltage is 66 kV

Table 18: Links between project’s inclusion in the NDP and its assessment

	Country	Additional information provided by the NRA
Projects need positive CBA results for inclusion in the NDP.		CZ (for all scenarios), PT (for all scenarios), HU (for at least one scenario), LT ⁷⁷ , PL (for at least one scenario), RO ⁷⁸ (for at least one scenario), SI (for at least one scenario)
Different projects have different rules.	BG	A CBA is only performed for PCI projects.
	EE	A CBA is only performed for cross-border projects.
	DE	Interconnectors are assessed via a CBA and internal projects via the following criteria: <ul style="list-style-type: none"> - Effectiveness: A project is deemed effective, if it's suitable to either cure or significantly reduce grid congestion in normal operation mode or in (n-1) operation cases in at least one hour of the modelled scenario. - Necessity: A project is deemed necessary if it is at 20% of its capacity in at least one hour of the modelled scenario with the grid being in normal operation mode.
	IE	Major infrastructure projects are subject to a CBA, but, most projects in the NDP (e.g. refurbishment or upgrades) are not.
	LV	A CBA is only performed for the PCI projects, while for other projects, technical necessity, appropriateness and economic efficiency of the investments has to be proven by the TSO.
	ES	In the latest NDP 2015-2020, a CBA was carried out by geographical areas (one joint CBA for all projects located in a specific area) and all results were positive. Only EU interconnectors were assessed by CBA on a project level and these projects were only included in the NDP, if the CBA results were positive in all scenarios. The used CBA methodology was based on the TYNDP 2014 methodology and the ‘Guideline

⁷⁷ In Lithuania, for some transmission projects (e.g. projects necessary for synchronization), a CBA is carried out in accordance to ENTSO-E CBA methodology and results must be positive. For other projects, an internal CBA is performed and the results must also be positive

⁷⁸ The Romanian NRA reports the TSO includes projects based on the network needs evaluated by miscellaneous studies and analysis. A positive CBA is requested for projects’ acceptance. The TSO is also obliged to make investments which ensure protection of environment, protection of personnel, security and protection of the TSO objectives. These investments have no CBA.

	Country	Additional information provided by the NRA
		for CBA of Grid Development Projects, October 2014', including some adaptations. For the next NDP 2021-2026, most of the projects included in the NDP will need positive CBA results for all the scenarios.
	CH	There are no clear rules in the national legislation. Assessment is done on a case by case basis, typically a positive CBA is needed for relevant scenarios.
A positive CBA result is not a prerequisite for the project inclusion in the NDP.	AT	There is no national CBA. The TSO has to prove technical necessity, appropriateness and economic efficiency of investments.
	BE	It is implicitly assumed that all projects proposed by the TSO and labelled as "planned" have a positive CBA in the reference scenario (interconnectors) or are necessary to cope with the expected flows (internal backbone). CBA (interconnectors) and avoided redispatch costs (internal backbone) are presented as information to substantiate the proposed set of investments.
	HR	Projects can be included in the NDP, even if they have negative CBA results, if the TSO proves that these projects are indispensable for maintaining system's security.
	CY	The TSO examines scenarios/locations that can cause serious interruptions or disturbances and includes projects in the NDP to reduce the possibility of these scenarios.
	DK	The NDP focuses on eliminating grid constraints and a detailed CBA is performed later when a specific project is advanced enough to apply for approval. The projects are then subject to a specific, individual approval process handled by the Danish Energy Agency which also takes into account socio-economic benefits of the specific project.
	FI	The TSO does an internal CBA for projects, but the CBA is not presented in the NDP.
	FR	All cross-border relevant projects are listed and subject to a CBA and they are prioritized according to their expected values and levels of uncertainty. Network adaptation and digitization strategy is based on a global economic analyses and on the CBA.
	GR	The criteria of acceptance are infrastructure needs (meet increased demand), most economical option of non-interconnected islands' electrification, RES expansion in the context of the NECP targets and security of supply.
	IT	A positive CBA result is not a prerequisite for the project inclusion (and approval) in the NDP. The only requirement is to run the CBA. CBA only applies to projects above 15 million EUR, unless the project is at an advanced construction stage (in such a case, the previous CBA can be displayed).
	LU	The TSO decides on inclusion of projects in the NDP.

	Country	Additional information provided by the NRA
	NL	There is no rule in the law regarding the number of scenarios in which there has to be a capacity problem in order to include an investment in the NDP. In many cases the capacity problem arises in all scenarios or at least in the majority of scenarios, but in different years. Since many investments will in any way be completed too late, this point is irrelevant.
	NO	There are no rigid criteria for inclusion of projects in the NDP.
	SK	The TSO does not perform a CBA for projects. Projects in the NDP are planned with the aim of strengthening infrastructure in places where it is overloaded, do not meet the N-1 criterion or in cases where the infrastructure is at its (moral or physical) lifecycle limit and if network calculations indicate or confirm that.
	SE	There is no formalised criteria for inclusion.

Table 19: Environmental assessment of NDPs and of their projects

		Country
NDP subject to strategic environmental assessment		BE, BG, CY, FR, DE, GR, IE (Every year the TSO publishes an Environmental Appraisal report to ensure that the NDP is in accordance with the provisions adopted in the SEA which is done once every 5 years), IT, LT (voluntarily), PL, PT, ES
Projects subject to environmental impact assessment	All projects	BE, BG, CY, CZ, EE, FR, DE, HU, IE, LT, PT, RO, SI, ES, CH
	Projects above defined thresholds	AT, HR, FI (projects with significant environmental impact, at least projects over 15 km of 220 kV voltage or higher), IT (Projects with major impact, e.g. overhead lines above 15 km are under national EIA as a sub-process of their authorisation process under Italian law 239/2004, while other projects are under regional EIA), LU, PL (at least for the new investment carried out in previously undeveloped areas, such as. agricultural, forestry, recreational areas; assessment is required in the implementation stage, not during the NDP elaboration), SK (above 15 km)
	Individual projects	NL, NO (large new infrastructure projects)
	Except reinforcements or upgrades	DK, GR, LV, SE

Table 20: Public consultation for the purpose of permitting and specific approaches related to the acceptance of projects

Public consultation specifically for the purpose of permitting	AT, BE, BG, CZ, EE, FI, DE, GR (SEA of the NDP is publicly consulted), HU, NO, PL (at the stage of obtaining a decision on environmental conditions when starting the investment implementation), PT, SK, SI, ES, SE	
Specific approaches in the preparation, consultation or approval of the NDP to facilitate acceptance of projects⁷⁹	The TSO engages with a panel of environmental associations, e.g. by directly consulting them when preparing the NDP⁸⁰	AT, BG, DE, IT, NO, PT, RO
	The NRA (or Ministry) engages with a panel of environmental associations, e.g. by consulting them, when scrutinising the NDP	DE, RO, ES
	The NDP includes environmental impact indicators (e.g. as in the ENTSO-E CBA methodology)	BE (indicators are part of the SEA report), IT, LT, PT

⁷⁹ In relation to specific approaches in the preparation, consultation or approval of the NDP, the following NRAs provided additional information:

- The DE NRA reports several public events by the NRA to provide information about the NDP aspects and SEA. Additionally, a hotline for topics raised by the public beyond formal consultation periods is provided by the NRA.
- The LT NRA reports the NDP must meet the environmental protection requirements.
- The SI NRA reports the NDP is prepared in line with Spatial Planning Act.

⁸⁰ This option does not account for the TSO's engagement with environmental associations through the general public consultation which is open to all stakeholders, including environmental associations.

Table 21: Information on the identification of infrastructure gaps

Country	Information on the identification of infrastructure gaps by the NRA
Austria	The needs assessment used for the NDP is based on the EU TYNDP Identification of System Needs process and sensitivities following it. The results (line overloading or additional SEW for interconnections) are being used to develop projects. Needs assessment methodology, inputs and outputs are not part of the (written) NDP document, the calculations are performed in order to identify the needs and develop projects for the NDP.
Belgium	For interconnectors, there is a reference to the EU TYNDP and no formal infrastructure gaps identification study is conducted in the NDP. For the internal backbone (reinforcements and new lines), there is also no formal infrastructure needs identification. There is only one figure on the avoided redispatching costs linked to these investments, but without further details.
Bulgaria	Output data of this study are concluded contracts for connection to the transmission network.
Croatia	Overall system needs are defined through a number of studies conducted by the TSO.
Cyprus	The TSO analyses the power flows of the network given certain generation outputs according to the predicted demand for the current and 2 future years. It identifies possible weak points in the network that under certain conditions have a high probability of causing operation issues and threatening supply to a large number of consumers and proposes network development to tackle these issues.
Czech Republic	The identification of needs is a part of the NDP.
Denmark	The analysis assumptions provided by the Danish Energy Agency is used as the foundation - and two alternative developments. Predictions regarding expected development in production and consumption are received from the Danish Energy Agency. Based on these, the TSO performs a spot market modelling analysis, which are the background for the grid analysis where infrastructure needs are identified. The basis for these analysis are the existing grid and approved projects. Output data are hourly values for the loading of each grid component for each study year and thereby the hourly overloading and total overloading for e.g. one study year.
Estonia	There is no formal infrastructure gap identification exercise.
Finland	The TSO does a network vision strategy document every few years. The current vision was done in 2017 and it extends to 2040. The vision is based on four different strategies differing in European energy policies, national energy policies, distributed energy system and centralized energy system.
France	The NDP identified the needed adaptation of the network.
Germany	There is no formal infrastructure gap identification exercise.
Greece	There is no formal infrastructure gap identification exercise.

Country	Information on the identification of infrastructure gaps by the NRA
Hungary	There is a formal infrastructure gap identification exercise.
Ireland	System Needs assessment is carried out by the TSO every 2 years (Dec 2017, Dec 2019). Needs were identified against all 3 National scenarios. The identification of the future needs of the electricity grid starts by considering potential changes in the supply and demand for electricity (i.e. set of scenarios). The outcome of this work may propose a potential need to reinforce the grid, or a need for an asset refurbishment. The System Needs Assessment identifies the worst-case limit exceedance recorded in the hourly simulations, and the number of hours during which a limit exceedance arises. This is done for each grid element in each scenario and study year. More info can be in the EirGrid's System Needs assessment report.
Italy	Target capacity reports were prepared in 2018 and in 2020. The TC report 2020 used two scenarios mainly at the study year 2030. The scenarios were BAU and NECP. The concept is to find the target MW at each boundary, accounting for reference costs and for several benefit categories (SEW, CO2 emissions, non-GHG emissions, EENS, local RES curtailment, ancillary services). The methodology is iterative by testing fixed MW-increases simultaneously at multiple borders.
Latvia	All PCI projects included in the NDP are studied (study years: 2030 and 2040, scenarios: EU TYNDP 2018, 2020). For the Synchronization project in June 2018 the study of dynamic stability and the study of frequency stability of the electrical network have been completed, determining the technical conditions for synchronization and analysing the synchronization variants. In August 2018, the Gdańsk Energy Institute completed a study of the necessary identification of measures and associated costs to ensure safe operation of the Baltic power transmission systems after synchronization with the mainland European synchronous area. The identification study showed the necessary measures that need to be taken by 2025 for the synchronization.
Lithuania	The TSO performs studies according to the current challenges of the grid. For example, Lithuania has synchronization with Continent Europe grid project (and desynchronization from BRELL ring) so a study analysing possible solutions was conducted. The TSO uses its own long term modelling tools. All steps are defined in NDP. Output data are forecasts of future demand, peak demand, cross-zonal capacities, etc.
Luxembourg	Infrastructure gaps identification is based on a network study (scenario 2040). The evolution of the electricity demand is determined, based on the ordinary load and on the expected development of electromobility and datacentres. The outcome is that the current network is not sufficient, given that today about 75% to 85% of the total transmission capacity is already used. With the foreseen development, the interconnection capacities between Luxembourg and Germany will be depleted from the year 2025 on, so investments in the network are needed.
Netherlands	The network plan identifies the locations and severity of capacity problems in the network for study years (2020, 2025, 2030 in the latest NDP) in individual scenarios.
Norway	The TSO uses a model of the power system to identify infrastructure needs. The infrastructure needs identification study gives price differences for different areas in Norway as well as the power flows in the grid given the assumed input (prices on the

Country	Information on the identification of infrastructure gaps by the NRA
	continent, weather, allocation of future production and consumption). In the latest edition, there were three study years (2025, 2030 and 2040) and three scenarios (expected, high prices, low prices).
Poland	The TSO develops scenarios and the infrastructure gaps are identified by mapping network connections. The TSO is not obliged to implement these gaps as a content of NDP. The TSO follows the criterion of economic profitability.
Portugal	There is no separate document with projects to meet needs identified by the TSO and alternatives.
Romania	Every two years, proposal of the new NDP is sustained by needs assessment realised by market, network and dynamic studies. The results of such studies are included in the NDP, but they are not based on an approved or regulated methodology approved by the NRA.
Slovakia	There is no formal infrastructure gap identification exercise.
Slovenia	Infrastructure needs identification is carried out by several studies encompassing historical consumption data, consumption forecast, adequacy studies etc. These studies are carried out mostly by Slovenian Electoinstitute as well as other contractors and internally by the TSO. In general, ENTSO-E scenarios are used as well as scenarios from the NECP.
Spain	The TSO conducts an infrastructure needs identification study taking into account technical aspects like losses, technical restrictions, security of supply, etc. In addition, the agents (Autonomous Communities and the sector actors) send transmission grid development proposals to the Ministry and to the TSO. The TSO conducts the necessary technical studies based on the information received by the agents and the criteria defined by the Ministry. Finally, the TSO formulates an initial draft NDP that is sent to the NRA for a financial/economic sustainability report that will also be taken into account when developing the network.
Sweden	There is no formal infrastructure gap identification exercise.
Switzerland	There is no formal infrastructure gap identification exercise.

Table 22: Planned and considered improvements of future NDPs⁸¹

Planned change	Country
improvement of stakeholder's involvement	BE, DK, FR, IE, LV, NL, SE

⁸¹ The NRAs of Austria, Latvia, the Netherlands and Sweden reported other ongoing changes/improvements (without further specification) mainly with regard to the implementation of Directive EU 2019/944.

Planned change	Country
improvement regarding the NDP transparency (publications)	BE, CY, DK, EE, FR, HU, IE ⁸² , LV, NL, NO ⁸³ , ES ⁸⁴ , SE
improvement of project assessment methodology	BE, HR ⁸⁵ , CY, FR ⁸⁶ , GR, NL, SE
improvement of the infrastructure needs assessment	BE, CY, EE, FR ⁸⁷ , GR ⁸⁸ , IE, LV, NL, RO ⁸⁹
improvement of the coordination with the DSO	BE, FR, HU ⁹⁰ , LV, NL, RO, SE, CH ⁹¹
improvement of the NDP monitoring	HR ⁹² , HU, IE, NL, RO ⁹³ , SE
improvement of the EU TYNDP-NPD consistency	ES
improvement of scenario development process	CY, FR ⁹⁴ , HU, IT ⁹⁵ , NL, RO ⁹⁶ , SE

⁸² IE: change of structure of the NDP including more information about infrastructure needs study

⁸³ NO: All the NDPs are being digitalized (this will also improve the coordination with the DSO).

⁸⁴ ES: The capital expenditure value will be provided for every project in the next NDP.

⁸⁵ HR: All the investments above 40 million kuna will require a CBA.

⁸⁶ FR: establishment of a roadmap to better integrate flexibilities such as demand side response and storage in the TSO's assessment

⁸⁷ FR: adequate justification on future investments for telecommunications

⁸⁸ GR: pending approval of an updated CBA

⁸⁹ RO: improvement in the portfolio of computer applications support for the analysis and simulation

⁹⁰ HU: close cooperation between the TSO and the DSOs to make the NDP more transparent, joint identification of problems and necessary developments

⁹¹ CH: more detailed data exchange with the DSOs

⁹² HR: The TSO will need to report all changes compared to the last NDP.

⁹³ RO: increased degree of monitoring of projects planned in the first 3 years

⁹⁴ FR: ensure a clearer presentation on the articulation between the hypotheses taken at the European and French levels to ensure a shared vision of possible futures for the energy system, beyond the sole scope of interconnections, consistency between CO2 price, fuel price and mix assumptions in scenarios shall notably be ensured and information on the European mix assumptions shall be updated regularly

⁹⁵ IT: The NRA requested to use the ENTSOs' National Trends Scenario.

⁹⁶ RO: correlation with scenarios proposed for the EU TYNDP