ENTSO-E
Roadmap for a multi-sectorial Planning Support

2020

About ENTSO-E

ENTSO-E, the European Network of Transmission System Operators for Electricity, represents 42 electricity transmission system operators (TSOs) from 35 countries across Europe. ENTSO-E, which was established and given legal mandates by the EU's Third Legislative Package for the Internal Energy Market in 2009, aims to further liberalise the gas and electricity markets in the EU.

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1 BACKGROUND

In accordance with the Paris Agreement, the European Union has set long-term energy targets and possible pathways towards a fully decarbonised European economy by the year 2050. In the next years, the European Commission will work on legislative packages to transfer the political targets into legislation.

The decarbonisation process of the European economy implies massive integration of variable renewable energy sources (vRES) into the electricity sector. Simultaneously, further developments towards more direct use of electricity (electrification) or indirect use in all sectors (gases, liquid fuels, etc.) are expected.

As the share of electricity demand covered by variable renewable energy sources increases, the need for system flexibility increases as well. The uncertainty of the production from vRES and of the future energy demand – amount and pattern – must be compensated by adequate flexibility of the energy system. Smart sector integration will enhance flexibility across various energy sectors and allows a development towards a more energy- and cost-efficient energy system.

2 INTRODUCING A MULTI-SECTORIAL PLANNING SUPPORT

Coordinated multi-sectorial planning and operation require proper data and modelling across sectors and time periods. On the one hand, questions arise related to resource and infrastructure adequacy, and on the other hand questions arise regarding the secure operation of each system. Both questions need to be answered. Today's general planning requirements to deliver technically sound and cost-efficient solutions are complemented with the new challenges and opportunities to plan considering different sectors. This is in line with a **one energy system view**, a view of all sectors in the European economy in order to ensure an affordable, effective, and efficient transition. To be able to fulfil the requirements of coordinated planning under a one energy system view, a multi-sectorial planning support is introduced.

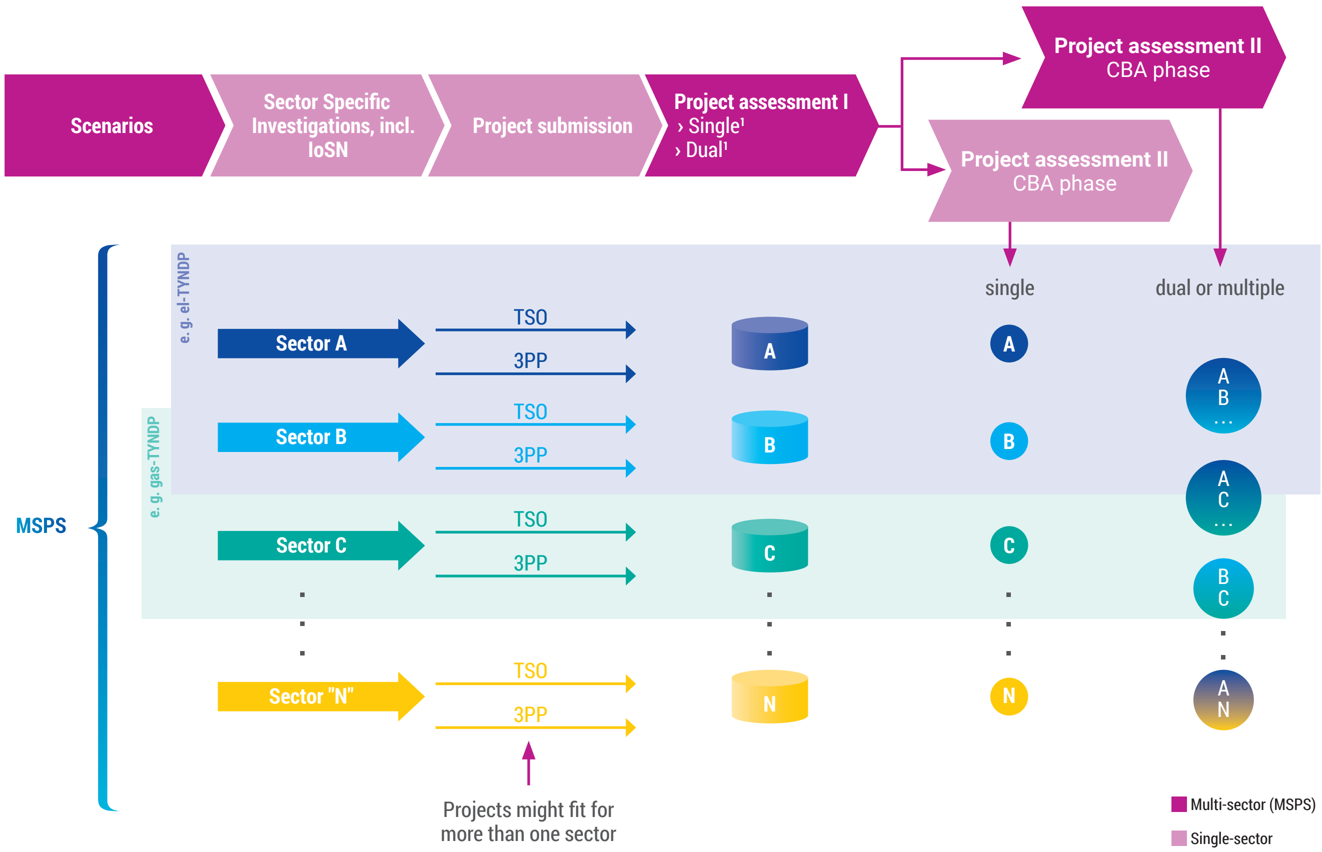

Figure 1: Multi-sectorial planning support – various sectors under the MSPS umbrella

1 Artelys, 2019, **Investigation on the interlinkage between gas and electricity scenarios and infrastructure projects assessment**

A multi-sectorial planning support (MSPS) shall serve as an umbrella for infrastructure planning activities: It shall be the starting point for system and sector development plans and focus on even more comprehensive and consolidated scenarios compared to today's ENTSO-E and ENTSOG joint scenarios. This ensures consistent pictures of possible futures. A MSPS provides several consistent scenarios/pathways for decarbonisation, including an overall set of assumptions considering cost assumptions, before infrastructures and assets are planned in detail. Thus, a MSPS contributes further to efficient decision making for policy makers and actors in the European economy. The use of the same and consistent scenarios across sectors is a key factor to maximise economic efficiency while avoiding stranded assets or infrastructure deficits. At the same time, it is important to point out that each sector will still run sector-specific analyses to identify its concrete system needs.

After defining the scenarios, detailed investigations of individual energy systems are still to be performed sector-independently, taking into account their specificities; see Figure 1. This means, for example, that during the 'identification of system needs' phase, corridors where energy is transported from one node to another node will be identified. After this phase, project promoters could submit their projects to the ENTSO-E and ENTSOG TYNDP processes. Afterwards, projects enter the project assessment phases I and II.

A comprehensive MSPS includes all types of primary energy, secondary energy, infrastructures, transformation, storage, and end-use needs as well as their technologies.

Actions to develop a MSPS

Figure 2 presents a proposal for the development of a multi-sectorial planning support towards 2030 and proposes a series of actions than can be classified according to the stage of the infrastructure planning process that they improve: scenarios, Project Assessment I (project sorting or screening), and Project Assessment II (cost benefit analysis); the steps will be explained in the following sections. The development of a MSPS leads to actions related to how scenarios are developed, including more sectors in the scenario-building process.

As shown in Figure 2, a first step to improve the scenario-building process is to define what sectors will be included and what information is needed to perform this addition successfully. Then, it will be necessary to evolve both the existing data platform related to new sectors and the data collection process to fulfil the needs to execute the MSPS. At the same time, market modelling will need to evolve in order to capture the behaviour and economics of the different sectors when they interact within and between sectors. In this way it will be possible to produce consistent scenarios from a technical and economic perspective. These two evolution processes (in data and in market modelling) must be performed before the quantification of the scenarios. Furthermore, two important stages of the scenario-building process are to define the scenarios, first, from a qualitative perspective, and then to translate these qualitative scenarios into quantitative scenarios, similarly to how scenarios are built currently in the TYNDPs.

Another step that will evolve with a MSPS is the project assessment. This stage will be split into two phases. The 'Project Assessment I' phase is applied in order to identify what kind of project assessment is needed for a given project: more specifically, if the 'Project Assessment II' should examine a single sector (e.g. electricity, i.e. execute a 'single assessment'), as is done currently in the TYNDPs, or if it should examine more sectors simultaneously (e.g. electricity and gas, i.e. execute a cross-sectorial or 'dual assessment'). This stage is similar to the screening methodology proposed by Artelys in the focus study on interlinkages between electricity and gas released in October 2019[2]. The 'Project Assessment II' phase is similar to the current cost benefit analysis (CBA) phase, potentially complemented by new indicators in the case of dual assessment. For this reason, it will be necessary to develop cross-sectorial indicators and to implement them in the different tools used for this assessment. Once these indicators have been tested, it will be necessary to proceed to their legal implementation in order to include them in the regulation accordingly. In this stage, early collaboration with the main stakeholders is especially important.

In Figure 2, the stars represent different types of workshops with stakeholders: Type 1 are workshops to define sectors to be included in the MSPS and the information required for them; Type 2 are workshops to receive qualitative input of the sectors being looked at; Type 3 are workshops to receive quantitative input of the sectors; Type 4 are workshops focused on methodologies; Type 5 are workshops focused on the development of cross-sectorial indicators. Because including new sectors in the development of scenarios is a complex and challenging task, it should be done in a progressive way, by adding only a few sectors at a time to learn what is important when including further sectors. This learning curve evolves in multiple dimensions, such as governance, CBA indicators, stakeholder collaboration, tools, and manpower, among others that will be further discussed in this document.

2 Artelys, 2019, **Investigation on the interlinkage between gas and electricity scenarios and infrastructure projects assessment**

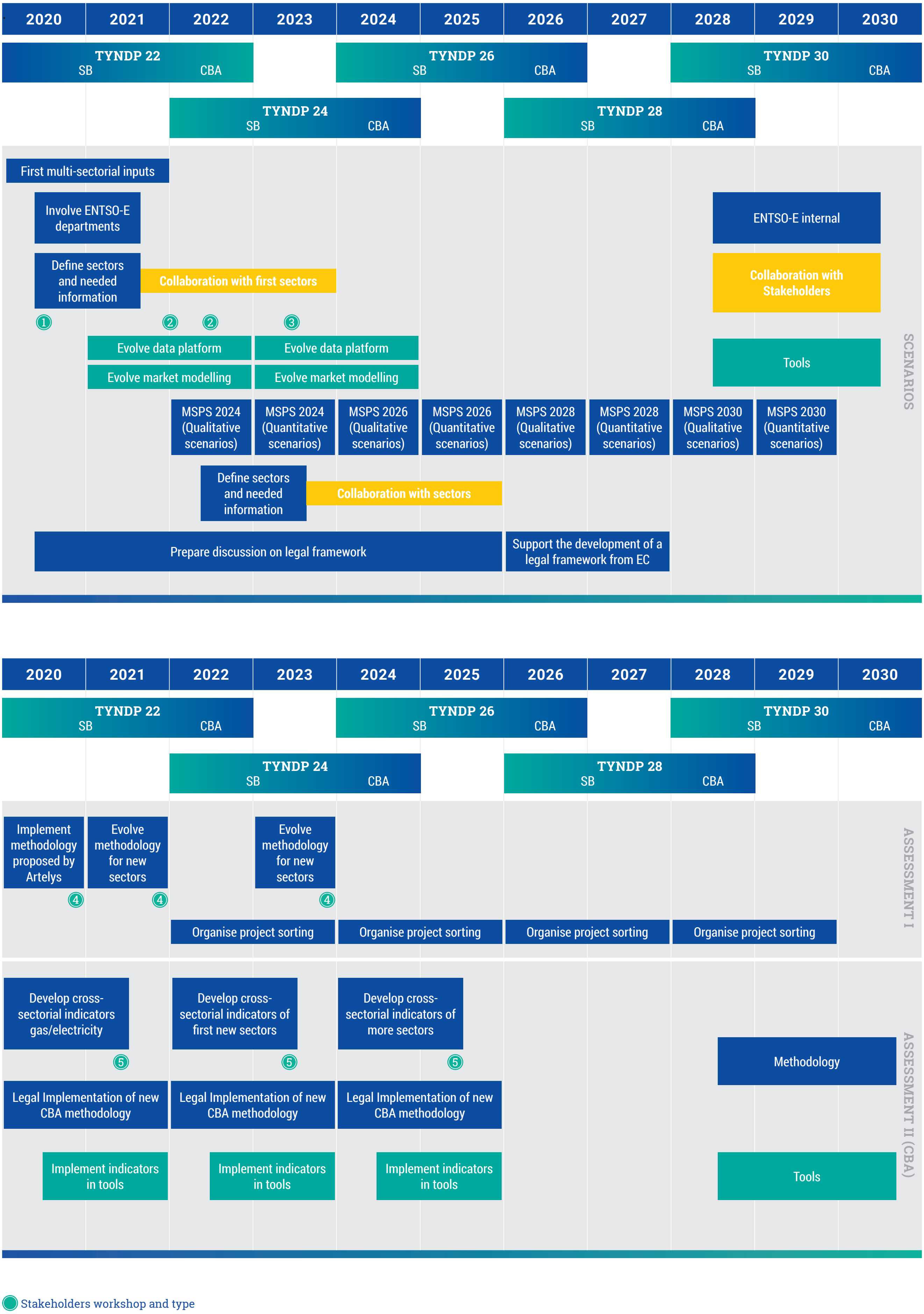

Figure 2: Proposal for the development of a multi-sectorial planning support

3 DETAILS OF THE MSPS

The implementation of the MSPS introduced in the previous section will bring modifications to the existing stages of the infrastructure planning process and will add new stages, as shown in Figure 2. More details about these modifications are described in this section.

Scenarios

The current scenario building process

Different scenarios are required in order to provide insights to policy makers and energy infrastructure stakeholders (E-TSO, G-TSO, etc.) on the technical (such as security of supply), economic, and environmental issues of the pathways of decarbonisation. Since NECPs are important instruments of the recent regulation on EU Energy and Climate Governance, there is a scenario based on them in the current TYNDP. This scenario is built on each member state's projections, based on the NECP until 2030. Further different scenarios are required for two main objectives: (i) to compare the technical and economic issues related to these pathways in order to contribute to judicious choices by policy makers and (ii) to identify the no-regret options in the investments in infrastructure projects (e.g. interconnectors). The different scenarios/pathways must be contrasted in order to bring to light a wide range of options for decarbonisation. These scenarios could differ on:

- the effort on energy efficiency
- the share of the different forms of energy in the final uses (e. g. transport, heating, etc.)
- the share of the different technologies in the generation mix (e. g. for electricity: PV, wind, nuclear, etc.)
- the development of flexibility on generation and demand side (mainly for electricity)
- the imports (or even exports) of energy from (or to) outside Europe (e. g. hydrogen)

The first step for the scenario building is to identify the main drivers (or key parameters) of the scenarios. The key parameters reflect political ambitions (such as the energy efficiency ambition, the role of each form of energy in the end-use, the decommissioning of nuclear power plants, the targeted level of security of supply, etc.). Further parameters are technical hypotheses (such as vRES potentials, the efficiencies of technologies, etc.), sociological hypotheses (such as the maximum level of acceptable wind and PV generation, existence of a hydrogen transmission network, etc.) and economic hypotheses (such as the cost of each technology).

These 'key parameters' or 'drivers' are considered as an input of the scenario-building process. Based on these parameters, scenarios must be described in detail: in each country, the share of each energy in the end-use demand (heating, transportation, etc.) and the technologies used (electric vehicle, heat pump, etc.), the power generation capacities installed (PV, wind, nuclear, etc.), the capacities of transformation from one energy vector to another (power-to-gas, etc.), and the interconnection capacities (electricity and gas) between countries.

New elements in the scenario building process under a multi-sectorial planning support

The scenario-building process under a multi-sectorial planning support will have deliverables similar to those of today; however, the scenarios will be developed with a more refined process. This new process to develop scenarios will differ from the current scenario-building process, because currently the final energy demand is quantified without considering the cost effectiveness of different technologies in the different sectors under examination, for example, CO_2 abatement costs. This approach could also consider a certain level of demand quantification based on cost efficiency (e.g. the end-user technology to be used for heating purposes is quantified according to economic assumptions), and other demands will not be impacted by this approach. These improvements can help to increase the credibility and consistency of the different scenarios.

Furthermore, the scenarios can be developed considering an economical approach for infrastructure development between the different sectors. This means that the supply side should not be quantified by analysing a single sector but by analysing multiple sectors (e.g. having more renewables for gas supply), which is currently not being done in the scenario-building process. At the same time, this use of infrastructure in the MSPS also leads to different investments in the energy carriers. In some cases, an efficient solution to solve an energy transmission issue in one sector could be to invest in transmission in a different sector to make the best use of the elements of the energy system.

National governments and the European Commission are relevant stakeholders in the development and execution of a MSPS. Since NECPs are important instruments of the recent regulation on EU Energy and Climate Governance, they should be considered when building scenarios by use of the MSPS. Thus, it is recommended that one of these scenarios fully reflects member state's projections in the NECPs until 2030. This scenario could serve as a scenario of common agreement between the different stakeholders. The multi-sectorial planning support should be useful in building further on the national investment plans, taking into account regional and European aspects, as well as aspects of the different sectors. At the same time, it should consolidate and contribute to assessing joint scenarios of ENTSO-E and ENTSOG, in order to indicate the right direction and confirm the national investments' interests and timing.

The detailed description of the scenarios will be based on a multi-sectorial economic model: Based on a varying amount of 'key parameters' that are taken from the NECPs and considered as exogenous, the model should compute the investment decisions, considered as driven by economical/market choices (investment on power-to-gas capacities, batteries, interconnectors, etc.). The model could be based on an optimisation algorithm, taking into account the exogenous parameters as constraints of the algorithm (e.g. level of security of supply) and aiming at minimising the global multi-sectorial cost. In order to take into account all flexibility issues, the model should be based on stochastic simulation of the energy system, modelling the uncertainties of weather (with effect on energy demand, RES, hydro generation, etc.) and availability of generation assets.

The optimisation approach guaranties the economic consistency of the scenario-building process. The scenarios should represent uncertainty regarding the prices of fuels, emissions, and other externalities. At the same time, they should also represent the uncertainty of the CAPEX of different generation and storage technologies. In order to ensure that this model is robust and transparent enough, an open source model with transparent data is recommended. If data confidentiality issues are a constraint, a phase should be added to the planning processes in which different promoters/stakeholders can raise questions on the results in greater detail.

These scenarios should be assessed from an economic perspective. The economic assessment of the scenarios will take into account all costs (cost of the energy system and cost of the technologies 'behind the meter', e.g. electric vehicles, heat pumps, etc.). Sensitivity analyses must be made in order to identify if the economic benefit of one pathway in comparison to the others is robust to the set of hypotheses.

Project Assessment I – Screening

The MSPS provides a one system view with several sectors included in the scenarios, showing possible interactions among them. This triggers the use of a screening methodology, similar to what Artelys proposed in its study on interlinkages between electricity and gas,[3] aiming to identify under what conditions the project assessment should include one sector only or multiple sectors. This change in how projects are assessed is another 'deliverable' of the implementation of a multi-sectorial planning support.

The screening process takes place after the project submission phase, identifying potential needs for a dual or multiple sector project assessment depending on the relevant sources of interaction. For that purpose, criteria that capture the relevant interactions of the project with all the sectors will be used (Project Assessment I, Figure 1).

Projects that the screening process revealed to have relevant interactions with other sectors or to compete with other projects addressing the same needs will be compared through a transparent CBA (Project Assessment II, Figure 1).

Project Assessment II – Cost Benefit Analysis

After Project Assessment I is applied, a single or multiple sector assessment will be needed to assess infrastructure projects. This procedure is named Project Assessment II and corresponds to a cost benefit analysis. In the case of the single sector project assessment, the indicators will capture benefits and costs looking at one sector only. On the other hand, multiple sector project assessment will capture costs and benefits in the different sectors when relevant interactions occur between them. New methodologies and new indicators will need to be developed for this purpose (e.g. an electricity interconnector can have an impact on the gas system).

It is important to note that there are energy carriers where the correspondent transmission is legally regulated (e.g. electricity or gas). But in the case of non-regulated sectors, there might be internal business decisions, like in the case of heavy or chemical industry, which are not labelled 'CBA'. These, however, have a similar role in terms of quantifying benefits and costs of projects in order to make investment decisions. In the case of these business decisions inside sectors, they might be also influenced by the energy infrastructure planning process, as their energy supply and their energy prices might depend on this infrastructure as well. The purpose of the MSPS is to facilitate more efficient solutions at the system level, rather than to make business investment decisions inside sectors.

3 Artelys, 2019, **Investigation on the interlinkage between gas and electricity scenarios and infrastructure projects assessment**

Handling differences between scenario building and CBA

The expansion model used for the computation of the scenarios will be based on some simplification in order to provide acceptable computation time. In contrast, the CBA phase provides a detailed analysis of the benefits of each project (interconnectors for electricity, interconnectors for gas, power-to-gas units, etc.). This enables the assessment of the value of each project and the comparison of each project with competing projects in a multi-sectorial approach. The results of this phase could lead to identifying potential gaps between these results and the results of the scenario-building phase, as the scenario-building phase is based on a more aggregated representation of the energy system and the infrastructures projects. These gaps may be, for example, differences between interconnection reinforcements between countries or power-to-gas development in the different countries, investments identified as profitable in the CBA phase were not identified in the scenario-building phase. After these gaps have been identified, there are two possible approaches to resolving them. These two options are described in the next paragraphs and visualised in Figure 3.

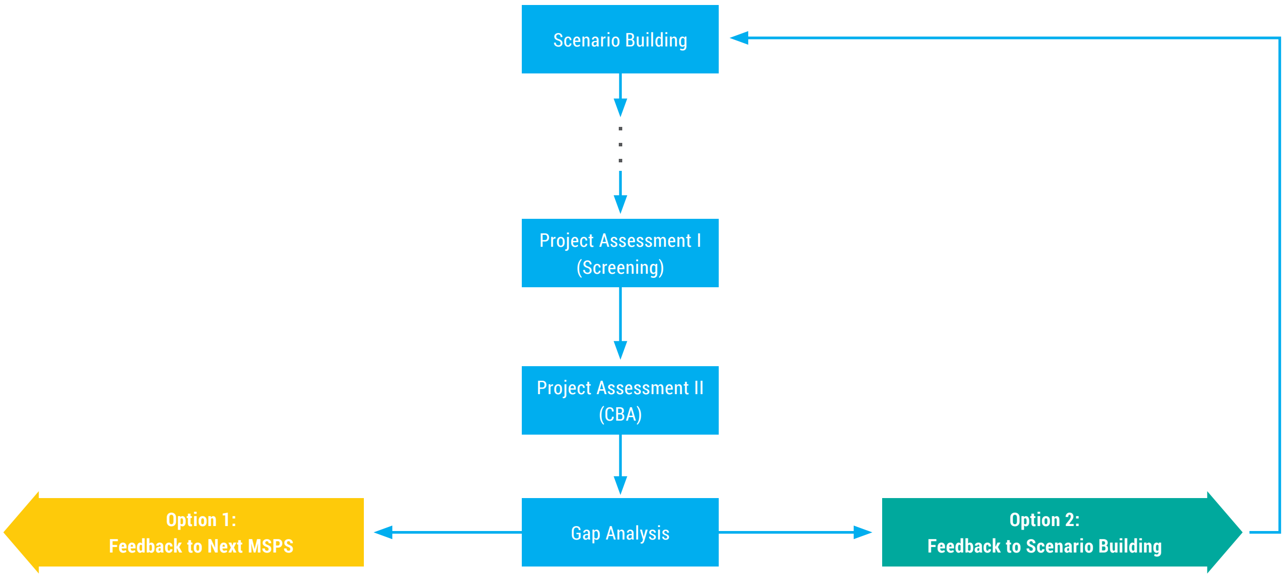

Figure 3: Relevant process steps for iteration of gap analysis

Option 1: Feedback to next MSPS

The gaps between the results of the scenario-building and the CBA phases could be addressed by introducing relevant results of the CBA into the scenario-building process of the next MSPS.

This path allows to realise the scenario-building phase in a reasonable time frame and to use the results from the Project Assessment II in the next MSPS.

Option 2: Feedback loop to scenario building

The gaps between the results of the scenario-building phase and the CBA phase could be addressed by reintroducing some results of the CBA phase (for example, the level of interconnections considered or the power-to-gas capacity) into the scenario-building phase. Such a process means that the scenario-building phase is not entirely finalised and requires more effort and time but provides a higher level of accuracy in the scenarios. In the gap analysis, maximum acceptable gaps between the scenario-building phase and CBA phase should be defined for considering the scenarios as final for the MSPS.

Alternative scenarios may benefit at a later stage of the MSPS from a detailed and iterative economic assessment process encompassing more efficient investments. In this context, it seems reasonable to adopt the screening process in the first stages of the MSPS and, in parallel, to start developing a multi-sectorial economic model. This model supports the iteration process and begins to implement it progressively in future stages, proving the results and avoiding jeopardising the schedule of the MSPS and TYNDP.

Pros and cons of the two options:

	ADVANTAGES	DISADVANTAGES
Option 1: **Feedback to the next MSPS**	– Swift implementation – More suitable with two-year cycle – Coherent with current E&G TYNDP approach – More transparency – Mitigated increase in resources and costs – Less risk for ENTSO-E to conduct the process	– Reaction to CBA results may take two years (next MSPS) – First editions may not provide solutions with higher cost efficiency
Option 2: **Feedback loop to scenario building**	– Increased accuracy – Feedback from CBA incorporated in the same MSPS	– Multiplication of steps (namely public consultations) – MSPS and TYNDP's schedule at risk – More discussions due to changing conditions for the scenarios. – Implementation delay – Increased resource allocation and costs

Sectors to be involved in the MSPS

This roadmap suggests including different sectors into the MSPS in two steps, as shown in Figure 2. The following sectors have been identified as relevant for the MSPS: heating and cooling, transportation, water, and new branches like PtX. Furthermore, the industry is relevant, especially the chemical industry and industrial compartments where energy will be provided through the different energy carriers: electricity, hydrogen, methane, and other energy carriers.

The relevant sectors should be included in two steps and thus in two consecutive rounds of building the MSPS. In the first MSPS, the energy-intensive industry sectors could be included. Because there are relatively few players, they are concentrated to a few locations in Europe and are connected to the TSO networks. The inclusion of the more distributed sectors, like transportation or heat and cooling, requires more time for preparation.

4 TYNDP OF THE FUTURE

During the last decade, the TYNDP process has been continuously developed and improved to meet expectations of different stakeholder groups without losing its actuality in terms of legislative changes and sharpened political (climate) goals.

As already stated in the previous chapters, the MSPS concept shall offer an extension of today's TYNDPs. The proposed approach will not require fundamental changes in the actual TYNDP process or structures. However, several extensions are foreseen.

Basically, the TYNDP process representation can be simplified to three major steps:

- Creating a framework including scenario building and deriving the resulting system needs from it;
- Project collection (addressing the system needs);
- Project assessment (evaluation or rating of the projects collected).

The first phase is of utter importance for the entire TYNDP process because it sets the scene for further actions. This would be the place to unfold the multi-sectorial planning support (MSPS) that would influence not only the first phase but also the project assessment phase.

In the future TYNDP, the scenario-building process will integrate more sectors considering additional factors, such as the cost of technologies. Moreover, the supply side will also consider all sectors; it will be possible to identify synergies between sectors as well. In the project assessment phase, a screening methodology will be applied to discover if the project assessment should focus on a single sector or whether multiple sectors should be considered. Then, a methodology to capture the costs and benefits of projects in the different sectors will be applied to the projects where this type of assessment is needed.

5 STAKEHOLDER COLLABORATION

A multi-sectorial planning support (MSPS) will bring stakeholder collaboration to a new level and will have a significantly broader scope compared to the current sectorial reports (e.g. E-TYNDP). In addition to the specifics of the various sectors, all possible relevant cross-sectorial interactions will need to be addressed.

A future MSPS will most likely rely on principles similar to the ones defined in the project assessment methodology submitted in 2019 to the EC and ACER for electricity and gas interlinkages. Taking into account possible shared responsibilities within a MSPS, an extended group of stakeholders should advise during all phases of the multi-sectorial planning support.

This broader scope of stakeholders will allow the facilitation of innovative solutions and new benefits due to perspectives from other sectors. Furthermore, it will provide long-term prospective elements for the various markets in the form of a guidance document, a kind of an expert advice on possible developments and trends, thus providing background information for future investment decisions.

Identified stakeholders

The development of the MSPS will require a high number of stakeholders. The following is an initial draft of identified stakeholders whose view should be considered in the MSPS:

- **Policy makers** (national and EU levels)
  Improve knowledge of the consequence of the scenarios – costs, security of supply, contribution to targets – in order to promote relevant and informed decision making.

- **E-TSOs, G-TSOs, E-DSOs, and other sectors infrastructures' operators**
  To improve investment decisions in transmission and avoid inefficient investments/sunk costs on national investment plans.

- **ENTSO-E, ENTSOG, EU DSO Entity**
  Instruments of the EU Energy policy; data providers and main players of the MSPS and the TYNDPs.

- **Electricity Regional Coordination Centres**
  To collect expert advice on electricity SoS.

- **Med-TSO**
  Aimed at the creation of a Mediterranean energy market, Med-TSO involvement may provide guidance on the harmonisation of boundary conditions and a pathway to enlarge MSPS in the future.

- **ACER, NRAs**
  MSPS should be useful to build further on national investment plans as well as on TYNDPs (confirming interest and timings of the projects), taking into account regional and European aspects, as well as aspects from the different sectors. Due to the increased complexity of MSPS, both ACER and NRAs must be engaged from the beginning for full visibility and scrutiny.

- **European Citizens and Customers Associations (IFIEC – International Federation of Industrial Energy Consumers, BEUC – The European Consumer Organisation, …)**
  Participation in the construction of better decisions and better understanding of the correspondent benefits (cost reduction of decarbonisation, awareness of SoS issues); In addition, energy communities will reinforce the relevance of the consumers, as well as their awareness to energy issues; Engagement from the beginning of the process will facilitate the understanding of the need for infrastructures and the acceptance of the proposed solutions.

- **Sectorial Associations: Eurelectric, Wind Europe, Hydrogen Europe, EHPA** (European Heat Pump Association), manufacturers, car associations (EGVIA – The European Green Vehicle Initiative Association and ACEA –s European Automobile Manufacturers' Association)

- **NGOs**
  Engage society and balance sectorial perspectives, enhancing credibility of the MSPS.

- **Academics, Researchers and Consultants**
  Professors, researchers, students, and consultant firms are all higher education stakeholders that may provide relevant technical and organisational solutions.

- **Equipment manufacturers**
  To incorporate experience and prospective knowledge on technological solutions (some manufacturers are already looking into smart sector integration).

Stakeholder collaboration schedule

Prior to the MSPS, a public consultation addressing the proposed methodology must be envisaged. This is visualised in Figure 2 with the stars 1–5.

On a cruise basis, stakeholder collaboration may occur at the same stages as they do in current TYNDPs (i. e. scenario building and final consultation), but especially in the development of the qualitative part of the scenario-building process, similar to the existing storylines. Moreover, stakeholder collaboration in the different assumptions (e. g. input data for models) is key to increasing the transparency of the results.

In order to ensure consistent scenarios, detailed analyses (such as a CBA of competing interconnectors) made by expert stakeholders of the corresponding sectors should be integrated in the process and used to adjust the scenarios. Furthermore, cross-sectorial projects covering two or more sectors should be analysed and used for this adjustment as well (see section 'Handling differences between scenario building and CBA'). Proceeding without stakeholders' feedback between scenario-building and sectorial investigation must be avoided.

6 COSTS, MANPOWER, AND RESOURCES

The development and execution of a multi-sectorial planning support may require an enormous amount of work among the different stakeholders. This may rise when adding more sectors into the MSPS.

The scenario-building process starts with the development of storylines. On the one hand, when adding more sectors to the scenario-building process, these sectors add more uncertainty to the scenario-building process, and it might be more difficult to reach agreement between stakeholders when there is a low number of scenarios. On the other hand, having more scenarios in order to assess infrastructure of the different sectors under different possible futures will result in increased time and resources required for the identification of system needs in the different scenarios and increased time for the CBA considering all the scenarios.

In addition, experts from the different sectors will be required to jointly work in developing the MSPS, expending a considerable amount of manpower. For example, the current scenario-building processes of the TYNDPs consider only the electricity and gas sectors respectively, and it takes approximately two years to finalise each process.

7 GOVERNANCE ON THE MSPS

As, in a multi-sectorial planning support, a high number of stakeholders might collaborate, it is important to introduce clear governance on the development and performance of such a process. By including more sectors and stakeholders in the scenario-building process, the complexity of the communication and development of the scenarios will likely increase. Furthermore, the scenario-building process, the applied methodologies, and their results still require transparency and comprehensibility to find a wide-ranging acceptance. An advisory group with participants from different sectors may help in this regard.

When defining the scenarios, collaboration with stakeholders is essential. They should develop models that consider the different interlinkages between sectors and joint scenarios to be used as references for the infrastructure planning, to ensure a consistent and holistic approach across sectors. In this way the multi-sectorial planning support will be able to capture characteristics of different sectors and integrate local aspects into the scenarios as well. Coordination of the MSPS data input on national and international levels is needed.

The task of identifying system needs should continue to be a TSO's responsibility as this is further linked to the technical expertise and liabilities of the TSOs with respect to knowing their networks and ensuring their secure and safe operation. Identification of system needs (IoSN) studies are very sector specific and require a significant level of experience and expertise to be able to execute the associated market and grid studies, analyse the results, and formulate conclusions. Consequently, these studies are executed in collaboration with experts from the involved countries/TSOs, which possess detailed knowledge about their national grid and its specificities. The IoSN will deliver an overview of the future system needs, in terms of increased cross-border capacity, but also the means required to operate the grid in real time: frequency management, voltage stability, and flexibility, among others. The identified needs should be robust in light of the different scenarios. A similar reasoning is valid for the IoSN in other sectors. On the one hand, it is not manageable for one entity to execute an IoSN overarching the entire system (all sectors), and on the other hand it is not efficient (and thus not in the interest of society) as many of the system needs are and will remain sector specific. Nevertheless, TSOs can also cooperate with other stakeholders. For example, currently the identification of system needs in the electricity sector and the related consistent set of definitions, criteria, and scenarios are established through a process involving the PCI Cooperation Platform (combining EC, ACER, ENTSO-E, and ENTSOG views) and many other stakeholders.

Optimal utilisation of the MSPS would require a shared responsibility (information quality) but not necessarily a shared governance (transparency, design, and availability performance indexes). System operators should continue in a central role as the main experts.

The MSPS would start on a voluntary basis, as shown in Figure 2 for the MSPS 2024 and MSPS 2026. During the development of the process, the need to adapt a legal framework might arise. This legal framework already exists; it is the current TYNDP that could be adapted in order to add more sectors in order to develop the MSPS. This legal framework would help establish a clear governance on the MSPS and overcome possible data confidentiality challenges, among others. However, it is important that this legal framework is built considering the experience of developing the MSPS, as different sectors have different challenges. For this reason, by the end of 2027 a first legal framework could already be developed, as shown in Figure 2.

8 CONCLUSION

The electricity system has an undeniably relevant role, being pivotal among all other energy systems. ENTSO-E recognises its important role in the development of energy infrastructure in Europe to reach the climate targets for 2050. In this sense, it has elaborated this roadmap as part of its constant search for improvements on the planning process.

ENTSO-E is firmly convinced that, through the implementation of this roadmap, it will get a more comprehensive overarching view on the energy system scene that will be translated into the improved quality of results delivered to decision makers.

European Network of
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