Ten-Year
Network
Development
Plan 2020

Smart Sector Integration
Insight Report

November 2020 – Version for public consultation

entsoe

How to use this interactive document

To help you find the information you need quickly and easily we have made this an interactive document.

Home button
This will take you to the contents page. You can click on the titles to navigate to a chapter.

Arrows
Click on the arrows to move backwards or forwards a page.

Hyperlinks
Hyperlinks are highlighted in bold text and underlined.
You can click on them to access further information.

ENTSO-E Technopedia
www.entsoe.eu/Technopedia/

Contents

Insight Report on Smart Sector Integration

The purpose of this report is to define and explain the basic concept of Smart Sector Integration, identify key challenges and perspectives from the TSO perspective and to explain how Smart Sector Integration is dealt with by ENTSO-E in its work on infrastructure planning, including TYNDP and CBA-methodology.

Introduction to Smart Sector Integration

In the future, the energy system will be more integrated and benefit from a more dynamic interaction across the value chains, linking the specific energy resources to the end-sectors. It is paramount to facilitate full decarbonisation while ensuring security of supply and limiting costs of the energy transition while ensuring technology neutrality. Thus, the various energy carriers (electricity, solid, liquid and gaseous fuels) will be linked and converted to provide the most efficient and carbon neutral services for the benefit of all European citizens and businesses.

Stronger commitment and more active participation of all sectors and actors is required to reach current and future EU climate objectives. The European Power System is already in a deep transformation and will progress towards a fully integrated and distributed model.

In order to ensure an affordable, secure and cost-efficient transition, a **System of Systems View of all sectors** in the European economy must be applied and a strong coordination of policy initiatives both at EU and at Member States level is essential.

A common element of all future energy scenarios is that **electricity** becomes the leading energy carrier (up to 60 %[1]), with the European electricity grids as a backbone for the decarbonisation of all energy sectors.

Electricity is a major building block of a climate-neutral energy system as renewables are to be key energy sources due to their maturity and intrinsic efficiency advantage. Already today, **renewable energies** cover 32 % of electricity demand in the EU-28 but only 18 % of final energy demand (see Figure 1).

In order to exploit the full decarbonisation potential of electricity, its share vis-à-vis other energy carriers must be increased. This process is typically referred to as **electrification** and will also contribute to a reduction of primary energy needs and thus to increased **energy efficiency**, which is a key instrument to implement in order to achieve long-term decarbonisation targets in a truly integrated energy system.

1 Eurelectric Scenario 3: https://www.eurelectric.org/decarbonisation-pathways/

Electricity is a valuable form of energy that can be converted into other forms and work (e. g. mechanical traction) at a very high efficiency. However, any energy conversion, including electricity, is inevitably creating losses, according to the laws of physics. Hence the electricity produced should primarily be used directly, as further conversion(s) significantly decreases efficiency of the entire chain/system.

Moreover, **electrification contributes to Smart Sector Integration**: For example, electric cars will be a bridge between the transport and electricity sector, when their batteries provide flexibility to the electricity grid (smart charging, vehicle-to-grid). Smart Sector Integration is featured in all parts of the value chain, in energy production, transportation and finally when it is consumed. Despite the superior efficiency of electricity, an energy transition involving all sectors (electricity production, transport, industry, heating and cooling of buildings) is unlikely to be able to rely exclusively on electrification and energy efficiency.

The remaining energy demand will be met by other **low-carbon energy carriers**, including liquid and gaseous fuels (**"molecules"**).

Smart Sector Integration in general, and in particular Power-To-Gas (P2G), could help increasing the overall share of renewable energy sources in national and European energy consumption. More specifically, these technologies should offer additional flexibility to the electricity system, facilitating the integration of renewables into electricity grids and helping ensure controllability of the electricity system (allowing to accumulate/store excess of electricity produced by renewables).

The use of green gases should not be considered as an alternative to electrification, because it reduces the potential for increasing efficiency in end-uses and causes an increase in primary energy consumption. As said before, in fact, recurring to gaseous or liquid carriers implies the need for chemical and mechanical transformations that could be avoided by directly using electricity in final consumption.

However, there are sectors that, for technical and/or economic reasons, are **difficult to electrify** such as long-haul transport or industrial applications using molecules as feedstock. For these applications, green gases may represent a valid alternative, above all due to the far greater energy density than that of current batteries.

Producing hydrogen from electricity implies an **increase in primary energy demand**, up to double or even triple its need. Nevertheless, energy sectors that need high energy density are the best candidates to adopt hydrogen and synthetic molecules made using green hydrogen as feedstock. In these cases, e. g. maritime, aviation, industry feedstocks, the low efficiency would be compensated by the high energy density (both in volume and weight).

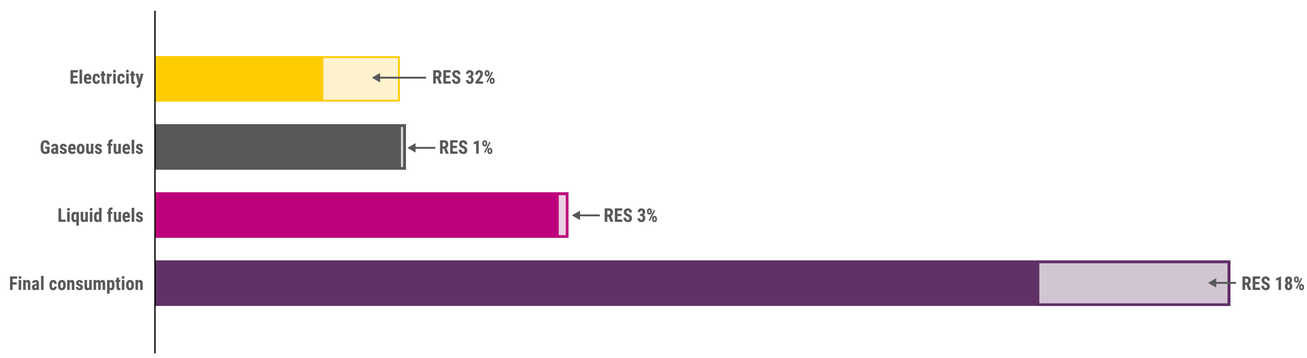


Figure 1 – Final energy consumption in the EU-28 in 2018 (Source: Eurostat, 2020)

State-of-play of Smart Sector Integration in the EU

The EU Strategy for Energy System Integration proposed by the EC *sets out a vision on how to accelerate the transition towards a more integrated energy system, one that supports a climate neutral economy across sectors – while strengthening energy security, protecting health and the environment, and promoting growth, innovation and global industrial leadership*.

Energy System Integration refers to the planning and operating of the energy system "as a whole", across multiple energy carriers, infrastructures, and consumption sectors, by creating stronger links between them with the objective of delivering low-carbon, reliable and resource-efficient energy services, at the least possible cost for society. The EU Strategy for Energy System Integration insists on the circular economy and energy efficiency principles first, on electrification and flexibility, and on clean fuels.

This EU Strategy gives special relevance to electricity as a driver for decarbonisation and it includes new elements to enhance Energy System Integration in multiple dimensions:

- **Demand side:** it proposes more energy efficiency, including this concept in buildings, more demand flexibility, creation/adaptation of regulation to encourage demand side flexibility, mentioning especially electromobility and V2G. At the same time, it promotes electrification of end demand and leaves room for other green fuels in hard-to-decarbonise sectors.

- **Supply side:** it proposes the efficient use of resources, using for example also waste-heat, biofuels, renewables, etc. It also proposes to improve the way how "green" sources are defined.

- **Infrastructure:** it encourages more coordination in infrastructure planning, especially between electricity and gas. Moreover, it also mentions opportunities for hydrogen and CO_2 transportation. The governance of the process will be reviewed.

- **Taxes and levies:** it tries to harmonise the taxation between sectors.

- **Digitalisation, Research, Development and Innovation:** It emphasises the relevance of digitalisation, especially for decentralised solutions. At the same time, it proposes funding for Research, Development and Innovation in order to produce or improve new technologies that will be useful for decarbonisation.

The Energy System Integration Strategy and the Hydrogen Strategy will lead to the revision and/ or the creation of several legal instruments that impact the TSO community. In 2020, the focus will be on the revision of the Regulation (EU) 347/2013 on guidelines for trans-European energy infrastructure (so-called Trans-European Network for Energy (TEN-E) Regulation) and on the Offshore Renewable Strategy. In particular, the European Commission is stressing the need to take into account the potential for on-site or nearby hydrogen production and strengthen the EU's industrial leadership in offshore technologies.

Concrete projects towards Smart Sector Integration

Smart Sector Integration is happening already; examples are the **electrification** of transport fleet (EV) or the penetration of hybrid heat pumps in heating and cooling system. Few examples following:

Example of projects towards Smart Sector Integration

1

In Italy, the Dual Fuel project is an initiative to electrify the gas compression and storage facilities owned by Snam, so that both electricity and gas can be used to run the compressors. This project will reduce CO_2 emissions, make new flexible resources available for the electrical grid enhancing, at the same time, the integration between gas and electricity systems. To this end, Terna and Snam have recently renewed a Memorandum of Understanding to study the potential operation of dual fuel assets and to develop sector coupling initiatives with a particular focus on the dynamics of flexibility and the integration of renewable energy sources;

2

TenneT, Swissgrid and Terna cooperate on the development of Equigy, a Crowd Balancing Platform (CBP), which is blockchain-based and that will incorporate small and distributed consumer-based resources into the electricity grid-balancing process. This will help TSOs' provide a reliable and cost-effective power system. The platform will enable owners of small-scale assets, such as electric vehicles (EVs), distributed storage and heat pumps, to play a key role in transforming the energy sector by optimising their interaction with the grid and allowing them to earn money in the process.

Equigy will link such distributed energy resources with the energy markets where flexibility is exchanged (so-called Ancillary Services Markets), by involving aggregators and Original Equipment Manufacturers (OEMs). It represents a cross-industry effort aimed at setting a new European standard for the flexibility markets, combining the driving force of commercial players with TSO's "third party" leadership role. This framework is seen as the most viable collective approach among other such initiatives in Europe. It offers standardisation, a common approach from TSOs with neutral governance, and the opportunity for scale-up, pushing the green-energy transition forward.

In this context, there are already developments towards Smart Sector Integration in the EU. ENTSO-E acknowledges these developments and the ENTSO-E's position on Smart Sector Integration is presented in the next section.

ENTSO-E's position on Smart Sector Integration

ENTSO-E welcomes the EC Energy System Integration Strategy as key milestone to accelerate the energy transition and reach climate neutrality. A well-integrated energy system linking different sectors and exploiting synergies between electricity, gas, transport, industry, etc., is necessary to deliver the EU climate neutrality objectives in a timely, cost-effective manner while ensuring secure and affordable energy.

Smart Sector Integration is key enabler of a climate neutral energy system by helping to find cost-efficient solutions for system needs, supporting a high level of system security and resilience and facilitating the decarbonisation of other sectors through innovative cross-sectoral solutions and synergies. As the power system evolves to a clean, digital and electrified consumer-centric system with interconnections across sectors and geographies, **in this 'one system of interconnected systems,' electricity becomes the dominant vector for clean energy production and the pan-EU cyber-physical grid plays a central role in transporting RES energy serving multiple sectors**.

- **One energy system view:** A view of all sectors in the European economy must be applied in order to ensure an affordable, effective, secure and efficient transition. A smarter, more integrated and optimised 'one energy system' view will help strengthen links across all sectors, and provide a level playing field for different energy carriers to compete and support coordinated decarbonisation on all fronts.

- **A global energy system and cost efficiency approach** that consider energy efficiencies and costs of different conversion technologies will be an important prerequisite to enable Smart Sector Integration and effective long-term decarbonisation of the energy system. Electrification and the direct use of electricity generated from RES is the most efficient way to decarbonise the energy system and should be encouraged where it is technically and economically sustainable (e. g. in integrating electric alternatives and solutions with much greater energy-efficiency in residential and tertiary sectors, transport, etc.). Multiple energy conversions should be avoided as they create losses and decreases efficiency of the entire system. RES energy that cannot be integrated into the power system should be used in other energy sectors through Smart Sector Integration.

- **Definition of 'green' products:** The certification of green products should consider emissions of CO_2 along their entire production process, including externalities. Products derived from Smart Sector Integration should only be defined as 'green' when the electricity used comes from a system without increasing its total CO_2 emissions.

- **Technology diversity and neutrality:** For a successful transition, different technologies have to be applied to manage different challenges (e. g. energy transmission, short-term and long-term storage). This includes technologies such as power to H_2, power to CH_4, power to heat and power to liquids, as well as other technologies providing flexibility such as electro-mobility or batteries. These individual technologies are not. directly interchangeable with each other due to the different kinds of flexibilities they provide. For example, hydrogen can be transported over a long distance, but heat cannot; batteries provide day/night shift whereas gas provides long-term storage. A neutral approach ensures that diverse solutions are considered and accordingly facilitates the transition.

- In the context of the smart integrated energy system of the future, **flexibility and system services become critical products. Energy markets need to eliminate distortions across sectors** to enable a cost-efficient operation, cooperation and coordination between TSOs, DSOs and aggregators, and coordination between market parties and customers.

- **Digitalisation and innovation** are game changers. Scaling up new technologies and stepping up R&D efforts are critical to unlock the full potential of SSI, through inter alia **optimising the use of existing infrastructure, ensuring secure and reliable operation of power networks, and optimal operation between various sectors and technologies** without increasing CO_2 emissions of the overall energy system.

Definitions of Smart Sector Integration

As of today, there is no unique and generally accepted definition of Smart Sector Integration. There is wide consensus on the underlying concept: plan and operate in a coordinated manner the electricity system and several mutually interacting systems; but when it comes to scope, targets, terminology, and sectors to be included, a diversified array of interpretations and nuances appears, depending on the individual stakeholder vision, its vested interest or just its legacy industrial compound.

In the following, an attempt is made of proposing a possible **set of consistent definitions** to be utilised homogeneously in the analysis of Smart Sector Integration initiatives and more in general to constitute a common base of understanding in the narrative of the relevant documentation; the proposal is articulate through different approaches which can then be adopted as such or combined in relation to the specific aim and intended use of the definitions.

Flexibility approach

The electric system is changing its basic operating philosophy from **"generation follows load"** to **"load flows generation"**, for paradigmatic changes in all its main components:

- **Load profile** from being an independent variable (inflexible load) to be covered shall be an active actor in modulating the consumption according to price signals, i.e. to resource scarcity, in a well-functioning electricity market;
- **Generation profile** from being modulable (fossil & hydro basin) shall be dominated by weather-dependent energy sources, with zero variable cost and therefore curtailment would be a large economic waste (inflexible generation);
- **Storing electrical energy** in a progressively improving economic and performant way by many technical options.

We are presently halfway in this path, with operational programming based on residual load profile; this concept will disappear, substituted by the need to **manage in an optimal manner a portfolio of flexibility instruments**:

- grid operation shall rely on how to best use and combine the flexibility portfolio;
- grid planning shall develop the electricity grid in a coordinated manner with development of many other independent actors and sectors: not only generation and load, but also new services and new interfaces, aiming at global infrastructure optimisation, and avoid stranded assets;

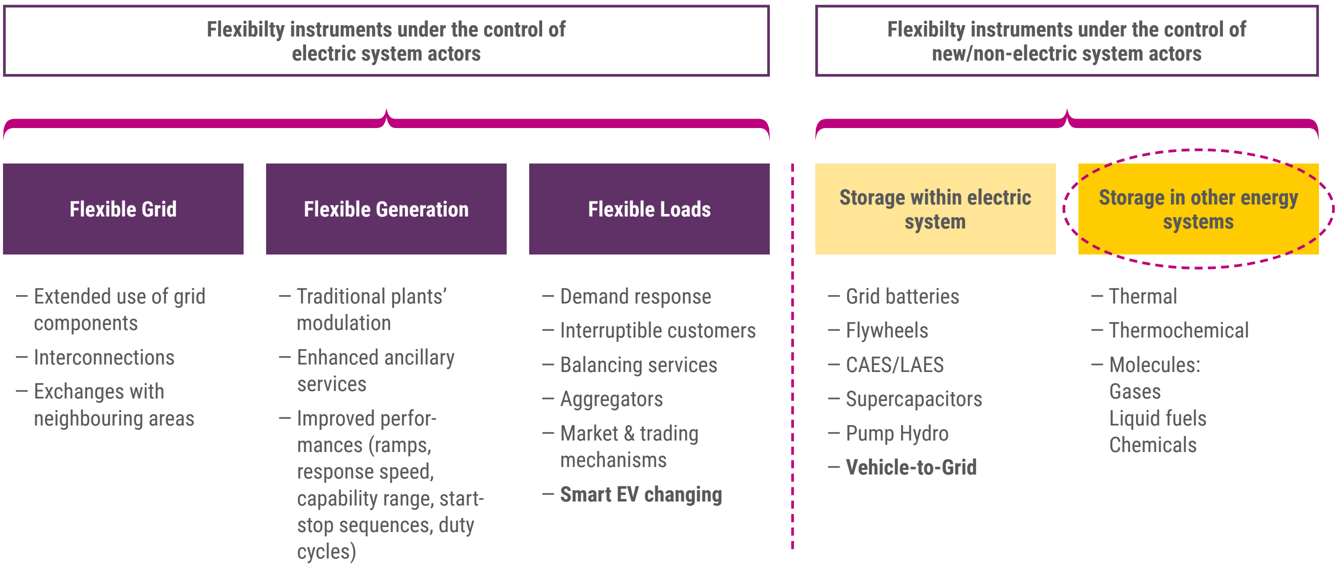


Figure 2 – Portfolio of flexibility instruments for a grid operator

Smart Sector Integration is adding new attractive options to the flexibility portfolio, which translates in another angle for adopting the relevant definitions. This is illustrated in Figure 2. Note that EV charging is appearing twice: smart charging is a form of flexible load, while Vehicle to Grid is a more sophisticated and more performing (as a flexibility instrument) form of storage (N. B. passive charging on the contrary is only an extra burden for the grid).

In respect of the services which can be provided to grid operators, a classification can be done as in Figure 3. Some options can provide only storage capability, while some others can provide both storage and further flexibility services.

CHARACTERISTICS	SYSTEM COMPONENT				
	Pure Load (traditional)	**Flexible Load**	**Storage in electric system**	**Storage in other energy systems**	**Molecules (chemicals & gases)**
Energy conversion/ Electric end use	End Use	End Use	Conversion	Conversion	Conversion
Energy Flow reversible	No	No	Yes	Yes	Yes
Providing storage capabilities	No	No	Yes	Yes	Yes
Providing flexibility capabilities	No	Yes	Yes	Yes	Yes
Energy carrier capabilities	No	No	No	No	Yes

Storage Flexibility Energy carrier

Figure 3 – Typology of grid services which can be provided by different categories of devices

Definitions according to the rationale of Smart Sector Integration initiatives

Any initiative in the field of Smart Sector Integration is comprising some basic conceptual elements:

- energy conversion into another form of energy;
- processing the converted energy in another energy sector, where it can follow different paths:
- consumed, if it is **cheaper/cleaner** than other energy sources typical of that sector, or if this allows to better use the infrastructure assets;
- be stored **more easily than within the electric system**, for successive re-conversion to electricity: the effect is a shift in time and in some cases also in space;
- transported, in some cases where transport performances can be higher than transmitting electricity
- re-converted for final use, but with multiple losses (conversion, reconversion, transport and storage losses).

From this angle, electrification of end-uses is not enacting a coupling among separate energy sectors, it is only shifting the energy consumption balance among the different sources. However, this is beneficial if it substitutes non-CO_2-free sources with CO_2 free electricity; on top of that, the additional electric loads can bring along a new amount of flexibility if the load profile is flexible.

The conceptual scheme is represented in Figure 4, where the primary goal(s) of any initiative should be explicated and quantified.

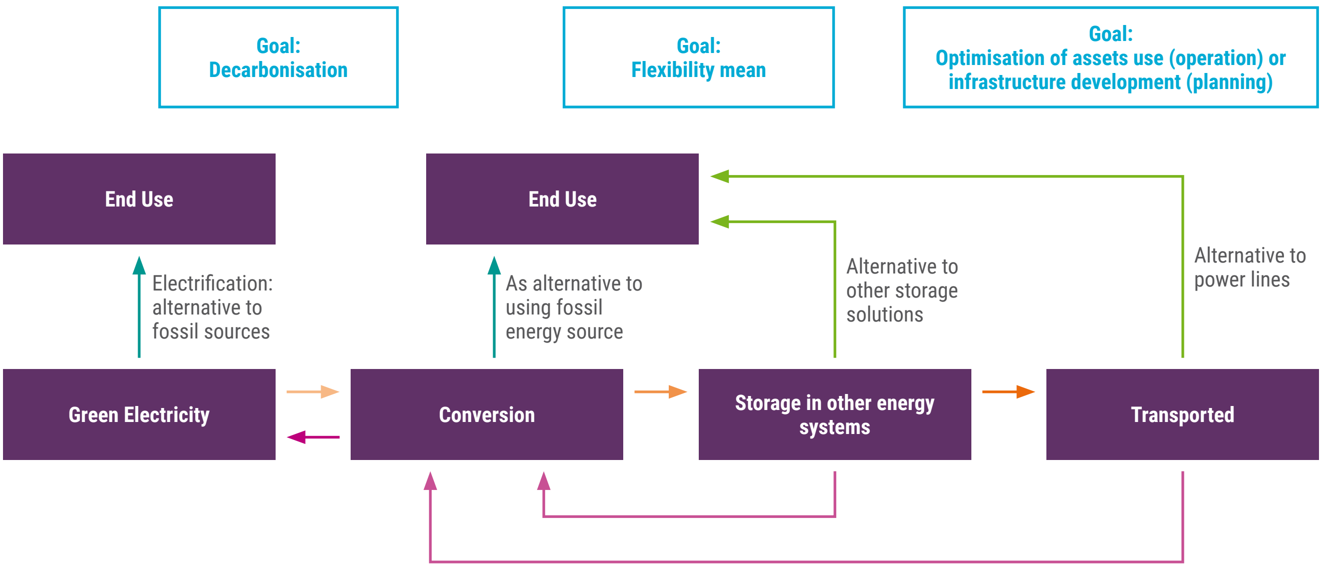


Figure 4 – Conceptual scheme of Smart Sector Integration initiatives

Impact of Smart Sector Integration on TYNDP today

Influence on the TYNDP2020 scenarios

ENTSO-E and ENTSOG have assessed the integration of **P2G facilities in their scenarios** (see Figure 5) by developing methodologies for their quantification, distribution and optimisation. For instance, in **National Trends** the economic viability of Power to Gas facilities is quantified by calculating the minimum full load hours for the facility to be economic viable in a country. The actual P2G production can vary depending on other factors, such as the distance of the RES facilities to the grid and the local excess electricity duration curve

For the top-down scenarios, the quantification of the production of **synthetic hydrogen**, methane and liquid via P2G and P2L was extended to a two-step approach for the top-down scenarios. In a first step, curtailed electricity from the electricity market model is considered as source of renewable electricity to produce renewable gases (hydrogen, methane and liquids). In a second step, additional renewable electricity production is assumed and modelled to meet the demand for renewable gases. This is done via a dedicated model, which quantifies the needed RES, P2G and P2L capacities for the purpose of supplying synthetic gas.

Distributed Energy scenario has a significantly higher demand for EU produced hydrogen, synthetic methane and liquids than **Global Ambition** in 2030 and 2040. The *Distributed Energy* storyline assumes a reduction by 70 % of gas imports by 2050 (from 3,700 TWh in 2020 down to 1,050 TWh in 2050) combined with the decarbonisation of the gas supply. It also assumes a quasi-phase-out of fossil oil by 2050 replaced by European biofuel and P2L.

Distributed Energy and *Global Ambition* have a specific demand for domestically produced hydrogen. In these scenarios, P2G and P2L plants are operated outside the energy markets, using dedicated renewables, but the curtailed electricity from the market is used to feed these plants. National Trends does not have a specific top down demand for hydrogen; therefore, the power-to-gas plants are built solely based on curtailed renewables.

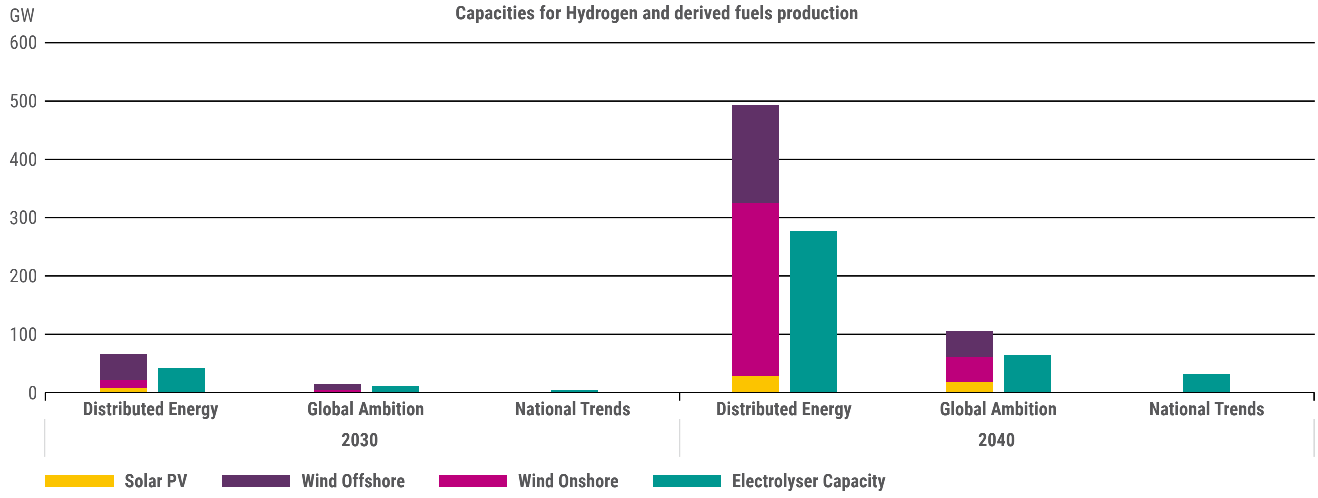
In the COP21 scenarios, the main source used for electrolysis is offshore wind, but where regional constraints exist, onshore wind and solar PV will be the alternative. The generation profiles match the capacities built. There is more RES capacity in *Distributed Energy* 2040 therefore it is natural that there is more curtailed energy in this scenario.

Next editions of the scenarios will provide the opportunity to further enhance the **modelling of P2X** by considering different configurations (e. g. P2G supplied by dedicated RES, at the interface of electricity and gas systems or at consumer facility) and analysing their impact on electricity and gas infrastructures. A detailed description of this and the P2G methodologies used for *Distributed Energy* and *Global Ambition* (*National Trends* considers the information provided by TSOs and NECPs) can be found in the **Scenario Methodology Report**.

Interlinked model and Impact on TYNDP

According to the Article 11(8) of the TEN-E Regulation ENTSO-E and ENTSOG should jointly submit to the European Commission and Agency for the Cooperation of Energy Regulators (ACER) a "[...] consistent and interlinked electricity and gas market and network model including both electricity and gas transmission infrastructure as well as storage and LNG facilities [...]".

In accordance with above mentioned Article 11 of TEN-E Regulation, the updated Interlinked Model, once approved by the European Commission, will be included in the CBA Methodologies which shall be applied for the preparation of each subsequent TYNDPs to be developed by ENTSO-E and ENTSOG. On 21 December 2016, ENTSO-E and ENTSOG have submitted the required interlinked model to the European Commission and the ACER for approval. The key element of the model submitted by ENTSO-E and ENTSOG was the joint



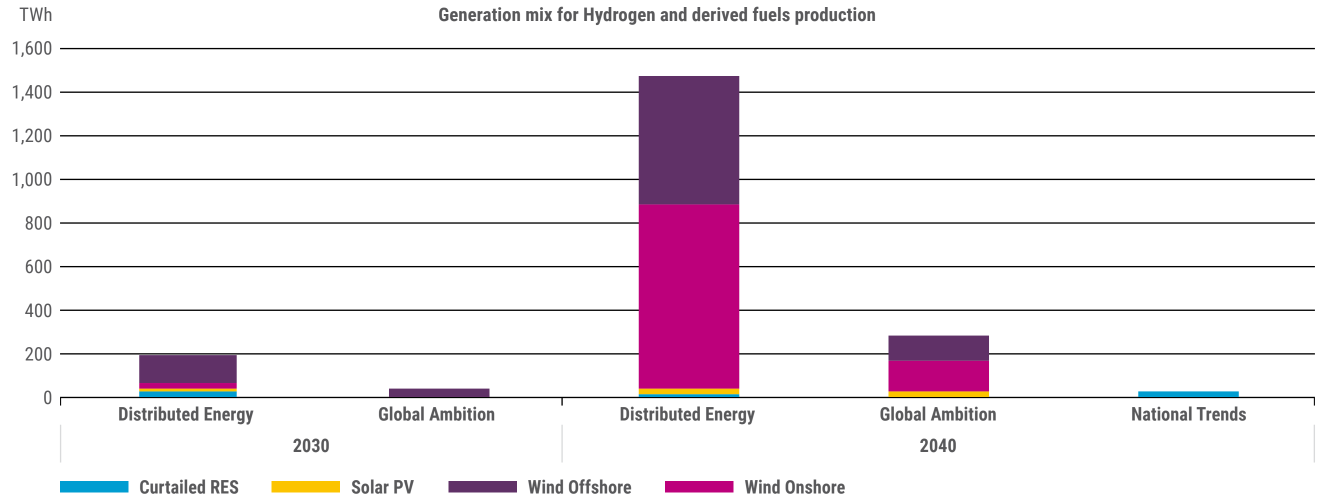


Figure 5 – Capacity and Generation mix for hydrogen and derived fuels

development of scenarios that constitute the basis for the cost-benefit analysis of gas and electricity infrastructure projects. Once the scenarios have been commonly established, the submitted model proposed that both ENTSOE and ENTSOG perform the cost-benefit analysis of infrastructure projects based on their specific tools and methodologies.

The **Interlinked model** is a clear example of how Smart Sector Integration is applied in the current TYNDP and it represents the common ground for the electricity and gas sectors and completes the CBA methodologies of ENTSO-E and ENTSOG. The Interlinked model guarantees a common perspective of the future allowing at the same time the flexibility to both sectors to go into details with regard to market and network studies.

ENTSO-E and ENTSOG commissioned a study by Artelys on the **"Investigation on the interlinkage between gas and electricity scenarios and infrastructure projects assessment"**, which was published in September 2019, whose main objective was to provide them with key insights and elements to be able to determine for which kind of projects a more thorough investigation of the impacts of interlinkages should be performed. The study considered different types of interactions between electricity and gas sectors, including interactions of the price formation process for the gas and electricity sectors, of infrastructure developments, and cross-sectoral influence of gas and electricity projects.

ENTSO-E and ENTSOG are currently working to improve their Interlinked Model in order to meet stakeholder expectations and meet new sectorial integration needs to better support decision-makers.

Impact of Smart Sector Integration on TYNDP in the future

In the future, the European economy will be decarbonised progressively. This process will require new technologies and infrastructure to enable higher penetration of green energy sources into the whole energy system, not only in the electricity sector but also in other sectors.

Therefore, Smart Sector Integration will play a key role with increasing importance and should also be addressed in the TYNDP. First modifications in the TYNDP towards holistic planning have already been done, as explained in the section before. However, the TYNDP will further evolve **to better consider Smart Sector Integration in infrastructure planning**. The following subsections give an overview of possible future developments to increase the consideration of Smart Sector Integration in the TYNDP.

Impact on TYNDP processes

The **TYNDP** process starts with the scenario building phase, which is already being done jointly with ENTSOG. In the future TYNDP, the scenario building process should develop in the direction of integrating more sectors and/or to include them considering additional factors. To ensure consistent scenarios, detailed analyses (such as CBA of competing interconnectors) made by transmission system operators or equivalent bodies of the corresponding sectors should be integrated in the process and used to adjust the scenarios.

Moreover, together with a rising number of sectors and applications that interact with the electricity system, the complexity of the TYNDP will increase. Furthermore, the number of actors that have an interest in the planning processes will rise. A collaboration of all the stakeholders in the process will lead to holistic planning as well as a more effective and efficient decarbonisation. This broader scope of stakeholders will allow to facilitate innovative solutions and new benefits due to perspectives from other sectors. Furthermore, it will provide long-term prospective elements on possible developments, trends and thus providing background information for future investment decisions.

In addition, the project assessment phase should evolve to capture the benefits of projects in different sectors. In this direction, a screening methodology should be applied to verify if the interactions between sectors are relevant enough to assess projects looking at multiple sectors or if a single sector should be considered. This methodology is similar to the screening methodology proposed by Artelys in their **Focus Study**, but its extension to more sectors might be required in the future. Finally, a methodology to capture the costs and benefits of projects in the different sectors should be applied to the projects where this type of assessment is needed.

How to assess multi sectorial projects

Introduction to the Multi-Sectorial Planning Support

A Multi-Sectorial Planning Support (MSPS) will 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 regarding current ENTSO-E and ENTSOG joint scenarios.

At a first stage, it provides several consistent scenarios/pathways for decarbonisation including an overall set of assumptions considering cost assumptions, before infrastructures and assets are planned in detail. It shall consider all types of primary energy, secondary energy, infrastructures, transformation, storage and end-use needs as well as their technologies.

Therefore, the MSPS contributes further to an efficient decision making for policy makers and actors in the European economy. The use of common, consistent and comprehensive scenarios across sectors is a key factor to maximise economic efficiency while avoiding stranded assets or infrastructure deficits.

The detailed description of the scenarios (NECPs based or based on different criteria) will be supported by a multi-sectorial economic model: Based on the "key parameters", considered as exogenous, the model should compute the optimal investment decisions, considered as driven by economical/market choices (investment on P2G capacities, batteries, interconnectors, etc.).

After defining the scenarios, detailed investigations of individual energy systems are still to be performed sector-independently, taking into account their specificities, in order to identify concrete system needs, allowing to refine the holistic view provided by the MSPS scenarios (Figure 6). This means that during the IoSN (Identification of System Needs) phase, corridors where energy is transported from one node to another node will be identified.

After this phase, project promoters submit their projects into the ENTSO-E and ENTSOG TYNDP processes and, afterwards, they enter the project assessment phases I and II.

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, aiming to identify under what conditions the project assessment should include one sector only or multiple sectors. This change on how projects are assessed is another "deliverable" of the implementation of a MSPS.

The screening process takes place after 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 6). 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 6).

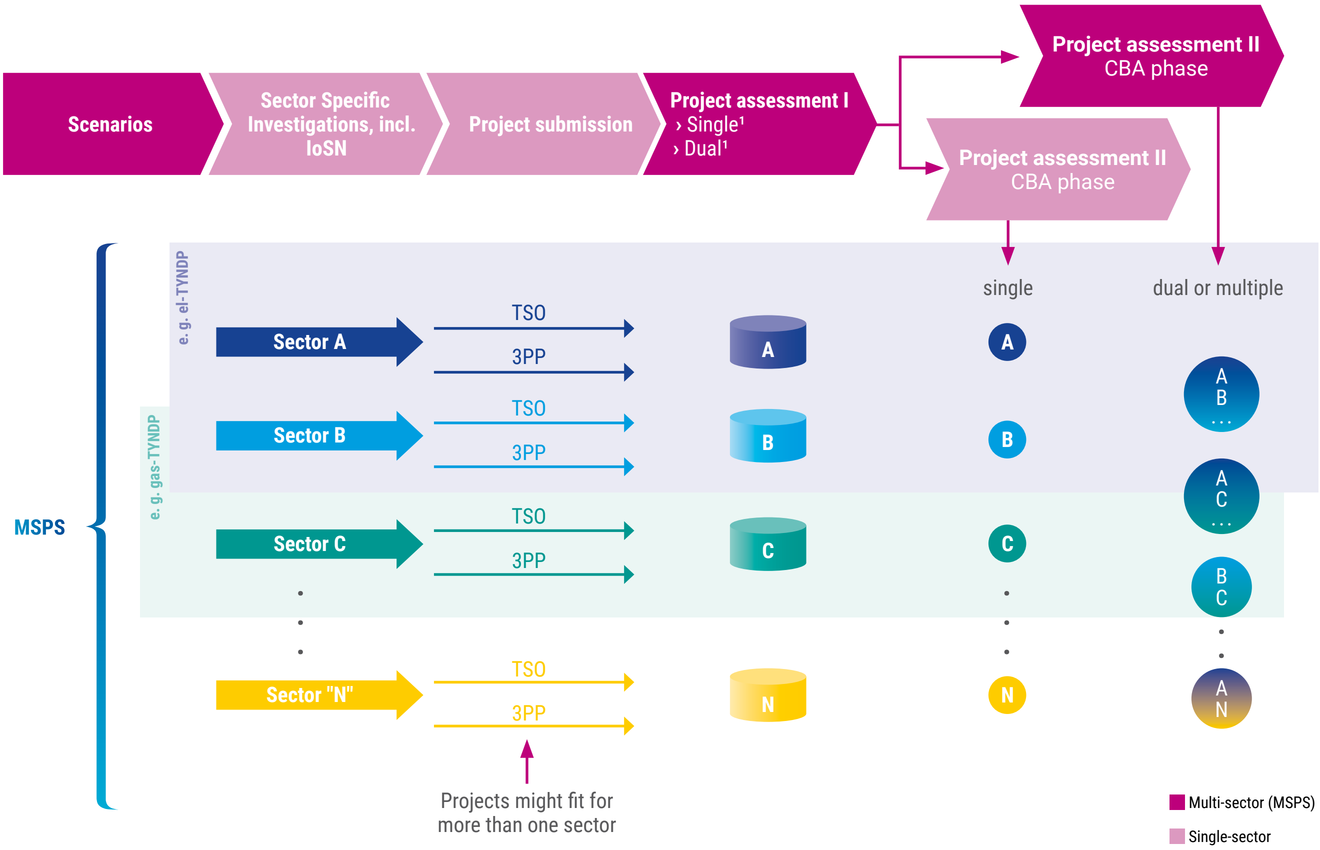


Figure 6 – Multi-sectorial planning support – various sectors under the MSPS "umbrella"

Project Assessment II – Cost Benefit Analysis

After the 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 it 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 have 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 the non-regulated sectors, there might be business decisions inside of them, like in the case of heavy industry or the chemical industry, which is not named "CBA". However, it has 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 optimal solutions at the system level, rather than to make business investment decisions inside sectors.

Design
DreiDreizehn GmbH, Berlin . www.313.de

Publication date
November 2020

ENTSO-E
Rue de Spa 8 . 1000 Brussels . Belgium