eurelectric
powering people

An EU strategy for smart sector integration

A Eurelectric response paper to European Commission questions

June 2020

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

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

We stand for

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

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

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

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

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

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

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

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Markets & Investments Committee
Electrification & Sustainability Committee

WG Power & Gas interactions
WG Electrification & Energy Efficiency

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EC Roadmap on the smart sector integration strategy

A Eurelectric response paper June 2020

KEY MESSAGES

Eurelectric recommendations for a smart sector integration strategy (paper available HERE):

- Fully align the 'Smart Sector Integration Strategy' with ambitious decarbonisation goals for 2030 and 2050, with carbon-free electrification and energy efficiency recognised as main drivers.
- Revamp energy taxation and tariffs to incentivise decarbonisation and electrification.
- Sectors which are not exposed to any carbon pricing or an insufficient carbon pricing should be addressed either by adjusting the ETS scope or through other carbon pricing measures.
- Identify best links between sectors through coordinated, cost-effective and future-proof infrastructure planning tools.
- Ensure the adequacy of European investment plans and economic recovery programmes with the decarbonisation objectives.
- Include cross-sectoral interactions and new flexibility solutions into a comprehensive European framework that remains technology open.
- Maintain leadership and market-based approach in the development of key emerging technologies coming from electricity and gas sector coupling (such as electrolytic hydrogen).

1. What would be the main features of a truly integrated energy system to enable a climate neutral future? Where do you see benefits or synergies? Where do you see the biggest energy efficiency and cost-efficiency potential through system integration?

As a preliminary point, Eurelectric underlines that carbon-free electrification and energy efficiency will make the key contributions to the decarbonisation of transport, buildings and industry. To that end, the electricity industry is committed to deliver a carbon-neutral power supply for Europe well before 2050 and is transforming the energy system to make it more and more responsive, resilient and efficient.

The strategy should fully take into account that clean and smart electrification is the cheapest and most time-ready route to decarbonise large portions in most of final energy uses. By integrating different sectors, Europe will facilitate the use of clean and carbon-neutral power supply to decarbonise efficiently transport, industry and heating & cooling. Direct electrification solutions, complemented by indirect electrification ones, will link power and other economy sectors and help to reduce final energy demand and GHG emission as it can deliver equivalent services with less energy input in most cases. Furthermore, the additional direct and indirect electricity demand from transport, heating and industry sectors could help to better match supply and demand when coupled with storage solutions, digitalisation, smart grids, and demand side response strategy. In addition, new partnerships with all the sectors of the economy are needed to efficiently reduce the carbon footprint.

Clear decarbonisation goals for 2030 and 2050 will drive joint efforts towards fighting climate change. Europe needs a truly integrated energy system to:

- **Unlock all the system benefits resulting from positive synergies among sectors.** The electricity industry calls for predictable, stable and market-based frameworks to ensure the necessary investments for a clean and cost-efficient transition in all sectors of the economy. To this end, Eurelectric supports the ambition of net-zero emission in the European Economy by 2050. Moreover, frictionless exchanges and interactions of energy carriers to the benefit of all connected systems and their energy customers are prerequisites for a truly integrated energy system. Therefore, in addition to the objectives set-out in the Climate Law proposals, we call for the identification of the most cost-efficient emission reduction policies, based on National Energy and Climate Plans (NECPs) as well as energy demand & supply forecasts aligned with the objectives of the Paris Agreement. Moving forward, a comprehensive smart sector and energy system integration would urge the stakeholders to move away from a silo thinking. In addition to physically connecting the different sectors, the strategy should improve cooperation and dialogue among sectors and review the energy governance.

- **Foster energy efficiency.** A successful and cost-effective transition relies on using energy carriers in a more efficient way. The EU should maintain a high energy efficiency ambition to reduce the carbon footprint in all sectors by promoting reliable carbon-free technologies and by developing innovative services as well as electric solutions through the use of the most energy-efficient vector. The smart sector integration strategy is an opportunity to strengthen the energy efficiency ambition through the value chain of all sectors. Indeed, a coordinated utilisation of assets/facilities can widen the range of markets services they can provide – i.e not just within their own system but also in other systems, whether it relates to energy supply to end-users, flexibility delivery for security of supply and congestions management of networks. The biggest energy efficiency gains will be provided by electrification (especially transport, heating and industrial processes), while large cost-efficiency benefits will be achieved by maximising the use of different flexibility options, from within and outside the power system and on different time scales.

- **Carbon neutral electricity, in particular renewables, and electrification at the heart of the future energy system.** As demonstrated by the European Commission's long-term scenarios, a carbon neutral power system will be dominated by renewable energy sources (RES), which would represent more than 80% of the electricity mix by 2045, complemented by other carbon neutral sources. A smart sector integration should identify the most cost-efficient emissions reduction policies and establish clear rules regarding Power-to-X solutions (district heating, hydrogen…) in line with the Renewable Energy Directive (RED II). Different flexibility solutions (Power-to-X, demand-side response including V2G, thermal firm power generation capacity) should compete on a level-playing field.

Strong grids will be essential to support the integration of decarbonised and renewable energy carriers in all sectors of the economy[1], whether they are related to power, gas or heat. To do so, we call to identify best links between sectors through coordinated, cost-effective and future-proof infrastructure planning tools. In a more decarbonised, decentralised and digitalised energy system, closer cooperation is required among all stakeholders (especially TSOs and DSOs) to anticipate possible evolutions of the electricity, heat and gas networks, supply & demand.

In other words, through a coherent sector integration plan, the European Union can make the best use of a decarbonised energy system to reach the climate objectives.

2. What are the main barriers to energy system integration that would require to be addressed in your view?

Eurelectric has previously presented the key enablers that should support the European Green Deal. Among them, a smart sector integration will greatly contribute to reducing the carbon footprint. In addition to creating an adequate framework for cross-sectoral dialogue, the strategy promoting such a vision should remove the following barriers.

- **The European taxation framework does not ensure a level playing field for all energy carriers.**

Today, electricity is subject to heavy taxation and imposed levies while the price gap between energy carriers on end-users bills has increased. In addition, the costs unrelated to the energy supply (e.g. energy policy-costs including support for reaching renewable targets, social policy-costs, etc.) are not equally shared and for some of them (e.g. social policy costs), born basically by electricity consumers alone. Therefore**, taxes and levies should provide efficient and stable decarbonisation signals, be fairly set across energy carriers and be in line with their contributions to these targets**. The current lack of harmonisation of energy taxation rates at EU level creates an uneven playing field between competing energies as it does not take into account their CO2 emissions. To tackle this, the revised Energy Taxation Directive must integrate climatic performance of energy sources, at a level which is consistent with the EU climate objective for 2030 and 2050.

Moreover, **unappropriated grid tariff regulation distorts competition among energy vectors**. Distortions may exist if the structure of grids tariffs do not provide to end-users with the accurate economic signals related to the grid costs/savings they induce. In other words, distortions could appear when grid tariffs are not efficient or if there is some unlevelled playing field due to sector or technology specific measures or provisions, for instance in network tariffs (either on injunction or withdrawal) or levies which in some cases translates into a duplication of costs. To fix these distortions, a review of power and gas network tariffs and an harmonisation of energy taxation and/or additional taxes/levies should be undertaken when relevant.

[1] For more details, see our answer to question 3f.

Grid tariff structures should reflect grid cost structures in order not to distort the provision of e.g. flexibility services by the different energy carriers, while ensuring that both the benefits and the cost that their action add to the system are adequately reflected in the final prices.

- **The current infrastructure planning framework is not aligned with the 2030 and 2050 objectives.**

The electricity grid is evolving fast to transport growing shares of renewable electricity while ensuring balancing and flexibility for the entire energy system. **Consistency should be sought to ensure that infrastructure planning instruments** (such as TYNDP scenarios, future DSO network development plans) **and the CBA used for the PCIs projects are aligned with the Paris Agreement and contribute to EU energy & climate objectives**. In this regard, a revised governance for the elaboration of the TYNDP for electricity and gas should be accomplished during the review of the TEN-E Regulation. The European Commission, ACER, NRAs and Members States should ensure a close oversight of this process. It shall be made sure that ENTSOs proactively consult various stakeholders (such as market parties and DSOs) at earliest stage especially when assumptions on demand and supply are being defined. **As the energy system integration progresses, a deeper coordination of the systems operation will be required for the sake of security while avoiding any conflict of interest.** A revised TEN-E Regulation will make a decisive contribution to the Green Deal by enabling investment into new infrastructure, fitting to the decarbonisation challenge.

Moreover, long-term coordinated planning of infrastructures should therefore include sound projections for the overall energy demand (of electricity, gas and other energy carriers) that are compliant with the Paris agreement, in line with the most recent analysis and take into account the maturity of promising technologies such as power-to-gas.

- **Make the EU ETS fit for purpose.**

Sectors which are not exposed to any carbon pricing (e.g. maritime transport) or an insufficient carbon pricing (e.g. individual heating, in some Member States) should be addressed either by adjusting the ETS scope or through other carbon pricing measures, using the most efficient tool for each sector. Therefore, the European Commission needs to consider adjusting the burden-sharing between ETS and non-ETS sectors or the mitigation speed in the non-ETS sectors.

- **Lack of ambitious international climate protection targets.**

The path to reaching climate neutrality in 2050 requires a toolbox of policy solutions, notably in view of the risks for carbon leakage. The power sector itself is already exposed to fossil fuel-based electricity imports along the EU external borders to Bulgaria, Croatia, Estonia, Finland, Greece, Latvia, Lithuania, Poland and Spain. Other producers covered by the EU ETS, as well as ones outside its scope, could be negatively impacted in terms of competitiveness. The competitiveness of the European industry will continue to need to be considered, and a debate over carbon border adjustment will be required also in line with EU trade policy objectives. The revenue from the mechanism should be steered towards low carbon activities in the EU countries. In this context, Eurelectric believes that – based on the Green Deal – the EU should push for ambitious international climate protection targets in addition to promoting mechanisms which could make European industries more carbon efficient but at the same time encourage third countries to become more climate friendly. In addition, the EU should be aware that third countries with more stringent carbon pricing should be able to introduce similar adjustments under the same principles unless the EU matches their climate ambition

3a. More specifically: How could electricity drive increased decarbonisation in other sectors? In which other sectors do you see a key role for electricity use? What role should electrification play in the integrated energy system?

The achievement of European Union climate targets will require the decarbonisation of all sectors, with direct electrification as the key element of the future energy sector. The EU has committed to at least 40% emissions reduction from 1990 level by 2030[2] and has further set an aspiration of carbon neutrality on by 2050. The European Commission long-term strategy[3] issued in November 2018 presents different pathways for achieving a climate-neutral Europe based of a radical transformation within all sectors. By mid-century, CO2 emissions will be limited to few applications which are very difficult to decarbonise. **The electricity system will play a central role in this effort, as the main and most efficient driver towards a decarbonised economy.** However, increasing interactions with energy end-users and other sectors will be key to achieve the common objective of climate-neutrality, as electricity cannot achieve an ambitious decarbonisation level in 2050 on its own. The long-term strategy and the European Green Deal are therefore the first steps of a shift from our current highly centralised and mainly fossil fuel-based energy system to a more decentralised, efficient and carbon-neutral energy system.

The power sector has a well-established position on the role of electricity to support the decarbonisation of several sectors in line with the results of its "Decarbonisation pathways" study released in 2018.[4] The study presents three decarbonisation scenarios of the power sector for 2050 - 80%, 90%, 95% emissions reduction compared to 1990 levels - based on the electrification of key economic sectors: buildings, transport, and industrial processes. **The findings feature high levels of direct electrification that grow from 38% to 60% with an increasing decarbonisation ambition**. Electricity will still have a substantial role to play in decarbonising those energy processes that cannot be electrified directly, mainly high-heat demand industries and heavy lift transportation, through the production of hydrogen and power-to-gas solutions. Therefore, the study foresees that hydrogen and power-to-gas would represent 6% to 14% of the final energy demand depending on the decarbonisation level**.**

Electrification, due to its cost competitiveness and high efficiency, will drive the decarbonisation of the European economy, as reflected by the various long-term forecasts. **Therefore, the smart sector integration strategy should be built assuming as its first priority the removal of barriers to direct and indirect electrification**. To allow for a cost-efficient transition in all sectors while keeping the lights on, such a system-wide shift will see a significant increase of variable generation. This will also require firm, dispatchable and flexible carbon-neutral and low-carbon capacity to ensure security of supply. To support this:

- A swift and rigorous implementation of the Clean Energy Package is a must;
- A strong EU ETS would deliver the most cost-efficient emission reductions in the sectors covered and should be the core instrument;
- Regulation should remain technology neutral, ensuring a level playing field between different energy carriers;

[2] A higher objective of GHG emission reduction level for 2030 is under discussion.
[3] European Commission, "A clean Planet for all", 2018, https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_en.pdf
[4] Eurelectric, "Decarbonisation pathways", 2018, https://cdn.eurelectric.org/media/3558/decarbonisation-pathways-all-slideslinks-29112018-h-4484BB0C.pdf

- To deliver on this ambition, we need to address the issue of permitting and public awareness with regard to the overall economic and environmental benefits arising from the deployment of clean technologies and electricity networks.

3b. What role should renewable gases play in the integrated energy system?

Reaching carbon neutrality by 2050 requires drastic changes in the way we generate, transport and consume energy. This ongoing shift is based on the massive deployment of renewable energy sources and the phasing-out of fossil fuels. The impact of this transition is significant on both electricity and gas value-chains which are interlinked but also competing with each other regarding the common decarbonisation challenge. In this context, the role of gas will profoundly evolve and should be basically determined by market forces.

1/ The shift to more variable renewables requests additional flexibility solutions.

Eurelectric clearly highlights that the transition to a carbon-neutral power system will result in important needs for system balancing and flexibility provided by multiple sources. The way flexibility is provided to the entire system will evolve over time:

- *In the short term*, Eurelectric agrees that existing conventional natural gas-fired power plants will, in some regions due to the different starting points, be needed for security of supply issues and system balancing as coal and lignite power plants close and while other solutions are not yet cost-effective. These plants will progressively run with different operating modes (e.g. fewer consecutives hours) to back-up variable intermittent RES generation when needed and to provide the firmness required for meeting the power demand even in tense situation (cf. adequacy issues).

- *In the medium to long-term*, most of this system balancing and flexibility will be provided by dispatchable renewable and other carbon-neutral technologies. A system-wide shift from dispatchable generation to renewables will require balancing (very short- term, hour-to-hour, day-to-day, weekly, monthly and seasonal) to respond to the variability of production. In a high-renewables future, this will be provided by competing sources from both within and outside the power sector. Traditional sources include conventional firm generation capacity such as hydro, nuclear and gas-fired power. In addition, we will see a much larger role played by demand side response from dispatch of new electric end-uses (e.g. electric vehicles), as well as energy storage solutions and flexible production of power-to-gas products (renewable hydrogen, synthetic methane) or power-to-liquids.

Regarding the role of fossil energy supply in particular, Eurelectric's study shows that "*fossil energy supply will be gradually phased out and represent only ~5% of total energy supply by 2045. However, gas will still account for ~15% of total installed capacity in order to secure system reliability, especially in regions that don't have access to hydro or nuclear*". Progressively, the gas-fired power plants should run on renewable gases (especially hydrogen from renewable electricity), as well as natural gas combined with CCS. The competition with other carbon-neutral sources of flexibility should increase and running hours decrease.

2/ A carbon-neutral economy does not mean switching blindly to full electrification – decarbonised molecules would be needed where they are essential.

Eurelectric highlights that the coupling of electricity & gas systems, notably through power-to-gas, is a key link in the transition to a carbon-neutral economy, needed to complement direct electrification in "harder to abate" sectors. This complementary role should be determined by considering (a) the expected future cost of decarbonised & renewable gases vis-à-vis electricity and (b) their expected availability (i.e. biomass is a limited resource; waste hierarchy; etc.).

Given the decarbonisation challenges at hand, Eurelectric is calling the EU to strive to maintain leadership in key emerging energy carriers such as sustainable hydrogen, biomethane and synthetic methane, as well as renewable and low carbon power-to-gas fuels which will be needed to decarbonise specific segments of industrial activity and heavy-duty transport where no electric alternative to fossil fuels exist. Eurelectric has however insisted that this is a complex matter. Thus, the uncertainty around future power-to-gas innovations and the expected potential for future commercial availability/maturity of biomethane, synthetic methane or renewable/low carbon hydrogen must be acknowledged. For instance, the Hybrit project aims at replacing coking coal, traditionally needed for iron ore-based steel making, with fossil-free hydrogen. The EU-funded H2FUTURE project is aiming at generating green hydrogen from renewable electricity to decarbonise steel production and provide ancillary services to the grid.

3c. What measures should be taken to promote decarbonised gases? What role should hydrogen play and how its development and deployment could be supported by the EU?

The development of a regulatory framework that establishes a real level playing field for all carbon-free technologies in a well-functioning integrated energy market should be at the core of the smart sector integration strategy. It should covers a wide range of aspects such as:

- **The classification of decarbonised and renewables gases.** Power-to-gas technologies can produce gaseous fuels with limited greenhouse gas emissions. Electrolytic hydrogen and synthetic methane, as well as other type of renewable (biogas, biomethane) or decarbonised gases, require clear, relevant and simple definitions, to enable all stakeholders to handle the same tools and to speak a common language (see our paper HERE). To this goal, a classification of these gases should be established by the European Commission in a clear and consistent manner. The main criteria of this classification should be the emissions of the gaseous products over its whole lifecycle - i.e. starting with the production processes and until the delivery of the gas to the end- consumer's entry point. Eurelectric also acknowledges that the distinction between renewable and decarbonised gases should not be disregarded.

- **The role of hydrogen.** The main "sector coupling" product is hydrogen produced via electrolysers (the most advanced and available power-to-gas technology). Different types of hydrogen will have to compete on the basis of costs, which heavily depend on the cost of electricity for electrolysers and the costs of natural gas and CO2 storage for SMR and CCS. This hydrogen can be stored, either as hydrogen molecule or converted into synthetic methane, and provide the necessary flexibility to the energy system or/and be used by sectors that can't be directly electrified. In a carbon neutral future, the role for hydrogen produced from decarbonised electricity, and more broadly renewable and low-carbon gases, will be determined by their competitiveness (a) vis-à-vis carbon free and renewable electricity in terms of bulk energy supply in sectors where both energy carriers are technically feasible and, (b) vis-à-vis DSR, stationary batteries, hydro pumped storage, interconnections, etc. in terms of the provision of flexibility.

  As a first step, it is important to undertake additional work on a clear regulatory framework and market design for hydrogen. This will provide clarity on the role of hydrogen, the cost to produce it and identify the most efficient way to transport it.

- **Electricity and gas grids tariffs and the use of network tariffs** (see question 2).

- **Ensure that all energy carriers internalise the cost due to their carbon footprint** – see our position mentioned in question 2 regarding Energy taxation, ETS and carbon Border adjustments.

- **Power-to-Gas technologies ownership.** In the short and medium term, the energy market will not deliver large scale power-to-gas technologies because they are not mature yet. Therefore, Eurelectric proposed a two-steps approach.

  First, public funding (either European or national) for financially supporting the scale-up of renewable and low carbon hydrogen and R&D for synthetic methane generation should be envisaged, in order to enable business cases for investors. Those investors will be primarily technology providers, and other commercial entities. It should be assessed whether such support mechanism should be based exclusively on investment grants/aid to facilitate development or should include mechanism to cover operation costs for the duration of the trial. Second, once the technology is mature and enables business cases, power-to-gas plants should be developed, owned and operated by non-regulated entities and not by TSOs nor by DSOs.

  Alike gas-fired power plants, power-to-gas plants are facilities consisting in converting an energy carrier to another one. As power generation is considered - without any controversy - as a contestable activity which cannot be carried out by regulated entities, we believe the same should apply for gas production from power-to-gas plants.

- **Removal of regulatory barriers** related to the operation of the gas system (e.g. clarifying quality standards). Considering the diversity of local circumstances (e.g. renewable and low-carbon gas availability), an EU-wide approach might not be efficient, although the internal natural gas market should be preserved at least in the mid-term. In addition, the regulatory framework for hydrogen should be developed for the sake of transparency and predictability.

In any case, the level playing field among all energy carriers should be primarily driven by CO2 abatement cost, whether it relates to renewables or decarbonised gases. Moreover, it should not be alter by distorted/non cost-reflective grid tariffs design or specific tax rebates.

3d. How could circular economy and the use of waste heat and other waste resources play a greater role in the integrated energy system? What concrete actions would you suggest to achieve this?

In the light of the Directive, renewables gases are by definition a limited energy sources, which must be used in the most efficient manner possible – i.e hard-to-abate sectors.

Financial incentives towards enabling excess heat and waste resources introduction into the district heating networks should be established. If coupled with lowering the medium temperature and combining district heating with heat pumps, significant reduction in energy and fuels consumption may be achieved. Moreover, waste and biomass may be used to produce low-carbon liquid fuels, which can be used in aviation and other transport applications

Biomethane, as a renewable gas, can play a role in this goal, as it favours circular economy and local territories development, creating virtuous synergies between the energy and agriculture sector. It enhances Europe's energy independence and can deliver various benefits from an agricultural perspective: use of the digestate as biological fertilizer, development of cover crops increasing carbon storage in soils, reduction of water nitrate pollution and reduction of phytosanitary products usage. Biomethane is also a technology to decarbonise the transport sector, for instance, in the case of long-haul trucks and maritime transport.

However, biomethane production development should not lead to conflicts of feedstock use. In this goal, dedicated crops for the sole or exclusive purpose of biogas production, should be avoided, while agriculture waste management carried out as valuation of by-products can be envisaged.

According to the Renewable Energy Directive (recast), *"when developing support schemes for renewable sources of energy, Member States should consider the available sustainable supply of biomass and take due account of the principles of the circular economy and of the waste hierarchy established in Directive 2008/98/EC of the European Parliament and of the Council in order to avoid unnecessary distortions of raw materials markets. Waste prevention and recycling of waste should be the priority option. Member States should avoid creating support schemes which would be counter to targets on treatment of waste and which would lead to the inefficient use of recyclable waste".*

In the light of the Directive, biomass must therefore be used in the most efficient manner possible, i.e. in hard-to-abate or hard-to-electrify sectors.

3e. How can energy markets contribute to a more integrated energy system?

First of all, **in the context of the COVID-19 crisis, Eurelectric calls to ensure the adequacy of European investment plans and economic recovery programmes with the decarbonisation objectives**. Therefore, they should be based on sustainable & green growth while, at the same time, support and accelerate electrification & smart sector integration by targeting investment in critical technologies – RES, digitalisation, EV charging infrastructure, storage, heat pumps including industrial ones for electrification of district heating systems, electric distribution grids. In addition to this, further integration of energy markets should be ensure by the regulatory framework.

Europe needs to maintain leadership and market-based approach in the development of key emerging technologies coming from the energy system. This can be done by developing market-based economic signals for all the services provided outside natural monopolies by market parties in competition. The lack of such signals should not justify:

- using an indulgent / loose definition for infrastructures that includes assets / facilities corresponding to regulated activities (e.g. G2P or P2G); and/or
- relaxing the application of the unbundling principle.

In this manner, energy markets can contribute to disclosing the actual efficient mix of energy carriers. As the energy system integration progresses, a deeper coordination of the systems operation will be required for the sake of security.

Moreover, electricity and gas sector coupling (such as electrolytic hydrogen) can be consolidated through a clear classification of decarbonised & renewable gases and an updated gas market design suited for cost-effective decarbonisation. For instance, power-to-gas plants, alike gas-fired power plants, are facilities converting an energy carrier to another one which should not be carried out by regulated entities.

3f. How can cost-efficient use and development of energy infrastructure and digitalisation enable an integration of the energy system?

The energy transition will encompass very significant investments in carbon neutral power generation, industrial and energy efficiency solutions, digitalisation, various flexibility enablers (such as storage, electro-mobility, demand-side management), negative emission technologies, low, medium and high voltage networks as well as the entire spectrum of smart grid solutions. **The decarbonisation of the power sector by 2045 will in itself require at least 100 billion EUR/year of investments in generation and storage.** In addition, between 60 and 110 billion EUR/year should be further invested into transmission and

distribution systems. A well-connected European-wide electricity network is one cornerstone of a decarbonised electricity system and will help integrate an ever increasing share of renewable electricity.

The current decentralisation, electrification and digitalisation trends are transforming the power grid, trickling potential effects to the wider European energy system. Threats stemming from cyber-attacks or natural disasters are also increasing as systems and networks, even local, are becoming more interconnected across the EU. In the light of changing infrastructure and system security needs, a revised TEN-E regulation should take a wider system approach and help to address the challenges faced by the distribution grid as well as reflect the role of distribution system operators (DSOs) in facilitating this transition and further contributing to the European Union's objectives.

Eurelectric calls to **ensure that only electricity and gas projects contributing to a carbon neutral economy will be eligible as projects of common interest and prioritise direct electrification.** Projects fostering electrification and direct use of electricity supplied from renewable and low carbon sources should be the preferred option as it is the key means of decarbonisation. A revised TEN-E regulation should give priority to integration of renewable energy and system flexibility projects while fostering interconnection and cross-border exchanges.

In a high renewable future**, balancing and flexibility options from both within and outside the power sector will compete**. The required flexibility will primarily be provided by the electricity system itself but other options, such as energy storage or power-to-gas (e.g. Hydrogen), will also play a role. However, the uncertainty around future power-to-gas innovation and the expected potential for future commercial availability/maturity must be acknowledged. The transformation of an infrastructure fit for renewable and decarbonised gases should be mainly based on the repurposing of the existing network which would not only avoid stranded investments but also ensure a cost-efficient transition. However, the construction of new infrastructure could become necessary in specific places to successfully build-up a grid for renewable and decarbonised gases, as long as it contributes to a cost-effective and future-proof decarbonisation pathway. In any case, possible new gas infrastructures or network upgrades should undergo a sound cost-benefit analysis in order to avoid stranded costs. Extensive retrofitting of the existing gas infrastructure to allow the blending of hydrogen into gas grid should be approached with caution as well. The increasing importance of potential substitutability and synergies between the electricity and gas infrastructures should be considered in order to provide additional efficiency and flexibility solutions for the entire energy system and successfully decarbonise all segments of the European economy. This is why the effective coordination of the planning and operation of infrastructure of the different energy carriers becomes key. Further, the inclusion of a sustainability indicator in monitoring of gas markets by ACER would help to guide decisions to prioritise solutions towards reducing the use of unabated fossil gas in line with EU decarbonisation commitments.

Finally, **the smart sector integration should identify and develop synergies with other sectors, such as transport, digital, heating, cooling and industry**. Together with the revised TEN-E, the sector integration strategy should promote a more transversal approach between sectors. For instance, replicable projects such as cross-border LV/MV grids connecting renewables to EV charging infrastructure on dedicated thematic corridors showing a clear cross-border impact, not necessarily involving two or more Member States with a common border (e.g. with beneficial implications or synergies for more than one Member State). As a consequence, a revised TEN-E should put specific emphasis on multi sectoral synergy projects as well as Renewable Cross-Border Projects, introduced by the CEF Regulation. For instance, projects aiming at maximising the deployment and integration of offshore renewables to two or more countries could be further prioritised.

4. What policy actions and legislative measures could the Commission take to foster an integration of the energy system?

First of all, Eurelectric already published 7 recommendations for a successful Smart Sector Integration Strategy. The strategy is a unique opportunities to create long-term interactions between different policy actions at European levels:

- Powering the European Green Deal – Eurelectric's key enablers
- An ambitious 2030 Climate Target Plan – Eurelectric comments paper
- A green European recovery package – call for a EU Green Recovery to restart Europe
- A supportive Sustainable Finance / EU Taxonomy – Eurelectric view on TEG final report
- A strong EU Emissions Trading Schemes and carbon pricing – Eurelectric position paper
- A fair Carbon Border Adjustment – Eurelectric position paper
- The revision of the Energy taxation Directive– Eurelectric comments paper on the inception impact assessment
- The revision of the TEN-E Regulation – 10 Key Points for a revised Trans-European Energy (TEN-E) Regulation
- An ambitious Industrial Strategy – Eurelectric statement
- The revision of the Industrial Emissions Directive – Eurelectric comments paper of the revision of the Industrial Emission Directive
- Empowering Consumers in the energy transition - Eurelectric-Accenture Report
- Full coordination in operational and strategic plans between gas and power TSO/DSO – Eurelectric response to ENTSOs consultation on TYNDP 2020 scenario Report
- Tackle regulatory challenges for the gas sector – Eurelectric response paper to ACER Consultation 'The bridge beyond 2025'
- Network Codes – Eurelectric response paper to the consultation on Network codes and guidelines for electricity & gas.
- React to Covid-19 - Eurelectric paper on the impact of Covid-19 on the electricity value chain.

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

Economic Development

- Growth, added-value, efficiency

Environmental Leadership

- Commitment, innovation, pro-activeness

Social Responsibility

- Transparency, ethics, accountability

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