Union Française de l'Électricité

19 May 2020

UFE's input to the EU Strategy on Energy Sector Integration

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?**

A truly integrated energy system should promote the use of renewable and low-carbon energies in order to reach climate neutrality by 2050 in the most efficient way, whether from a cost or an energy perspective. To that extent, the legislative framework as well as market-based rules should be comprehensive and stable enough to enable and ultimately promote such an integrated system. For instance, UFE welcomes the European Commission's ambition to reduce by at least 50 % and up to 55 % by 2030 the EU GHG emissions as lower targets would undoubtably hinder the development of an integrated energy system approach.

UFE strongly believes that, as they allow to drastically decarbonise all sectors, **energy efficiency and electrification** must be the cornerstone of tomorrow's energy system integration approach. Indeed, whether it concerns the transport sector (which remains the main European economic sector where GHG emissions keep increasing), the building sector (especially regarding the heating and cooling systems) or the industry (especially regarding the production of industrial heats), the combination of energy efficiency and electrification (as well as renewable heat) is the best way to decarbonise. Moreover, investing in these sectors also bring the possibility to better exploit synergies and flexibilities among them. For instance, it is possible to bring more flexibility to the power system thanks to the deployment of heat pumps in buildings or the vehicle-to-grid technology.

With higher share of renewables coming into the grid (potentially up to 80 % of the electricity mix by 2045[1]) at European level, the volatility will increase. The development of storage solutions from within and outside the power system as well as other sources of flexibility (demand-side response, generation…) should go hand in hand with direct and indirect electrification that would create important synergies with RES.

In this context, transmission and distribution electricity networks will have a major role to play as key transition enablers. For instance, decarbonisation of the building and the transport

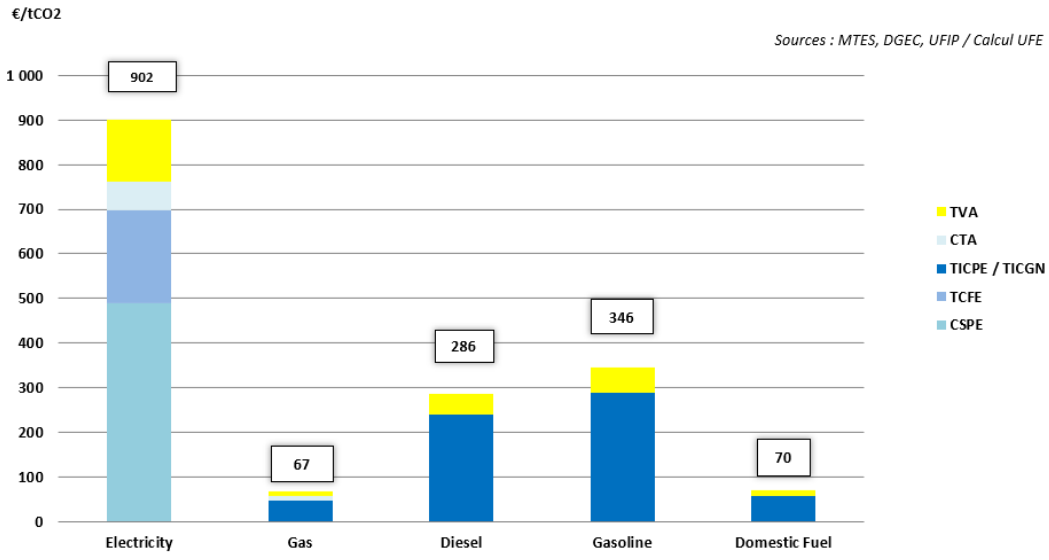
[1] https://www.eurelectric.org/news/europe-s-power-sector-can-decarbonise-by-2045/

sectors will, to a large extent, heavily rely on electrification. Consequently, networks will be essential to support these changes and bring more flexibility to the system especially thanks to smart grids. **Network infrastructures are and will be part of the range of key technological solutions to achieve the 2050 carbon neutrality target.** The interconnected electricity grid is a tool for solidarity between territories in Europe. It makes it possible to mobilise the cheapest and least polluting production at any time. It also offers opportunities to develop new, more decentralised sources of flexibility when these make it possible to optimise infrastructure investments and the safe operation of the system (e.g. reserves that can be activated at short notice, storage solutions (e.g. electric vehicles), marginal production curtailments, demand response, etc.).

The consumer, will, more than ever, be at the heart of the new energy system**. A smart sector integration should continue to promote a consumer-centric approach since consumers are the main actors of the energy system**. An integrated energy system should be at the service of the consumers and adapted to their need and uses of today and tomorrow (UFE published a **study** on that topic stressing the emergence of new needs for consumers and its outcome on buildings). For this reason, a smart sector integration should take into account the territories and bring positive externalities to end users and at the local level.

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

One of the main barriers to the integration of energy systems is the **lack of fair competition between different types of energy carriers. Decarbonised energy carriers, especially electricity, are often more taxed than fossil fuels**. Therefore, it is crucial that energy taxation reflects the CO2 content of the various energy carriers by updating the energy taxation directive. According to UFE, it is compulsory to rapidly adapt the regulatory framework to better match the climate objectives and avoid the occurrence of a different level of taxation according to the final use of the electricity (as illustrated below by the case of France) [2]:



[2] See more regarding the taxation in France at https://www.ecologique-solidaire.gouv.fr/fiscalite-des-energies

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Since the directive was adopted in 2003, it now appears to be outdated whether it is in the light of the Paris Agreement and the European long-term strategy or the ETS system. UFE is well aware that the legislative procedure in force regarding the revision of the directive require the unanimity of the Council but strongly reiterates the necessity to put an end to the inappropriate price signal that are sent to users and discourage them from choosing a low-carbon energy carriers.

In the light of the tentative agenda published by the European Commission prior to the health crisis, UFE believes that **several regulations' revisions are worth mentioning when it comes to energy system integration**.

Proper investment signals in energy infrastructures must be sent early, as they are costly and can take time to materialise. Carbon neutrality by 2050 will heavily depend on the investments that are yet to come. **The revision of the TEN-E regulation should help promoting decarbonisation at various levels** thanks to a consistent framework where all projects would be assessed on an adequate CBA methodology so as to select the most beneficial project from a European perspective.

As highlighted by the COVID-19 crisis, the **EU ETS system is still fragile to various exogenous shocks.** Since a predictable carbon price is essential for the EU ETS to foster investments in low-carbon technologies a revision is needed. The EC is currently studying various scenarios for the future EU ETS. While carbon pricing should undoubtedly apply to all sectors, the best approach (ETS extension, taxation through the revision of the ETD, etc.) could vary from one sector to another depending on its characteristics (subject to international competition or not, centralised or decentralized sources of emissions, cost of abatement, etc.). In any case, the harmonisation at European level should not lead to a "race to the bottom" and hinder the results already obtained in some Members States which have put in place carbon pricing measures for sectors currently outside the EU ETS.

Currently, the electricity and the gas regulatory frameworks are not fully aligned regarding various measures (billing information, access to flexibility providers and comparison of commercial offers including the related CO2 emissions). It is paramount that the European Commission guarantees an equal level of transparency for both electricity and gas consumers.

3. **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?**

According to a **study** conducted by Eurelectric in 2018, to become carbon neutral by 2050, it was estimated that high levels of direct electrification were needed – from 38 % to 60 % – depending on the decarbonisation target. To meet such an ambitious goal, **3 key economic sectors** that must undergo massive changes were singled out:

- **Transport**, as it currently accounts for nearly a quarter of EU CO2 emissions and is the only major economic sector where GHG emissions keep on increasing. **Electro mobility** (passenger

cars, two-wheelers, light duty vehicles, buses and trucks) is the most efficient solution to drastically reduce GHG emissions. Life-cycle analysis[3] show that electric vehicles emit significantly less CO2 than ICE vehicles. Moreover, as electric engines do not emit any particle nor noise pollution, EVs are also an answer to local pollution issues and its impact on health. It is therefore paramount to reinforce the deployment of an electric fleet in the EU within the upcoming "**strategy for sustainable and smart mobility**" of the European Commission. Thanks to smart-charging solutions, EVs provide benefits to the power system and reduce the cost of mobility for consumers[4]. If we take France as an example, the electrical system could accommodate up to 15 million EVs by 2035 without any particular difficulty according to a study conducted by UFE[5]. In the light of a study conducted by the French TSO RTE[6], it is expected that 7,4 million EVs will be on the road by 2030, (which nearly represents a fifth of the French fleet) creating no issue to absorb the growing demand of electricity. Moreover, regarding the potential impact during peak demand (e.g at night during winter), the study stresses that the ability to absorb the arrival of a massive fleet of EVs is guaranteed as long as basic steering solutions such as peak / off-peak periods are in place. In its worst-case scenario without smart charging, RTE estimated that: since the overall impact of EVs on peak demand could only oscillate up to 8 GW, it would **enhance the value of carbon-free electricity and decentralised energy allowing to be in line with the carbon neutrality objective**. The electricity system is ready and at full capacity to integrate the important deployment of EVs in the next decade since planned investments would make it possible to increase this capacity. A report on the integration of electromobility into the electricity grids[7] concluded that the uptake of e-mobility is not the dominant factor for the development of the electricity distribution network by 2030 in France. Thus, even if distribution system operators need to invest in the network to keep adapting it more to electromobility, they have already anticipated and planned these investments. Overall, managing the charging of EVs will also help reducing both the costs and the delay regarding electric connection. Finally, the positive impact of e-mobility on GHG emissions and pollution could be increased by supporting the location of giga-factories in Europe and in particular in France.

- **Buildings**: the transfer of use from fossil fuels to low-carbon solutions including renewable sources like urban heating networks or **electrical heat pump** installations in individual and collective housing will allow for a significant **decarbonisation** of this sector. In addition, the ability of buildings to face new changes given the expected increase of temperatures in the coming years in the European Union will be essential and the installation of cooling systems will also become increasingly relevant. In fact, district cooling networks or "individual" equipment at end users' or in building will have to swiftly develop. Otherwise, without such equipment, a less efficient one would be used, resulting in additional emissions. Currently, both their diffusion is mainly being slowed down by the lack of suitable investments schemes for households and building owners requiring Members State to create incentives scheme in that field. Ultimately, the measures within the soon to be unveiled "**Renovation wave**" of the European Commission could back up that willingness to support energy efficiency in

[3] See for instance https://www.transportenvironment.org/news/does-electric-vehicle-emit-less-petrol-or-diesel

[4] For instance according to a study conducted by RTE, the French TSO, an EV user could save up to 1000€ (with smart-charging or 820€ without) in comparison with the use of a fossil fuel vehicle https://www.rte-france.com/sites/default/files/electromobilitee_syntheese_vf.pdf

[5] https://ufe-electricite.fr/IMG/pdf/ufe--developpement_de_l_electromobilite.pdf

[6] Enjeux du développement de l'électromobilité pour le système électrique, RTE, Mai 2019.

[7] Report on the integration of electromobility to the public electricity distribution network (November 2019)

buildings[8] as well as the empowerment of electrification and the integration of RES in buildings. Another illustration of the mitigation effect that **efficiency measures** have on peak demand is highlighted by RTE, in its Adequacy Report "*Balance of Energy Generation and Demand*"[9]. According to the TSO, the sole replacement of electric convectors by heat pumps (300.000 within 3 years) could lead to noticeable changes that would **improve the overall electricity demand by generating margins** (0.3 GW) for the peak period.

- **Industry**: decarbonising the industrial processes requires that industry reaches 50% of direct electrification by 2050. While the direct use of electricity should be prioritised for efficiency reasons, indirect electrification (i.e power-to-gas) will also play a role whether it is regarding industrial process such as steel, chemicals, cement or the production of heat beyond 400°C. Such question should be assessed in the light of the EC "***Industrial Strategy***".

➢ **What role should renewable gases play in the integrated energy system?**

Decarbonised and renewable gases will be needed to **complement direct electrification** in sectors such as aviation and maritime transport, chemicals, steel and other heavy industries that are hard or costly to abate sectors. However, as the economic rationales for such technologies remain fragile those appliances should be **carefully considered and only favoured when it is the most cost-efficient option**. **A clear definition** regarding what lies behind the terms of low-carbon and renewable gases should be established. UFE believes that categories based on colours or specific technologies should be avoided. The classification must be unequivocal and should notably take into account the fact that hydrogen must be produced from decarbonised electricity (RES, nuclear, hydro) to contribute to EU decarbonisation path. In fact, as stressed by a recent study on storage[10] published by the European Commission, in a 1.5°C scenario, 3000TWh of carbon free electricity are used to produce hydrogen by electrolysis in 2050. This very significant amount of electricity needed for H2 production would eventually come from a variety of sources (RES, hydro, nuclear, CCGTs with CCS).

When it comes to the role of renewables gases in the electricity system, it should be noted that in the medium to long-term (depending on the countries) renewable gases could indeed provide flexibility, which could be used when variable RES are not producing sufficiently to cover the electricity demand. However, it should also be underlined that from that perspective renewable gases will be in competition with other decarbonised flexibility sources (decarbonised generation, demand-side response, storage…). The regulatory framework should therefore be technology-neutral and should not favour one decarbonised flexibility source over the others.

➢ **What measures should be taken to promote decarbonised gases?**

[8] According to the European Climate Foundation, measures to improve the thermal efficiency of buildings require upfront investment but lead to significant savings down the line – up to 22% when applied with smart technologies – due to avoided investments in energy infrastructure and generation assets.

[9] Bilan prévisionnel de l'équilibre offre-demande d'électricité en France, édition 2019.

[10] https://ec.europa.eu/info/news/energy-storage-key-incorporating-renewables-eu-grid-new-study-suggests-2020-may-11_en

As stated before, making sure that oil and fossil gas are taxed in a way that really reflects their CO2 emissions is compulsory to ensure that decarbonised alternatives benefit from an effective and fair competition. In addition, the European Commission should promote the actual contribution to climate change provided by decarbonised gases taking into account eventual barriers such as market fragmentation between different types of gases with low level of liquidity. Clearly establishing that decarbonised gases would only complement direct electrification could also help to single out cases were, projects relying on decarbonised gases are more efficient and should be, after a careful evaluation, favoured.

- **What role should hydrogen play and how its development and deployment could be supported by the EU?**

Schematically, hydrogen can be used in various cases:

In the short to medium term, low-carbon hydrogen first meets a strong need to decarbonise our economy, in particular when it comes to final uses such as mobility or industry. It is therefore important to have a pragmatic approach. Hydrogen should be used as a decarbonisation vector only when it is the most efficient option from a CBA standpoint. For instance, concerning passenger cars, light-duty vehicles and, in some cases heavy-duty vehicles (buses or some industrial vehicles), battery electric vehicles already exist and are cheaper than hydrogen-powered vehicles, that are also less efficient if we take into account the production of low-carbon hydrogen. Consequently, hydrogen should only be favoured in heavy transport segments such as shipping. Incentivising renewable and low-carbon hydrogen could however be useful when it comes to replacing the current hydrogen volumes consumed by the EU industry.

Regarding the **power system**, as mentioned above, the regulatory framework should allow to disclose the true value added by the flexibility provided by hydrogen, nothing more, nothing less. **In the longer term (2050), hydrogen could meet the need of flexibility for the power grid in scenarios of massive integration of intermittent renewables.** It could indeed be useful to set-up large-scale storage solutions to reduce the risk of renewable shortages during peaks in electricity consumption according to a study conducted by RTE[11]. The EU should act as an enabler while remaining agnostic when it comes to determining what is the best flexibility source for the electricity system. It is important to have a legal basis that establishes a level playing field allowing all flexibility solutions (hydrogen, but also decarbonised generation, demand-side response, storage…) to compete on equal grounds to match the electricity system needs. However, the European Commission should not go further and should not try to incentivise the use of flexibility provided by hydrogen (or any other sources). Directly incentivising the use of hydrogen as a flexibility source would hinder the fairness of the competition in the electricity sector. Therefore, the EU should rather devote funds to R&D and other demonstrators that would ultimately allow the given technology to prove whether it is an economically viable flexibility solution.

[11] https://media.rte-france.com/rapport-hydrogene/

- **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?**

Circular economy could be implemented in the network updating plan, taking into account the retrofit of the infrastructure and its reuse (a component that is not adapted to a certain situation anymore may be used in another one).

District Heating and Cooling networks help the decarbonisation of the heating and cooling sector while delivering energy efficiency through the use of Combined Heat Power and recovery of waste heat. Thus, enhancing their development is crucial.

Finally, a consistent CO2 price signal across the heating sector to ensure a level playing field would drive the uptake of renewable heat and the decarbonisation of the entire heating and cooling sector.

- **How can energy markets contribute to a more integrated energy system?**

The market-based approach that we currently know is a good and efficient building block we can rely on, to help better integrate new technologies within the energy system. In this sense, UFE underlines that technologies linking energy systems (e.g. power-to-gas or gas-to-power) fall in the remit of market activities. The relevant principles enshrine in the Electricity directive should therefore be mirrored in the gas framework.

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

Regarding the **development of energy infrastructure**, the revision of the TEN-E regulation should help promoting decarbonisation at various levels thanks to a consistent framework where all projects would be assessed based on an adequate CBA methodology and a sustainability criteria, so as to select the most beneficial project from a European perspective.

It should also be noted that network tariffs should not be confused with support mechanisms, and should thus not be used to provide financial support to any particular type of technology (be it on the electricity or the gas network), as it would hinder the economic signals they convey and thus be detrimental to a cost-efficient deployment of energy networks.

Digitalisation of networks, in particular through an increased exchange of information and data between TSO and DSO at all time scales, will be essential for a successful integration of the energy system thanks to an optimised use of the flexibilities available to manage electricity flows on their own networks. Furthermore, digitalisation of the energy sector is a trend which deeply changes the way stakeholders interact with consumers and the way sectors interact together:

- Digitalisation and cost-efficient development of networks lead to a better decision-making process in the choice of the most effective technical solution such as (and among others) flexibility technologies.
- Digitalisation is also the main tool to coordinate networks in different sectors (thanks to smart grids). Thus, common guidelines for data from all sectors could be established for a

better integrated system and an efficient coordination. This should go hand in hand with the ability to have non-discriminatory access to data across sectors in order to enhance smart energy management of buildings, vehicle-to-grid technology (V2G), or industrial flexibility.

- Coupling transectoral data can bring benefits to consumers and enhance their active participation to the energy transition. Considering their experience of trusted third party in managing consumers' data, DSOs would have a significant role to play.

4. Are there any best practices or concrete projects for an integrated energy system you would like to highlight?

Enedis, the French DSO is already involved in several projects related to multi-energy issues:

- In the future Nice-Meridia eco-district, in order to optimise the consumption of all the energies (hot, cold and electricity), the operator in charge of the project will combine a multi-energy smart grid solution.
- As part of the Lyon Living Lab Confluence project, Enedis has teamed up with nearly 70 companies and public partners to test the smart and sustainable city of tomorrow on the scale of the district, supported in particular by self-consumption and Linky metering. The project aims to create a future neutral multi-energy data operator at the Metropolitan level.
- In addition, Enedis signed the TerriStory consortium agreement, a multi-energy data platform, which notably facilitates the development of policies or action plans to concretely act in favor of the energy transition of territories.

Here are some examples of projects where EDF is active and which aim to foster an integrated energy system:

- EU Sys Flex stands for "Pan-European system with an efficient coordinated use of flexibilities for the integration of a large share of RES." The project develops new types of services that will meet the needs of the system with more than 50% of renewable energy sources. The main project objective is to find the right blend of flexibility and system services to support secure and resilient transmission system operation.
- MAGNITUDE project aims at developing business and market mechanisms as well as supporting coordination tools to provide flexibility to the European electricity system, by increasing and optimizing synergies between electricity, gas and heat systems.
- H2SHIPS project is aiming at piloting H2 solutions and identifying the necessary conditions to introduce hydrogen as an alternative fuel for inland and maritime transport. Technological, economic and regulatory measures are tackled through this project.

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

UFE published several position papers that are closely linked with the integration of the energy system:

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To achieve climate-neutrality, the European Green Deal mush push electrification in which UFE supports the political willingness to reduce EU GHG emissions by at least 50 % and up to 55 % by 2030 alongside the adoption of various measures (regarding the ETS, the energy taxation directive, the TEN-E regulation…) to reach carbon neutrality by 2050.

Answer to the European Commission's consultation: inception impact assessment of the revision of the Energy Taxation Directive in which UFE, among others concerns, stresses the necessity to ensure that the directive correctly reflects the contribution of energy carriers to climate change.

Answer to the European Commission's consultation: inception impact assessment on the revision of the directive on the deployment of alternative fuels infrastructure (AFID) in which UFE notably highlights the importance of extending the AFID scope to all infrastructures accessible to the public and introducing smart charging for tertiary and residential areas.

Answer to the 2030 Climate Target Plan in which UFE welcomes the European Commission's ambition to speed up the GHG emission reduction by 2030 and recalls the importance of proposing scenario regarding the economic rebound to avoid the occurrence of a boom in fossil energy consumption like in 2008.

Answer to the European Commission's consultation on sustainable finance in which UFE voices its concern regarding the necessity to adopt a pragmatic approach that would acknowledge both the role of networks as well as flexible low-carbon capacity to reach the climate neutral objective in the light of the climate change and mitigation objectives.