WindEurope answer to the European Commission strategy for smart sector integration

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Renewable-based electrification is the most cost-effective approach to reach climate neutrality by 2050. The direct use of this renewable electricity whenever is available and wherever is possible, across all sectors of the economy (especially in the easy-to-abate-sectors[1]), should be prioritised. Renewable electricity should be used to produce zero-carbon gases and fuels, only where necessary, in activities which cannot reduce CO_2 emissions otherwise (e.g. the hard-to-abate sectors[2]).

Sector coupling refers to the increased integration of energy supply-side sectors with all end-use energy consuming sectors. It would be an important strategy to deliver decarbonisation and other important objectives pursued in energy policy such as security of supply and affordability. One of the major enablers of sector coupling is the conversion of power-to-gas.

After sending input via the European Commission (EC) dedicated mailbox for the Smart sector Integration Strategy, **WindEurope welcomes the opportunity to reply to the EC roadmap on Smart Sector Integration Strategy and calls for the Strategy to:**

- **Exploit the benefits and synergies of smart sector integration;**
- **Accelerate renewable-based electrification as the most cost-efficient way to decarbonise;**
- **Foster indirect electrification in the hard-to-abate sectors; and**
- **Support a cost-efficient energy infrastructure development and reinforcement.**

1. To exploit the benefits and synergies of smart sector integration

To reach net-zero emission by 2050, Europe will need a highly flexible energy system with very large shares of wind and solar energy. **This flexibility can stem from smart electrification of energy uses and sector coupling including for the hard-to-abate sectors**. These would enable the demand response and storage required to match renewables generation profile across different timeframes. Electrification and sector coupling would also help to minimise curtailment of valuable renewable energy and would enable the power system to deal with strong and fast changes of residual load.

A key feature of a truly integrated energy system to enable a climate neutral future is also energy efficiency. **We would welcome opportunities to strengthen energy efficiency ambition through the value chain in all sectors:**

- **Electrolysers** could serve as large flexible load, especially in time of high renewable generation and low power demand;
- **Renewable hydrogen (i.e. hydrogen produced with 100% renewable electricity) as feedstock for the industry** can replace carbon-based feedstock in industrial processes, especially in the energy-intensive industry, such as steel, chemicals and refineries; and
- **Renewable hydrogen as transport fuel in fuel cells** for heavy, long-distance modes of transport that are not cost-competitive to electrify via the direct use of electricity as energy carrier can also play an important role (this includes road, maritime and aviation sectors).

A renewables-based electrification would help increasing energy efficiency as the conversion losses decrease, capacity factors improve and electrical devices become smarter. Indeed, electrical devices are more efficient than fuel-based combustion, even when accounting for power transformation losses. For instance, using renewable electricity in large heat pumps or power-to-heat installations

[1] Power generation, light-duty vehicles, and most industrial processes.

[2] Heavy industry (cement, steel, and chemicals), heavy-duty road transport, aviation and shipping.

and then injecting the heat into a district heating network is a very cost-efficient option. Heat pumps have further potential for efficiency gains as the technology advances, whereas traditional gas boilers would struggle to surpass their current efficiency rates of 40-80%[3].

With regards to electromobility, battery electric vehicles have a conversion efficiency of 80-90% from tank to wheel, compared to internal combustion engines with an average efficiency of 20-30%. This allows electric vehicles (EV) to drive 3 to 4 times the distance with the same amount of energy. It also provides flexibility to the grid via the vehicle-to-grid potential. Indeed, EVs can generate their own electricity and sell demand response services back to the power grid.

2. To accelerate renewable-based electrification as the most cost-efficient way to decarbonise

Europe should pursue a direct electrification using renewable electricity wherever is available and whenever is possible in the easy-to-abate sectors, as it is the most mature and cost-effective approach to reach climate neutrality:

- **Heating and cooling** could reach a 64% electrification rate by 2050[4]. Buildings would reduce their direct emissions 70% from today, mostly by replacing gas and oil by electricity.
- **Transport** could reach a 51% electrification rate by 2050. Indeed, if costs of EVs continue to decrease and are on a par with internal combustion engine vehicles by 2024 (light vehicles) and by 2027 (heavy vehicles), then half of all new sale vehicles will be EVs shortly after 2025 (for light vehicles) and shortly after 2030 (for heavy vehicles).[5]
- **Industrial processes** could reach an 86% electrification rate by 2050. Industry could reduce its CO_2 footprint by almost 90% from today[6], by a combination of electrification, energy efficiency improvements and, as a last resort, carbon capture and storage (CCS).

Yet, there are several **barriers to direct renewable-based electrification of industry, heating and transport sectors to overcome:**

- Complicated and burdensome **licencing and authorisations** of renewable energy projects;
- **Taxes, levies and tariffs in the use of electricity**: a level playing field between electricity gas and fuels is needed. There are today large differences on the approach countries tax electricity, gas and fuels. Electricity is often exposed to higher taxes than other energy carriers. The revision of the Energy Taxation Directive should consider the climate impact of different fuels and carriers;
- **Energy efficiency accounting methods** are penalising electricity vs fossil fuels. For instance, the Primary Energy Factor (PEF) for complying with the Energy Performance of Building Directive does not reflect the current power system and is not standardised among Member States (MS);
- **Lack of incentives for widespread use of heat pumps** (e.g. in industry) **and for integrating electricity into transport** (e.g. financial incentives for new EV purchase);
- **Lack of transparency and incentives for consumers**: for instance, there is a lack of information on the availability, and accessibility of charging stations. For consumers to be willing to use alternative fuels infrastructures, adequate and transparent information is needed. In the same way, a more reflective Primary Energy Factor for eco-design products and Energy Performance of Building Directive (EPBD) reporting would also be welcome;
- **Lack of a specific sub-target for electricity** under the fuel suppliers obligations of the Renewable Energy Directive (as compared to biofuels);
- The **framework for vehicle-to-grid services** is not clear yet. It is generally not possible to provide vehicle-to-grid services unless the vehicle user is recognised as an energy generator;

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[3] European Commission (2016), An EU strategy on heating and cooling. https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/1- 2016-51-EN-F1-1.PDF

[4] WindEurope (2018), Breaking New Ground. https://windeurope.org/wp-content/uploads/files/about-wind/reports/WindEurope-breaking-new-ground.pdf

[5] Ibid

[6] Ibid

- Ensure a **level playing field between electricity, gases and fuels** by applying the same principles and methods for determining grid tariffs of both sectors; and
- Oil and gas are not exposed to **CO_2 pricing for transport** applications nor building heating as they both fall outside the ETS scope. Power is, putting it in an economic disadvantage.

3. To promote indirect electrification in the hard-to-abate sectors

Where direct electrification is not cost-efficient, technically viable, or sustainable, other ways to help decarbonising and reaching carbon neutrality by 2050 are needed. Indirect electrification with renewables should be used only where necessary, like in the hard-to-abate sectors of the economy:

- **Heavy industrial processes**: Substituting the fossil gas-based hydrogen with renewable hydrogen could significantly reduce CO_2 emissions in industry (e.g. chemistry, steel and refineries).
- **Heavy-duty transport**: a significant part of heavy trucks could run on hydrogen by 2050.
- **Shipping and aviation**: Direct electrification would remain marginal with less than 5% for both sectors[7].

Renewable hydrogen production can be a source of demand flexibility. It could help to smooth ramp rates and reduce intra-day variability of the wind supply. However, its cost structure will limit its deployment as demand flexibility can be enabled at a lower cost from other sources (e.g. industrial demand, battery systems). It could be more interesting to provide a source of seasonal storage.

In any case, using electricity directly is more efficient than converting it into other energy carriers. Consequently, indirect electrification, besides being intrinsically more expensive, would require more renewable energy capacities than direct electrification. While renewable hydrogen is currently expensive and its costs structure highly depend on specific projects (size, location, price of electricity), technologies for direct electrification are already available and their deployment should be accelerated to significantly curve GHG emissions already by 2030.

Barriers to indirect electrification, especially to renewable hydrogen, need to be tackled:

- **Taxonomy:** a clear and consistent European definition for renewable hydrogen is needed;
- **Energy Taxation**: the EC should review the definition of hydrogen in the revised taxation directive to tackle renewable hydrogen. Nowadays, electricity is taxed when released for consumption it is not clear whether electricity is released for consumption when supplied to storage facilities. This opens the door to double taxation of electricity that is stored and re-sold. To avoid double taxation of storage, the revised directive should state that electricity supplied to storage facilities electrolysers cannot be considered as end-consumption;
- **Scale and cost reduction for electrolysers:** Producing hydrogen with electrolysers costs roughly double than with fossil-fuels[8]. The use of electricity represents 65-80% of the operational costs of electrolysers (IEA);
- Some **infrastructure developments** could be required depending on the end use of renewable hydrogen. Renewable hydrogen used as feedstock for industry is a high value gas that is needed in pure form. Today, most of it is compressed and transported by trucks or produced onsite at the industrial location. Infrastructure for transporting renewable hydrogen from locations with high wind concentration (and grid congestions) to industrial clusters is needed; and
- **Lack of hydrogen refuelling stations** across Europe both for heavy-duty transport, public transport and passenger vehicles.

Policymakers should support the development for the commercialisation of renewables hydrogen by:

- **Ensuring a clear, consistent, and transparent European definition** for renewable hydrogen, and the different sources and routes to produce renewable hydrogen and renewable hydrogen

[7] Ibid
[8] 21 IEA, 2019. The Future of hydrogen. p.55

derivatives, is missing in the current legislations. We are calling for **electrolysed renewable hydrogen powered by 100% zero-carbon renewable electricity to be the reference baseline**;

- **Ensuring a clear distinction between Guarantees of Origins (GO) for renewable energy** (renewable electricity and renewable hydrogen) and, where applicable GOs for non-renewable energies. GOs for renewable energy play an important role to stimulate final customer's demand for renewable energy. Renewable energy GOs should only be issued for energies that are 100% renewable-based;
- **Targeting the development and upscaling of electrolyser** technologies through industrial policies for securing technology leadership and reducing the cost of renewable hydrogen production;
- **Continuing R&I on system integration** and give incentives for research, test, and demonstration, of large-scale electrolysers and off-grid connected renewables;
- **Ensure grid tariffs are cost-reflective** for power-to-gas injected to the gas network, and for the input electricity when power-to-x infrastructure provides flexibility to the energy system;
- **Resoling the pending delegated act under Article 27 of the Renewable Energy Directive**. It defines what renewable energy or renewable sources are but is not clear whether other energy carriers produced with such renewable energy or sources can be referred to as renewables when used in other sectors (e.g. when electrolysers are connected to a power grid with a varied energy mix and co-located with other sources of power generation to produce hydrogen). This is critical to provide clarity to investors and to prevent conflicting definitions across schemes; and
- **Ensuring power-to-X remains a competitive activity**: it has to be developed by market operators, in order to avoid distortions and inefficient outcomes. TSOs and DSOs should not be involved in competitive activities like power-to-gas, as they will have a potential conflict of interest when planning, granting access and operating / dispatching infrastructures.

4. To support a cost-efficient energy infrastructure development and reinforcement

As increasing the electricity share in Europe's energy mix would require larger and stronger grids, optimising the existing power grid infrastructure should be the priority together with further development of this grid. In that regard, TSOs should have greater incentives to save on OPEX by applying optimisation technologies. **The upcoming Trans-European Networks for Energy (TEN-E) Regulation revision in 2020 should also be aligned towards a renewables-based electrification and prioritise electricity infrastructure**, it should include a category on offshore hybrid wind projects combining transmission and generation elements and it should give the sustainability criteria for the selection of PCIs a more important weighting.

According to various stakeholders[9], gas demand has been systematically overestimated. So, the **extension of the gas infrastructure to accommodate and transport renewable gases and renewable hydrogen should be carefully assessed** by the EC. In some cases, it might not even be necessary to connect power-to-gas facilities to the grid. This is the case for on-site production of renewable hydrogen. It could be consumed locally on the territory of an industrial customer and thus a grid connection becomes obsolete.

Blending hydrogen with natural gas into the gas network should be approached with caution, making sure that hydrogen does not end up feeding final uses for which other more effective and efficient decarbonisation options already exist and avoiding a lock-in into technologies using gaseous fuels with limited decarbonisation potential.

Furthermore, Europe should carefully assess the need for an extensive retrofitting of the existing gas infrastructure. A large demand for renewable hydrogen is still uncertain as are locations where it will be produced and used. There is no need of such an infrastructure today. The first deployment of

[9] http://www.caneurope.org/docman/climate-energy-targets/3580-2020-can-gas-pp/file
https://www.e3g.org/docs/E3G_Trends_EU_Gas_Demand_June2015_Final_110615.pdf
http://www.foeeurope.org/sites/default/files/extractive_industries/2017/entso-g_fossil_free_europe_report_vfinal.pdf

renewable hydrogen projects should start from solutions that see generation as close as possible to the consumption point.