Energy efficiency in buildings – consultation on 'renovation wave' initiative

Hydrogen Europe welcomes the opportunity to respond to this public consultation on the renovation wave and fully supports the EU objective of reaching climate neutrality by 2050. Meeting climate neutrality in 2050 means also to reduce carbon emissions in the building and construction sector. Approximately 80% of today's buildings will still be in use in 2050 and 75% of this stock is energy inefficient. Hence, it should be clear that upgrading and renovating buildings is the main challenge taking the social aspect into account.[1]

The building sector is responsible for **40% of energy consumption** and **36% of CO2 emissions** in the European Union, most which are associated with heating, cooling and hot water use. Given the challenges decarbonising buildings and increasing efficiency, stationary fuel cells can be considered a key solution to decarbonisation of the heating and cooling and to increase efficiencies in buildings.

Renovation and insulation of the building are key to improve energy efficiency in building. However, whatever the effort to accelerate renovation, it will only do part of the work.

Similarly, electrification of heating, notably through heat pumps, can contribute to reduce energy consumption and CO2 emissions. However, this can only do a small part of the decarbonisation effort. Heat pump are only feasible in new/renovate house. More importantly, the main obstacle to electrification of heat is its seasonality and its size:

- The energy demand for heat is maximum in the winter when renewable electricity is more limited by the non-availability of solar energy. Hence heat requires an energy that is available in winter and can be stored across the year.
- The energy demand for heat is also several time bigger than the current electricity production and consumptions which means that the electricity grid is not sized to cope with this.

Today, Europe's gas grid connects Europe's industry and delivers more than 40% of heating in EU households. For the reasons mentioned above, heat will continue to need a gaseous form of energy that is decarbonised, can be stored across the year and can be transported in large quantities.

Hydrogen produced notably from excess electricity in summer and transported by an adapted gas grid can be the seasonal energy storage that can help overcome these obstacles. It is efficient and as recent studies show also the most efficient strategy to meet CO_2 mitigation targets. In the short term, producers can distribute some hydrogen by blending it into the existing gas grid without the need for major upgrades for up to 20% blending. Alternatively, the construction of new dedicated hydrogen pipelines is another option for transport and distribution.

Pure hydrogen, hydrogen blended with natural gas or other renewable gas can contribute to a massive and cost-efficient reduction of building emissions. The reduction can be further increased if these gases are used with efficient energy converters.

- Boiler manufacturers have developed devices that are capable to process i) varying hydrogen-methane blends up to 30% Volume Hydrogen, ii) "pure" hydrogen and iii) methane when initially installed and "pure" after device conversion on-site ("hydrogen-ready").

Next to these boilers, also small fuel cell micro CHP (combined heat and power) installations entered the market. The micro CHP fuel cells provide both electricity and heat to buildings. They come with two additional advantages: an improved overall efficiency and support to the electricity system stability. The later point deserves a short explanation. During the day, the peak of electricity demand and heat demand in the

[1] European Commission, 2020

residential sector are synchronised. If the heat production is electrified the two demand add up and strain the electricity grid. By contrast a fuel cells can will cogenerate electricity in peak time and relieve the electricity grid. There is no need to wait for a decarbonised gas grid to already introduce micro-CHP fuel cells.

Already today, running on natural gas with a system efficiency of 95%, micro CHPs have proven to achieve significant primary energy savings and CO2 emission reduction compared to all incumbent technologies.[2] Up to **30-50% Co2** can be reduction can be achieved.[3]

The micro-CHP fuel cells can then easily be adapted to different gas mixes (pure hydrogen, varying hydrogen-methane blends). Micro-CHP fuel cells is therefore both a short term and long-term solution.

Policy Objectives

Hydrogen Europe welcomes the Commission's efforts to implement a policy framework to create a level playing field on the pathway to decarbonisation, accounting for all benefits of Fuel cells and combined Heat and Power. Delivering a successful Green Deal is dependent to find solutions in the heat sector, especially hydrogen policy. It should prioritise the uptake of efficient H2 use in buildings, to ensure reliable integration of RES and tackle security of supply as well as promote stationary fuel cells to boost efficient H2 use for buildings. It should also enable the relevant funding programmes for the development of a market in the context of the just transition fund.

1. **Drive a diversified heating energy carrier mix by 2050**: A diversified heating energy carrier mix including decarbonised gases supports affordable and cost-optimal decarbonisation of the building stock 2050.

2. **Optimize the use of existing gas infrastructures to facilitate decarbonisation of transport, industry and buildings**: a smart mix of heating based on electricity where useful and decarbonised gases supports the decarbonisation of the energy system, reducing costs by optimizing the use of existing infrastructures.

3. **Tap the potential of innovative heating technologies in the EU Renovation Wave:** Investments to support the installation of efficient and renewable-based heating systems, equipped with digital demand response capabilities, are key enablers to decarbonise buildings. Modern heating technologies such as gas heat pump/gas hybrids, condensing boilers, micro-cogeneration and fuel cells already work with biomethane, synthetic methane and shares of hydrogen. They speed up the uptake of renewables, deliver large aggregated emission reductions and reduce energy bills. It is a no-regret for both staged and deep renovation.

4. **Prepare the integration of cleanhydrogen in the energy system:** The European Commission should synchronize decarbonisation of gas and market uptake of end-use appliances able to process hydrogen-(bio)methane blends or pure hydrogen; e.g. under ecodesign and energy labelling regulations, and stimulate the modernisation of the installed stock via scrappage schemes of old and inefficient heaters under the Renovation Wave. Synchronize policies for decarbonisation of gas and for market transformation of gas-using appliances under eco-design and energy labelling – ensuring that the majority of future installed end-use appliances are capable to process hydrogen-methane blends or pure hydrogen.

[2] http://www.pace-energy.eu/benefits/
[3] PACE Position on Green Deal, slide 15