Hydrogen Europe

Hydrogen Europe Contribution

Call for evidence for an impact assessment for 2040 EU wide target

June 2023

Feedback to the EC initial call for evidence

After a proposal for ambitious GHG emissions reduction target for 2030 and successful adoption of the "Fit for 55 package" designed to deliver on this ambition, Hydrogen Europe welcomes the European Commission initiative to define a 2040 target for EU GHG reductions, following European Climate Law (Regulation (EU) 2021/1119) Article 4(3) [1]. This is indeed necessary to define a clear GHG reduction path beyond 2030 towards the 2050 climate neutrality objective. The new target will then be translated into several policy options (different energy mix scenarios) that will help the EU fit into the 2030-2050 carbon budget. The energy sector will play a central role in this process as it represents more than 75% of total emissions, with clean hydrogen playing a major role in driving the decarbonisation of the European economy.

Hence, Hydrogen Europe, as the leading organisation representing European-based companies and stakeholders committed to moving towards a (circular) carbon-neutral economy, stands ready to contribute towards the collective effort of reaching the carbon neutrality, and supports the need for an intermediary target within the 2050 horizon. Our vision is to propel global carbon neutrality by accelerating the European hydrogen industry.

Below are our main messages concerning the current call for evidence for an impact assessment[2], which will inform the future preparation of a post-2030 policy framework:

- *The need for an ambitious target that will take us towards effective carbon neutrality by mid-century*

Climate neutrality by 2050 will require an extremely ambitious 2040 intermediary target as well as a well-designed and calibrated pathway to reach it. Thus, we believe the EU should carry out a detailed impact assessment, taking into consideration the most ambitious options for the target to adopt and its character (whether it should include carbon removals or whether a separate target should be set EU wide). For instance, the preliminary conclusions from the European Scientific Advisory Board on Climate Change[3] are worth exploring, suggesting that the EU should aim to reduce its net emissions by 90% to 95% by 2040 compared to 1990 levels. That will result in keeping the EU's greenhouse gas emissions budget (i.e., cumulative emissions) for the period 2030 to 2050 within a limit of 11-14 Gt CO2e, in line with limiting global warming to 1.5°C.

- *The need to accurately define the trajectory for the contribution of renewable and low carbon hydrogen to decarbonisation efforts of the 2040 energy system, and all relevant sectors*

Within the reduction in emissions scenario chosen for 2040, the role of clean hydrogen should be duly acknowledged as well as policy options proposed should ensure its production and distribution are efficiently promoted (both for EU based and imported hydrogen). Indeed, the hydrogen economy has been developing rapidly since 2020 and hydrogen is expected to become a key pillar of the energy transition, replacing coal, oil, and gas in a range of applications, from transport fuels to chemical

[1] Which calls on the Commission to make a legislative proposal, as appropriate, for a Union-wide 2040 climate target within 6 months of the global stock take under the Paris Agreement in November 2023.
[2] To be published in 2024
[3] Scientific advice for the determination of an EU-wide 2040 climate target and a greenhouse gas budget for 2030–2050 https://climate-advisory-board.europa.eu/reports-and-publications/scientific-advice-for-the-determination-of-an-eu-wide-2040

feedstock as well as fuel for power and heating generation. It has enormous potential as it can be used across multiple industries and applications. Hence, the European Commission's REPower EU strategy has already underscored its major role in achieving the EU's climate goals and safeguarding energy security as it has set an overall target for 20MT of renewable hydrogen by 2030. The 2040 horizon will require even bolder targets and more importantly, it will demand from Europe to meet its ambitious 2030 targets, which as of today, lack a strong financial framework to be delivered.

- *The need to foster the role of hydrogen in the power sector*

According to the Impact Assessment (IA) accompanying the EC Communication 'Stepping up Europe's 2030 climate ambition"[4], the growth of the installed electrolyser capacity is expected to accelerate significantly after 2030, reaching already between 40 and 70 GW in 2035 and between 528 and 581 GW in 2050 in the policy scenarios. Following our assessment of the IA, that means that by 2050 clean hydrogen and its derivatives will make up 20% of final energy needs[5].

The same IA points to a strong role of further electrification of the economy to achieve the increased climate target. Electrification is confirmed as a key avenue for energy system integration and thus cost-effective decarbonization. Under the 1.5°C Scenario, electricity would meet more about 50% of our energy consumption, compared to 22% in 2020. Accelerated electrification is tantamount to the process of massive integration of variable renewable energy sources. Renewable energy, not including hydroelectricity, is expected to provide between 30 and 41 percent of all power by 2040, with 1,137 GW of capacity in Europe[6]. With similar amounts of variable power, not followed by significant investment in expansion and reinforcement of power grids[7], the need for electricity storage will be even greater in 2040. While the EU projections factor in the role of hydrogen in hard-to-abate sectors, that is not the case for its function as storage and balancing solution for the power system. Hence, the new scenarios underpinning the 2040 target should adequately address this missing piece of the puzzle.

- *Addressing growing storage needs across all sectors*

Given the above-mentioned evolution of the power system (as well as growing needs in the industry and transports sector), Europe will likely require around 72.1TWh of H2 storage by 2030. As for 2050, due to the deployment of more renewable energy sources, and electrification of the system, more flexibility will be needed, which might translate into a storage needs bracket, according to preliminary estimates, comprised between 450 and 750TWh - with indicative demand for hydrogen storage of around 466TWh[8]. In this future and constantly evolving energy landscape, pumped hydro storage (PHS), lithium-ion batteries, and hydrogen are expected to be the primary technologies as they have demonstrated high efficiency, scalability, and cost-competitiveness. Hydrogen is particularly interesting as it offers storage capacity at varying time horizons (from short to long term) but it is actually the only solution available for decarbonised large-scale and seasonal storage. Hence, the need, already today, for precise modelling for hydrogen storage deployment by 2040.

This exercise would above all require modification of the PRIMES model used for the projection of the policy scenarios in general and potential storage needs calculation within them. Indeed, currently, the model used by the EU institutions to design policy scenarios is largely driven by so-called "copper

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020SC0176
[5] Based on EC's Impact assessment 2030, Covid-Mix scenario 2050. Energy demand: 615Mtoe equivale to 7,152 TWh
[6] See https://www.iea.org/data-and-statistics/charts/renewable-electricity-capacity-by-region-and-scenario-2018-2040
[7] Source: Eurelectric Power Barometer 2022
[8] See: https://www.hydrogeneurope.eu/members-intranet/cms-files/2023/06/1686824753_michael-kohl--rwe-gas-storage-west-gmbh.pdf

plate" assumption that disregards infrastructure congestions and restrictions of energy transport. It is a simplistic assumption that all components of the system are in one place that does not take into consideration modification of the power system that results from massive integration of variable renewable power. In addition, the model should be updated to reflect storage needs in energy terms (TWh) rather than in terms of capacity (volume). Only a revamp of the model will enable an adequate estimation of actual storage needs in the future electricity system in general, and the potential role that H2 can play to satisfy those needs.

We are ready to contribute to this overhaul in order to better reflect the potential clean hydrogen, can have in speeding up decarbonization efforts. Once the above elements are factored in, the 2040 target and underlying policy scenarios will provide greater visibility to all relevant stakeholders regarding the actual infrastructure for hydrogen needs (not restricted to actual pipelines but also including storage) well beyond the 2030 horizon.

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