Renewable
Hydrogen Coalition

RHC recommendations
for the Fit-for-55 package

22 June 2021

To become the first climate neutral continent by 2050, Europe needs renewable hydrogen. Renewable hydrogen is the missing link to fully decarbonise those sectors in our economy that cannot be easily or economically electrified, tapping into Europe's vast wind and solar potential to power our economy with renewable energy and leveraging technology "Made in Europe".

Electrolysis with renewable electricity is one of the key industries of the future. Building such an industry in Europe can be a true industrial success story of the European Green deal, triggering massive private investments, stimulating a green recovery, long-term competitiveness, innovation in Europe, and placing the European renewable hydrogen value chain at the core of Europe's growth and jobs strategy for the generations to come.

The future is not happening in 2050 but is created here and now. Europe currently has the technological and political lead but others are catching up fast. Supporting the rapid and large deployment of European renewable hydrogen technologies in hard-to-electrify end-use sectors must become a clear EU investment and industrial policy priority for Europe to keep its competitive edge in renewable hydrogen solutions.

Electrolysis with renewable electricity **a key industry of the future**

1

Growth potential in existing hydrogen markets

$ 20 billion growth potential a year, $ 150 billion market worth*

2

Technology made in Europe

Europe is currently the global leader in electrolyser technologies

3

Reducing electrolyser & renewable electricity costs

40-55% cost reduction for electrolysers by 2030

4

Expansion to new markets

Heavy industry, energy intensive transport notably aviation and shipping

5

Renewable hydrogen cheapest before 2030

Compared to fossil hydrogen with CCS

*existing markets of ammonia, refineries, methanol

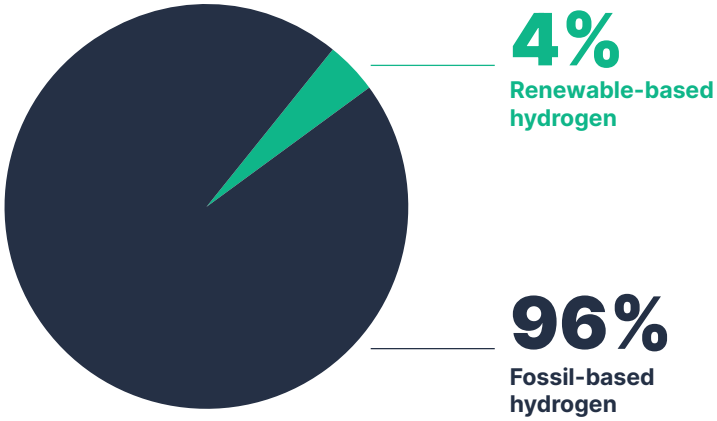
Sources: IRENA, BloombergNEF, Hydrogen Council

A clear enabling framework for renewable hydrogen is needed now. The upcoming Fit-for-55 package is a unique opportunity to do so and below are the RHC recommendations to make it a success.

Prioritising renewable hydrogen: the way forward

Prioritise the uptake of renewable hydrogen and derived e-fuels in existing hydrogen uses, hard-to-electrify sectors such as heavy industry and energy intensive transport notably aviation and shipping, where direct electrification is not technically or economically feasible. In line with the EU's energy efficiency-first principle, renewable-based electrification should also be prioritised when possible and accelerated as the most cost-efficient way to decarbonise key sectors of the economy such as heating and cooling, large portions of transport and industry.

The majority of hydrogen in Europe today comes from fossil-based hydrogen



Source: European Commission

Accelerate and massively deploy additional renewable electricity generation capacity and electrolysers across Europe, as pre-requisites for a flourishing renewable hydrogen market. This entails

- Higher EU renewable energy target, underpinned by clear support measures to ensure uptake in key end-use sectors (see below point).
- Strengthening and modernising EU electricity grids to support the further direct electrification and renewable hydrogen as key drivers to decarbonise our economy.
- Supporting simpler and faster national permitting procedures for renewable electricity generation and electrolyser installations by setting out benchmark of best practices to empower Member States. Lengthy and complex permitting procedures hamper the of

deployment renewable electricity projects which is needed to serve the demand for hydrogen. In the absence of bold actions to solve the permitting bottleneck, there will be no renewable hydrogen economy.

- Supporting electrolysers of all size in this early phase[1] to help reduce technology cost, promote a diversified approach towards renewable hydrogen production – which will mostly be decentralised and adjacent to consumption sites due to the initial lack of hydrogen transport infrastructure - and avoid slowing down the development of renewable hydrogen. Support should also help research, innovation, and demonstration in the next generation of renewable hydrogen technologies and to build the foundations of world class competitive electrolyser industry in Europe - the European Clean Hydrogen Alliance should have a key role to play in that connection. Leveraging EU funds such as the Recovery and Resilience Facility and other "Next Generation Europe" instruments, Horizon Europe and Green Deal calls should also be considered.

Need for clear EU definitions, verification and consumer disclosure

Establish a robust and comprehensive EU-wide certification system for renewable hydrogen and derived e-fuels for appropriate accounting towards the fulfilment of the EU renewable energy and decarbonisation targets. Such a system will be crucial to ensure that renewable hydrogen and derived e-fuels make a real contribution to renewables penetration and decarbonisation but also that the EU Hydrogen Strategy goals are indeed achieved. This certification system should:

- Be underpinned by an EU-wide terminology of renewable hydrogen, other renewable and non-renewable fuels clarifying that renewable hydrogen is produced via water electrolysis using renewable electricity.
- Recognise the sustainability of renewable hydrogen based on minimum GHG emissions savings compared to incumbent alternatives[2].
- Clarify the origin of CO2 in the e-fuels. The carbon used in e-fuels should come from sources that contribute to support climate neutrality, including biogenic carbon, inevitable industrial emissions and direct air capture.
- Ensure the traceability of renewable hydrogen and derived e-fuels.

In addition, and similarly to the power sector, a consumer disclosure system should also be put in place in order to increase consumers' awareness towards renewable hydrogen and e-fuels. This system would facilitate uptake by end-users and enable informed choices. This consumer disclosure system should:

- Assign Guarantees of Origin (GOs) to renewable hydrogen produced.
- In the case of e-fuels, make the origin of the carbon clear to consumers.

1 The size of the majority of electrolysers currently installed or in projects under development ranges between less than 1 MW to 50 MW. It is thus important to take this reality into consideration to ensure these projects can secure funding.
2 The RED specifies that greenhouse gas emissions savings from the use of renewable liquid and gaseous fuels of non-biological origin shall be at least 70 %.

- Apply consistently across EU legislation and end-use sectors to enable the development of a harmonised EU market for GOs of renewable hydrogen and derived e-fuels.

Finally, a reflection should be started on whether both system (i.e. for verification and for consumer disclosure) should converge at some point and how. The possibility of making this system secure and based on best available technologies (e.g. block chain) should also be explored.

Facilitate the availability of additional renewable electricity in this early phase to enable the rapid scale up of renewable hydrogen production. Electrolysers producing renewable hydrogen should rely on dedicated renewable power generation but also power from grids, to increase the load factor of electrolysers and reduce the renewable hydrogen cost. This requires guaranteeing that the electricity used is renewable through GOs and a Power Purchase Agreement (PPA) as well as that additional renewable generation capacity is built (i.e. 'additionality' principle) to scale up the production of renewable hydrogen. Yet, applying strict additionality principles too soon could represent a barrier to the early development of renewable hydrogen projects aiming to replace carbon-intensive energy carriers and meeting the EU Hydrogen Strategy goals. This is due to the fact that developing new renewable installations in Europe still faces important challenges related to permitting delays and restricted grid access. The following principles should apply for the additionality, temporal, and geographical correlation criteria for renewable hydrogen and derive e-fuels:

- **Additionality** should apply from 2025 onwards for renewable electricity generation installations on which a Final Investment Decision is taken. In this early stage, it is important that the first wave of electrolysers can find a route to the market without delay despite slow build out of renewable power plants. This will also unleash the full potential of electrolysers in delivering broader system benefits (e.g. for system balancing), enhancing Europe's energy security and resilience. As of 2025, additionality should be demonstrated through a PPA between the electrolyser(s) and (a) renewable generation plant(s)[3] and underpinned by GOs for customer disclosure purposes only. This PPA should be signed before the renewable power plant is commissioned. To reflect the longer time required to build a renewable electricity plants compared to electrolysers, such plants should have flexibility preferably for a maximum of three years to start operations after the installation producing hydrogen starts operation. In the meantime, the renewable character of hydrogen should be demonstrated through renewable electricity GOs for customer disclosure purposes only.
- **Temporal correlation** between renewable electricity and hydrogen production should be demonstrated daily. After 2025, a finer granularity could be explored to better match supply and demand and based on the evolution of the market. Stored renewable electricity used for hydrogen production should also be accommodated for.
- **Geographical correlation** should allow for electrolysers to access renewable electricity across bidding zones, also to safeguard the EU Internal Energy Market, provided that there is no structural grid congestion(s) across bidding zones when the PPA is signed. The hydrogen produced should be considered renewable for as long as the PPA lasts.

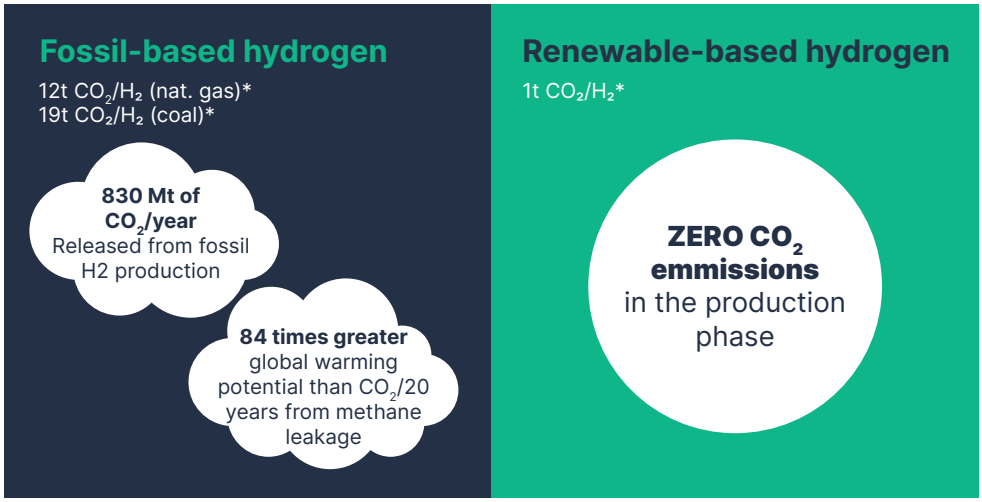
3 Such a plant should include an existing renewable electricity generation plant that is no longer subsidised but is given an extended economic case through hydrogen production, a newly deployed plant, a repowered plant. Curtailed surplus renewable electricity should also be eligible to count as additional.

A fit-for-purpose approach with streamlined support is needed now

Establish support instruments for renewable hydrogen and derived e-fuels to bridge the cost gap with fossil-based alternatives and facilitate uptake in priority end-use sectors. This will be key to help end-use sectors move towards renewable hydrogen while preserving their competitiveness.

- Streamlining support to renewable hydrogen and derived e-fuels to make them competitive with fossil-based alternatives will be key to deliver the goals of the EU Hydrogen Strategy, which clearly identifies renewable hydrogen as the most compatible and sensible solution with the Paris Agreement and climate neutrality goals.

Renewable hydrogen has the lowest-environmental impact



*Life-cycle GHG emissions

Sources: European Commission, IEA, Parkinson et.al "Levelized cost of CO^2 mitigation from hydrogen production routes, Energy & Environmental science

- Supporting investments into fossil-based hydrogen would only delay the take-off of a strong European electrolysis industry and jeopardize early global European leadership in this promising industry of the future. It is particularly important that the Renewable Energy Directive (RED) does not include support measures for low-carbon fuels (mostly non-renewable and fossil-based energy sources) to respect the scope of the directive.
- Support schemes for renewable hydrogen should be based on competitive tenders and consider both CAPEX and OPEX support. Tools to be leveraged include PPAs as well as reducing heavy taxation and levies on renewable electricity, which could be covered through Contracts for Difference or waved by the State. Carbon Contracts for Difference are also an important tool for consideration, with the caveat that they do not necessarily distinguish between renewable and non-renewable energy sources and could thus lead to carbon lock-in. Their design should thus ensure they directly support the uptake of renewable-based hydrogen in hard-to-electrify end-use sectors.

Foster pure hydrogen applications to ensure the most optimal use of this highly valuable resource and maximise its decarbonisation potential. Blending hydrogen into natural gas grids should be avoided for it leads to carbon lock-in, stranded assets and sub-optimal use of high value renewable hydrogen in sectors that have more efficient alternatives. In this connection, the EU should not support blending except on the following clear conditions:

- Only renewable hydrogen should be injected into natural gas grids to support a rapid increase in renewable hydrogen production in this early phase.
- Blending should happen only for a "transitional period".
- Feasible future alternative uses for hydrogen should be foreseen to avoid stranded assets. This calls for careful planning and assessment of demand.

In addition, repurposing existing natural gas pipelines into a pure hydrogen infrastructure should be carefully assessed and come only if confirmed through a cost-benefit analysis and sustained hydrogen demand to avoid investments in stranded assets and carbon lock-in.

Ensure a level playing field between energy carriers, notably via taxation rules. This can be done by reducing levies, taxes and preventing distortions on grid tariffs for renewable electricity. Taxes and levies should provide efficient and stable decarbonisation signals, be fairly set across energy carriers and be in line with their contributions to decarbonisation targets. Renewable energy consumers should be relieved from bearing the cost for renewable development and decarbonisation. Those costs should be transferred to the state budget.