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Position paper

Five proposals for accelerating the ramp-up of green and low-carbon hydrogen in the EU

Finally enabling the hydrogen ramp-up – Five proposals for EU policymakers

In the member states of the EU, no progress is yet being made with the ramp-up of green and low-carbon hydrogen. Both in Europe as a whole and in Germany, the political goals and strategic targets strongly diverge from market reality. This results in damage to climate protection and weakens Europe as an industrial location.

EU targets for 2030

- Consumption of green hydrogen: 20 Mt
- Electrolysis capacity: 40 GW
- Indigenous production: 10 Mt [1], imports: 10 Mt

from EU programme

- REPowerEU, 2022
- Hydrogen Strategy, 2020
- Hydrogen Strategy, 2020

Situation in the EU (2023)

- Hydrogen consumption: 7.2 Mt (99.7 % fossil hydrogen)
- Electrolysis capacity: approx. 200 MW (installed)

Fig. 1: EU targets and target achievement

Electrolysis capacity for the production of renewable (green) hydrogen is developing too slowly. Production plants for low-carbon hydrogen are not yet being built. There is also no effective European strategy for hydrogen imports. As a result, the availability of renewable and low-carbon hydrogen is very low and it is not yet competitive with conventional grey hydrogen.

On the other hand, demand is also too low. Users face concerns regarding the reliable, long-term availability of competitive renewable and low-carbon hydrogen. Investments in the production and development of hydrogen transport and storage infrastructure have not yet reached a satisfactory level. One of the main reasons is that the regulatory conditions for the ramp-up of green and low-carbon hydrogen and its integration in European energy supplies are either too restrictive or have not yet been finally clarified [1]. Elements such as too stringent requirements for the use of green power for hydrogen production or excessively narrow criteria for the assessment of the carbon footprint increase production costs and restrict the possible future availability of hydrogen [2].

To avoid further delay and allow a rapid ramp-up of green hydrogen, action needs to be taken in five areas by the EU Commission and political decision-makers at the European level (Fig. 2).

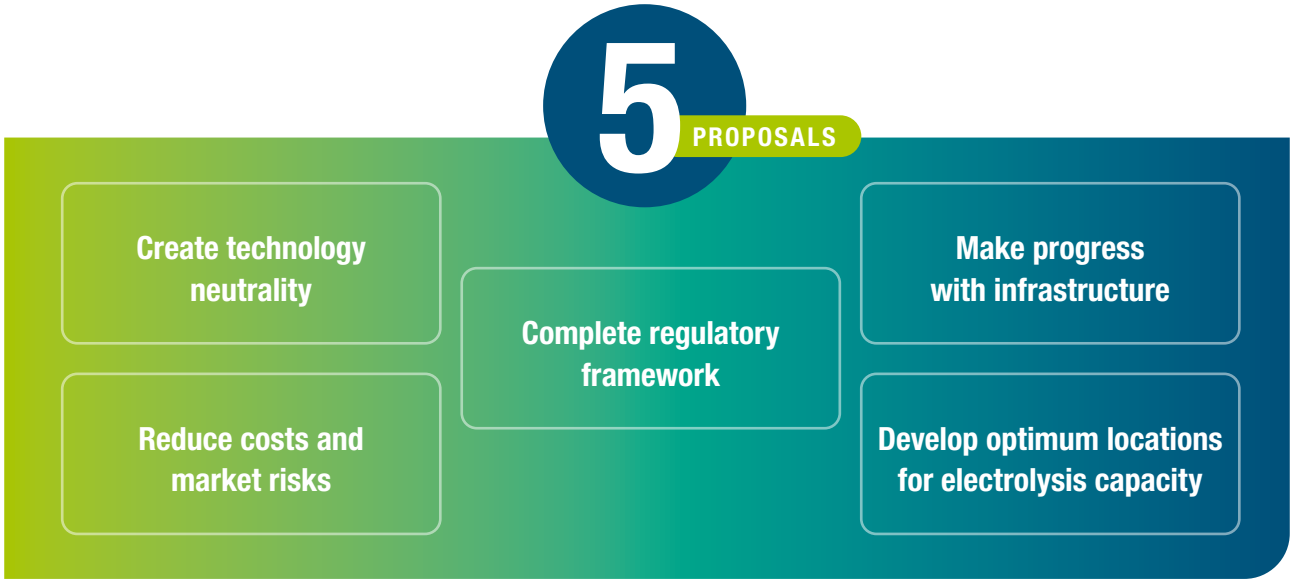

Fig. 2: Action required for hydrogen ramp-up

Create technology neutrality

01

At the European level, the regulatory framework is focused to a very large extent on the utilisation of hydrogen and derivatives produced by electrolysis. This makes the ramp-up more difficult and reduces the availability of hydrogen. In this context, the regulatory requirements of RED II/III (Renewable Energy Directive) need to be adapted and technology neutrality needs to be allowed. **The decisive factor is that equal priority should be given to the development and implementation of hydrogen production by steam reforming or pyrolysis in combination with CCS or CCU technologies** (Carbon Capture and Storage; Carbon Capture and Use).

While the requirements for green hydrogen production by electrolysis are clearly defined, there are no clear rules for the production of low-carbon hydrogen by steam reforming or pyrolysis. The delegated regulation which will be required for the assessment of greenhouse gas emissions savings through the use of low-carbon hydrogen is still in the consultation stage at the EU level. It will only be possible to achieve the volume ramp-up which is aimed for when final regulations have been adopted concerning the production and utilisation of low-carbon hydrogen.

With respect to low-carbon hydrogen, the adoption of restrictive, impracticable regulatory requirements that would impede investment in the development of production capacity must be avoided. A pragmatic, technology-neutral approach is called for. **Low-carbon hydrogen should be assessed solely on the basis of its carbon footprint.** A value of 3.38 kg CO_2 per kg H_2 has already been laid down in RED II/III. For the determination of the carbon footprint, production, transport, storage and distribution must be assessed using LCA (Life Cycle Assessment) methodology. No special requirements concerning the use of green power for production should be imposed.

The requirements for renewable hydrogen and its derivatives are defined by RED II/III and the delegated regulations EU 2023/1184 and EU 2023/1185. These regulations are very restrictive and make the production of renewable hydrogen more difficult. **These regulations need to be revised as a matter of urgency. Especially the restrictive requirements concerning additionality and the temporal and geographic correlation of hydrogen production with renewable electricity purchasing should be reviewed and relaxed.**

Make progress with infrastructure

02

Hydrogen transport and storage infrastructure is a key driver for market development. An interconnected, cross-border network (European Hydrogen Backbone) allowing the creation of a liquid market will be necessary. This should be based on demand expected in the future. The backbone must connect production sites, input terminals, storage facilities and centres of demand on a cross-border basis. The design and development of the network must be in line with the ramp-up of hydrogen and the growth of demand centres. **The EU Commission, member states and network operators as well as market players must ensure that markets and systems develop hand-in-hand with a view to avoiding overcapacity and inefficiency.** Hydrogen transport and distribution systems as well as hydrogen storage facilities must be taken into consideration.

Access to infrastructure must be transparent and non-discriminatory. In view of the fact that network capacity utilisation will initially be low, network charges for hydrogen transport must not be too high. **It will be necessary to adopt a European solution allowing a fair distribution of costs between earlier and later users of infrastructure. Infrastructure charges must be designed to ensure that they remain at a reasonable level and do not restrict the market ramp-up of hydrogen. The EU Commission will need to ensure that EU member states implement European requirements promptly and develop and introduce the necessary access models.** One example is the network charge system proposed by the Federal Network Agency for Germany, which provides for a payback account [3]. A further financing possibility is direct financial transfers through the approval of special charges. However, this arrangement must be developed in such a way that the charges do not have a detrimental impact on the

market. Both mechanisms are already possible on the basis of the EU Internal Gas Market Regulation [4] but the specific definitions are still too vague. DVGW recommends that the mechanisms should be clarified by the EU Commission or ACER as the regulatory authority responsible for both financing options. It will also be necessary to develop charging systems for future hydrogen storage facilities, terminals, crackers and other infrastructure facilities. These systems must limit the cost to the user and provide the security required for investments by infrastructure operators.

Reduce costs and market risks

03

The cost of renewable hydrogen is 3 to 4 times as high as that of hydrogen produced from fossil fuels. The production cost of renewable hydrogen is currently €6/kg, or €8/kg in the case of RFNBO (Renewable Fuels of nonbiological origin) conformity in accordance with delegated regulation EU 2023/1184. The main reasons for these cost figures are high electricity costs and the capital expenditure needed for electrolysers. Natural gas-based hydrogen costs €1.5 – 2/kg (steam reforming) or €3/kg with CCS [5].

As regards the regulatory situation, the delegated regulation needs to be revised in the near future and the provisions concerning the purchase of electricity from solar or wind power facilities under long-term contracts (Power Purchase Agreements (PPAs)) need to be considerably simplified. This could reduce electricity purchasing costs. However, further measures such as tax concessions, the reduction of network charges and an increase in green power offerings would also be needed. The approach adopted under the EU Affordable Energy Action Plan to reduce electricity costs points in the right direction.

The production of hydrogen from renewable sources will call for significant investments in production, transport and storage. Investors need security for planning and secure financing for the implementation of projects. The financing banks call for appropriate collateral.

In order to further reduce risks, long-term contracts (Supply and Purchase Agreements) between producers and users are needed. The conclusion of such contracts should be actively promoted and supported at the European level. Guaranteed offtakes under such contracts provide security for investments, making projects bankable and reducing financing costs. This also applies to the development of the transport and storage infrastructure required.

A key tool for the reduction of market risks will be the use of Carbon Contracts for Difference (CCfD), under which the state guarantees a minimum price for renewable hydrogen and pays the difference in the event that the market price is below the guaranteed price. It should be noted that this mechanism will only apply in the ramp-up phase as it will not find it possible to finance such a mechanism with the large quantities of hydrogen which are aimed for. CCfD are used in Germany. Such a tool for supporting the hydrogen ramp-up in the industrial sector should also be considered and introduced at the European level.

The European Hydrogen Bank supports the ramp-up of hydrogen at the level of producers and users. The auction mechanism and compensation between bid and offer prices provide financial incentives for the production of green hydrogen. **In future, low-carbon hydrogen should also be included in the support mechanisms of the European Hydrogen Bank.** For example, the production of hydrogen by the steam reforming of natural gas in combination with CCS would then also be supported. In the medium term, the hydrogen supply situation could be significantly improved.

Targeted investment support, whether direct or via low-interest loans or loan guarantees by European or national development banks, continues to be necessary, both for production and for transport and storage infrastructure. For support to have the optimum effect, it must be technology-neutral and give equal consideration to all hydrogen production methods. Large production capacities should also be supported with a view to realising scale effects. In addition, support processes must become faster and less bureaucratic so that the required investments can be implemented more rapidly.

The CO_2 price is the key control instrument for forging ahead with the market ramp-up of climate-friendly hydrogen across the various sectors in a market economy context. A CO_2 price that increases reliably ensures that fossil fuels and CO_2-intensive production processes will increasingly become uneconomical, without direct distortion of the market. Over the course of time, renewable hydrogen will become increasingly competitive as a result of this process.

The EU Commission should ensure that the cost of CO_2emissions rises continuously within the framework of EU emissions trading and that free-of-charge allocations are reduced over the course of time. This will be essential if the CO_2 price is to develop its full effect in steering developments and to provide sustained incentive for investments in zero-emission technologies such as hydrogen.

Develop optimum locations

04

To reach the EU target for 2030 of 10 Mt/a of green hydrogen in Europe, about. 550 TWh/a of additional renewable electricity will be needed (Basis: hydrogen production by electrolysis). It will not only be necessary to build up production capacities but also to massively expand electricity grids. The selection of sites for electrolysers, the development of the hydrogen network and the development and reinforcement of the power grid must be planned in an integrated way at the European and national level by hydrogen producers and network operators.

A key factor will be the selection of sites for electrolysers. **Electrolysis capacities should be installed in the vicinity of windy regions such as the North Sea coast in the case of Germany and the hydrogen produced should then be transferred to users via pipelines.** This approach would minimise network expansion or network overloading. Installation of electrolysers in the direct vicinity of wind farms minimises transmission losses as the power can be used directly for hydrogen production. Electrolysers installed in windy regions can be used for longer operating hours. This reduces the production cost of renewable hydrogen. **European and national hydrogen strategies should recognise and recommend the advantages of such sites.**

However, the selection of sites must be based on market economy principles and ensure that electrolysers can be operated economically in the long term.

Complete regulatory framework

05

The EU Hydrogen and Decarbonised Gas Market Package (Gas Package) sets out the legal and regulatory framework for the integration of hydrogen and other decarbonised gases in the European energy system. The Gas Package has not yet been transposed into national law in the member states [6]. Certain countries, such as Denmark and Germany, have already developed specific requirements for the construction of hydrogen networks. It will now be crucial for the member states to transpose the gas package into national law within the deadline set.

Key elements are uniform requirements for the certification of renewable hydrogen and guarantees of origin that apply throughout the EU. The European Commission should ensure that guarantees of origin and the registration of the guarantees are harmonised throughout the member states, allowing mutual recognition. In addition, the functionality of the Union Data Base (UDB) for the registration of guarantees of origin at the European level must be established in the near future. The integration of renewable hydrogen and gases in existing and new gas networks can only succeed if obstacles to the cross-border use of renewable and decarbonised gases are abolished and open, market-oriented access to hydrogen infrastructure is enabled.

DVGW Deutscher Verein des Gas- und Wasserfaches e.V. is a technical and scientific association. With its long-term expertise based on research results and practical experience from the industry, it provides support for and enables specialists and political decision-makers. The German gas supply system is one of the safest in the world and has taken a leading position in comparison with other countries for many years. Strict requirements apply along the supply chain from the source to the user. German legislators have explicitly entrusted to DVGW the task of formulating these standards. This also applies to hydrogen infrastructure. In order to maintain these high standards, DVGW supports the conversion process of natural gas infrastructure to renewable, low-carbon gases on the basis of scientific knowledge. DVGW pools the experience of its more than 13,000 members – transmission and distribution system operators, local authorities and other players in the German gas industry – and contributes its 165 years of experience in the gas industry and standardisation to transformation at the national and European level. In the EU, DVGW is actively involved in the European Committee for Standardisation (CEN) as well as the associations Marcogaz, Hydrogen Europe and Eurogas. DVGW also provides support for the research initiatives European Research Institute for Gas and Energy Innovation (ERIG) und Hydrogen Europe Research.
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Sources

[1] **Source: ACER Report European hydrogen markets 2024 – Market Monitoring Report 19 November 2024** [European hydrogen markets – 2024 Market Monitoring Report | www.acer.europa.eu], last retrieved on 12 May 2025

[2] **See also the DVGW study: Regulatorische und technische Rahmenbedingungen für den Hochlauf und den Import von Wasserstoff** (Regulatory and technical conditions for the ramp-up and import of hydrogen); [https://www.h2-marktindex.de/medien/h2mi/pdf/g202401-regulatorische-technische-rahmenbedingungen-hochlauf-h2.pdf], last retrieved on 12 May 2025

[3] **With its determination, "WANDA", the Federal Network Agency has created a regulatory framework for ensuring the financing of the core hydrogen network.** [https://www.bundesnetzagentur.de/DE/Beschlusskammern/GBK/Rahmen_Ebene1/WANDA/start.html], last retrieved on 12 May 2025.

[4] **Art. 5 of EU Gas/H_2-Internal Market Regulation (EU) 2024/1789**

[5] **Source: Eurogas; ACER Report European hydrogen markets 2024 – Market Monitoring Report 19 November 2024,** [https://www.acer.europa.eu/european-hydrogen-markets-2024-market-monitoring-report], last retrieved on 12 May 2025

[6] **The EU Hydrogen and Decarbonised Gas Market Package includes the Gas Market Regulation (EU) 2024/1788 and the Gas Directive (EU) 2024/1789, which came into force on 5 March 2024.** While the Regulation applies directly in all the member states, the Directive must be transposed into national law by 5 August 2026.

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