NATIONALER WASSERSTOFFRAT

STATEMENT 2024-06-21

Hydrogen ramp-up in danger – immediate measures urgently needed

The hydrogen ramp-up in Germany is faltering and the location is in danger of losing ground in international comparison four years after the formulation of Germany's National Hydrogen Strategy. Without effective measures, the goals set out in the National Hydrogen Strategy are at risk of being missed, despite the projects and initiatives recently launched by politicians, scientists and businesses.

This has far-reaching implications for the achievement of climate protection targets, for the attractiveness and resilience of Germany as an industrial location, for the achievement of the goals of becoming a leading provider of hydrogen technologies, and for sufficiently diversifying the procurement of hydrogen and hydrogen derivatives. There is growing uncertainty among energy-intensive companies as to whether hydrogen and its derivatives will be available in sufficient quantities and, above all, at suitable conditions in order to decarbonise their own processes and remain competitive with their own products in the EU and globally at the same time. There is a risk of value chains being relocated abroad if we do not create reliable framework conditions and a rapid development and ramp-up of the hydrogen economy now – with corresponding job losses and losses in the competitiveness of many sectors of the economy that continue to rely on gaseous energy sources. At the same time, the availability of hydrogen is a key prerequisite for achieving the climate protection targets for 2030, especially in industry, the electricity supply and in almost all other sectors.

There are many commitments to hydrogen and its derivatives as an important pillar for decarbonising our economy. However, there is a growing gap between the politically defined level of ambition at national and EU level and its practical implementation and feasibility. This gap is reflected in the difference between planned hydrogen projects and the final investment decisions, among other things. The planned hydrogen generation capacity in 2030 is over 10 GW, but investment decisions have only been made for projects totalling 0.3 GW.

Important measures have already been initiated with the creation of legally binding certification requirements for green hydrogen, the first funding projects for the transformation of the steel industry, the first tender rounds for climate protection contracts, the German Hydrogen Acceleration Act, the planning framework for the hydrogen core network and its financing model, the H2Global instrument and the European quota requirements for sustainable fuels in the aviation and shipping sectors. Nevertheless, the development of hydrogen value chains is faltering. Delays in the Important Projects of Common European Interest (IPCEI), the downscaled tenders for the use of hydrogen in the power generation plants flanked by the power plant strategy, the cancelled funding for hydrogen both in mobility applications and in the area of hydrogen filling station infrastructure play a key role here. In addition, the

demand for hydrogen and hydrogen derivatives as part of the greenhouse gas reduction quota (including in the refinery sector) has eroded – at least temporarily – due to the drop in prices for GHG quota certificates, which is apparently attributable to fraudulent activities in non-EU countries. These ambivalent signals and developments do not create confidence that politicians will support the ramp-up in the long term. There has so far been a lack of a clear business case for investments, which are urgently needed to achieve climate protection targets and secure the industrial location, in industrial applications in particular.

Specifically, the NWR recommends addressing the following points and translating them into political action in a timely manner. Care must be taken to ensure that upcoming elections at EU and national level do not become a stumbling block to the necessary legislative activities for the mandatory ramp-up of the hydrogen economy and a functioning hydrogen market.

RAPID RAMP-UP OF THE AVAILABILITY OF CLIMATE-NEUTRAL HYDROGEN AND ITS DERIVATIVES

The potential demand for hydrogen and its derivatives is still foreseeable at 94–125 TWh in 2030 and 620–1,288 TWh in 2045, as the updated demand estimates of the NWR show.[1] Climate-neutral hydrogen and its derivatives are indispensable for achieving the climate targets.

The development of the hydrogen supply, logistics and value chains requires that the players at the various stages invest in production, transport, storage and application technologies with confidence in attaining the common goal. There is a considerable problem regarding coordination in view of the competitive situation and the climate-related time pressure, as the development and ramp-up must be synchronised and coordinated in parallel. One of the main hurdles is that the price difference between the supply side (what has to be achieved in the long term to trigger a final decision on investing) and that the willingness and ability to pay on the demand side is too great. Solution instruments, although available, are not backed by sufficient funds to enable a continuous ramp-up to a liquid hydrogen market. There is a lack of a clear signal from politicians to industry that the hydrogen ramp-up is viewed and addressed as a challenge for all and a priority. What is needed here are long-term and reliable framework conditions and incentives that underpin the prospect of a growing demand curve and increasing supply. The cost gap for hydrogen and its derivatives in competition with today's fossil fuels cannot be closed without flanking support measures from the public sector and/or the corresponding obligations via the fuel markets as well as state guarantees/securities. These instruments are key to balancing the different risk and profitability expectations as well as the financing conditions of hydrogen producers and consumers.

At present, climate-neutral hydrogen is still significantly more expensive than fossil alternatives, which makes it difficult for producers and customers to conclude long-term binding purchase contracts. However, the latter are a basic prerequisite for the financial viability of projects and acceptance on the part of banks and investors. Instruments do exist to close this cost gap, such as climate protection contracts and auctions organised by the EHB or H2Global; however, these mechanisms are far from being equipped to achieve the necessary volume effects. There is also a lack of strategic interlinking of funding instruments on the supply and demand side, which is urgently needed in times of scarce resources. In addition to closing the fundamental cost gap, it is important to create suitable framework conditions for

[1] NWR whitepaper 'Update for 2024: Greenhouse gas savings and the associated hydrogen demand in Germany' from 3 May 2024.

midstreamers, i.e., companies that commercially link supply and demand.[2] This is the only way to minimize the risks involved in performing this important function for the hydrogen ramp-up and to gradually establish a liquid hydrogen market.

Another challenge for the market ramp-up is the fact that the regulatory framework for specifying all relevant hydrogen and power-to-X routes has still not been comprehensively adopted. Despite the complexity of the regulations already adopted due to various EU law requirements, there are still important gaps to be closed. Otherwise, intelligent and flexible business models will not be feasible and a rapid market ramp-up will be difficult to implement. Examples include the lack of definition and regulation of low-carbon hydrogen and mass balancing, for example, ISCC+[3]. The NWR recommends that the provisions of Art. 8(5) of the EU Gas Directive be applied pragmatically in the current drafting of the EU Commission for the specification of the requirements for low-carbon hydrogen in a Delegated Act in order to ensure the prospective availability of sufficient hydrogen and the necessary phasing-in. The NWR sees the conflict between the very demanding certification criteria for renewable hydrogen and its derivatives (Delegated Acts 1184 and 1185) and the uncertainties arising for the market if these regulations were to be adapted in the light of current practical experience. It strongly encourages the examination of options for adapting these regulations accordingly, prioritising the avoidance of uncertainty in the market and compliance with the general requirements of RED III. It is important to design pragmatic and internationally compatible certification systems based on sustainability and proof of origin in order to establish a liquid hydrogen market. Small-scale, overly complex and, above all, nationally orientated certification should be avoided, as was the case with biogas/biomethane, for example. The Union Database introduced at EU level should be the central instrument that views the pan-European transport system as a mass balancing system and thus enables trade between as many suppliers and consumers as possible.

The complexity and intricacy of the regulatory environment is not easy to penetrate for companies along the value chain. This is a barrier to market entry, particularly for small and medium-sized companies, and restricts international connectivity. Overly restrictive regulation narrows the solution space in the ramp-up phase and has a prohibitive effect on urgently needed hydrogen projects, especially at the beginning of the developing hydrogen market. The availability of electrolysers, including the resources required for their construction, is of the utmost importance for the domestic production of renewable hydrogen. Here it is important to underpin the targets of the National Hydrogen Strategy regarding installed electrolysis capacity of 10 GW by 2030 with sufficient measures to enable the target to be achieved. This also includes the exemption from electricity grid utilisation fees for electrolysers going into operation after 2029, which should be linked to measurable criteria for grid and system efficiency. It is also necessary to speed up authorisation procedures for all stages of the value chain.

Political action is also required to create acceptance and suitable framework conditions in order to utilise the domestic production potential for hydrogen and its derivatives. In addition, part of the hydrogen requirements (50–70 per cent)[4] must be covered by imports. The NWR has already pointed out the importance of an import strategy for communication in the national and international arena in a separate

[2] NWR statement on 'Hydrogen supply – term transformation, coordination and product structuring as essential elements of an ambitious and efficient hydrogen ramp-up' of 19 January 2024.
[3] Voluntary certification system of the International Sustainability and Carbon Certification (ISCC) for the circular economy and bio-based products, renewable energies, food, feed and biofuels outside the framework of RED II: ISCC PLUS – ISCC System.
[4] Federal government (2023): Update of the National Hydrogen Strategy.

statement and emphasised the urgency of prompt publication[5]. An import strategy will give Germany access to the emerging global market for hydrogen and its derivatives, thereby laying the foundations for the expansion of international supply and value chains and for the diversified procurement of hydrogen and its derivatives. This should address both pipeline-based imports from other European countries and regions in the European neighbourhood as well as global imports based on derivatives, regardless of whether they are converted back into hydrogen. In particular, hydrogen imports by ship beyond the derivatives (SNG as LNG, ammonia and methanol) still require extensive development work (especially in the area of liquid hydrogen) in order to strengthen Germany's international competitive position. Therefore the NWR recommends that urgent action be taken in the R&D sector in order to have the relevant technologies available in Germany and to be able to develop an efficient port structure.

RAPID DEVELOPMENT AND EXPANSION OF THE HYDROGEN INFRASTRUCTURE

Infrastructure such as pipelines, harbours and other distribution options via rail, rivers and roads are a basic prerequisite for the development of hydrogen supply and value chains. The hydrogen core network forms the basis for a nationwide supply of hydrogen. The next step is to create suitable framework conditions for connection lines to the core network and for the part of the downstream distribution grids required in the next stage of the hydrogen ramp-up in order to ensure a cost-efficient connection of further consumers to the core grid. In addition to the infrastructure for transporting and distributing hydrogen, hydrogen storage facilities also play an essential role in ensuring security of supply. For this reason, the prompt publication of the announced storage strategy and the creation of an incentive system that promotes the reallocation and new construction of hydrogen storage facilities are required for an adequate reallocation or new construction of hydrogen storage facilities. Forward-looking planning that takes all energy systems into account is essential as many existing infrastructures that can potentially be used for hydrogen will initially continue to be needed for gas supply security. These challenges do not exist for renewable gas (SNG/biomethane) as they do for pure hydrogen: the existing gas storage facilities and networks can initially be used for this purpose.

The energy crisis resulting from the Russian war of aggression against Ukraine has shown how important sufficiently diversified supply paths (LNG, ammonia, etc.) are. Liquefied hydrogen will open up a similar path in the medium to long term. However, this requires a corresponding harbour structure that needs to be developed in Germany. With liquefied hydrogen, an additional route can be opened up via lorries, rail or inland waterway vessels to supply customers who are not connected to the core network with hydrogen.

A majority of the NWR welcomes the draft Hydrogen Acceleration Act as an important instrument for the rapid ramp-up.[6] However, at the same time, the NWR recommends extending the scope of application to the entire value chain of hydrogen and all derivatives (including methanol and SNG). The hydrogen targets can only be achieved with a rapid transformation at all stages of the value chain and at all network levels. As part of this transformation, the NWR suggests that attention should also be paid to better planning and structural synchronisation of the individual infrastructure elements (transmission grids, distribution grids, storage facilities).

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[5] NWR statement on the 'Development of the German government's hydrogen import strategy' from 19 January 2024.

[6] NWR publication "Statement on the German Hydrogen Acceleration Act: Further improving the important course for the hydrogen ramp-up" from 21 June 2024. See also the special vote by Christiane Averbeck of Climate Alliance Germany (Klima-Allianz Deutschland) and Verena Graichen of Friends of the Earth Germany (Bund für Umwelt- und Naturschutz Deutschland, BUND) at the end of the document.

The NWR recommends that the necessary financing framework for the development and expansion of the hydrogen infrastructure should guarantee sufficiently attractive risk and yields profiles for national and international investors without excessively increasing the grid fees for the hydrogen network in order to make sufficient capital available for the transformation of the infrastructure. For investors such as insurance or pension funds, an investment in hydrogen infrastructure in Germany is in direct competition with comparable projects in other energy infrastructures and other countries. A 6.69 per cent return on equity is planned for the hydrogen core network by 2027, which is on a par with investments in electricity and gas grids in Germany, although investments in the hydrogen core network have a significantly higher risk profile. By way of comparison, the return on equity for infrastructure projects in the network sector in the US is over 10 per cent in some cases. Parallel to the expansion of the domestic pipeline infrastructure, the integration of the German hydrogen network into the European backbone network is of central importance. For international strategic pipeline projects in particular, the NWR is in favour of examining the extent to which the amortisation account model developed for Germany can be transferred at international level or anchored at European level, as the blockade for the phase of initially underutilised pipeline infrastructures that has been resolved in Germany with the amortisation account must also be resolved for the various import corridors.

In addition to the pipeline-based import of hydrogen, overseas and inland ports will also play a key role in supplying Germany with hydrogen and its derivatives. The costs should be restructured between the federal and state governments in order to drive forward the upgrading of the port infrastructure for the energy transition with new financing models due to the national and European implications, in addition to a coordinated domestic German port strategy, which also takes into account the development of ports in northwestern Europe. Some industries (such as steel) are dependent on the development of a cracker infrastructure in order to be able to use non-European imports as they cannot use derivatives such as ammonia directly, but only hydrogen. Hydrogen can also be recovered from other derivatives such as SNG. These options should be considered as part of the import and harbour strategy.

TARGETED DEVELOPMENT OF SALES MARKETS FOR HYDROGEN AND DERIVATIVES

The demand for hydrogen and its derivatives is still there, but high additional costs compared to fossil alternatives with long contract periods are slowing down the conversion of the corresponding production processes in the industries. Actual demand will not develop at the speed required to achieve the energy and climate policy targets without reliable framework conditions, planning security and incentives for the industry. However, purchase guarantees of hydrogen and its derivatives, particularly in the form of long-term supply contracts, is a basic prerequisite for the implementation of hydrogen production projects. Very ambitious targets for industry, such as the industry quota under RED III, must be supported with a coherent funding framework.[7] It should be noted here that demand for hydrogen in industry will only develop if the measures to support the ramp-up of hydrogen are embedded in an industrial policy target compass or an overall concept. The aim of this must be to enable all branches of industry to become climate-neutral and at the same time maintain the competitiveness of industry in Germany.

[7] NWR statement on the 'Implementation of RED III into national law (RFNBO target for industry)' from 1 March 2024.

One demand-side instrument that has already been implemented is climate protection contracts, which incentivise a switch to climate-friendly production processes and offset the additional costs compared to conventional processes. The climate protection agreements must be designed in such a way that even large decarbonisation projects (> €1 billion) can be implemented without excessive risk burdens. Companies need planning security, which is why the German government should quickly clarify how much funding volume will actually be available in the next funding rounds. Suitable instruments to close the cost gap should be created for all areas of application, regardless of technology, in a timely manner in order to also support smaller SMEs and businesses with the transformation. In addition, a consistent orientation of public procurement towards climate-friendly and hydrogen-based raw materials, for example, in national procurement law or within the framework of EU product policy, should now also be supported on the demand side in the near future. With regard to the steel industry, the Low Emission Steel Standard (LESS) is a widely agreed labelling system that can form the basis for establishing lead markets for climate-friendly raw materials, for example, via national procurement law or EU product policy. Systemic hydrogen clusters are an important building block for supporting the industrial transformation in the regions in order to be able to meet the demand for hydrogen in regions without a timely connection to the core network. The NWR recommends targeted funding to make hydrogen production from decentralised clusters competitive,[8] in addition to accelerated approval procedures and risk protection.

The NWR sees great demand for hydrogen in the traffic and transport sector, including in heavy goods transport, shipping and aviation, in addition to demand in industry. In order to enable the widespread use of hydrogen in heavy goods transport, an initial refuelling station infrastructure is a basic prerequisite. A temporary funding freeze and an unclear perspective with regard to support measures and future budget funds are acutely jeopardising it, instead of pushing ahead with the development of a corresponding infrastructure. As a result, urgently needed investments are being prevented and the current infrastructure is under threat. The development of the petrol station infrastructure should be driven forward now and without delay due to the project duration of three to five years in order to be able to meet the needs of the transport sector in the long term.

The greenhouse gas (GHG) reduction quota is the main driver for the use of hydrogen in refineries and in turn for the transport sector. The current decline in the quota due to large-scale imports with a questionable sustainability effect also threatens the willingness to pay for RFNBOs in developing hydrogen projects that haven not been developed yet. The NWR recommends adopting measures, including the exclusion of imports that distort competition, that will sustain the GHG reduction quota instrument as an incentive instrument for RFNBOs.

The demand for hydrogen in the energy supply is mainly characterised by the power plant strategy, which initially provides for tenders for H_2-ready power plants in the amount of four times 2.5 GW plus a sprinter segment for fully hydrogen-fuelled power plants with an output of 500 MW. The operation of H_2-ready power plants, which could possibly be subsidised, is not planned until the 2030s. However, the objectives of the strategy are not sufficient to guarantee future security of electricity supply in the context of the emissions reduction path specified by the EU ETS. The NWR emphasises the urgency of initially launching the power plant strategy in order to support the use of hydrogen in larger power plant capacities at an earlier stage and recommends ambitious further development in order to stimulate additional required power plant capacities and promote clear framework conditions for combined heat and power generation beyond 2026. [9]

[8] NWR statement “Regional H2 clusters: The hydrogen ramp-up needs domestic value chains” from 21 June 2024.
[9] NWR statement on ‘Power plant strategy defines the role of hydrogen in the future climate-neutral electricity system’ from 19 January 2024.

In general, the NWR is in favour of discussing the segments and regions for which planning certainty is required in the foreseeable future, which conversely also restricts the open range for technologies due to cost reasons. Hydrogen and its derivatives have the potential to act as a key technology in many sectors. This would not only drastically reduce CO_2 emissions in industry, transport and energy supply in particular, but also our dependence on fossil fuels and the countries of origin for these fuels. To this end, the right course must be set in good time to accelerate the hydrogen ramp-up. Germany can no longer afford any further delays.

NATIONALER WASSERSTOFFRAT

THE GERMAN NATIONAL HYDROGEN COUNCIL

On 10 June 2020, the German Federal Government adopted the National Hydrogen Strategy and appointed the German National Hydrogen Council. The Council consists of 26 high-ranking experts in the fields of economy, science and civil society. These experts are not part of public administration. The members of the National Hydrogen Council are experts in the fields of production, research and innovation, industrial decarbonisation, transportation and buildings/heating, infrastructure, international partnerships as well as climate and sustainability. The National Hydrogen Council is chaired by former Parliamentary State Secretary Katherina Reiche.

The task of the National Hydrogen Council is to advise and support the State Secretary's Committee for Hydrogen with proposals and recommendations for action in the implementation and further development of Germany's National Hydrogen Strategy.

Contact: info@leitstelle-nws.de, www.wasserstoffrat.de/en

APPENDIX

DISSENTING OPINION OF DR CHRISTIANE AVERBECK OF CLIMATE ALLIANCE GERMANY (KLIMA-ALLIANZ DEUTSCHLAND) AND VERENA GRAICHEN OF FRIENDS OF THE EARTH GERMANY (BUND FÜR UMWELT UND NATURSCHUTZ DEUTSCHLAND – BUND)

It is vital that the green hydrogen infrastructure develops rapidly, but the draft Hydrogen Acceleration Act will neither improve this nor achieve it. The draft massively restricts public participation and effective legal protection, jeopardising the acceptance and legal certainty of the systems, which could lead to a delay instead of the desired acceleration in the medium term. In addition, an overriding public interest has been defined for all H_2 infrastructures. However, no distinction is made between fossil (blue and grey) and green hydrogen or between the various derivatives, although ammonia, for example, has a significantly higher hazard potential for humans and the environment than other hydrogen derivatives. A differentiation must be made here. In addition, the actual cause of the slow hydrogen ramp-up – a lack of investment security due to a lack of secure demand – is not being addressed. The draft therefore does not speed things up, but merely abolishes important legitimisation and co-determination procedures. At the same time, it does not suggest how processes can actually be accelerated – for example, through better staffing and digitalising approval authorities.