



On the Path to Global H2 Readiness

Ensuring a Safe, Secure and Sustainable
Scale Up of the Hydrogen Economy

On the Path to Global H2 Readiness – Ensuring a Safe, Secure and Sustainable Scale Up of the Hydrogen Economy

- ▶ For global H2 readiness, hydrogen applications must gain acceptance in society, industry, and politics.
- ▶ A comprehensive, harmonized regulatory framework with norms, standards, and testing obligations is essential for a secure transition to a hydrogen economy. It is crucial that planning and approval processes can be completed swiftly.
- ▶ The independent multi-stakeholder initiative International Sustainability and Carbon Certification (ISCC) is currently preparing the certification of RFNBO (Renewable Fuels of Non-Biological Origin). To make progress here, the “green light” from the European Commission is crucial.
- ▶ The further development of the German National Hydrogen Strategy (NWS) sets the right priorities for promoting the scale-up of hydrogen in Germany and is explicitly welcomed. The development of the core hydrogen network is also essential for building the hydrogen infrastructure.
- ▶ With a view to the future management of hydrogen infrastructure and hydrogen plants, as well as the expansion of the user base with new focus sectors, DEKRA recommends adjusting legal frameworks (NRM H2¹) and harmonizing them across Europe (ECH2A²).

¹ Standardization Roadmap for Hydrogen Technologies

² European Clean Hydrogen Alliance

WHAT IS IT ABOUT?

- With the Paris Agreement, 195 countries – including Germany and the European Union – have committed to limiting the temperature rise to as close to 1.5 degrees Celsius above pre-industrial levels as possible.
- To implement this, the European Commission launched the Green Deal in 2019. The Green Deal aims for a carbon-neutral European Union by 2050. By 2035, greenhouse gas emissions are to be reduced by at least 55 percent compared to 1990 levels. In Germany, greenhouse gas emissions are to be reduced by 65 percent compared to 1990 levels by 2035, with the goal of achieving climate neutrality by 2045.
- Sector Integration: Not all sectors can be made emission-free through electrification alone. To integrate all energy-consuming sectors into a carbon-free economy, storable and mobile energy carriers are needed. The development of the hydrogen economy provides a sector-integrating solution.
- The use of hydrogen also increasingly involves derivatives, meaning the synthesis of hydrogen with other elements. While hydrogen itself can be used as a raw material or energy carrier, for certain applications derivatives like e-ammonia or e-methanol may be more economically efficient.

FOCUS: EUROPEAN UNION

- The REPowerEU plan aims, among other goals, to make use of 20 million tons of renewable hydrogen within the EU by 2030. The goals, definitions, and production conditions for the use of RFNBOs are detailed in the revision of the EU Renewable Energy Directive (RED III): by 2030, 42 percent of the hydrogen used in the EU should come from renewable sources, and by 2035, this should increase to 60 percent. The Decarbonized Gas Market Directive contains the definitions and the production conditions for LCFs.
- The Hydrogen and Decarbonized Gas Market Regulation specifies the structure of the future hydrogen market within the EU. It outlines a set of principles that must be adhered to by Member States, regulatory authorities and system operators in the operation of natural gas and hydrogen markets. It further includes provisions for the cooperation of future hydrogen distribution network operators and the creation of the European Network of Network Operators for Hydrogen (ENNOH), which will work closely with the European Network of Transmission System Operators for Gas (ENTSOG).

- To achieve the production and import objectives and speed up the upscaling of the hydrogen economy, the European Commission funds research and innovation projects through the Clean Hydrogen Partnership. Additionally, the Commission established the European Hydrogen Bank to ensure investment security and create business opportunities for both European and global renewable hydrogen production.
- The European Union distinguishes between Renewable Fuels of Non-Biological Origin (RFNBOs), which includes hydrogen that meets the GHG reduction target of 70 percent and is based on renewable electricity; and Low Carbon Fuels (LCFs), which includes hydrogen that meets the same GHG reduction target but is based on non-renewable electricity.

FOCUS: GERMANY

- In Germany, the National Hydrogen Strategy was updated in July 2023. The following goals have been defined for 2030: an accelerated scale-up, expansion of hydrogen capacity to 10 gigawatts, development of a hydrogen start network with over 1,800 kilometers of converted and newly built hydrogen pipelines, increased applications in industry, heavy-duty vehicles, as well as in aviation and shipping for hydrogen and its derivatives. Additionally, hydrogen is expected to contribute to power and heat supply.
- According to the National Hydrogen Strategy, "the sustainable market ramp-up of hydrogen requires ambitious and as uniform as possible sustainability standards and certification systems for hydrogen and its derivatives, both for domestic production and, crucially, for imports."
- On November 15, 2023, the German government passed the Hydrogen Planning and Hydrogen Core Network Financing Act (Third Act Amending the Energy Industry Act).
 - The hydrogen core network is referred to as the basic framework for developing the hydrogen infrastructure in Germany (the "federal highways" of German hydrogen). According to the Federal Ministry for Economic Affairs and Climate Action, the goal is to connect key hydrogen sites across Germany, such as major industrial centers, storage facilities, power plants, and import corridors.
 - The hydrogen core network is planned to cover approximately 9,700 kilometers. The goal is to gradually commission the pipelines between 2025 and 2032. The injection and withdrawal capacities of the core network are around 100 GW and 87 GW, respectively. The hydrogen core network includes conversion measures (pipelines currently used for

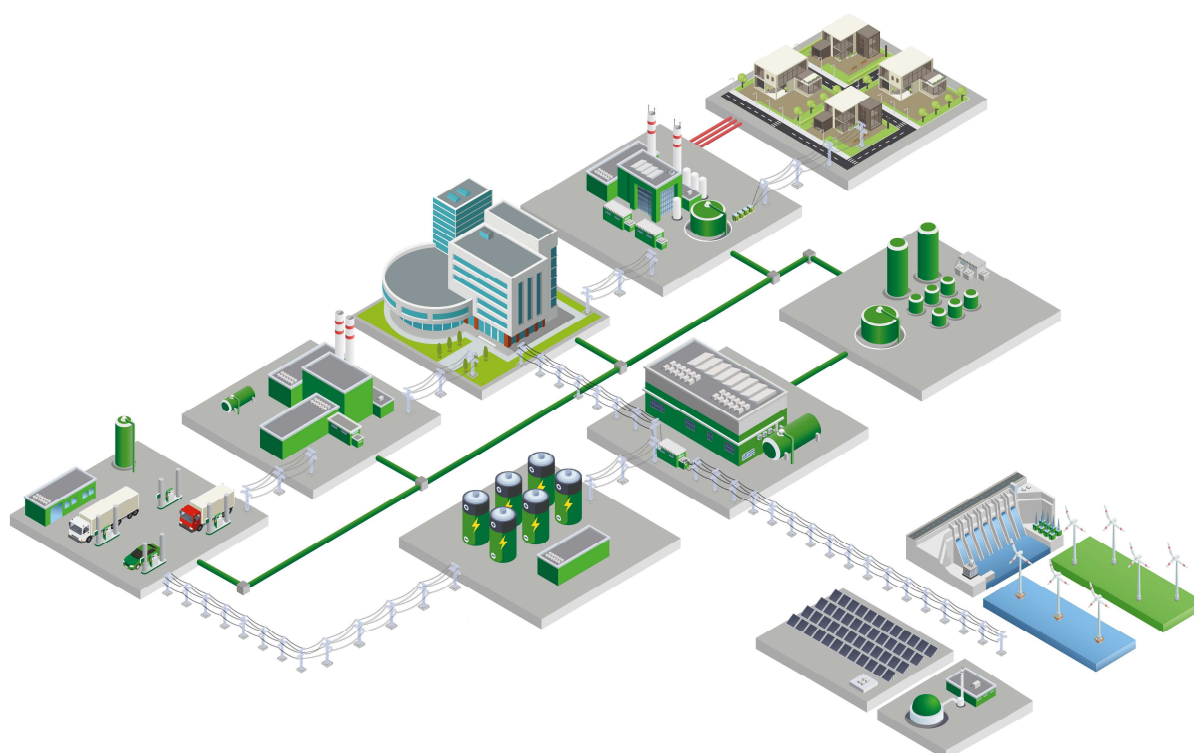
natural gas transport that will be converted to hydrogen operation), new construction pipelines, compressor stations, and gas pressure regulation and measurement facilities (GDRM facilities). About 60% of the total length of the core network will involve conversions.

- On July 24, 2024, the German government also approved the national import strategy for hydrogen and hydrogen derivatives.
- The German government anticipates a demand for hydrogen and derivatives in Germany of 95-130 TWh by 2030, with an import share of 50-70%. The demand for hydrogen and corresponding import needs are expected to increase further as the economy transforms towards climate neutrality: by 2045, demand is projected to rise to approximately 360-500 TWh for hydrogen and 200 TWh for hydrogen derivatives.
- Support for hydrogen imports includes a diversified range of products. In addition to molecular hydrogen (i.e., gaseous or liquid hydrogen not bound in derivatives), various hydrogen derivatives (e.g., ammonia, methanol, naphtha, power-to-liquid fuels) and carrier media (e.g., LOHC) are considered. The German government also aims to pursue the parallel development of import infrastructures for pipeline and ship transports. For transportation by ship, rail, or road, hydrogen derivatives, carrier media, and downstream products are particularly suitable.

THIS IS OUR POSITION

1. Preliminary Remarks

- Since its founding in 1925, DEKRA stands for safety – in traffic, at work, and in the everyday lives of consumers. This is also a foundation of our corporate strategy: to be the global partner for a safe, secure and sustainable world by our 100th anniversary in 2025. In the realm of our services, about one-third of our offerings are focused on topics such as the energy transition, Environmental Social Governance (ESG), and the circular economy.
- DEKRA's activities for the European hydrogen economy do not only contribute to this vision but are already a reality – since many decades, DEKRA has extensive expertise, in this field thanks to the testing, inspection and certification activities of our experts, in preventing potential hazards and enabling the scale up of the hydrogen economy – including high-pressure equipment testing, hydrogen system inspection and green energy certification.



Our DEKRA Services Cover the Entire Hydrogen Value Chain

- DEKRA is actively committed to the establishment and further development of existing regulations and standards. This also applies to globally recognized standards for the production and transport of “green” hydrogen, as well as for its derivatives - aiming for uniform processes, internationally regulated traceability, and independent oversight.
- Through our memberships in the German Hydrogen Association (DWW) and Hydrogen Europe, we collaborate with other stakeholders to contribute our expertise to the development of norms and standards. DEKRA further contributes to the development of roadmaps for European pipeline infrastructure in collaboration with other stakeholders within the European Clean Hydrogen Alliance (ECHA).
- DEKRA thanks the federal government for the opportunity to participate in the German Strategy Forum for Standardization, which was established in February 2023 by the Federal Ministry for Economic Affairs and Climate Action. We also explicitly support the necessary harmonization at the European level. Moreover, DEKRA supports and welcomes the further development of the German National Hydrogen Strategy (NWS) 2023 and participates in the German standardization roadmap for hydrogen technologies.
- Regarding the market penetration of hydrogen and its derivatives, the following key factors are crucial:

2. NECESSARY FRAMEWORK CONDITIONS & APPLICATION SOLUTIONS

- Hydrogen as an energy carrier can be as safe as other energy carriers. Ensuring this safety is essential for gaining acceptance of hydrogen applications in society and industry. This includes transparency about potential risks along the value chain and their management. DEKRA helps companies make these risks transparent. Moreover, with our extensive knowledge of laws and regulations, we support companies – this can have a positive impact not only on an individual basis but also on the market as a whole.
- Independent third-party inspection organizations also take on societal, social, and ecological responsibilities - among other things, by empowering professionals to adhere to safety standards through training.

2.1 FOCUS: HUMAN RESOURCES

- In the past, hydrogen has been primarily used in secure industrial parks and handled by trained professionals. In the future, the range of users will expand: for example, in transport via truck, train, or ship, or in the context of vehicle refueling at hydrogen refueling stations, in repair workshops, or with the use of fuel cell vehicles and other fuel cell devices, like in camping.

POLITICAL FRAMEWORK CONDITIONS

- Ensuring certifications and/or inspections to protect against potential hazards by recognized, independent experts.

APPLICATION SOLUTIONS

- DEKRA trains industrial employees and staff along the hydrogen value chain in the handling of hydrogen and its derivatives - covering everything from the creation of the facility to safe operation, including fire safety and other necessary emergency measures, as well as staff training.
- DEKRA also ensures safety across interfaces by providing specially trained experts for occupational safety and, for example, by assigning hazardous materials officers for the transport of gases.

2.2 FOCUS: PRODUCTION/INFRASTRUCTURE

- Even in the transformation of energy-intensive industrial processes, such as those in the fertilizer, chemical, and steel industries, the use of green hydrogen and its derivatives will be essential to achieving climate neutrality in Germany. The development of infrastructure and production is one of the key challenges.

POLITICAL FRAMEWORK CONDITIONS

- To continue contributing to the safety and availability of hydrogen pipeline infrastructure, regular inspections of hydrogen pipelines should be mandated every two years. A similar regulation for pipelines has already been implemented in the area of industrial applications within the Pipeline Safety Regulation.

- For the sustainable scaling and expansion of hydrogen facilities, these and the associated energy infrastructure components should be included in the Industrial Safety Regulation in Germany (BetrSichV). This would enable uniform and recurring inspection processes and intervals nationwide, as well as reduce inspection-related downtime. While bureaucratic hurdles should be reduced and planning accelerated, the requirement for an inspection report under §18 of the BetrSichV should be retained.

2.3 FOCUS: MOBILITY

The DEKRA Technology Center in Klettwitz is Europe's largest independent test site for automated and connected driving and also fosters innovations in alternative drive systems - such as new testing techniques for determining hydrogen consumption values. Using the so-called gravimetric measurement method, DEKRA, in collaboration with a German automaker, determined the consumption value of a hydrogen vehicle as a prerequisite for regulatory approval.

POLITICAL FRAMEWORK CONDITIONS

- Regulatory framework conditions need to be adjusted accordingly - with a focus on the development of safety requirements for H2 high-pressure storage and drive systems for transportation. It is essential to establish a separate legal provision for the periodic technical inspection of hydrogen vehicles and their hydrogen-specific components.

APPLICATION SOLUTIONS

- At the end of 2023, DEKRA was accredited by the Clean Energy Partnership (CEP) to inspect and certify hydrogen refueling stations according to ISO 19880-1. This makes DEKRA one of the first recognized inspection organizations being approved by the CEP for this task.
- Additionally, the hydrogen dispensed at German filling stations must meet the quality standards of DIN EN 17124, as required by automotive manufacturers. The reason is that impurities in hydrogen can damage the fuel cells in vehicles.

Therefore, DEKRA now offers a new service for testing and confirming the quality of hydrogen dispensed at filling stations.


- Other mobility services include: vehicle homologation, design, upgrading and functional safety, and risk assessments of H2 workshops, hydrogen vehicle consumption measurements (including leakage simulations), upgrading of H2 engine test benches, and conducting crash tests.

2.4 RECOGNIZED HYDROGEN CERTIFICATION

- DEKRA aims to be one of the first TIC companies to offer its clients "green" hydrogen certificates recognized by the European Commission. DEKRA has long been working closely with International Sustainability & Carbon Certification (ISCC) and CertifHy.
- Currently, we can certify the CO2 content of hydrogen and its derivatives under the voluntary "ISCC-plus" system. To offer ISCC-EU certificates in accordance with legal definitions (RED II definition of RFNBO - Renewable Fuels of Non-Biological Origin), an official recognition from the European Commission is required. The most important milestone on the way to receive recognition has been reached in September 2024 with the positive technical assessment from the European Commission.

POLITICAL FRAMEWORK CONDITIONS

- For recognized certification, regulatory decisions at both the European and national levels are necessary.



DEKRA was originally founded in 1925 to ensure road safety through vehicle inspection. With a much wider scope today, DEKRA is the world's largest independent non-listed expert organization in the testing, inspection, and certification sector. As a global provider of comprehensive services and solutions, we help our customers improve their safety, security, and sustainability outcomes. In 2023, DEKRA generated revenue of EUR 4.1 billion. The company currently employs around 49,000 people who offer qualified and independent expert services in approximately 60 countries on five continents. With a platinum rating from EcoVadis, DEKRA is now in the top one percent of sustainable businesses ranked.

Imprint

Date Version: 09/2024
Contact Dr. Fabienne Beez
Phone +49 30 9860988 10
Email fabienne.beez@dekra.com

DEKRA
Representative Office Berlin
Behrenstrasse 29
D-10117 Berlin
www.dekra.com

Contact Elija Leib
Phone +32 2 740 24 90
Email elija.leib@dekra.com

Contact Dr. Christoph Flink
Phone +49 151 1179 0534
Email christoph.flink@dekra.com

DEKRA SE
Hydrogen Economy
Program Management
Handwerkstr. 15
D-70656 Stuttgart
www.dekra.com

DEKRA e.V.
Representation to the EU
Avenue de Cortenbergh 52
B-1000 Brussels
www.dekra.com

**DEKRA**

Representative Office
Behrenstr. 29
D-10117 Berlin
Phone +49 30 9860988-0
buero-berlin@dekra.com
dekra.com