

Hydrogen Update Germany

New Regulatory and Market Developments



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Exciting times for hydrogen market participants in Germany – in the last months, a variety of new regulatory instruments and policy initiatives have been announced which will boost the ramp-up of the hydrogen economy in Germany.

Germany goes all in on Hydrogen

In the recent months, the regulatory developments for the hydrogen market ramp-up in Germany have been significant. Even though it comes with some delay, this activity is meant to be a clear signal to the economy and the capital markets: Germany is determined to enable as much hydrogen economy as possible as soon as possible and aims to provide the necessary financial support as well as investment-friendly framework conditions.

While the German regulatory push to shape a hydrogen economy is still relatively nascent (the first national hydrogen strategy was published in 2020), the German government has advanced quickly since then. The update of the German hydrogen strategy in 2023 sets ambitious targets for the ramp-up of the

hydrogen economy and the government has established a variety of financial support schemes offering billions of Euros in subsidies for investment in the German hydrogen market to attract both national and international investors. Major German companies and other stakeholders have expressed strong support.

Hydrogen is expected to play an essential role in the German energy transition and decarbonisation puzzle. Firstly, hydrogen is indispensable to achieve full decarbonisation of energy consumption. Germany has pledged to achieve net zero greenhouse gas (GHG) emissions by 2045. Hydrogen is foreseen to be the central tool to decarbonise in particular hard-to-abate industries (e.g. steel and chemical), as well as heavy duty and long-range applications in the transport sector. Secondly, hydrogen is projected to play an important

role to balance the electricity market after the phase out of fossil fuels in electricity generation by providing flexible supply and demand of electricity.

Concerning the development of a hydrogen infrastructure, Germany is in a sweet spot: Its geographical position in the centre of the European Union makes Germany an important hub for the European hydrogen infrastructure. Additionally, Germany's large existing natural gas pipeline infrastructure of around 600,000 pipeline kilometres is expected to be very useful as it can generally be converted to hydrogen infrastructure at lower costs than newly built hydrogen pipelines.

In the last months, the German government has taken various steps which aim at boosting the German hydrogen economy. We have summarised the most relevant points for investment in the growing hydrogen economy in Germany.

Rapid expansion of hydrogen infrastructure

Plans for the development of a hydrogen core network until 2032

In January, the German government submitted legislative drafts for a regulatory framework for the planning and financing of a German hydrogen pipeline network.¹

In a nutshell, the plan foresees a development in two steps: First, the rapid development of a so-called hydrogen core network (*Wasserstoff-Kernnetz*) which shall connect the most important hydrogen demand areas in Germany by 2032 latest. This core network would encompass approximately 9,700 kilometres of pipeline with a total entry/exit capacity of 100 GW. It is planned to start operation successively from as early as 2025 until completion of the entire core network in 2032. Only roughly 40% of the hydrogen core network will be newly constructed; about 60% shall consist of converted natural gas infrastructure. The government estimates the total costs for the development of the core network to reach EUR 20 billion. In a second step,

the Government's plan foresees the development of a more granular distribution network.

With regard to the geographical planning of the core network, the most important hydrogen sites in Germany are being prioritised. This includes the IPCEI and PCI/PMI hydrogen projects as well as important industrial sites of sectors which do not have many suitable alternatives for decarbonisation other than hydrogen (e.g. the iron and steel, chemical, glass, or ceramic industry, and refineries). The planning for the core network is already underway. A final proposal by the network operators for the core network is due in May 2024 and shall be approved by the German Federal Network Agency (**BNetzA**) no later than summer 2024.

As cost-based network fees would be prohibitively high for potential network users in the first years of network operation due to the high upfront construction costs and the expectedly low number of early network users, the draft legislation foresees a cap of the network fees in the early years of operation. These capped fees will be topped up by the German government to cover the actual development costs of the network operators including a 6.69% return on equity. The top-up payments, i.e. the negative difference of the actual network development costs and the revenues from capped early-year network fees will be booked to a so-called amortisation account operated by the government.

The intention is to balance the amortisation account via a so-called intertemporal cost allocation mechanism. This mechanism foresees that after the initial period of capped network fees, these fees shall increase and be higher than the network operators' costs in a later phase. For this purpose, the BNetzA will revise the capped fees every three years starting in 2028 to determine whether the fees should be increased. In the determination process, the BNetzA will consider (1) the need to balance the amortisation account, i.e. to finance the hydrogen core network, on the one hand, and (2) the need to avoid prohibitively high fees for network users on the other hand. The network fee surplus in the later phase shall compensate the negative balance of the amortisation

¹ Find the draft legislation here: „Entwurf eines Dritten Gesetzes zur Änderung des Energiewirtschaftsgesetzes“, BT-Drs. 20/10014 (<https://dserver.bundestag.de/btd/20/100/2010014.pdf>).

account from the initial phase with capped fees. As a result, the network users in the later years would pay for the artificially low fees of the early network users.

There is a risk that there will not be sufficient network usage demand in the future and that, as a result, there will not be sufficient surplus revenues from network fees at a later stage to balance the negative amortisation account. For this scenario, the German government provides a financial guarantee: If the amortisation account is not balanced by 2055, the German state will balance the account with public funds.

The German government is entitled to terminate the financing mechanism before 2055 at any time after the end of 2038 if the financing mechanism to balance the amortisation account until 2055 is likely to fail. This is the case if a scientific assessment determines that network fees covering the network operators' actual costs would still be considerably too high to incentivise network usage and that, as a consequence, the hydrogen core network would not attract sufficient fee-paying network users to finance its development. According to the draft, this should be the case if the initially presumed demand for transport capacity of the core network will not materialise. In case of early termination, the German state will also balance the amortisation account with public funds.

However, the draft legislation foresees that the network operators shall share part of the risk that the amortisation account's balance is negative by 2055 or upon early termination of the German government. To be specific, the network operators would have to bear 24% of the negative balance themselves. Furthermore, in case of an insolvency of one of the network operators, the other network operators would have to chip in. In case of early termination by the German government, the draft legislation reserves the right for the government to request total ownership of the core network from all network operators in exchange for compensation of its residual value if (1) one of the network operators is unable to pay its 24% share and (2) the other network operators do not pay for his share.

While the overall concept for the development of the hydrogen core network was received positively in the market, network operators and investors have raised concerns on whether the financial incentives are substantive enough to attract sufficient capital from investors. Main proposals are to significantly reduce the network operators' 24% share of a potentially negative amortisation account and to ensure that the insolvency risk of one network operator is borne by the state instead of the other network operators. Parliamentary debate is ongoing with changes to the draft still possible and the draft act is expected to enter into force in the second or third quarter of 2024.

Hydrogen import infrastructure currently under development

To secure sufficient supply of hydrogen, the German hydrogen strategy largely relies on the import of hydrogen. In order to develop the necessary coastal infrastructure to import hydrogen from overseas, Germany has recently announced a national port strategy which will outline the planning and financial support of those projects.

One step already taken in this direction is the recently revised LNG Acceleration Act (*LNG-Beschleunigungsgesetz*). It foresees that new LNG-terminals shall be hydrogen-ready in order to prepare for later hydrogen imports and to prevent the LNG-terminals from turning into stranded assets following a future gas phase-out. This also applies to a number of LNG-terminals recently constructed or currently under development at the German coastlines. The permission to operate the terminals with natural gas imports expires 2043. After 2043, operation is permitted with hydrogen or its derivatives only.

EU Commission approval of IPCEI projects

German hydrogen infrastructure development received a further boost on 15 February 2024 when the EU Commission issued long-awaited state aid approvals for financial support for 33 hydrogen projects clustered in the "infrastructure wave" hy2infra of the EU hydrogen IPCEI.² Of those 33 hydrogen infrastructure projects, 24 are located in

² See the press release of the EU Commission (https://ec.europa.eu/commission/presscorner/detail/en/IP_24_789).

Germany, underlining Germany's pivotal role for an integrated European hydrogen infrastructure.

The German government has announced that corresponding national approvals for the financial aid will be issued shortly. Together with the German federal states, the German government plans to distribute an amount of EUR 4.6 billion to these projects, which has incentivised the project companies to commit EUR 3.4 billion of private capital.

Hydrogen demand on the rise

Key points of German power plant strategy announced

Progress has also been made regarding the ramp-up of the demand side: In February 2024, the German government published key points for its much-anticipated power plant strategy (*Kraftwerksstrategie*).³ These key points delineate a framework to tender subsidies for the development of 10 GW capacity of hydrogen-ready gas-fired power plants. The planned gas power plants shall provide a reliable electricity supply amidst the steadily growing share of volatile renewable energy production and the approaching coal phase-out in Germany. In order to pave the way towards a completely decarbonised energy system, these gas power plants will be built hydrogen-ready and are intended to switch completely to hydrogen-based electricity generation in the 2030s.

The key points contemplate four auction rounds each tendering 2.5 GW capacity of hydrogen-ready gas power plants. The power plants are to be constructed near large, energy-intensive industrial sites and shall be fully integrated into a capacity mechanism planned to be operational by 2028. A first round of auctions shall be initiated in the second half of 2024. The German government estimates its financial commitment for the program to be EUR 15-20 billion. The tendered subsidies will partly be issued as CAPEX grants for plant construction and partly as

OPEX grants for the more costly hydrogen-fired operation at a later stage.

In order to speed up construction of the plants, the German government further announced legislation to speed up planning and approval procedures for these projects (announced in 2023 as the *Wasserstoffbeschleunigungsgesetz*).

Industry CCfDs approved by EU Commission

Hydrogen demand in Germany will also be boosted by the German support scheme for industrial decarbonisation called 'carbon-contracts-for-difference' (*Klimaschutzverträge – CCfDs*).⁴ Through this support scheme, the German government commits billions to the German industry's conversion to decarbonised production such as to production based on renewable energies, hydrogen or production including carbon capture and usage or storage (CCU/S) technology. On 12 March 2024, the support scheme launched the first auction round worth EUR 4 billion. The sector focus of the first auction round is the steel, chemicals, paper, and the glass industry. The CCfDs had already been kicked off in summer 2023 but were pending EU Commission approval which was granted in February 2024.

The CCfDs are intended to compensate the additional CAPEX and OPEX necessary for the development and operation of climate-friendly industrial facilities in comparison to a similar conventional facility. The government concludes CCfDs with the companies that have submitted the lowest CO₂ abatement costs (CCfD strike price) as a bid in the auction. The term of a CCfD is 15 years, commencing with the start of low-carbon operation. As long as the costs of the climate-friendly facility stay higher than the CCfD strike price, the awarded company would receive CCfD payments. As soon as the costs of a climate-friendly facility would be lower than the CCfD strike price, the payments would go in the opposite direction, i.e. to the government. As the CCfD payments are indexed to CO₂ and fuel prices

³ See the press release of the German government (<https://www.bundesregierung.de/breg-en/news/power-station-strategy-2257994>) and the press release of the German Ministry of Economic Affairs and Climate Action (<https://www.bmwk.de/Redaktion/EN/Pressemitteilungen/2024/02/20240205-agreement-on-power-station-strategy.html>).

⁴ See the newest press release on CCfDs of the German Ministry of Economic Affairs and Climate Action with further reference to the CCfD-guidelines which set forth the participation criteria and auction procedure (<https://www.bmwk.de/Redaktion/DE/Pressemitteilungen/2024/03/20240312-erste-runde-klimaschutzvertraege.html>).

and as the CO₂ price and fossil fuel prices are likely to rise in the future, such a scenario has to be considered carefully.

Auctions are planned semi-annually until the overall budget for the CCfD scheme is exhausted. Eligibility criteria for participation are the following:

- The industrial facility is part of an energy-intensive sector which is subject to the EU ETS, e.g. steel, cement, or glass.
- The planned climate-friendly industrial facility will in aggregate emit 90% less CO₂ equivalents than a comparable conventional plant at the end of the 15-year CCfD-period.
- The comparable conventional plant would emit more than 10 kt CO₂ equivalents per year.

Criteria for the qualification of hydrogen-based fuels as RFNBO implemented and RFNBO made deductible under the GHG quota

Further support for the demand side of hydrogen comes from the German parliament's approval of a new regulation on so-called renewable fuels of non-biological origin (*erneuerbare Kraftstoffe nicht-biogenen Ursprungs – RFNBO*) on 14 March 2024.⁵ The new regulation implements the EU criteria for the renewable quality of RFNBO and thus the requirements for hydrogen-based products to qualify as RFNBO into national law. Those criteria were originally set forth by the EU Commission's delegated acts under Articles 27 and 28 of RED II. The German regulation foresees a 1:1 implementation of the EU requirements. Fuels made from electricity are considered renewable when the criteria of additionality, temporal correlation, and geographical correlation are met.⁶

Additionally, the regulation integrates the commercial usage of RFNBO by mineral oil companies into the German regulatory scheme for the decarbonisation

of the fuel sector: the GHG quota mechanism (*THG-Quote*) regulated in Section 37a of the German Federal Immission Control Act (*Bundesimmissionsschutzgesetz*).⁷ The use of RFNBO by mineral oil companies is now eligible for the fulfilment of their GHG quota obligations under German law.

The GHG quota mechanism obliges mineral oil companies to decrease GHG emissions of their marketed fuels by certain percentage shares over time until 2030. The mechanism defines certain options for mineral oil companies to lower the GHG emissions of their fuel portfolio. One option is the utilisation of RFNBO: Mineral oil companies are now incentivised to utilise RFNBO to fulfil their GHG quota obligations via (1) the inclusion of RFNBO in their product portfolio, or (2) in the production processes for their fuels, or (3) via the admixture of RFNBO to their fuel products.⁸

Support of green steel production

The last year saw significant financial support by the German government for the decarbonisation of the German steel industry by switching to hydrogen-based iron and steel production.

On 23 February 2024, the EU Commission approved a support package of EUR 1.3 billion for the decarbonisation of two steel works of Arcelor Mittal in Bremen and Eisenhüttenstadt. The issuance of a corresponding grant by the German government is expected to follow soon. The support aims to facilitate the construction of hydrogen-based direct reduced iron (**DRI**) plants. The DRI plants' demand for hydrogen is estimated to be 135,000 tons per year. Operation shall start in 2026.

On 26 January 2024, the German government issued a similar grant for steel producers in the German state of Saarland following approval of the EU Commission in December 2023. The grant will provide EUR 2.6 billion to the Saarland-based producers Saarländische Stahl AG, ROGESA mbh, and

⁵ See the now adopted draft regulation from 18 December 2023, BT-Drs. 20/9844 (<https://dserver.bundestag.de/btd/20/098/2009844.pdf>).

⁶ See for a detailed overview regarding these requirements in our publication "Hydrogen in Europe: An update on the RED II Delegated Acts" from 14 March 2023 (<https://www.allenoverly.com/en-gb/global/news-and-insights/publications/red-ii-delegated-acts-hydrogen-updates-analysis>).

⁷ See the English version of the German Federal Immission Control Act and its section 37a on page 32 of this English version of the Act (https://www.bmuv.de/fileadmin/Daten_BMU/Download_PDF/Luft/bimschg_en_bf.pdf).

⁸ RFNBO are defined as a GHG quota obligation fulfilment options in section 37a paragraph 5 No. 6-8 of the German Federal Immission Control Act.

Dillinger Hüttenwerke AG for the construction of DRI plants and electric arc furnaces in their steel works. In order to facilitate hydrogen procurement, further market actors in the region are planning electrolysis capacities and a regional cross-border hydrogen pipeline network spanning over Germany, France, and Luxembourg (Project mosaHYc).

In July 2023, the government granted more than EUR 2 billion to German steel producer ThyssenKrupp for the construction of DRI plants at ThyssenKrupp's Duisburg site. ThyssenKrupp kicked off the procurement of hydrogen in December 2023 by announcing auctions for hydrogen purchase, explicitly including blue hydrogen produced from natural gas via splitting off CO₂ by application of CCU/S technology. Infrastructure-wise, the site in Duisburg is well situated for hydrogen-based steel production. The inland port of Duisburg is planned to be a central hub for the hydrogen infrastructure network planned across Germany and Europe. In September 2023, the ports of Rotterdam and Duisburg published a new feasibility study for a so-called "hydrogen corridor" between the two ports.⁹ The operation of a first hydrogen pipeline between the two ports is planned to start in 2027.

Earlier in 2023, the EU Commission had already approved a similar 1.3 billion support package to German steel producer Salzgitter AG for the construction of DRI plants and electric arc furnaces.

Hydrogen supply

New subsidies for hydrogen imports via the H2Global mechanism

On the supply side, Germany has issued further support for the import of green hydrogen. The German government has announced a second round of auctions for the import of hydrogen through the H2Global mechanism. In February 2024, the German Ministry of Economic Affairs and Climate Action (**BMWK**) issued a press statement declaring to commit further EUR 3.5 billion to the import of green hydrogen and its derivatives over the next years.¹⁰

This support package is currently pending approval by the European Commission

The H2Global mechanism provides financial support to the import of green hydrogen via a double auction model. The mechanism foresees that H2Global internationally auctions the procurement of green hydrogen under long term supply terms. In a second auction, H2Global sells the procured green hydrogen to the highest bidder in Germany and Europe. The financial gap between procurement and sales prices is covered by the German government.

Blue hydrogen via CCU/S: Key points of a German carbon management strategy released

As part of its decarbonisation initiatives, the German government has published key points of a carbon management strategy on 26 February 2024. The strategy aims to provide a regulatory framework for the market launch of carbon capture and usage or storage (**CCU/S**) activity in order to facilitate decarbonisation for sectors with hard- or impossible-to-abate CO₂ emissions and the supply of blue hydrogen produced from natural gas under the application of CCU/S technologies.

More specifically, the forthcoming strategy will establish a regulatory framework and financial support schemes for private investment in the development of CO₂ pipeline networks, the exploration of offshore storage sites in the German exclusive economic zone, the removal of regulatory and administrative hurdles, and a variety of other measures to support the development of CCU/S in Germany.

The key points explicitly stipulate that CO₂ storage onshore and in marine reserves will not be allowed. With regard to CO₂ storage onshore, however, the German federal states shall be entitled to individually decide whether to allow storage (opt-in right).

The ramp-up of a CCU/S market in Germany will be relevant for the ramp-up of the German hydrogen economy. The production of many hydrogen

⁹ See the press release of the Port of Rotterdam (<https://www.portofrotterdam.com/en/news-and-press-releases/new-feasibility-study-ports-rotterdam-duisburg-cooperation-hydrogen>).

¹⁰ See the press release of the BMWK ([https://www.bmwk.de/Redaktion/DE/Pressemitteilungen/2024/02/20240220-globaler-wasserstoffhochlauf.html#:~:text=Das%20Bundesministerium%20f%C3%BCr%20Wirtschaft%20und%20Klimaschutz%20\(%20BMWK%20\)%20stellt%20f%C3%BCr%20die,aus%20unterschiedlichen%20Importregionen%20zu%20beschaffen](https://www.bmwk.de/Redaktion/DE/Pressemitteilungen/2024/02/20240220-globaler-wasserstoffhochlauf.html#:~:text=Das%20Bundesministerium%20f%C3%BCr%20Wirtschaft%20und%20Klimaschutz%20(%20BMWK%20)%20stellt%20f%C3%BCr%20die,aus%20unterschiedlichen%20Importregionen%20zu%20beschaffen)).

derivatives requires the availability of CO₂ extracted with CCU/S technology. Blue hydrogen produced with CCU/S technology can be used as an additional source of climate-friendly hydrogen next to green hydrogen produced from renewable energies via electrolysis. The availability of large quantities of blue hydrogen is particularly crucial for the decarbonisation of the German industry (cf. above regarding the example of ThyssenKrupp's hydrogen-based steel production). Furthermore, we understand that the government's power plant strategy will allow the use of blue hydrogen in the new fleet of hydrogen-ready gas power plants to be erected in Germany.



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