

Germany: the next steps in designing the hydrogen network

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On 10 November the Bundestag adopted an amendment to the Energy Industry Act (*Energiewirtschaftsgesetz*, EnWG), a crucial part of which were regulations regarding the planning and approval of the so-called core hydrogen network (*Wasserstoff-Kernnetz*). By 2032, this network is scheduled to become the nucleus of the national hydrogen grid, connecting hydrogen production and import sites with domestic industrial customers and storage facilities across Germany. The Association of Gas Transmission Network Operators (FNB Gas) has been tasked with designing this *Kernnetz* based on specific criteria. The network is primarily intended to include projects co-financed under the EU IPCEI (Important Projects of Common European Interests) mechanism; cross-border projects which will be implemented as part of the EU PCI (Projects of Common Interest) mechanism and are intended to create the planned European network; and supra-regional projects to create connections between various parts of Germany.

The network is to be based on the existing gas infrastructure to the greatest extent possible. At the present stage, the most important recipients connected by the hydrogen network will include the energy, metallurgical, chemical, petrochemical and glass-making industries. Once the law comes into force, after its final approval by the Bundesrat on 24 November, FNB Gas will be obliged to submit the core hydrogen network design to the Federal Network Agency (BNetzA) for approval.

A draft of the German core hydrogen network, which had been negotiated over the past few months by FNB Gas, the government, BNetzA and representatives of the industries concerned, was jointly presented by Robert Habeck, the Vice-Chancellor and Minister of Economic Affairs and Climate Action, and Thomas Gößmann, the Chairman of FNB Gas, during a press conference on 14 November. The network's length is planned to reach 9721 km by 2032; almost 60% of it will be based on the existing gas network, and its total cost will be €19.8 billion. The planned injection capacity at entry points is 101 GW_{th} and the extrusion capacity is to be 87 GW_{th}. The network is designed to have a maximum throughput of 279 TWh of hydrogen per year (the largest recipients will include thermal power plants (157 TWh), the metallurgical industry (50 TWh), the chemical industry (32 TWh) and refineries (30 TWh)).

It can be understood from Habeck and Gößmann's statements that the public presentation of the draft and sending it to BNetzA before the act has come into force is intended to accelerate the next phase, which will focus on formal work on the official project. BNetzA has already announced the launch of informal consultations to this effect, and these are expected to continue until January. Once the new regulations become effective, FNB Gas

will again submit the draft to the German regulator, and another consultation (this time shorter) will be held. BNetzA will then be able to request to have it corrected before the final design is submitted for approval, which should take place at the end of the first quarter of 2024. As Gößmann pointed out, the network operators want construction work to start next year.

Commentary

- The presented draft for the core hydrogen network is the result of many months of negotiations, in which representatives of the German government, the federal states, BNetzA, FNB Gas and the relevant sectors of German industry have been involved. Although the network draft was based on market research (plans for the production and use of hydrogen), the version presented is more an effect of political arrangements and attempts to reconcile the interests of the various actors, rather than market modelling. Thus, the parameters of the core hydrogen network planned for 2032 will be much higher than the expected demand: its annual designed throughput will be 279 TWh, while the estimated consumption level in 2030 will range between 95 and 130 TWh, according to the hydrogen strategy.
- Berlin has decided to carry out the process of building its hydrogen transmission network in two stages. The *Kernnetz* will be the first stage, as part of which the framework of the future national hydrogen infrastructure will be created by 2032. The infrastructure will be made available almost exclusively to industrial customers, with a sufficiently large planned consumption. Top priority has been granted to those industries in which the use of hydrogen is essential in the decarbonisation process. In the second stage, the core network is to be expanded in stages by adding successive sections based on network development plans, to be prepared regularly every two years, which will be analogous to those developed for the gas and electricity infrastructure. The necessary legal framework is currently the subject of legislative work; a bill regulating these issues was submitted to the Bundestag on 15 November. The bill envisages that the first hydrogen network development plan will be prepared in 2025. As of 2027, procedures for planning the expansion of the gas and hydrogen networks will be integrated.
- Germany's business and political circles view the start of the creation of the nationwide hydrogen network as a key step towards building a national hydrogen economy. It has been pointed out, primarily by representatives of business circles, that the unclear perspectives regarding the future availability of new transmission infrastructure is among the key factors that may hinder investments in both hydrogen production installations and hydrogen-based production technologies. Berlin sees a rapid pace for the creation of the network, supported by state guarantees, as politically desirable, in the hope that this will make it easier for the industry to start investing in hydrogen technologies.
- The recently presented draft confirms that Germany plans to rely on hydrogen imports for the foreseeable future. According to the latest government estimates, Germany will be able to cover 30 to 50% of its consumption from domestic sources. It is noteworthy that Berlin is trying to ensure that its infrastructure will enable hydrogen to be imported from almost all of its neighbours (the exceptions are Luxembourg and Switzerland). According to the parameters of the draft adopted, in 2032 Germany could import the largest

volumes of hydrogen from Denmark (343 GWh/d), the Netherlands (280 GWh/d), France (204 GWh/d), Austria (150 GWh/d), the Czech Republic (144 GWh/d: although this mainly concerns transit through the Czech Republic back to Germany), Norway (120 GWh/d) and Belgium (91 GWh/d). Two interconnectors with a total capacity of 67 GWh/d are planned to be built on the border with Poland: near Schwedt (19 GWh/d) and Eisenhüttenstadt (48 GWh/d). In addition to imports via gas pipelines, it is also planned to import hydrogen (or its derivatives; ammonia is most frequently mentioned) via sea terminals. Such projects have been developed for the ports of Wilhelmshaven, Stade, Brunsbüttel, Hamburg and Rostock, among others.

- The rules for financing the hydrogen infrastructure construction have been agreed on preliminarily, but the issue is still unresolved. The bill adopted by the government on 15 November, which is based on the model developed by the German Energy Agency (DENA) and has been accepted by all the actors involved, assumes in principle that financing will come from equity capital and market investors, as well as from funds paid by hydrogen recipients as the network fee (*Netzentgelt*) approved by BNetzA. However, this fee will be kept artificially low in the first years, so that the high initial costs of creating the network are not entirely shifted to the small group of first consumers. Losses incurred by network operators are to be recorded on a special account (*Amortisationskonto*) that will be operated by an external entity and secured with state guarantees. Over time, as more and more customers begin to use the network, the initial losses will be gradually compensated. The details of the mechanism will still be the subject of legislative work, and some minor changes are possible. According to the schedule, the act should be adopted in December this year or in January 2024. Network operators are claiming that a market-attractive financing model is a fundamental condition for investing.

Map. Draft plan for the German core hydrogen network



Source: Association of Gas Transmission Network Operators (FNB Gas).