

Demand for Hydrogen

**as reported by the respondents to the
Hydrogen Generation and Demand Market Survey for
the Scenario Framework of the Gas NDP 2022-2032**



September 2021

About FNB Gas:

The Berlin-based association Vereinigung der FernleitungsnetzbetreiberGas e.V. (FNB Gas) was founded in 2012 by the German gas transmission system operators (TSOs), i.e. the network companies operating the major supra-regional and cross-border gas transmission pipelines. One key focus of the association's activities is the Gas Network Development Plan, which has been drawn up annually by the TSOs since 2012. The association also acts as a central point of contact for policymakers, the media and the general public on behalf of its members.

The members of the association are: bayernets GmbH, Ferngas Netzgesellschaft mbH, Fluxys TENP GmbH, GASCADE Gastransport GmbH, Gastransport Nord GmbH, Gasunie Deutschland Transport Services GmbH, GRTgaz Deutschland GmbH, Nowega GmbH, ONTRAS Gastransport GmbH, Open Grid Europe GmbH, terranets bw GmbH and Thyssengas GmbH. Between them they operate a pipeline network totalling some 40,000 kilometres in length.

Results of hydrogen survey: Almost 500 reported projects with a demand of over 230 TWh in 2032 highlight the need for the rapid development of a hydrogen infrastructure

- A total of 488 hydrogen projects with a demand of almost 600 TWh in 2050
- National Hydrogen Strategy targets for electrolysis capacity exceeded almost 6-fold
- Distribution system operators report huge demand for hydrogen

From January to April 2021, the German transmission system operators conducted their Hydrogen Generation and Demand (*Wasserstoff Erzeugung und Bedarf – WEB*) market survey for the Scenario Framework of the Gas NDP 2022-2032 to collect information on the planned generation and future demand of hydrogen and other green gases in Germany. The information will provide the basis for a potential hydrogen network and is therefore included in the hydrogen modelling approach used for the Gas NDP 2022-2032. The market survey respondents reported almost 500 projects, including 488 hydrogen projects with a total demand of 231 TWh in 2032, 427 TWh in 2040 and 598 TWh in 2050. Most of the projects previously reported as part of the market survey for the NDP Gas 2020-2030 were again submitted this year.

The reported electrolysis capacity of around 29 GW_e in 2032 is remarkable and is significantly higher than the capacity predicted in the National Hydrogen Strategy (5 GW_e by 2030) and in the Electricity NDP 2035 (up to 8,5 GW_e in scenario C 2035). The electrolysis capacity reported for 2040 is around 40 GW_e, and for 2050 it is around 56 GW_e.

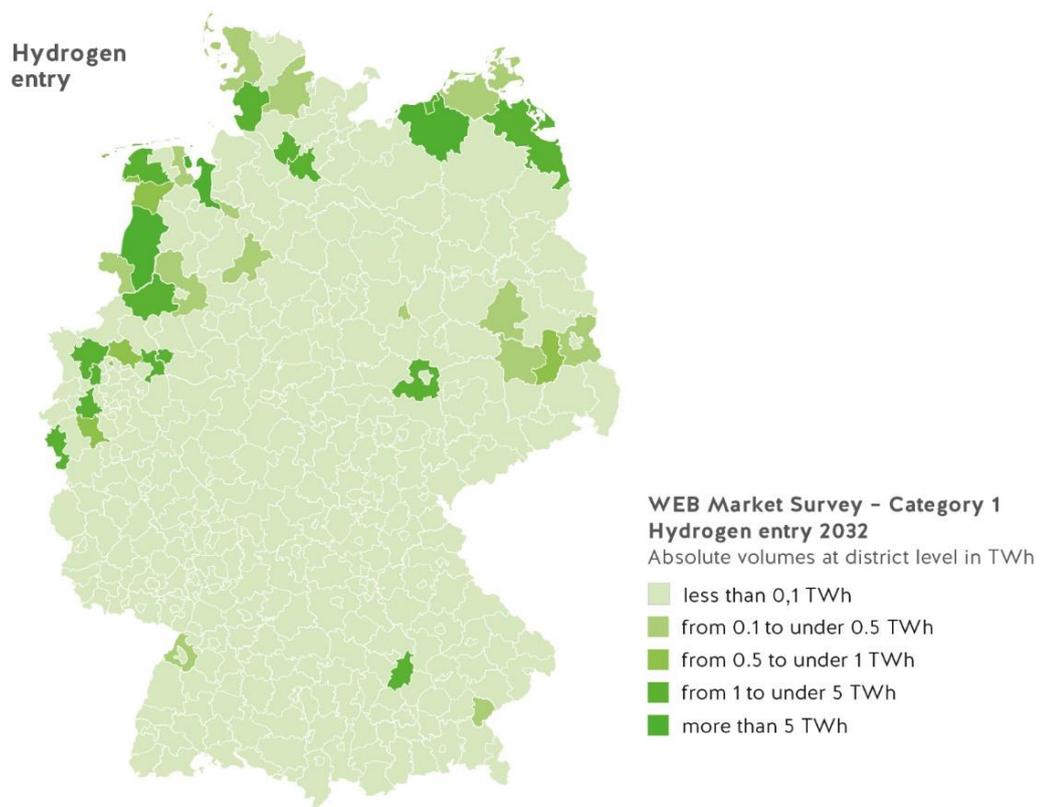
Which of the submitted projects will actually be considered for the Gas NDP 2022-2032 hydrogen model will be decided on 1 October 2021, by which time the project sponsors must have concluded a Memorandum of Understanding with the relevant TSO to demonstrate their intention to go ahead with the project.

For the analysis of the survey, the TSOs have divided the reported projects into different categories: projects of relevance for the gas transmission network (category 1), storage projects (category 2), projects in the distribution grids of relevance for the transmission network (category 3), projects reported from abroad (category 4) as well as projects in the distribution grids without any relevance for the transmission network and other reported projects (categories 5 and 6).

For the categories where most projects were reported (category 1 with 287 projects and category 3 with 183 projects), the TSOs have shown the reported entry and exit hydrogen quantities in maps. The underlying information has been added to [Annex 2](#) of the Scenario Framework.

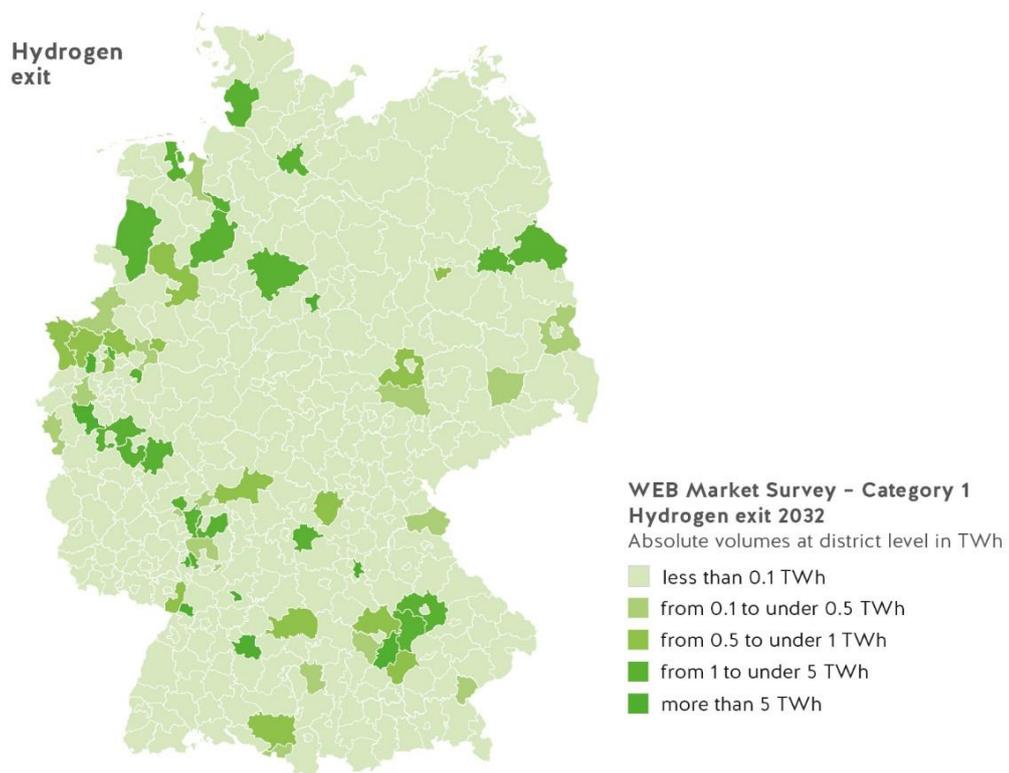
The two maps below show the regional distribution of entry and exit quantities at district level for the year 2032. The nationwide distribution of hydrogen projects relevant to the transmission network demonstrates the need for a supraregional, pipeline-based transmission infrastructure for hydrogen, which will need to be developed shortly in order to connect the hydrogen sources with the hydrogen sinks. This infrastructure is expected to be developed predominantly by repurposing existing natural gas pipelines for the transportation of pure hydrogen.

Reported WEB hydrogen injections in 2032 for the category 1 projects



Source: Transmission system operators

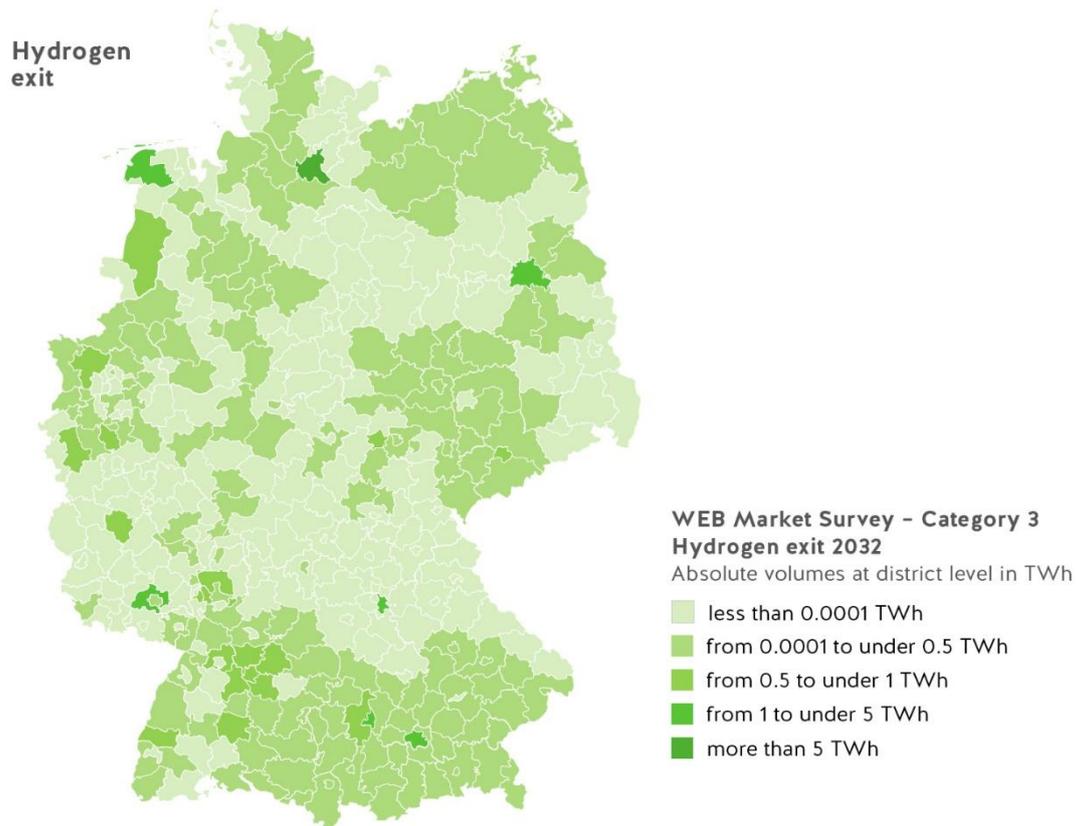
Reported WEB hydrogen withdrawals in 2032 for the category 1 projects



Source: Transmission system operators

The regional distribution of projects with hydrogen exit capacities in category 3 shows the need to open up entire regions for hydrogen in order to ensure the supply of hydrogen to the large number of customers in the distribution grids. The demand reported by the respondents also proves that an efficient hydrogen infrastructure should be developed as early as possible.

Reported WEB hydrogen withdrawals in 2032 for the category 3 projects



Note: it is not always unambiguously possible to allocate the distribution system operators at the district level, which is why a simplified presentation is provided here. Some distribution system operators have been allocated to several districts (cf. also appendix 2).

Source: Transmission system operators