EUROPEAN COMMISSION

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In the published version of this decision, some information has been omitted, pursuant to articles 30 and 31 of Council Regulation (EU) 2015/1589 of 13 July 2015 laying down detailed rules for the application of Article 108 of the Treaty on the Functioning of the European Union, concerning non-disclosure of information covered by professional secrecy. The omissions are shown thus […]		PUBLIC VERSION This document is made available for information purposes only.

Subject: **State Aid SA.113565 (2024/N) – Germany**
Aid for the construction of the Hydrogen Core Network in Germany

Excellency,

1. PROCEDURE

(1) Following pre-notification contacts, pursuant to Article 108(3) of the Treaty on the Functioning of the European Union ('TFEU'), the German authorities notified on 31 May 2024 to the Commission their intention to provide support for the construction and operation of the Hydrogen Core Network ('HCN') (the 'Project').

(2) By letter dated 21 May 2024, Germany agreed to waive its rights deriving from Article 342 TFEU in conjunction with Article 3 of Regulation 1/1958 ([1]) and to have the present decision adopted and notified in English.

([1]) Regulation No 1 determining the languages to be used by the European Economic Community (OJ 17, 6.10.1958, p. 385).

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2. THE PROJECT

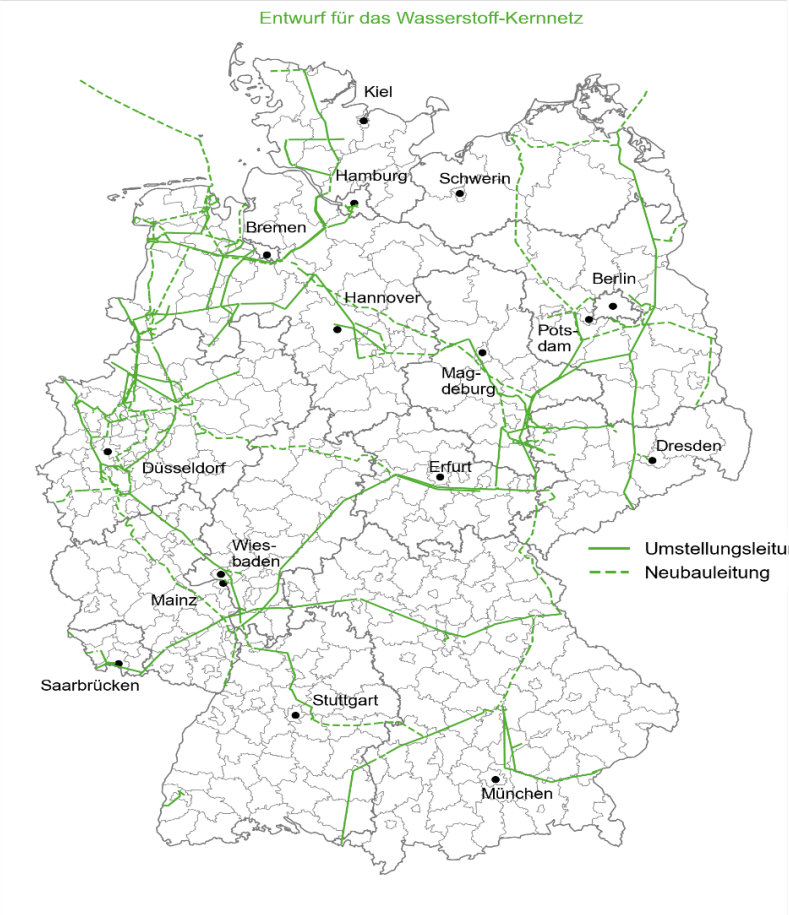
2.1. Project description

(3) The Project consists in the construction and operation of the HCN, which will be the nation-wide backbone of long-distance transmission pipelines for hydrogen in Germany. The HCN will not include distribution pipelines for the local distribution of hydrogen. Hence, connection lines to individual producers or end consumers are generally not part of the HCN (whereas ports or cross-border connection points are included). If future hydrogen transmission pipelines were added in the German system, those would also not form part of the HCN but instead be financed under the regular regulatory system.

(4) The German authorities explain that the HCN will support the decarbonisation of Germany's energy supply and overall economy. Green hydrogen will provide a decarbonised source of energy to energy-intensive sectors of the economy with the highest greenhouse gas emissions that need to rely on gaseous fuels, where no superior alternatives to hydrogen are available. Hydrogen will also enable the storage of electricity for periods in which little or no electricity can be generated with renewable wind and solar power and thereby facilitate the transition of the broader energy sector to renewable sources. This requires an efficient hydrogen transport infrastructure to be in place, otherwise supply and demand cannot be connected in an efficient and timely manner.

(5) The HCN will be the basic framework for the development of the hydrogen infrastructure in Germany. Its aim is to connect key hydrogen locations throughout Germany, such as large industrial centres, storage facilities, power plants, production and import locations.

Figure 1: Result of the modelling of the HCN



Source: Cartographic illustration of the HCN modelled by the TSOs in the indicative HCN application of 15.11.2023 and provided by the German authorities

(6) The German authorities explained that uncertainty about the prospects of the future market for hydrogen prevents potential network operators from investing in the construction of the HCN in a timely manner. Necessary investments would include both repurposing existing natural gas pipelines and building new hydrogen pipelines.

(7) Due to the uncertainty in the future development of the hydrogen market, no final investment decisions ('FIDs') of any major pipeline has been taken. The German authorities submit that in various stakeholder engagement formats, the potential hydrogen operators have made it clear that, in the absence of State support, they would remain unable to achieve FIDs for major hydrogen pipelines for the foreseeable future.

(8) The HCN will be fully regulated under internal energy market legislation, it will therefore be subject to full third party access and tariff regulation. The German authorities confirmed that the project would be in line with Directives

2019/944/EC ([2]) and 2009/73/EC ([3]) as well as with the recently amended internal market legislation for natural gas and hydrogen ([4]).

(9) The Project will also be part of the European hydrogen backbone and, as such, an infrastructure connecting several Member States. The Project will contain, *inter alia*, Projects of Common Interest ('PCIs') such as those included in the 6th PCI list. However, not all transmission pipelines in the network will be PCIs. The HCN is also expected to include (but not be limited to) projects that are part of the IPCEI (Important Project of Common European Interest) Hy2Infra ([5]).

2.2. The market failure

(10) The German authorities explained that the timely development of the HCN was prevented due to coordination problems between potential hydrogen producers and users and potential hydrogen infrastructure developers and operators. These problems constitute a market failure justifying the need for State intervention.

(11) Specifically, the hydrogen industry is still at an early stage of development, therefore due to the current lack of sufficient hydrogen production and demand, there is a lack of incentives for the development of a core hydrogen infrastructure, which in turn is the prerequisite for new demand for hydrogen by users.

(12) The German authorities explained that the transport of hydrogen through the HCN would be a fully regulated industry. The independent regulatory authority (the federal network agency, *Bundesnetzagentur*, 'BNetzA') would have determined, in the absence of the measure, the regulated tariffs for the users of the network on the basis of approvable costs for each HCN operator. These include investment costs (the annual depreciation of CAPEX), financing costs (including a regulated return on equity) and operating costs.

(13) In the absence of intervention, in the early years of the hydrogen ramp-up, the HCN would be used by relatively few users, who would have to be charged prohibitively high fees for using the network to allow the transmission system operators ('TSOs') to cover the substantial investment costs incurred to build it. This would mean that TSOs would not be able to recover costs and it therefore currently prevents

([2]) Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU (recast) (OJ L 158, 14.6.2019, p. 125).

([3]) Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC (OJ L 211, 14.8.2009, p. 94).

([4]) See the press release at https://www.consilium.europa.eu/en/press/press-releases/2023/12/08/gas-package-council-and-parliament-reach-deal-on-future-hydrogen-and-gas-market/ and the REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the internal markets for renewable gas, natural gas and hydrogen, amending Regulations (EU) No 1227/2011, (EU) 2017/1938, (EU) 2019/942 and (EU) 2022/869 and Decision (EU) 2017/684 and repealing Regulation (EC) No 715/2009 (recast), available at https://data.consilium.europa.eu/doc/document/PE-105-2023-INIT/en/pdf .

([5]) Commission decision C(2024) 1053 final of 15 February 2024 in cases State Aid SA.102821 – France, State Aid SA.102810 – Poland, State Aid SA.102825 – Germany, State Aid SA.103494 – Portugal, State Aid SA.102815 – Italy, State Aid SA.102811 – Slovakia, State Aid SA.102807 – The Netherlands – Important Project of Common European Interest on Hydrogen Infrastructure 'Hy2Infra' – RRF (not yet published).

potential network operators from investing large sums to provide the network in a timely manner, and in turn the prospect of prohibitively high fees and uncertainty over the existence of the network discourages investments in the production and use of hydrogen, further shrinking the potential user base. In the absence of the intervention, the infrastructure would therefore not be built.

(14) The German authorities estimated that if the full costs were levied via network tariffs upon few initial users, this would lead to fees as high as 1033 EUR/kWh/h/a ([6]) in 2027, corresponding to 213% of the assumed future price of hydrogen ([7]). The German authorities explain that in comparison, the current German-wide TSO network charge for natural gas currently amounts to 5.10 EUR/kWh/h/a.

2.3. The measure

(15) To overcome this market failure, described at recitals (10) to (14) above, the German authorities devised a measure that will provide private actors the financial and legal security needed to enable long-term planning: hydrogen producers will know that they will be able to supply their future customers efficiently and hydrogen customers will know that the core infrastructure will be in place for them to access hydrogen, all at adequate user fees.

(16) The early development of the HCN thus enables many market participants to invest in the climate-friendly transformation of their business models in a timely manner.

(17) Specifically, to address the market failure, the German authorities have introduced a financial model based on the intertemporal smoothing of the network tariffs, through the creation of an 'amortisation account', backed by a State guarantee (the 'measure').

(18) The construction and operation of the HCN will be financed privately by the future hydrogen TSOs.

(19) The intertemporal smoothing of the network tariffs will work as follows:

i) Ramp-up phase: To prevent very high initial fees, which would be prohibitively high for initial users (which will already have to bear costs for switching to hydrogen usage), the cost-based network tariffs will not be fully charged to the limited initial users. The BNetzA will approve a lower tariff up to the maximum willingness to pay of initial consumers instead, to ensure hydrogen uptake. Charging lower initial tariffs than needed to cover approvable costs is expected to result in initial deficits for the hydrogen TSOs, which will be spread over a multi-year period.

ii) Recovery phase: Once the user base of the HCN will be sufficiently broad, therefore at a more mature stage of the hydrogen market with higher utilisation of the network, BNetzA will set tariffs higher than needed to

([6]) The tariff refers to the price for which a hydrogen user acquires the right to feed in to or out of the HCN 1 kWh of hydrogen per hour for the duration of one year. For a complete transport, an entry and exit booking must be made, so that a total of 2066 EUR/kWh/h/a has to be paid.

([7]) Such an estimate relies on a number of assumptions: future hydrogen price of 130 EUR/MWh and capacity rights used at 85%.

cover the approvable costs of a given year, which are expected to nonetheless be below or up to the maximum willingness to pay of the users as the user base will be broader. Such tariffs are expected to result in profits that will offset losses made in the initial ramp-up phase.

(20) A special purpose vehicle (the 'SPV') will be created by all HCN TSOs together to keep a dedicated account, called the amortisation account. During the ramp-up phase, when TSOs would otherwise be operating at a loss, the SPV will pay the amount required to offset the eligible costs net of the revenues received through user tariffs to the TSOs. The necessary liquidity will be provided by the Kreditanstalt für Wiederaufbau ('KfW') ([8]) on behalf of the Federal Government ([9]) through a loan priced at KfW's own refinancing cost, whose interest will be charged to the TSOs and initially financed by the amortisation account. The loan will be covered by a guarantee from the Federal Government.

(21) During the recovery phase, the additional revenues net of eligible cost coverage will be transferred by the TSOs to the SPV, which will in turn use them to repay the loan principal and interest to KfW.

(22) The amortisation account is required to be balanced by 2055 ([10]). Once the amortisation account is balanced, the financing model comes to an end and the tariffs are formed solely in accordance with the then valid reference tariff methodology of the BNetzA.

(23) The financing model includes a revision mechanism, through which the BNetzA determines every three years whether the amortisation account is on track to be balanced by 2055 at the latest. If the revision exercise projects a remaining balance of the amortisation account by 2055, the BNetzA adjusts the grid fees for future periods to a level that ensures a balanced account by 2055. Only if higher grid fees would have a dampening effect on demand such that that the expectation for the revenues of the HCN overall would be lower than when maintaining lower rates, BNetzA may refrain from adjusting grid fees.

(24) Overall, the measure is therefore designed in such a way that revenues will cover the costs in a long-term perspective, by 2055. However, in case the hydrogen ramp-up remains below the anticipated path determined by the regulator based on scientific expert analysis (e.g. if radical innovation in battery technology greatly reduces the hydrogen demand projected today) and sufficient excess revenue to repay the loan and interests does not materialise, the Federal Government will have to balance the amortisation account by 2055 at the latest.

(25) The Federal Government may decide to cancel the amortisation account already at an earlier date than 2055 to prevent additional costs from accruing. The earliest possible date is 31 December 2038, taking effect on 31 December 2039. In this case, just as when a balance remains in the amortisation account by the end of 2055,

([8]) KfW is a State-owned promotional bank, with the Federal Republic of Germany owning 80% and the German federal states owning the remaining 20%.

([9]) Pursuant to Article 2(4) of the Law Concerning Kreditanstalt für Wiederaufbau (available at: https://www.kfw.de/PDF/Download-Center/Law-Concerning-KfW/KfW-Gesetz-DE-EN.pdf).

([10]) The amortisation account is considered balanced when all debts have been fully repaid.

the Federal State will cover the remaining amount through the general federal budget.

(26) The financing model moreover foresees a burden-sharing mechanism between Federal State and TSOs in case the amortisation account is not fully balanced by 2055. In this case, the Federal State would be entitled to recover part of the costs for covering any remaining balance in the amortisation account in 2055 (or when the Federal Government decides to cancel the amortisation account at an earlier date after 2038) from the TSOs. By the end of 2055, this share would be 24% or the remaining balance. In the event of an early termination, the share is reduced by 0.5 percentage points for each calendar year, starting from the expiry of the term of the amortisation account in 2055. If one or several HCN-TSOs are unable to pay the deductible (in full) due to insolvency, and their share is not paid in cash by one or more of the other HCN-TSOs, all TSOs are obliged to transfer their assets to the Federal Government in return for payment of the imputed residual value (less the deductible). This ensures that the entire HCN is transferred to the Federal government if a pro rata deductible is not paid.

(27) The German authorities confirmed that the measure did not entail any violation of relevant Union law. In particular, it is based on the option provided in Article 5, paragraph 3, of the recast EU Gas Regulation, as adopted by the Council ([11]).

(28) The German authorities submit that the construction and operation of hydrogen pipelines is not subject to a legal monopoly in Germany. German authorities submit that while *operation* of the HCN has many characteristics of a natural monopoly, and conversion of existing infrastructure may have characteristics of a natural monopoly, in this particular case, the relatively high share of newly built pipelines within the HCN is a reason not to consider at least the *establishment* of (parts of) the HCN as a natural monopoly. German authorities set out that the overall revenues of the network and the financial flows on the amortisation account do not distinguish between converted and new-built infrastructure, and the measure is therefore notified as a single measure to enhance the legal certainty security for the financing mechanism that stretches until 2055. German authorities therefore do not argue the activity supported by the measure to constitute a natural monopoly.

2.4. The beneficiaries

(29) The beneficiaries of the measure are all potential HCN TSOs (*Kernnetzbetreiber*) that will construct and operate parts of the hydrogen network. Germany submits that KfW is not a beneficiary. Even though KfW receives the guarantee from the Federal State to cover any remaining balance in the amortisation account, this advantage is fully passed on to the TSOs, because KfW may only charge its own

([11]) '*Member States may allow hydrogen network operators to spread the recovery through network access tariffs of hydrogen network costs over time in order to ensure that future users duly contribute to initial hydrogen network development costs. Such an intertemporal cost allocation and its underlying methodology shall be subject to approval by the regulatory authority. Member States may put in place measures, such as a State guarantee, to cover the financial risk of hydrogen network operators associated with the initial cost recovery gap arising from the application of inter-temporal cost allocation provided that such measures comply with Article 107 TFEU',* Regulation on the internal markets for renewable gas, natural gas and hydrogen, amending Regulations (EU) No 1227/2011, (EU) 2017/1938, (EU) 2019/942 and (EU) 2022/869 and Decision (EU) 2017/684 and repealing Regulation (EC) No 715/2009 (recast), adopted on 21 May 2024 by the Council, available at: https://data.consilium.europa.eu/doc/document/PE-105-2023-INIT/en/pdf.

financing costs for providing liquidity to the amortisation account. Moreover, limited administrative costs incurred by KfW for providing the loan (e.g. costs for external legal or accounting expertise) can be included subject to verification by BNetzA, which will review these costs.

(30) Potential beneficiaries are interested parties who want to become HCN TSOs. These parties can be operators of gas transmission systems, operators of gas distribution networks, operators of hydrogen networks, operators of other pipeline infrastructure that can be converted for the transport of hydrogen, and companies that have registered hydrogen projects with transmission system operators.

(31) In order to become an HCN TSO and, therefore, a beneficiary of the measure, eligible parties are required to submit a joint application for a HCN. The joint application was prepared by a call for interest, which was published on the website of the Association of Transmission System Operators ('FNB Gas') with a press release in both German and English. Any operator of distribution networks, potential and existing hydrogen network operators and operators of other pipeline infrastructures were entitled to respond to the call.

(32) The HCN planning process (see also recital (34) below) emphasised the use of existing infrastructure, reflecting the considerably higher cost effectiveness of repurposing existing natural gas pipelines over building entirely new hydrogen pipelines. The majority of the existing infrastructure is currently operated by German natural gas TSOs which are partly German entities or German subsidiaries of TSOs located in other EU Member States (e.g. Fluxys SA, Nederlandse Gasunie NV). Germany submits that they expect converted pipelines to be operated by hydrogen network operators related to the current owners.

(33) The total number of beneficiaries depends on the submission and approval of the HCN. The public call by the Association of Transmission System Operators (*FNB Gas*) which closed on 28 July 2023 as well as the second public consultation closed on 8 January 2024, have identified a potential range of 12 to 34 operators (12 current gas TSOs and 22 third parties which have indicated their potential interest).

(34) In order to be included in the modelling of the nation-wide HCN, the proposed pipeline infrastructure had to meet the legal requirements of Section 28r EnWG and certain technical criteria:

i) Legal Criteria:

- The planning needed to ensure the development of a Germany-wide, efficient, expandable HCN that can be quickly realised, connecting all essential future hydrogen production sites as well as potential import points with the relevant future consumption points and hydrogen storage. It had to include and connect, in particular, all relevant IPCEI and PCI in the field.
- Furthermore, it had to ensure a safe, inexpensive, consumer-friendly, efficient, environmentally compatible grid-bound supply with hydrogen that is greenhouse gas-neutral while ensuring effective and undistorted competition and the long-term, efficient, and reliable operation of energy supply systems as well as the application of EU energy law.

ii) Technical criteria:

- Submission of a complete infrastructure report form, including a map of the pipeline route.
- Safeguarding a transport-effective internal design pressure of minimum 30 barg due to a minimum transfer pressure of 18 barg to the end customers.
- The reported line infrastructure should primarily serve to enable supra-regional hydrogen transport and must not only be suitable for connecting individual network connection points.
- Ensuring the integrity (safe operation) and quality assurance of the reported hydrogen transport pipeline infrastructure.

(35) The German authorities confirmed that aid under the measure would not be granted to undertakings in difficulty or to an undertaking that is subject to an outstanding recovery order following a previous Commission decision declaring an aid illegal and incompatible with the internal market.

(36) The measure is subject to a standstill clause ([12]). In turn, the financial investment decisions of the TSOs and thereby the joint final application to build the HCN is contingent upon the entry into force of the measure. That is due to the fact that the application entails an obligation to build an infrastructure. Future HCN TSOs can finance the pipelines only with the financing model.

(37) Once the formal application is submitted, BNetzA has two months to approve the submitted infrastructure if the legal requirements are met.

2.5. Financial aspects of the Project

(38) The German authorities have provided the detailed business plan used for the coordination process on the financing mechanism between gas TSOs, the Federal Ministry for Economic Affairs and Climate Action ('*BMWK'*), the Federal Ministry of Finance ('*BMF'*) and BNetzA, reviewed and extended by an independent advisor who validated the financial model ([13]). The business plan provides the central scenario. The German authorities have moreover provided several other sensitivity analyses including a worse-case scenario. The main modelling assumptions,

([12]) Paragraph 28r (10) EnWG provides that subparagraphs 1 to 9 thereof [which set out the rules for financing the HCN] shall only be applicable as from the end of the day in which the ministry for economy and climate protection has published a State aid approval decision by the European Commission in the *Bundesgesetzblatt,* and only in line with the conditions of this approval decision (*Die Absätze 1 bis 9 sind erst nach Ablauf des Tages, an dem das Bundesministerium für Wirtschaft und Klimaschutz eine von der Europäischen Kommission erteilte entsprechende beihilferechtliche Genehmigung mit Angabe des Datums im Bundesgesetzblatt bekannt gemacht hat, und nur nach Maßgabe dieser Genehmigung, anzuwenden.*). Paragraph 28s(6) EnWG provides the same for subparagraphs 1 to 5 thereof [on balancing of the amortisation account].

([13]) See 'Expert opinion on the validation of a private sector financing approach for the deployment of a core hydrogen network', Fraunhofer Research Institution for Energy Infrastructures and Geothermal Systems IEG, 14 February 2024 (available at: https://www.bmwk.de/Redaktion/DE/Downloads/G/gutachterliche-validierung-des-finanzierungsmodells-zum-aufbau-eines-wasserstoff-kernnetzes-bei-subsidiarer-staatlicher-absicherung.pdf?__blob=publicationFile&v=6).

required investments, operational expenditures and revenues and the financial return on the Project are summarised below.

2.5.1. Reference Project

(39) The business plan is based on a Reference Project, as the call for applications for the selection of the pipelines and operators that will be part of the HCN has not been closed.

(40) The assumption on which infrastructure (pipelines and compressors) will be part of the HCN, as provided in the business plan, has been modelled starting from the HCN scenario that was the result of the Hydrogen Production and Demand - HPD ('Wasserstoff Erzeugung und Bedarf – WEB') market survey from the Gas Network Development Plan 2022-2032 (FNB Gas, 2023), which was adjusted using the latest information ([14]).

(41) The scenario for the HCN is based on the following criteria:

- The Project is part of an IPCEI or PCI process.
- The Project serves to integrate the HCN into a (prospective) European hydrogen network.
- The Project is part of a real-world laboratory for the energy transition, which is funded by the BMWK.
- The Project serves to decarbonize the industrial sectors and processes ([15]).
- The Project serves to feed in hydrogen produced by electrolysis plants.
- The Project serves to store hydrogen and has been pre-notified as an IPCEI project or has concrete indications of investment.
- Combined heat and power plant ('CHP') locations from the market master data register with an electrical CHP capacity of more than 100 MW were considered.

(42) Based on the criteria outlined in recital (41) above, and taking into account a regional balance, projects were included in the scenario for the HCN and are therefore included in the modelling.

(43) As shown in Table 1 below, the reference project of the HCN includes 9720.5 km of pipelines, of which approximately 60% will be natural gas pipelines to be repurposed for the transport of hydrogen, and compressors with cumulative power of 291 MW.

Table 1: Key characteristics of the modelled HCN

([14]) For example, projects that are no longer being pursued, as far as the transmission system operators are aware, were removed. Analyses of the hydrogen strategies of the federal states and feedback on specific projects from the federal states were also incorporated into the scenario.

([15]) Specifically, in the sectors of iron and steel production, chemicals, refineries, glass industry including glass fibre, ceramics and brick products.

Project type	Pipelines length (km)	Pipelines diameter (min-max), DN	Pipelines gauge pressure (min-max), Barg	Compressors power (MW)	Pipelines CAPEX (EUR million)	Compressors CAPEX (EUR million)
New by natural gas TSOs	3 960.7	200 - 1 400	64 - 120	291	14 432.6	1 698
Repurposed by natural gas TSOs	5 049.8	200 - 1 400	40 - 100	N/A	3 148.9	N/A
New and repurposed by others	710.1	80 - 600	25 - 100	N/A	512.9	N/A
Total	9 720.6	80 - 1 400	25 - 120	291	18 094.4	1 698

Source: Information provided by the German authorities based on the indicative HCN application provided by the TSOs on 15.11.2023

2.5.2. Costs

(44) Table 1 moreover illustrates that the overall estimated CAPEX for the pipelines and the compressors respectively is equal to EUR 18.1 billion and EUR 1.7 billion, for a total of EUR 19.8 billion.

(45) The German authorities used, for the CAPEX calculation, generalized cost rates per meter for natural gas pipelines and per MW for compressors, unless the operators already had available measure-specific estimates. They explain that this is a well-established methodology that they have used for several years for the German Network Development Plan ('NDP') ([16]).

(46) The increase in construction costs was calculated using price indices as these specific costs have increased from 2021 to 2023 by […] ([17]). Moreover, a further increase of […] for higher costs for newly built hydrogen pipelines (compared to natural gas pipelines) has been included to account for the technical challenges associated with hydrogen, which requires a higher level of safety due to its chemical properties and additional amounts of materials needed to extend its technical service life.

([16]) The specific cost (CAPEX) assumptions of the NDP 2022-2032 for natural gas pipelines and compressor stations, used for the business plan, can be found in Tables 60 and 61 of the German NDP 2022-2023.

([17]) The price indices pursuant to the Gas Network charges Ordinance (GasNEV) were used to determine the construction cost increases.

(47) For repurposed pipelines, the German authorities assume costs of repurposing to be 20% of the cost of comparable newly built pipelines.

(48) Finally, a generalized add-on for ancillary facilities (i.e. control and measurement stations) of […] of CAPEX for newly built and […] of repurposing costs for repurposed pipelines has been included.

(49) The German authorities moreover explained that they chose a standard approach to determine the operating costs. In particular, the methodology is based on the provisions on the recognition of generalized operating costs for investment measures pursuant to paragraph 23 of the *Verordnung über die Anreizregulierung der Energieversorgungsnetze* (ARegV, incentive regulation decree for energy grids). These were determined after analyses of actual operating costs in regulations of the BNetzA.

(50) For newly built pipelines annual operating costs are calculated as 0.8% of the investment costs of these pipelines. In the case of converted pipelines, the projected annual operating costs amount to 0.8% of the investment costs of comparable newly built pipelines. Hence, newly constructed and repurposed pipelines enter the HCN modelling with the same OPEX per km of pipeline length. Annual operating costs of 1.5% of the investment costs of compressor stations are forecasted for compressor stations. In addition, the annual costs for fuel energy to operate compressor stations were accounted for.

(51) The German authorities explain that both tariffs and costs (CAPEX and OPEX) are assumed to increase in line with annual HICP index.

(52) The German authorities provided that the timeline for construction has been derived in line with representative CAPEX projects the Gas TSOs have carried out in the past. It foresees a schedule for pipeline projects (new built) taking 7 years on average from the moment the final investment decision is taken. The German authorities furthermore explained that projects which include the repurposing of currently existing natural gas assets have to be considered individually, taking into account local technical constraints or necessities. However, they estimate that on average repurposing will need significantly less time than new constructions, estimated at 3-4 years.

2.5.3. Ramp-up scenario and tariffs

(53) The German authorities explained that the hydrogen ramp-up is modelled in line with a scientific long-term scenario of the transformation of the energy system in Germany, from the project '*Langfristszenarien für die Transformation des Energiesystems in Deutschland*' ([18]). From the various scenarios developed modelling hydrogen demand, the business plan provided by Germany uses the scenario 'T45-Strom', delayed by 3 years ([19]). They explain that they chose this

([18]) https://langfristszenarien.de/enertile-explorer-en/scenario-explorer/this-project.php

([19]) The German authorities have decided to use the scenario delayed by 3 years based on the advice of external experts, Fraunhofer Research Institution for Energy Infrastructures and Geothermal Systems IEG. They submit that the delay by three years provides a conservative estimate as regards the speed of hydrogen system development, taking into account both possible delays in infrastructure and equipment investments and possibly slower demand side investment decisions in case of remaining uncertainties regarding the overall hydrogen development.

scenario because it is the most technologically open out of the long-term scenarios. In this scenario, greenhouse gas neutrality is achieved at the lowest economic costs (because of a high level of direct use of renewable electricity).

(54) In the selected scenario 'T45-Strom', hydrogen demand is modelled to come almost solely from industry and electricity generation (while there is hardly any hydrogen demand from the building and transport sectors). They explain that the modelling is thus based on a relatively conservative scenario.

(55) The ramp-up tariff charge in the business plan is set to EUR […]/kWh/h/a ([20]). Keeping all other assumptions fixed, this charge reflects the minimum charge which is required for a full payback of the amortization account by 2055. The German authorities provided estimations showing that such a price is expected to be below the maximum willingness to pay of users by arguing that it would account for less than […]% of the price for hydrogen ([21]). While significantly higher per kWh/h/a than current network charges for natural gas systems (see recital (14)), German authorities submit that this assumed ramp-up tariff charge would be similar in relative terms to that currently applied to natural gas, where network charges currently account for approximately […]% of the price of natural gas ([22]).

(56) BNetzA has not calculated the actual ramp-up tariff yet. It will be subject to a separate determination procedure. The determination will be based on complex forecasts of future costs, demand development and the willingness to pay of the final customers. Regarding all these elements BNetzA will set a tariff that is supposed to be suitable to balance the amortization account by 2055 and that will not be prohibitive.

2.5.4. Alternative financing in the absence of State aid

(57) The business plan assumes that in the absence of State aid, the HCN TSOs would need to obtain commercial loans to cover losses in the ramp-up phase.

(58) To determine the base rate and margin of the commercial loan, the German authorities have referred to the Communication from the Commission on the revision of the method for setting the reference and discount rates ('Reference Rate Communication') ([23]). Based on the methodology provided in the Reference Rate Communication, commercial loans are assumed to bear a base interest rate of 4%, and a margin of 5.81% until 2039 and 1.96% in 2040, which decreases over time to 1.85% in 2055 as the collateral increases. The methodology and its practical

([20]) The tariff refers to the price for which a hydrogen user acquires the right to feed in or out to the HCN 1 kWh of hydrogen per hour for the duration of one year. For a complete transport, an entry and exit booking must be made, so that a total of […] EUR/kWh/h/a has to be paid.

([21]) Such an estimate relies on a number of assumptions: future hydrogen price of […] EUR/MWh and capacity rights used at […]%. The German authorities note, however, that from today's perspective, the future maximum willingness to pay is very difficult to assess, given that the German, European and global hydrogen market does not yet exist and even the regulatory regime for it has not yet been fully determined.

([22]) Estimate based on assumptions regarding usage of […]% and commodity price of approximately […] EUR/MWh.

([23]) OJ C 14, 19.1.2008, p. 6.

application to the measure are explained in detail in Section 2.6, recitals (67) to (69) below.

2.5.5. Financial structure

(59) The German authorities explained that while the BNetzA does not have requirements on the financial structure of HCN TSOs, an inefficient capital structure will not be rewarded by the regulation. In the regulatory system, equity ratios above 40% are assumed to be inefficient and equity above 40% is remunerated as if it was debt. Consequently, the business plan assumes a share of 40% of the regulated fixed asset base to be financed by equity by the HCN TSOs and a share of 60% to be financed through loans.

2.5.6. Lifetime of the Project and Residual value

(60) The technical life cycle assumed for the HCN is of 35 years, shorter than the typical regulatory lifespan of natural gas pipelines, which ranges from 30 to 65 years (depending on the pipeline material). The German authorities explain that this is due to the fact that hydrogen as a commodity has different characteristics regarding stress corrosion potential paired with the need for changing more often the pressure conditions in the pipelines due larger expected swings in demand patterns. German authorities set out that if in the future more experience is gained on the operation of hydrogen pipelines and their technical characteristics, this regulatory lifespan may be updated by the national regulatory authority in its determination of network charges.

(61) For the period after 2055, the residual value of the HCN is estimated to be equivalent to the residual book value of EUR 4 billion. The German authorities explain that this assumption is justified as the intertemporal smoothing of the network tariff will cease to apply in 2055 and the applicable tariff will be determined by BNetzA to cover the remaining Regulatory Asset Base (RAB), on the basis of approvable costs for each HCN operator. In particular, the German authorities explain that the approved regulated revenues will be limited by the remaining book value of the regulated asset base. German authorities set out that the TSOs cannot earn any revenue with the HCN other than from regulated network charges, and revenues from those regulated network charges are equivalent to the remaining depreciation (plus allowed margin). An overcompensation by underestimating the residual value would thus be excluded. The regulated tariff for this period is estimated at 6 EUR/KW ([24]) in 2056 and will decrease to 2 EUR/KW after 2067, once all approved CAPEX has been depreciated, accounting only for remaining OPEX of the system.

2.5.7. WACC

(62) The German authorities explained that the discount rate applied to the funding gap calculation is set at 6.69% which is the allowed return on equity for the HCN operators set by BNetzA. This is because project cashflows used to determine the funding gap reflect 'equity' cashflows to project owners after interest expense to

([24]) This estimate does not include any replacement expenditures in the infrastructure, as the extent of such expenditures depends on the successful ramp-up of the hydrogen market.

be paid on debt. Consequently, these cashflows are discounted at the allowed return on equity at the regulated level of 6.69%.

2.6. Funding gap and aid amount

(63) On the basis of the base case scenario of the business plan, the German authorities have provided the present value of the grant equivalent, which corresponds to the aid amount, and the calculation of the funding gap related to the Project, i.e. the negative net present value of the cash flows triggered by the Project for the private investors, absent State support. These calculations rely on the financial projections of the business plan as described in Section 2.5 above. The counterfactual scenario for this Project is that no alternative project would be built.

(64) To enable the intertemporal cost-allocation mechanism, the KfW provides loans to the SPV holding the amortisation account at a price in line with its own refinancing costs. KfW does not charge an additional credit risk margin because the loans are fully guaranteed by the Federal Government.

(65) Therefore, the gross grant equivalent of the loan is the present value of the margin at market costs multiplied by the expected amount lent by KfW, which corresponds to the expected loss in the ramp-up phase.

(66) The German authorities have submitted that the market does not provide guarantees for the type of transaction envisaged by the German authorities. Further, they submitted that there exists no similar non-guaranteed financing arrangement with a specific market interest rate the HCN TSOs would have borne without the guarantee. Specifically, the German authorities argued that the long duration of the intertemporal financing, the uncertainty about the exact amount to be covered by the loan, and the novel activity of financing the HCN are the factors that lead to the lack of any market benchmark that would be available.

(67) In the absence of a comparable transaction on the market which could serve as a reference for the margin of the loans, the German authorities have referred to the Reference Rate Communication to determine the base rate and margin needed to calculate the aid value. The Reference Rate Communication sets out a table with margins to be applied in principle depending on the rating of the undertaking concerned and the collateral offered ([25]).

(68) Accordingly, the margin is derived from the parameters of (a) rating category, (b) collateralisation; and the disbursement and repayment profile.

(a) Rating category. For purposes of determining a rating category, the project can be divided into two phases:

– The first phase is characterised by comparatively high uncertainty on the success or not of the hydrogen ramp up and is therefore assigned to the 'weak' rating category for reasons of prudence. This phase runs until 31 December 2039, the date on which a possible cancellation of the

([25]) Since KfW is charging its refinancing costs for the loan, the calculation of the gross grant equivalent is limited to the difference to the applicable margin based on the Reference Rate Communication.

amortisation account by the Federal Government would become effective for the first time.

– By 1 January 2040 at the latest, the project will then qualify as a stable infrastructure project, which usually means that it will be assigned at least the rating category 'good' ([26]). This is because the Federal Government would terminate the amortisation account by end of 2039 if no stable business model for the HCN had been established until this point in time (as the continuation of the financing model would only result in higher costs to be covered by the end of 2055).

(b) Collateralisation. The loans further have to be divided into two tranches – one with and one without collateral:

– The law establishes a statutory recourse to HCN operators for 16% to 24% of the loans. The German authorities consider that this recourse to the core network operators is valuable, as the core network operators are jointly liable for this obligation and need to transfer ownership in the HCN in case of failure to meet the obligation ([27]). The extent of the recourse increases by 0.5 percentage points annually starting with 16% for the balance at the end of 2039 up to 24% at the end of 2055. A 'high' level of collateralisation is assumed for the amount secured by this pro rata recourse claim.

– The second, remaining tranche of the loan is unsecured, i.e. the collateralisation is considered 'weak'.

(69) The above considerations are reflected as follows in the calculation of the margin, whereby a blended rate to cover both the collateralised and uncollateralised tranches of the loan for each individual year is calculated ([28]):

– In the first phase up to 31 December 2039 with a weak rating category (B), a margin of 650 basis points ('bps') ([29]) is used for 84% of the loan with weak collateralisation and 220 bps for 16% of the loan with high collateralisation.

– In the subsequent phase with a good rating category (BBB), which starts in 2040, the margin for the unsecured portion is 220 bps and for the collateralised portion 75 bps. The collateralised portion gradually increases to up to 24% in 2055.

([26]) After the ramp-up phase and in a scenario in which the German government does not consider the termination of the amortisation account to be advantageous, Germany expects a stable business model for HCN operators. Their economic parameters should then correspond to those of the large transmission system operators in the electricity sector. These are all rated in the investment category, so that the corresponding rating category 'good' is justified for the group of HCN operators.

([27]) The recovery against the TSOs is not limited to their ownership of the HCN. In case the HCN was worth less than the joint liability of the TSOs, the Federal Government could also recover the remainder from the TSOs other assets.

([28]) For example, for the year 2039 with a collateralised portion of 16%, this results in a blended rate of 5.81% p.a. (84% * 6.50% + 16% * 2.20% = 5.81%).

([29]) 100 bps are equal to 1%.

(70) The nominal aid value of the respective year is then determined by applying the blended rate to the expected loan amount which would cover the balance of the amortisation account as of 31 December of each year in the ramp-up phase. For the calculation of the nominal value of the loan each year, which corresponds to the expected loss each year, the German authorities relied on the base case scenario of the business plan described in the previous section.

(71) Based on the business plan, the German authorities estimate that aid amounts to EUR 3.018 billion and that the funding gap also amounts to EUR 3.018 billion, using 6.69% as discount rate for both the funding gap and the aid amount calculation (see recital (62)). Therefore, the expected funding gap is equal to the expected aid amount under the measure, hence proportionality is ensured.

(72) The German authorities moreover provided a robustness check, where it is hypothetically assumed that the HCN would become a stranded asset based on the assumption of a cancellation of the project in 2039. The German authorities explain that the measure could in principle result in the payment of a larger amount of aid than estimated in the central scenario presented by the German authorities, however, the aid amount would be below the hypothetical funding gap even in the worst-case scenario. Assuming a cancellation of the project in 2039, the funding gap of the project would increase significantly, given the short operation period in which the HCN generated revenues (which would also be expected to be lower than in the business plan, as otherwise the project would not be cancelled). Given the 16% participation of the TSOs in bearing the remaining amounts due on the amortisation account, the aid amount, even though also higher than expected under recital (71)), would always remain lower than the gap which would have needed to be bridged to make the investment viable. In such a case, the funding gap consists of 100% of the remaining balance of the amortisation account at year-end 2039, while the statutory recourse of 16% in case of cancellation by year-end 2038 (see recital (68)) limits the aid amount to 84% of the remaining balance at year-end 2039 ([30]) plus the cumulated interest rate differential ([31]).

2.7. Cumulation

(73) The HCN is expected to include (but not be limited to) projects that are part of the IPCEI (Important Project of Common European Interest) Hy2Infra ([32]) and that will receive aid in the form of grants under separate State aid permissions for Hy2Infra.

([30]) The 2039 balance used to calculate the aid amount is lower than the 2039 balance used to calculate the funding gap, reflecting the interest rate differential between KfW loans priced at its own refinancing costs and assumed market costs.

([31]) To provide one example calculation for a hypothetical extreme case, where a) annual hydrogen demand is assumed to be only […]% of what is projected in the base case and where b) the BNetzA cannot raise the ramp-up tariff charge above EUR […]/kWh/h/a to make up for the shortfall (hence the cumulated annual revenue of the HCN is just […]% of the base case revenue), the following present values would result: funding gap of EUR […] billion; aid amount of EUR […] billion.

([32]) Commission decision C(2024) 1053 final of 15 February 2024 in cases State Aid SA.102821 – France, State Aid SA.102810 – Poland, State Aid SA.102825 – Germany, State Aid SA.103494 – Portugal, State Aid SA.102815 – Italy, State Aid SA.102811 – Slovakia, State Aid SA.102807 – The Netherlands – Important Project of Common European Interest on Hydrogen Infrastructure 'Hy2Infra' – RRF (not yet published).

(74) The German authorities explained that any grant received under the IPCEI Framework or potentially from any other sources of financing will be directly and fully subtracted from the CAPEX when the BNetzA determines the approvable costs that the regulated infrastructure is allowed to recover.

(75) Specifically, the approvable costs for each HCN operator are determined by the BNetzA as a sum of the following: a) the annual depreciation of assets, b) the financing costs including a regulated return on equity (including the consideration of business tax) and c) the operating costs (e.g. maintenance costs, costs related to the amortisation account, administrative costs etc.).

(76) Therefore, the German authorities explain that the cumulation with grants under the IPCEI Framework does not result in double counting, as these have been deducted from the CAPEX in the business plan considered for the funding gap calculations above in Section 2.6 and overcompensation is avoided.

2.8. Legal basis and budget

(77) With regard to national legislation, the legal basis for the Measure are paragraphs 28r and 28s of the Energy Industry Act (*Energiewirtschaftsgesetz*, '*EnWG'*).

(78) The financing model is based on the third party access and tariff regulation of the HCN. The BNetzA started a consultation procedure on the draft for the tariff regulation on 9 April 2024 ([33]).

(79) The German authorities explain that given that the guarantee is based on a legal provision in the EnWG and independent scientific analysis has confirmed that it is unlikely to be drawn, the measure is neutral for the federal budget, in the sense that no payment by the Federal Government under the measure is expected to take place.

(80) However, the budget of the measure can be understood as the expected aid amount, as reported in section 2.6.

(81) Paragraphs 28r and 28s of the EnWG, which set out fundamental principles on the financing of the HCN and the balancing of the amortisation account, also include a standstill clause providing that the provisions on the financing model for the Project will only apply after the notification of the Commission's decision authorising the measure.

2.9. Transparency

(82) The German authorities have confirmed that the full text of the measure will be published on a comprehensive State aid website. The HCN TSOs need to apply jointly to become joint beneficiaries (see recital (31)).

(83) Germany confirms that (i) information will be published in such a way as to allow easy access to the information, (ii) that the information will be published in a format, which allows data to be effectively searched, extracted, downloaded and

([33]) Available at: https://www.bundesnetzagentur.de/DE/Beschlusskammern/GBK/Rahmen_Ebene1/WANDA/Wanda_Beschlussentwurf.pdf?__blob=publicationFile&v=4.

(iii) that the general public has access to the website without restrictions and no prior user registration is required to access the website.

2.10. Evaluation Plan

(84) The German authorities notified, together with the measure, an evaluation plan, taking into account the best practices recalled in the Commission 2014 Staff Working Document on a Common methodology for State aid evaluation. The main elements of the evaluation plan are described below.

(85) The evaluation plan describes the objectives of the measure and comprises evaluation questions that, through both quantitative and qualitative analysis, address the direct and indirect effects of the measure, as well as its proportionality and appropriateness.

(86) The questions addressing the direct effect of the aid will mainly investigate the scheme's contributions to: resolving the market failure with regard to the development of the HCN and ensuring that the HCN will be repaid through user fees by 2055.

(87) A set of questions will address the indirect effects of the aid on: the development of local distribution hydrogen infrastructure to support the decarbonisation of Germany's energy supply and overall economy; the impact on the development of an EU-wide hydrogen network and on the trade in hydrogen; the development of the hydrogen market; the effect on the development of privately funded hydrogen infrastructure in neighbouring countries.

(88) The evaluation plan describes the result indicators that will be used to measure the degree of achievement of the measure's objectives in relation to the evaluation questions, and the methodology to be used to determine the impact of the measure.

(89) The specific characteristics of the scheme pose some methodological issues that shall be considered when estimating the causal effect associated with the aid. Given the characteristics of the measure, it is unlikely that HCNs will be built at sufficient speed without the aid support, which jeopardises the possibility of establishing a control group based on HCNs built in absence of support. Germany considers that the most suitable methodology to be applied for the purpose of the evaluation of the effectiveness of the aid scheme on beneficiaries might be to compare actual outcomes with simulated counterfactual scenario to avoid distortions from feedback effects between (subsidized) supply and demand, which in turn would have positive effects on supply potentially not distinguishable from those directly induced by the intervention under scrutiny. For evaluation of the effects of the measure on the level of hydrogen customers, Germany considers exploiting the heterogeneity in the provision of hydrogen transport capacity due to the financing model of the HCN. Undertaking the staggered time of the infrastructure realisation allows to consider areas where projects that at time, say *t*, are not started yet as the "control" group of areas that, instead, have already started over the same time. By exploiting the fact that the HCN will not be put into operation at a single point in time, but rather will be created over the period from 2025 to 2032 (or even 2037 at the latest), this will allow to causally estimate the effect of the infrastructure on the investment behaviour and production methods of local industrial companies.

(90) The data necessary for the assessment of the direct and indirect effects and of the proportionality and appropriateness of the measure will be drawn from: an initial study already available to validate the sustainability of the funding model and the data bases to be produced as part of the periodic revision mechanism by BNetzA detailing the development of demand and costs.

(91) The data collected will be made available to the independent experts carrying out the evaluation.

(92) The interim and final evaluation reports will be submitted, respectively, on 31 December 2038 and 31 December 2056.

(93) The evaluation plan will be published on the relevant section of the website of the Federal Ministry of Economic Affairs and Climate Action.

(94) The ex-post evaluation will be carried out by an independent expert. The independent external expert(s) will be selected through a transparent process following a public tender: the selection procedure will ensure that the expert(s) are independent of both the Federal Government and the regulatory authority.

3. ASSESSMENT

3.1. Existence of State aid according to Article 107(1) TFEU

(95) According to Article 107(1) TFEU, '*[s]ave as otherwise provided in the Treaties, any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, in so far as it affects trade between Member States, be incompatible with the internal market*'.

(96) The qualification of a measure as aid within the meaning of this provision therefore requires the following cumulative conditions to be met: (i) the measure must be imputable to the State and financed through State resources; (ii) it must confer an economic advantage to one or several undertakings; (iii) that advantage must be selective; and (iv) the measure must distort or threaten to distort competition and affect trade between Member States.

3.1.1. Imputability to the State and involvement of State resources

(97) In order to be considered as involving State aid within the meaning of Article 107(1) TFEU, the measure in question must be imputable to the State. In the present case the Commission notes that the measure is imputable to the State as the State Guarantee will be granted by the German authorities.

(98) The aid in question must also be granted directly or indirectly through State resources. In the present case, the financing of the Project – through the amortization account – relies on the resources of KfW, a State-owned promotional bank acting on behalf of the Federal Government. In particular, as described in recital (20), Germany mandated KfW to provide financing at its refinancing cost, pursuant to Article 2(4) of the Law Concerning Kreditanstalt für Wiederaufbau. In case the HCN TSOs were not able to reimburse the financing as planned, Germany would reimburse KfW by means of payment under the State guarantee.

(99) In light of the above, the measure is imputable to the State and involves a transfer of State resources.

3.1.2. Economic Advantage

(100) The Commission notes that the measure will provide an economic advantage to the beneficiaries: future HCN TSOs will benefit from a lower interest on the financing received than what they would need to bear under normal market conditions, since this financing is provided without charging an interest margin. Thus, the financing provided by KfW confers an economic advantage on its beneficiaries, which they would not have obtained under normal market conditions. The Commission observes that KfW is acting on behalf of the Federal Government and does not retain any undue advantage by ultimately providing the financing to the HCN TSOs, as explained in recitals (20) and (29).

3.1.3. Selectivity

(101) The advantage granted by the measure is selective, since it is awarded only to the undertakings that will be selected to become HCN TSOs. Moreover, it is granted only to undertakings that will operate the HCN, while other hydrogen pipelines, including distribution level pipelines and future transmission pipelines, are not included in the measure and it cannot be excluded that additional long distance pipelines will be added subsequently.

3.1.4. Impact on competition and on trade between Member States

(102) The Commission Notice on the notion of State aid ('NoA') ([34]) contains indications that are relevant to assess whether or not investment support for energy infrastructure constitutes State aid. According to point 217 NoA, such support is in principle liable to constitute State aid. However, according to point 188 NoA, under certain cumulative conditions, aid to undertakings which are in a position of legal monopoly does not constitute aid.

(103) Moreover, pursuant to point 375 of the Commission Guidelines on State aid for climate, environmental protection and energy ('CEEAG'), a possible distortion of competition is excluded where the energy infrastructure is run under a 'natural monopoly', if the following cumulative conditions are met:

a) an infrastructure faces no direct competition, which is the case where the energy infrastructure cannot be economically replicated and hence where no operators other than the TSO/DSO are involved;

b) alternative financing in the network infrastructure, in addition to the network financing, is insignificant in the sector and Member State concerned;

c) the infrastructure is not designed to selectively favour a specific undertaking or sector but provides benefits for society at large.

([34]) Commission Notice on the notion of State aid as referred to in Article 107(1) of the Treaty on the Functioning of the European Union (2016/C 262/01).

d) Member States also have to ensure that the funding provided for the construction and/or operation of the energy network infrastructure cannot be used to cross-subsidise or indirectly subsidise other economic activities.

(104) In the present case, the Commission observes that the HCN will not be the only network of hydrogen transport pipelines in Germany, as the Project does not cover distribution pipelines and it cannot be excluded that additional transport pipelines will be built *ex post* outside of the HCN Framework. Hydrogen is traded between Member States, and Germany will be connected to the EU grid.

(105) The construction and operation of hydrogen pipelines is not subject to a legal monopoly in Germany. Also, in view of the uncertain developments on the hydrogen market, the question of whether the *operation* of existing Hydrogen pipelines constitutes a natural monopoly can be left open, even though the German authorities recognize that the construction and operation of new pipelines could be undertaken by a number of different undertakings. At least as regards those pipelines which are not converted from natural gas but new-built as hydrogen pipelines, there is thus at least potential competition *for* the market. Where there is potential competition *for* the market, even a legal monopoly does not exclude the existence of aid (point 374 (b) of the CEEAG and point 188 (b) of the Commission Notice on the notion of State aid as referred to in Article 107(1) of the Treaty on the Functioning of the European Union[35]). Similarly, where there is still potential competition for the market, a natural monopoly cannot (yet) exist. While one could argue that the conversion of existing natural gas pipelines into hydrogen pipelines can only be implemented by the current owner/operator of the natural gas pipeline, the measure also includes support for a significant portion of fully new built pipelines. As set out by Germany, overall revenues of the network and the financial flows on the amortisation account do not distinguish between converted and new-built infrastructure. If the amortisation account is not fully balanced at the time of termination of the mechanism, Germany would be entitled to transfer of ownership and control of the entire HCN, and all TSOs would be liable for their share of the obligation to balance the account. The measure constitutes a single measure, and it is sufficient that part of the supported infrastructure is subject to competition for the market to establish that the measure as a whole is liable to impact competition.

(106) The measure may strengthen the position of the undertakings that will be selected to become HCN TSOs on the EU market for the transport of hydrogen. It follows that the measure is likely to distort or threaten to distort competition and affect trade between Member States.

3.1.5. Conclusion regarding the existence of State aid

(107) Based on the above-mentioned elements, the Commission concludes that the measure constitutes State aid within the meaning of Article 107(1) TFEU.

3.2. Lawfulness of the aid

(108) The national legal basis of the measure includes a standstill clause providing that the regulations regarding the financing model for the Project will only enter into force after the notification of the Commission's decision authorising the measure

[35] OJ C 262, 19.7.2016, p. 1.

(see recital (81)). By notifying this measure before putting it into effect, the German authorities have, therefore, respected the notification and standstill obligations laid down in Article 108(3) TFEU.

3.3. Compatibility of the aid

3.3.1. Legal basis for assessment

(109) Article 107(3), point (c) TFEU states that aid to facilitate the development of certain economic activities or of certain economic areas may be considered to be compatible with the internal market where such aid does not adversely affect trading conditions to an extent contrary to the common interest. Thus, in order to be capable of being considered compatible with the internal market under that provision, State aid must meet two conditions, the first being that it must be intended to facilitate the development of certain economic activities or of certain economic areas and the second, expressed in negative terms, being that it must not adversely affect trading conditions to an extent contrary to the common interest ([36]).

(110) In the present case, the measure aims to support the construction of the HCN in Germany, which constitutes a hydrogen energy infrastructure within the meaning of point 19(36)(c) CEEAG.

(111) The Commission has, therefore, assessed the compatibility of the measure on the basis of the general compatibility provisions set out in section 3 CEEAG and the specific compatibility criteria set out in section 4.9 CEEAG (aid for energy infrastructure).

3.3.2. The aid facilitates the development of an economic activity (positive condition)

3.3.2.1. Identification of the economic activity which is being facilitated

(112) In line with points 23 to 25 CEEAG, Member States must identify the economic activities that will be facilitated as a result of the aid and describe if and how the aid will contribute to the achievement of Union policies and targets.

(113) In the present case, the aid will facilitate the development of the HCN in Germany, which will be part of the broader European hydrogen pipeline transport network, thereby developing the trade in hydrogen and will supports the decarbonisation of Germany's energy supply and overall economy. Therefore, the measure supports the development of trade in hydrogen in Germany and Europe, which is fully aligned with the EU Hydrogen strategy for a climate neutral Europe ([37]).

(114) In line with point 371 CEEAG, the Commission considers that modern energy infrastructure is crucial for an integrated energy market that meets climate targets while ensuring security of supply in the Union. Adequate energy infrastructure is a

([36]) Judgment of 22 September 2020, *Austria v Commission*, C-594/18P, EU:C:2020:742, paragraphs 18 and 19.

([37]) See in general the Communication from the Commission: A hydrogen strategy for a climate-neutral Europe, 08.07.2020, COM(2020).

necessary element of an efficient energy market. Improving energy infrastructure enhances system stability, resource adequacy, integration of different energy sources and energy supply in under-developed networks.

(115) In view of the above, the Commission concludes that the measure contributes to the development of trade in hydrogen, improving the energy infrastructure network and contributing to the decarbonisation of the German and EU economy.

3.3.2.2. Incentive effect

(116) According to point 26 CEEAG, aid can be considered as facilitating an economic activity only if it has an incentive effect. An incentive effect occurs when the aid induces the beneficiary to change its behaviour, to engage in an additional economic activity or in a more environmentally-friendly economic activity, which it would not carry out without the aid or would carry out in a restricted or different manner. The aid must not support the costs of an activity that the aid beneficiary would anyhow carry out and must not compensate for the normal business risk of an economic activity (point 27 CEEAG).

(117) Proving an incentive effect entails the identification of the factual scenario and the likely counterfactual scenario in the absence of aid (point 28 CEEAG). For aid to infrastructure, the counterfactual scenario is presumed to be the situation in which the Project would not take place (point 381 CEEAG).

(118) In the present case, Germany submitted that in the absence of the aid, the future HCN TSOs would not have the incentive to undertake the material investments required for the construction and operation of the HCN. The analysis provided by Germany shows that without the measure, the construction and operation would not take place because the expected market revenues do not suffice to ensure viability of the Project, leading to a funding gap (see recital (13), with the determination described in section 2.6). This confirms the presumption under point 381 CEEAG.

(119) According to point 29 CEEAG, aid does not have an incentive effect for the beneficiary in cases where the start of works on the project or activity took place prior to a written aid application by the beneficiary to the national authorities. In cases where the beneficiary starts implementing a project before applying for aid, any aid granted in respect of that project will, in principle, not be considered compatible with the internal market.

(120) In the present case, however, the potential HCN TSOs have not yet taken the Final Investment Decision to build the Project and works on the Project have not yet started. As explained in recital (31), to become an HCN TSO, and therefore become a beneficiary of the measure, eligible parties are required to submit a joint application for a HCN. The final call of interest, which contains an obligation to carry out the Project if selected, has not been open yet and will in any case be subject to a standstill clause. Therefore, the measure complies with point 29 CEEAG, as start of works on the Project did not take place prior to the German authorities providing their intention to support the Project, subject to a stand-still clause.

(121) In view of the above considerations, the Commission concludes that the measure has an incentive effect, as it induces the beneficiary to engage in an economic activity, which it would not carry out without the aid.

3.3.2.3. No breach of any relevant provision of Union law

(122) According to point 33 CEEAG, if the supported activity, or the aid measure or the conditions attached to it, including its financing method when it forms an integral part of the measure, entail a non-severable violation of relevant Union law, the aid cannot be declared compatible with the internal market.

(123) In the present case, the Commission notes that the HCN will be fully subject to third party access and tariff regulation (see recital (8)), in line with Directives 2019/944/EC and 2009/73/EC as well as with the draft Gas Package.

(124) The German authorities have also confirmed that the measure did not entail a violation of relevant Union law (see recital (27)). The Commission notes that Article 5(3) of the recast EU Gas Regulation, as adopted by the Council, explicitly refers to the possibility of an inter-temporal cost allocation, which may be supported by State measures provided these comply with Article 107 TFEU.

(125) Therefore, the Commission has no indication that the measure contravenes any relevant provision or general principle of Union law.

3.3.3. The aid does not unduly affect trading conditions to an extent contrary to the common interest (negative condition)

(126) Distortions of competition and trade are minimised if the aid is necessary, appropriate and proportionate, and the cumulation and transparency requirements are met.

3.3.3.1. Necessity and appropriateness of the aid

(127) The Commission recognised in point 372 CEEAG that where market operators cannot deliver the infrastructure needed, State aid may be necessary in order to overcome market failures and to ensure that the Union's considerable infrastructure needs are met.

(128) Energy infrastructure is typically financed through user tariffs and the granting of State aid is a way to overcome market failures which cannot be fully addressed by means of compulsory user tariffs (points 379-380 CEEAG).

(129) Although some of the pipelines that are expected to form part of the Project are in the list of Projects of Common Interest (PCI) ([38]), this is not the case for the totality of the pipelines that are expected to become part of the Project. Therefore, the Commission needs to examine if the conditions of paragraph 380(b) CEEAG are met. In its assessment, the Commission will consider the extent to which a market failure leads to a sub-optimal provision of the necessary infrastructure, the extent to which the infrastructure is open to third party access and subject to tariff regulation; and the extent to which the Project contributes to the Union's security of energy supply or to the climate neutrality objectives of the Union. In the following recitals, the Commission will assess these points.

([38]) See Commission Delegated Regulation (EU) 2022/564 of 19 November 2021 amending Regulation (EU) No 347/2013 of the European Parliament and of the Council as regards the Union list of projects of common interest.

Market failure leading to sub-optimal provision of the necessary infrastructure and contribution to the climate neutrality objectives of the Union

(130) In order to demonstrate the necessity of the measure, it has to be established that the measure is targeted towards a situation where aid can bring about a material improvement that the market alone cannot deliver.

(131) In the absence of intervention, in the early years of the hydrogen ramp-up, the HCN would be used by relatively few users, who would have to be charged prohibitively high fees in order for the TSOs to be able to recover the substantial investment costs which they incurred to build it (see section 2.2). As such charges are expected to be above the maximum willingness to pay of potential users, this would mean that TSOs would not be able to recover costs as no potential customers would be interested in using the network. This prevents potential network operators from investing large sums to provide the network in a timely manner. In turn, the prospect of prohibitively high fees and uncertainty over the existence of the network discourages investments in the production and use of hydrogen, further shrinking the potential user base.

(132) The early development of the HCN will enable many market participants to invest in the climate-friendly transformation of their business models in a timely manner. In particular, as explained by the German authorities (see recital (4)), the HCN will support the decarbonisation of Germany's energy supply and overall economy. Green hydrogen will provide a decarbonised source of energy to energy-intensive sectors of the economy with the highest greenhouse gas emissions that need to rely on gaseous fuels, where no superior alternatives in terms of energy and cost efficiency to hydrogen are available. Hydrogen will also enable the storage of electricity for periods in which little or no electricity can be generated with renewable wind and solar power and thereby facilitates the transition of the broader energy sector to renewable sources.

(133) Moreover, major infrastructure projects like the construction of a HCN are capital intensive. The financial analysis provided by the German authorities (see section 2.5) plausibly reveals that the Project would not be sufficiently profitable without the aid measure. The funding gap of the Project, amounting to EUR 3.018 billion in the central scenario as assessed below, demonstrates the existence of a market failure.

(134) The Commission therefore concludes that the measure contributes to addressing a market failure, by alleviating the sub-optimal provision of an infrastructure which contributes to the Union's climate neutrality objectives.

Third party access and tariff regulation

(135) The Project will not be subject to any exemption, pursuant to Article 36 of the Gas Directive, from the requirements regarding third party access and tariff regulation. The HCN is thus subject to a '*regulated regime*', in which capacity allocation rules, usage tariffs and access to the network are approved by the National Regulatory authority (see recitals (8) and (78)).

3.3.3.2. Proportionality and cumulation

(136) Aid is considered to be proportionate if its amount per beneficiary is limited to the minimum needed for carrying out the aided project or activity (point 47 CEEAG).

(137) The proportionality of an investment grant is assessed on the basis of the funding gap principle set out in points 48, 51, and 52 CEEAG (point 381 CEEAG).

(138) According to point 48 CEEAG, aid is considered as limited to the minimum needed for carrying out the aided project or activity if the aid corresponds to not more than the net extra cost ('funding gap') necessary to meet the objective of the aid measure, compared to the counterfactual scenario in the absence of aid. The funding gap is determined by the difference between the economic revenues and costs (including the investment and operation) of the aided project and those of the alternative project which the aid beneficiary would credibly carry out in the absence of aid.

(139) According to point 51 CEEAG, where the aid is not granted under a competitive bidding process, the funding gap must be determined by comparing the profitability of the factual and counterfactual scenarios. To determine the funding gap in such cases, the Member State must submit a quantification, for the factual scenario and a credible counterfactual scenario, of all main costs and revenues, the estimated WACC of the beneficiaries to discount future cash flows, as well as the net present value ('NPV') for the factual and counterfactual scenarios, over the lifetime of the project. The Commission will verify whether this counterfactual is realistic. The Member State must provide reasons for the assumptions used for each aspect of the quantification, and explain and justify any methodologies applied. The typical net extra cost can be estimated as the difference between the NPV for the factual scenario and for the counterfactual scenario over the lifetime of the reference project.

(140) In accordance with point 52 and 381 CEEAG, the counterfactual scenario in the case of infrastructure projects corresponds to the situation in which a project would not be realised.

(141) As submitted by the German authorities, the estimated funding gap of the Project in the central scenario amounts to EUR 3.018 billion. Germany furthermore explained that the discounted value of the expected aid under the measure amounts to EUR 3.018 billion, which is equal to the funding gap (see recital (71)). The Commission notes that this calculation is based on detailed business projections, which the Commission has reviewed, and concludes that the expected aid does not exceed the estimated funding gap.

(142) The business plan on which the funding gap calculation and aid amount are based is the central scenario for the construction and operation of the HCN. The Commission considers that this plan relies on plausible estimates of future earnings and costs, and that the underlying assumptions are justified.

(143) In particular, in relation to these underlying assumptions, the Commission notes that:

- the modelling assumptions underlying the size of the Reference Project were justified by the German authorities and are based on clear criteria and a market

survey from the Gas Network Development Plan 2022-2032 (FNB Gas, 2023) (see recital (41));

- the German authorities justified the CAPEX and OPEX assumptions explaining that these were based on a well-established methodology that has been used for several years for the German Network Development Plan ('NDP') and on the provisions on the recognition of generalized operating costs for investment measures pursuant to paragraph 23 ARegV (see recitals (45) and (49)). The timelines for construction have also been justified based on projects the Gas TSOs have carried out and assuming a shorter lead-time for repurposed projects (see recital (52));

- the demand ramp-up scenario used for the business plan is based on a scientific scenario on the transformation of the German energy system and its choice was justified on the grounds of being the most technologically open scenario (see recital (53));

- the assumed ramp-up tariff charge, although it may differ from the actual tariff that will be determined by BNetzA, reflects the minimum charge which is required for a full payback of the amortization account by 2055 (see recital (56)). The German authorities have provided evidence showing that this tariff is expected to be below customers willingness to pay as it only accounts for a small share of the assumed future hydrogen price (see recital (55));

- the assumed financing structure is realistic based on the incentives provided by the regulatory system and the assumed technical lifetime of the HCN can be considered justified by the peculiar characteristics of hydrogen (see recital (60)) and the lack of replacement CAPEX in the business plan;

- the German authorities provided a reasonable justification for estimating the residual value of the HCN based on its residual book value. In particular, as the intertemporal smoothing of the network tariff will cease to apply in 2055 and the applicable tariff will be determined by BNetzA and the approved regulated revenues will be limited by the remaining book value of the regulated asset base (see recital (61));

- the discount rate used is justified as it reflects the permissible return on equity set by BNetzA for HCN operators (see recital (62)).

(144) The business plan provided by the German authorities correctly assumes that the HCN operators would not receive support in the form of loans at below market rates absent the State guarantee.

(145) The Commission has reviewed the assumptions underlying the calculation of the estimated margin that the beneficiaries would have been able to obtain at market terms, a necessary input for both the calculation of the aid amount and for the funding gap calculation. Specifically, the Commission agrees with the choice of relying on the Reference Rate Communication for the determination of the margin, in the absence of a comparable transaction on the market (see recital (67)) given that the intertemporal financing is expected to last over a long duration, that the exact amount to be covered by the loan is uncertain, and that the HCN is a peculiar project in that its success depends on the success of hydrogen as an energy carrier in the decarbonised energy system of the future, which does not only depend on

market and technology developments but also on future policy choices which cannot be fully judged by market participants, and therefore the riskiness of the loans to cover initial losses cannot be easily derived through benchmarking margins on loans for alternative infrastructure projects (i.e. for gas or electricity) which are already established.

(146) Moreover, the German authorities have sufficiently justified the assumptions on the credit rating and collateral chosen for the ramp-up and subsequent period (see recital (68)). Even if the choice of credit rating relies on the assumption that the Federal Government, rather than a financial institution, would terminate the amortization account in 2039 if the HCN were to be insufficiently used by that date, it is reasonable to assume that a financial institution would also decide whether to stop providing further credit to cover for subsequent losses on a rolling basis and therefore that the riskiness of the project would gradually decrease over time. Similarly, the German authorities assume that the value of the collateral increases over time, and this reflects the expectation that a financial institution would only continue providing credit to the HCN if the likelihood that the HCN would become a stranded asset was decreasing over time, thereby increasing the value of the collateral.

(147) Moreover, as the aid is provided in the form of a guarantee giving access to cheaper loans, if upside risks materialise to the central scenario (i.e. a larger number of users than expected joins the network), the value of the guarantee would decrease, as over time financial institutions would be more willing to provide credit to the HCN operators at better terms. Conversely, if downside risks materialise (i.e. less users than expected join the network), the actual value of the guarantee would increase, together with the actual funding gap.

(148) Overall, this feature of the measure provides an added safeguard in relation to the robustness of the business plan itself.

(149) As the measure could in principle result in the payment of a larger amount of aid than estimated in the central scenario presented by the German authorities, the Commission takes comfort in the fact that the aid amount would be below the hypothetical funding gap in the worst-case scenario. This is illustrated in the robustness check the German authorities provided (see recital (72), where it is hypothetically assumed that the HCN would become a stranded asset in 2039).

(150) According to point 55 CEEAG, where a competitive bidding process is not used and future developments in costs and revenues are surrounded by a high degree of uncertainty and there is a strong asymmetry of information, the Member State may be required to introduce compensation models that are not entirely *ex ante*. Instead, these models will be a mix of ex ante and ex post or introduce *ex post* claw-back or cost monitoring mechanisms, while keeping incentives for the beneficiaries to minimize their costs and develop their business in a more efficient manner over time.

(151) Furthermore, point 381 CEEAG on the proportionality of the aid for energy infrastructure further specifies that the introduction of monitoring and claw-back mechanisms may be necessary where there is a risk of windfall profits, e.g. when the aid is close to the maximum allowed, while keeping incentives for the

beneficiaries to minimise their costs and develop their business in a more efficient manner over time.

(152) In the present case, the HCN will be a fully regulated infrastructure, where return on equity of operators is capped (see recital (62)). Therefore, there is no risk of windfall profits. Should demand for the HCN service exceed expectations, this will not lead to additional profits, as the BNetzA will need to revise the tariff downward.

(153) The Commission moreover notes that a monitoring system is in place (see recital (23)), as BNetzA determines every three years whether the amortisation account is on track to be balanced by 2055 at the latest. If the revision exercise projects a remaining balance of the amortisation account by 2055, the BNtzA adjusts the grid fees to a level that ensures a balanced account by then. This should minimise the risk that the State guarantee need to be triggered in 2055.

(154) Moreover, the Commission notes the additional safeguard provided by the option for the Federal Government to cancel the amortisation account earlier than in 2055 in order to prevent additional costs from accruing (see recital (25)).

(155) The Commission furthermore notes that the financing model foresees a burden-sharing mechanism between the Federal State and TSOs, should the amortisation account not be fully balanced by 2055. In this case, the Federal State would be entitled to recover part of the costs for covering any remaining balance in the amortisation account in 2055 (or when the Federal Government decides to cancel the amortisation account at an earlier date after 2038) from the TSOs. By the end of 2055, this share would be 24% or the remaining balance. In the event of an early termination, the share is reduced by 0.5 percentage points for each calendar year, starting from the expiry of the term of the amortisation account in 2055. If one or several HCN-TSOs are unable to pay the deductible (in full) due to insolvency, and their share is not paid in cash by one or more of the other HCN-TSOs, all TSOs are obliged to transfer their HCN assets to the Federal Government in return for payment of the imputed residual value (less the deductible). This ensures that the entire HCN is transferred to the Federal Government if a pro rata deductible is not paid (see recital (26)).

(156) According to point 56 CEEAG, aid may be awarded concurrently under several aid schemes or cumulated with ad hoc or de minimis aid in relation to the same eligible costs, provided that the total amount of aid for a project or an activity does not lead to overcompensation or exceed the maximum aid amount allowed. If the Member State allows aid under one measure to be cumulated with aid under other measures, then it must specify, for each measure, the method used for ensuring compliance with the conditions set out in this point.

(157) In the present case, the aid may be cumulated with grants received under the IPCEI Framework or potentially from other sources of financing (see recital (74)).

(158) The Commission notes that the measure, which includes but is not limited to pipelines which are part of the IPCEI Hy2Infra (see recitals (9) and (73)), complements the IPCEI framework and ensures that the combined effect of both measures will translate into a mutually reinforced investment in hydrogen infrastructure in Germany and the Union.

(159) The Commission notes that the German authorities explained how overcompensation would be avoided, specifically that any grant received under the IPCEI Framework or potentially from other sources of financing would be directly and fully subtracted from the CAPEX when the BNetzA determines the approvable costs which the regulated infrastructure is allowed to recover (see recital (76)).

(160) The Commission concludes that the methodology used to account for cumulation by the German authorities prevents overcompensation.

(161) In view of the above considerations, the Commission concludes that the measure is proportionate.

3.3.3.3. Transparency, reporting and monitoring

(162) Germany committed to comply with the transparency requirements laid down in points 58 to 61 CEEAG. The relevant data of the measure will be published on the website https://webgate.ec.europa.eu/competition/transparency (see recital 2.9).

3.3.3.4. Avoidance of undue negative effects on competition and trade

(163) Pursuant to point 382 CEEAG, the Commission will carry out a balancing test on the positive effects of the aid against negative effects on competition and trade.

(164) In the present case, point 382(a) CEEAG is relevant for this balancing test. In view of the existing requirements under the internal energy market legislation, which are aimed at strengthening competition, the Commission will generally consider that aid for energy infrastructure subject to full internal market regulation does not have undue distortive effects.

(165) Therefore, on balance, the Commission concludes that undue negative effects on competition and trade from the measure are avoided.

3.3.4. Weighing up the positive effects of the aid against its negative effects on competition and trade

(166) A carefully designed aid measure should ensure that the overall balance of its effects is positive in terms of avoiding adversely affecting trading conditions to an extent contrary to the common interest.

(167) As shown in section 2, the aid will facilitate the development of the core hydrogen network in Germany, thereby providing the necessary infrastructure to enable the uptake of hydrogen.

(168) In addition, as shown above in section 3.3, the German authorities have designed the measure in such a way as to minimise the potential distortion of competition arising from the measure. Furthermore, by granting access to the network to all interested parties at regulated prices, the measure will contribute to additional competition in the hydrogen markets in the region. The overall impact on competition is, therefore, deemed to be positive. The negative effects on competition are limited.

(169) Therefore, the positive impact of the aid measure in developing the economic activity at issue outweighs any potential negative effects on competition and trade. On balance, the measure is in line with the objectives of Article 107(3), point (c) TFEU as it facilitates the development of the HCN and hence the development of trade in hydrogen in Germany and in Europe, and does not adversely affect competition to an extent contrary to the common interest.

3.3.5. Evaluation plan

(170) Points 455 and 456 CEEAG state that to further ensure that distortions of competition and trade are limited, the Commission may require notifiable aid schemes to be subject to an ex-post evaluation and that in any event ex-post evaluation will be required when the State aid budget exceeds EUR 750 million over the total duration of the scheme.

(171) As further explained in point 459 CEEAG, the Member State must notify a draft evaluation plan, which will be an integral part of the Commission's assessment of the scheme.

(172) In view of the envisaged budget, the scheme will be subject to an ex-post evaluation. In this context, the Commission required the submission of an evaluation plan, which the German authorities submitted in the context of the notification as an integral part of it.

(173) The Commission considers that the notified evaluation plan contains all the necessary elements: the objectives of the measure to be evaluated, including evaluation questions, the result indicators, the envisaged methodology to conduct evaluation and the proposed timing of the evaluation including the date of submission of the final evaluation report (see section 2.10).

(174) The Commission notes that:

i) the scope of the evaluation is defined in an appropriate way. It comprises a list of evaluation questions with matched result indicators. Moreover, the evaluation plan explains the main methods that will be used in order to identify the direct and indirect impacts of the scheme;

ii) the evaluation will be conducted in accordance with the notified evaluation plan by an independent evaluation body, in line with the criteria laid down in the evaluation plan;

iii) the proposed modalities for the publication of the evaluation results are adequately ensure their transparency;

iv) Germany committed to submit an interim report (see recital (92)), by the end of 2038 and a final evaluation report in December 2056. The Commission notes that the evaluation methods might be further refined in common accord between the German authorities and the Commission, and it will be described in the interim report.

(175) The Commission notes that Germany will communicate to the Commission any difficulty that could significantly affect the agreed evaluation in order to work out possible solutions.

4. CONCLUSION

The Commission has accordingly decided not to raise objections to the aid granted for the HCN in Germany on the grounds that it is compatible with the internal market pursuant to Article 107(3), point (c) of the Treaty on the Functioning of the European Union.

Yours faithfully,

For the Commission

Margrethe VESTAGER
Executive Vice-President