

HI WEST 27 (Less-Advanced)

Interconnection Netherlands - Germany at Zevenaar/Elten

Reasons for grouping [ENTSOG]

The project group aims at interconnecting through a future hydrogen infrastructure, producers and consumers between the Netherlands and Germany.

The group includes investments in the Netherlands (HYD-N-468) and in Germany (HYD-N-1075).

Objective of the group [Promoter]

The TSOs Gasunie and OGE are members of the European Hydrogen Backbone (EHB) initiative which provides a future vision of a fully connected European pipeline infrastructure to transport hydrogen from supply to demand centres. HNS and OGE are aiming to realize several GW cross border hydrogen transport capacity between both countries. To make this cross-border transport possible OGE and HNS are now working on the proper bilateral agreements. The network National H2 Backbone (HNS) - H2ercules Network (OGE) can establish a connection to five European countries (Norway, Netherlands, Belgium, France and Czech Republic) via pipeline. This project group is focusing on the hydrogen transport for the cross-border point Zevenaar/Elten.



HYD-N-1075 H2ercules Network North-West

Comm. Year 2029

HYD-N-468 National H2 Backbone (Part)

Comm. Year 2026

A. Project group technical information [Promoter/ ENTSOG]

Project technical information [Promoter]

Hydrogen Transmission

TYNDP Project code	Section name	New / Repurposing	Nominal Diameter [mm]	Section Length [km]	Compressor power [MW]
HYD-N-1075	Elten – Hamborn (H2ercules Network North- West)	Repurposing	500 - 900	190 km	6,5 MW
HYD-N-1075	Elten – Paffrath (H2ercules Network North- West)	Repurposing	500 - 900		
HYD-N-468	Section Backbone- Zevenaar	Repurposing	600-900	9 km	-

Capacity increment [ENTSOG]

TYNDP Project code	Point name	Operator	From system	To system	Capacity increment [GWh/d]	Comm. year
HYD-N-468	H2_IP_DE-NL	Gasunie Transport Services B.V.	Transmission Netherlands (NL Hydrogen)	Transmission Germany (DE Hydrogen)	76,8	2029
HYD-N-1075	H2_IP_DE-NL	OGE	Transmission Netherlands (NL Hydrogen)	Transmission Germany (DE Hydrogen)	76,8	2029

B. Project Cost Information

During the TYNDP 2022 Project Data Collection, promoters were asked to indicate whether their costs were confidential or not. The following tables display the non-confidential costs provided by the promoters (as of December 2022, end of PCI project collection). The amounts provided can differ

from the figures used by the project promoters in other contexts, where costs can be updated and/or evaluated using different methodologies or assumptions.

[ENTSOG]

TYNDP Project code	CAPEX [M€]	CAPEX range [%]	OPEX [M€]	OPEX range [%]
HYD-N-468	48	40%	1	40%
HYD-N-1075	250	30%	9	30%

Description of the cost and range [Promoter]

DE (OGE): CAPEX and OPEX are based on best estimates at the time of project submission in December 2022 and might be subject to changes, e.g. due to supplier price adjustments or concretization of project scope. Cost deviations are already considered in both CAPEX and OPEX cost ranges.

NL (Gasunie): Supported by the conclusions of HyWay27, Gasunie continued with the preparations for the development of the national hydrogen network, "the hydrogen backbone". The input in the template is based on figures from Hyway27. Since the publication of Hyway27, there are new developments around the backbone. The latest information, scope and timing can be found on our website: <https://www.hynetwork.nl/>

C. Project Benefits [ENTSOG]

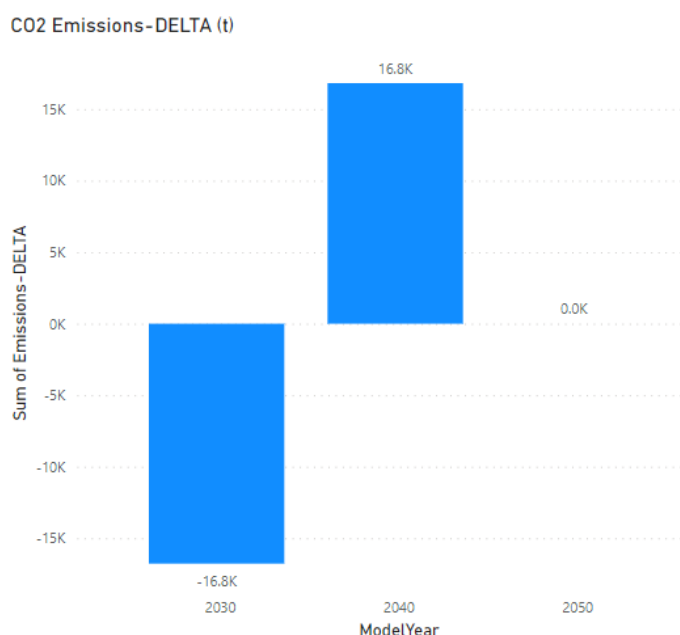
C.1 Summary of benefits

This section provides a summarised analysis by ENTSOG of the main benefits stemming from the realisation of the overall group. More details on the indicators are available in Annex D of TYNDP 2022¹.

Distributed Energy

Sustainability benefits

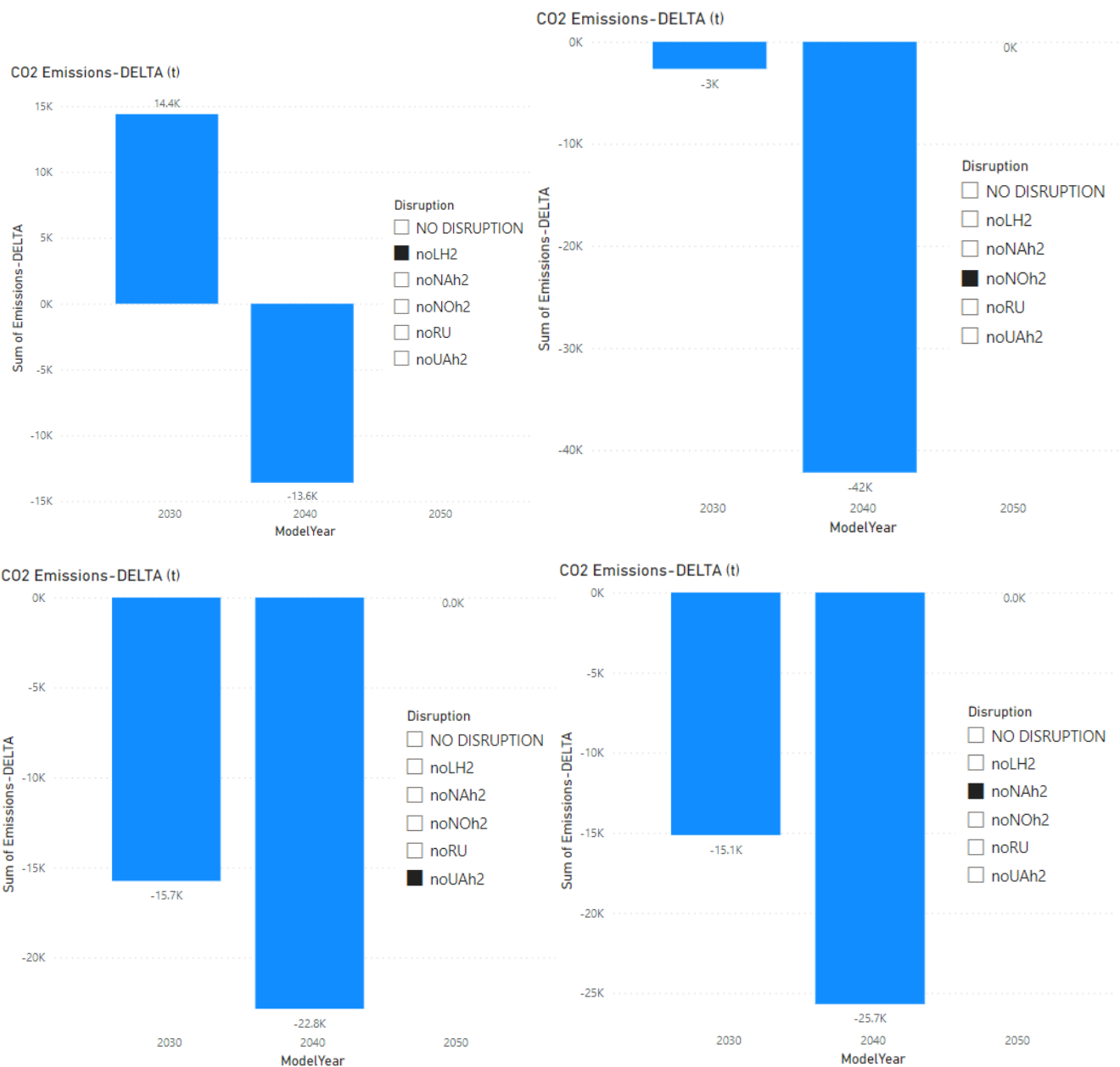
In the reference case, which analyses yearly demand in two periods (average winter and average summer), the project group will contribute to sustainability by reducing overall CO₂ emissions by 16,8 kt in 2030. The project group enables the transport of green hydrogen and so then replacing use of SMR's. However, in 2040, triggered by the higher hydrogen demand project group will increase overall CO₂ emissions by using more SMRs and hence reduce demand curtailment.



Similar trend is expected under any supply disruption.

1 noLH2 : LH2 disruption / 2 noNOh2 : Norway disruption / 3 noUAh2 : Ukraine disruption/ 4 noNAh2 : North Africa disruption

¹ https://www.entsog.eu/sites/default/files/2023-04/ENTSOG_TYNDP_2022_Annex_D_Methodology_230411.pdf



Security of Supply:²

Because of competing projects groups, between the Netherlands and Germany, benefits could be limited.

> Reference case:

² As for the hydrogen system there is no existing infrastructure level available yet, ENTSOG has identified a possible hydrogen network according to the information provided by promoters in their project submission for the TYNDP/PCI process (i.e., H2 Infrastructure level). Therefore, the System Assessment shows the results that could be reached (for different timestamps) under the hypothesis of a full commissioning of the H2 infrastructure projects that were submitted by project promoters but that are not yet in place. Therefore, even in configurations where no demand curtailment is identified (e.g., average winter in 2030) these results should not be read as an absence of H2 infrastructure needs for the given scenario. On the contrary, the full availability of the planned infrastructures composing the H2 infrastructure level is assumed to avoid the potential demand curtailment.

In the reference case, the project is not further mitigating hydrogen demand curtailment risk in average summer and average winter for European countries.

2030 DE- Benefits



2040 DE- Benefits



2050 DE- Benefits



> Climatic stress cases:

Under 2-week and 2-week dunkelflaute climatic stress case, as well as under peak day climatic case the projects group is contributing to mitigate demand curtailment in the Netherlands in 2030. Moreover, in 2040, group mitigates demand curtailment in almost all the European countries.

2030 DE- Benefits



2040 DE- Benefits



2050 DE- Benefits



> Disruption cases (S-1):

Similarly, under disruptions cases, projects group is mitigating demand curtailment. First in case of noLH2, group is mitigating demand curtailment in the Netherlands in 2030, then under other supplies disruptions in different countries in 2040, depending on the case.

1 noLH2 : LH2 disruption / 2 noNOh2 : Norway disruption / 3 noUAh2 : Ukraine disruption/ 4 noNAh2 : North Africa disruption

1 noLH2 : LH2 disruption

2030 DE- Benefits



2040 DE- Benefits



2050 DE- Benefits



2 noNOh2 : Norway

2030 DE- Benefits



2040 DE- Benefits



2050 DE- Benefits



3 noUAh2 : Ukraine disruption

2030 DE- Benefits



2040 DE- Benefits



2050 DE- Benefits



4 noNAh2 : North Africa disruption

2030 DE- Benefits



2040 DE- Benefits



2050 DE- Benefits



> Single largest capacity disruption (SLCD):

In case of SLCD many European countries benefitting on small scale from this project group by mitigating the risk of demand curtailment from 2040 by 1-2%.

Benefits 100% - 20% 20% - 5% 5% - 0%

SLCD Benefits - 2030 - Distributed Energy



SLCD Benefits - 2040 - Distributed Energy



SLCD Benefits - 2050 - Distributed Energy

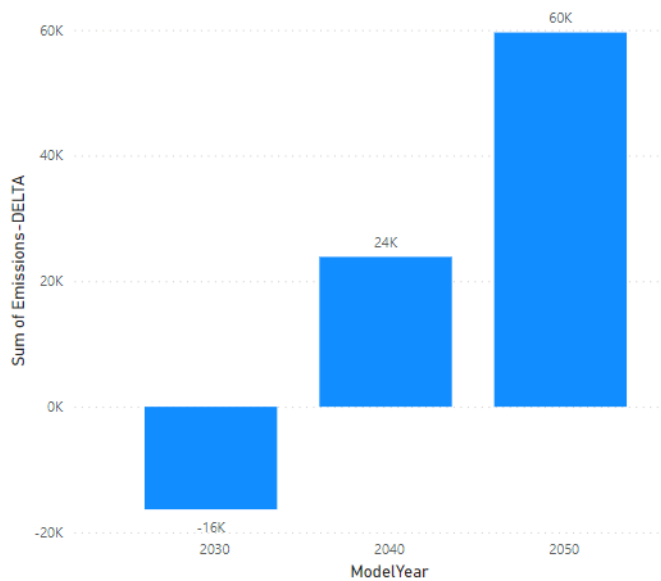


Global Ambition

Sustainability benefits

In the reference case, which analyses yearly demand in two periods (average winter and average summer), the project group will contribute to sustainability by reducing overall CO₂ emissions by 16 kt in 2030. The project group enables the transport of green hydrogen and so then replacing use of SMR's. However, in 2040 and 2050, triggered by the higher hydrogen demand project group will increase overall CO₂ emissions by using more SMRs and hence reduce demand curtailment.

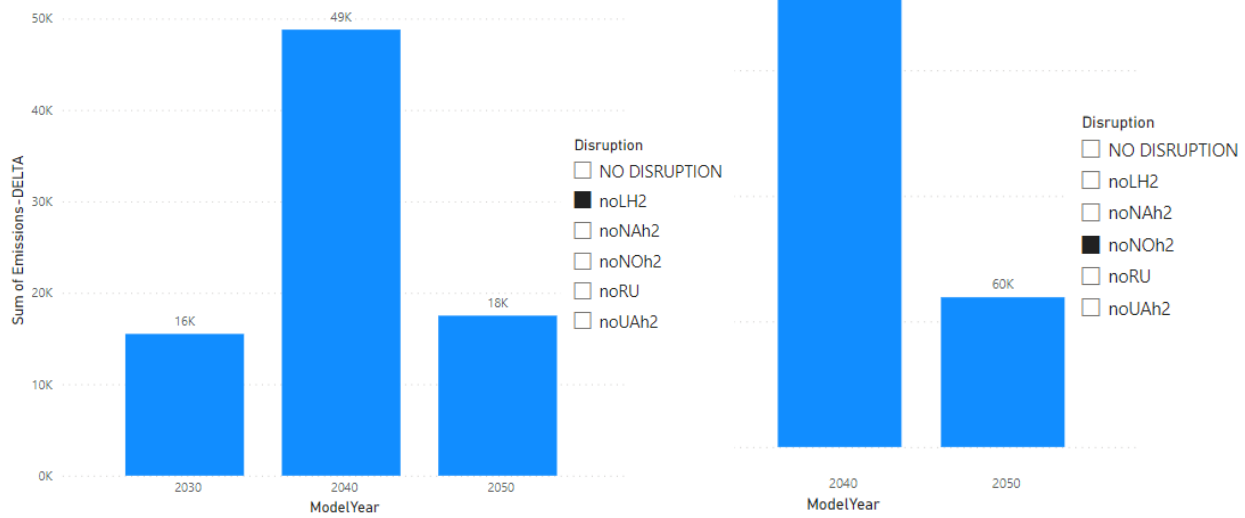
CO₂ Emissions-DELTA (t)



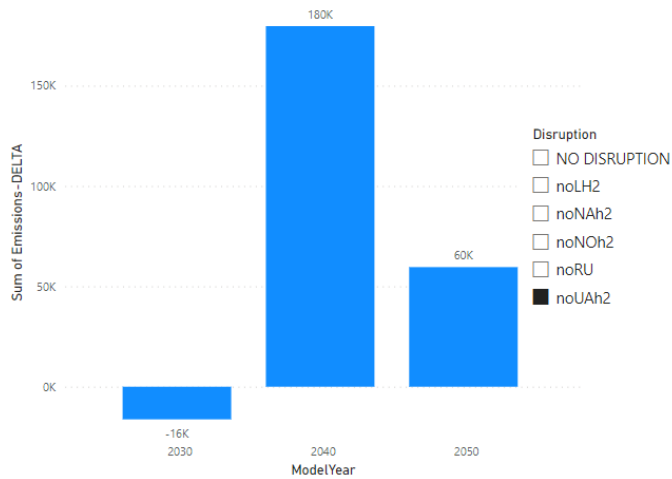
Sustainability benefits are increased under supply disruption cases, such as Norway, Ukraine, or North Africa Disruption for 2030. For example, in case of North Africa disruption the project group will reduce CO₂ emissions by 100 kt in 2030.

1 noLH2 : LH2 disruption / 2 noNOh2 : Norway disruption / 3 noUAh2 : Ukraine disruption/ 4 noNAh2 : North Africa disruption

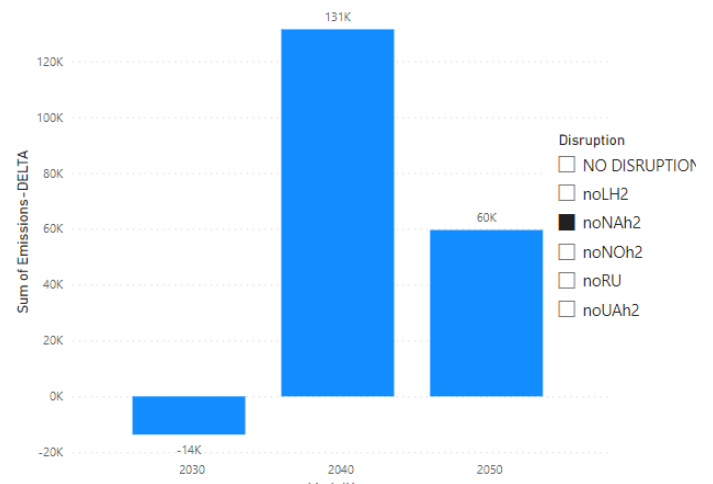
CO2 Emissions-DELTA (t)



CO2 Emissions-DELTA (t)



CO2 Emissions-DELTA (t)



Security of supply benefits

> Reference case

In the reference case, the projects group is contributing to mitigate demand curtailment in almost all European countries in 2040.

2030 GA- Benefits



2040 GA- Benefits



2050 GA- Benefits



> Climatic stress cases

Under 2 -week and 2-week dunkelflaute climatic stress case, as well as under peak day climatic case the projects group is contributing to mitigate demand curtailment in the Netherlands in 2030. Moreover, in 2040, group mitigates demand curtailment in Denmark, Czechia and Slovenia.

2030 GA- Benefits



2040 GA- Benefits



2050 GA- Benefits



> Disruption cases (S-1)

Similarly under disruptions cases, projects group is mitigating demand curtailment. First in case of noLH2, group is mitigating demand curtailment in the Netherlands in 2030, then under other supplies disruptions in different countries in 2040, depending on the case.

1 noLH2 : LH2 disruption / 2 noNOh2 : Norway disruption / 3 noUAh2 : Ukraine disruption/ 4 noNAh2 : North Africa disruption

1 noLH2 : LH2 disruption

2030 DE- Benefits



2040 DE- Benefits



2050 DE- Benefits



2 noNOh2 : Norway

2030 GA- Benefits



2040 GA- Benefits



2050 DE- Benefits



3 noUAh2 : Ukraine disruption

2030 GA- Benefits



2040 GA- Benefits



2050 DE- Benefits



4 noNAh2 : North Africa disruption

2030 GA- Benefits



2040 GA- Benefits



2050 GA- Benefits



> Single largest capacity disruption (SLCD):

In case of SLCD many European countries benefitting on small scale from this project group by mitigating the risk of demand curtailment in 2040 by 1-2%.

Benefits 100% - 20% 20% - 5% 5% - 0%

SLCD Benefits - 2030 - Global Ambition



SLCD Benefits - 2040 - Global Ambition



SLCD Benefits - 2050 - Global Ambition



C.2 Quantitative benefits [ENTSO-G]

The following tables display all the benefits quantified by ENTSOG through specific indicators and stemming from the realisation of the considered project group.

CO2 Emissions:

ModelYear	Disruption	Scenario	Unit	Emissions- DELTA	Emissions- PLUS	Emissions- MINUS
NO						
2030	DISRUPTION	DE	tonne	-16775,03	538677299	538660524
2030	noLH2	DE	tonne	14392,75	540175890,2	540190283
2030	noNAh2	DE	tonne	-15138,82	539785356,1	539770217,3
2030	noNOh2	DE	tonne	-2651,78	538877197,8	538874546
2030	noUAh2	DE	tonne	-15742,98	539378771,9	539363028,9
NO						
2030	DISRUPTION	GA	tonne	-16265,14	592910448,4	592894183,3
2030	noLH2	GA	tonne	15505,61	594817481,2	594832986,8
2030	noNAh2	GA	tonne	-13681,40	594141433,2	594127751,8
2030	noNOh2	GA	tonne	0,00	593310994,3	593310994,3
2030	noUAh2	GA	tonne	-16264,87	593627617,9	593611353,1
NO						
2040	DISRUPTION	DE	tonne	16821,50	392077044	392093865,5
2040	noLH2	DE	tonne	-13590,14	392213883,4	392200293,2
2040	noNAh2	DE	tonne	-25680,18	392188097,7	392162417,5
2040	noNOh2	DE	tonne	-42190,52	392144022,6	392101832,1
2040	noUAh2	DE	tonne	-22843,68	392399182,9	392376339,2
NO						
2040	DISRUPTION	GA	tonne	23865,85	396523251,6	396547117,5
2040	noLH2	GA	tonne	48792,24	397455196,7	397503989
2040	noNAh2	GA	tonne	131466,14	397301976,6	397433442,8
2040	noNOh2	GA	tonne	178364,65	397450977,1	397629341,8
2040	noUAh2	GA	tonne	179692,79	397478498,3	397658191,1
NO						
2050	DISRUPTION	DE	tonne	0,00	232557734,8	232557734,8
2050	noLH2	DE	tonne	0,00	232557734,8	232557734,8
2050	noNAh2	DE	tonne	0,00	232557734,8	232557734,8
2050	noNOh2	DE	tonne	0,00	232557734,8	232557734,8
2050	noRU	DE	tonne	0,00	232557734,8	232557734,8
2050	noUAh2	DE	tonne	0,00	232557734,8	232557734,8
NO						
2050	DISRUPTION	GA	tonne	59600,10	228306706,5	228366306,6
2050	noLH2	GA	tonne	17503,52	228306706,5	228324210,1
2050	noNAh2	GA	tonne	59600,10	228306706,5	228366306,6
2050	noNOh2	GA	tonne	59600,10	228306706,5	228366306,6
2050	noRU	GA	tonne	59600,10	228306706,5	228366306,6
2050	noUAh2	GA	tonne	59600,10	228306706,5	228366306,6

Curtailment Rate (SLCD):

Country	2030-DE-DELTA	2030-GA-DELTA	2040-DE-DELTA	2040-GA-DELTA	2050-DE-DELTA	2050-GA-DELTA
Belgium	0%	0%	-2%	-1%	-1%	0%
Czechia	0%	0%	-2%	-2%	-2%	0%
Estonia	0%	0%	-2%	-1%	-2%	0%
Finland	0%	0%	-2%	-1%	-2%	0%
Germany	0%	0%	-2%	-1%	-1%	0%
Latvia	0%	0%	-2%	-1%	-1%	0%
Lithuania	0%	0%	-2%	-1%	-1%	-1%
Poland	0%	0%	-2%	-1%	-1%	0%
Portugal	0%	-1%	-2%	-1%	0%	0%
Slovenia	0%	0%	-2%	-1%	-1%	0%
Sweden	0%	0%	-2%	-1%	-2%	0%
Switzerland	0%	0%	-2%	-1%	-1%	-1%
France	0%	0%	-2%	-1%	-1%	0%
The Netherlands	0%	0%	-1%	-1%	-2%	0%
Austria	0%	0%	-1%	-1%	-2%	0%
Denmark	0%	0%	-1%	-1%	-1%	0%
Italy	0%	0%	-1%	-1%	-2%	0%
Spain	0%	0%	-1%	-1%	-1%	0%

Curtailment Rate (Climatic Stress):

SimulationPeriod	Country	2030-DE-DELTA	2030-GA-DELTA	2040-DE-DELTA	2040-GA-DELTA	2050-DE-DELTA	2050-GA-DELTA
Average2W	Austria	0%	0%	0%	0%	0%	0%
Average2W	Belgium	0%	0%	0%	0%	0%	0%
Average2W	Bulgaria	0%	0%	0%	0%	0%	0%
Average2W	Croatia	0%	0%	0%	0%	0%	0%
Average2W	Cyprus	0%	0%	0%	0%	0%	0%
Average2W	Czechia	0%	0%	0%	0%	0%	0%
Average2W	Denmark	0%	0%	0%	0%	0%	0%
Average2W	Estonia	0%	0%	0%	0%	0%	0%
Average2W	Finland	0%	0%	0%	0%	0%	0%
Average2W	France	0%	0%	0%	0%	0%	0%
Average2W	Germany	0%	0%	0%	0%	0%	0%
Average2W	Greece	0%	0%	0%	0%	0%	0%
Average2W	Hungary	0%	0%	0%	0%	0%	0%
Average2W	Ireland	0%	0%	0%	0%	0%	0%
Average2W	Italy	0%	0%	0%	0%	0%	0%
Average2W	Latvia	0%	0%	0%	0%	0%	0%
Average2W	Lithuania	0%	0%	0%	0%	0%	0%
Average2W	Luxembourg	0%	0%	0%	0%	0%	0%
Average2W	Malta	0%	0%	0%	0%	0%	0%
Average2W	Poland	0%	0%	0%	0%	0%	0%
Average2W	Portugal	0%	0%	0%	0%	0%	0%

Average2W	Romania	0%	0%	0%	0%	0%	0%
Average2W	Serbia	0%	0%	0%	0%	0%	0%
Average2W	Slovakia	0%	0%	0%	0%	0%	0%
Average2W	Slovenia	0%	0%	0%	0%	0%	0%
Average2W	Spain	0%	0%	0%	0%	0%	0%
Average2W	Sweden	0%	0%	0%	0%	0%	0%
Average2W	Switzerland	0%	0%	0%	0%	0%	0%
Average2W	The Netherlands	0%	0%	0%	0%	0%	0%
Average2W	United Kingdom	0%	0%	0%	0%	0%	0%
Average2WDF	Austria	0%	0%	0%	0%	0%	0%
Average2WDF	Belgium	0%	0%	0%	0%	0%	0%
Average2WDF	Bulgaria	0%	0%	0%	0%	0%	0%
Average2WDF	Croatia	0%	0%	0%	0%	0%	0%
Average2WDF	Cyprus	0%	0%	0%	0%	0%	0%
Average2WDF	Czechia	0%	0%	0%	0%	0%	0%
Average2WDF	Denmark	0%	0%	0%	0%	0%	0%
Average2WDF	Estonia	0%	0%	0%	0%	0%	0%
Average2WDF	Finland	0%	0%	0%	-1%	0%	0%
Average2WDF	France	0%	0%	0%	0%	0%	0%
Average2WDF	Germany	0%	0%	0%	0%	0%	0%
Average2WDF	Greece	0%	0%	0%	0%	0%	0%
Average2WDF	Hungary	0%	0%	0%	0%	0%	0%
Average2WDF	Ireland	0%	0%	0%	0%	0%	0%
Average2WDF	Italy	0%	0%	0%	0%	0%	0%
Average2WDF	Latvia	0%	0%	0%	0%	0%	0%
Average2WDF	Lithuania	0%	0%	0%	0%	0%	0%
Average2WDF	Luxembourg	0%	0%	0%	0%	0%	0%
Average2WDF	Malta	0%	0%	0%	0%	0%	0%
Average2WDF	Poland	0%	0%	0%	0%	0%	0%
Average2WDF	Portugal	0%	0%	0%	0%	0%	0%
Average2WDF	Romania	0%	0%	0%	0%	0%	0%
Average2WDF	Serbia	0%	0%	0%	0%	0%	0%
Average2WDF	Slovakia	0%	0%	0%	0%	0%	0%
Average2WDF	Slovenia	0%	0%	0%	0%	0%	0%
Average2WDF	Spain	0%	0%	0%	0%	0%	0%
Average2WDF	Sweden	0%	0%	0%	0%	0%	0%
Average2WDF	Switzerland	0%	0%	0%	0%	0%	-1%
Average2WDF	The Netherlands	0%	0%	0%	0%	0%	0%
Average2WDF	United Kingdom	0%	0%	0%	0%	0%	0%
DC	Austria	0%	0%	0%	0%	0%	0%
DC	Belgium	0%	0%	0%	0%	0%	0%
DC	Bulgaria	0%	0%	0%	0%	0%	0%
DC	Croatia	0%	0%	0%	0%	0%	0%
DC	Cyprus	0%	0%	0%	0%	0%	0%
DC	Czechia	0%	0%	0%	0%	0%	0%

DC	Denmark	0%	0%	0%	0%	0%	0%
DC	Estonia	0%	0%	0%	0%	0%	0%
DC	Finland	0%	0%	0%	0%	0%	0%
DC	France	0%	0%	0%	0%	0%	0%
DC	Germany	0%	0%	0%	0%	0%	0%
DC	Greece	0%	0%	0%	0%	0%	0%
DC	Hungary	0%	0%	0%	0%	0%	0%
DC	Ireland	0%	0%	0%	0%	0%	0%
DC	Italy	0%	0%	0%	0%	0%	0%
DC	Latvia	0%	0%	0%	0%	0%	0%
DC	Lithuania	0%	0%	0%	0%	0%	0%
DC	Luxembourg	0%	0%	0%	0%	0%	0%
DC	Malta	0%	0%	0%	0%	0%	0%
DC	Poland	0%	0%	0%	0%	0%	0%
DC	Portugal	0%	0%	0%	0%	0%	0%
DC	Romania	0%	0%	0%	0%	0%	0%
DC	Serbia	0%	0%	0%	0%	0%	0%
DC	Slovakia	0%	0%	0%	0%	0%	0%
DC	Slovenia	0%	0%	0%	0%	0%	0%
DC	Spain	0%	0%	0%	0%	0%	0%
DC	Sweden	0%	0%	0%	0%	0%	0%
DC	Switzerland	0%	0%	0%	0%	0%	0%
DC	The Netherlands	0%	0%	0%	0%	0%	0%
DC	United Kingdom	0%	0%	0%	0%	0%	0%

D. Environmental Impact [Promoter]

Any gas infrastructure has an impact on its surroundings. This impact is of particular relevance when crossing some environmentally sensitive areas. Mitigation measures are taken by the promoters to reduce this impact and comply with the EU and National regulations.

TYNDP Code	Type of infrastructure	Surface of impact	Environmentally sensitive area
HYD-N-1075 / HYD-N-468	Repurposing of pipelines for hydrogen transport	Reconstruction of existing above-ground objects or locally limited interferences	Minimal environmental impacts expected due to repurposing of pipeline or locally limited interferences.

Potential impact	Mitigation measures	Related costs included in project CAPEX and OPEX	Additional expected costs
HYD-N-1075 / HYD-N-468	Minimal environmental impacts expected due to repurposing of pipeline and or locally limited interferences	detailed calculation not available yet	Not expected

Environmental Impact explained [Promoter]

OGE: No serious environmental threats have been identified as the repurposing will take place mostly in the existing above-ground objects or locally limited interferences. The impact of works will be reduced with the maximum effort by selecting the most suitable technology during the implementation of the project. In order to protect air and water pollution, respective measures will be taken during construction phase.

The construction sites will be equipped with technical means for the possible remediation of leakage of fuel or other harmful substances that may endanger the quality of surface or underground water. All produced waste will be collected, disposed of, or recycled in accordance with applicable legislation. Waste collection containers will be placed in designated places and marked accordingly. Further detailed measures will be described in building permit design and agreed with the concerned environmental authority.

Gasunie: The project will follow the strict EIA regulatory framework as required by the Dutch Ministry for Economic Affairs and Climate and will consider all environmental impact aspect during the permitting procedures. No significant harm to the environment or any negative effect on climate change will be created by the project.

E. Other benefits [Promoter]

Missing benefits are all benefits of a project which may be not captured by ENTSG analysis.

As a necessary condition a missing benefit cannot have discrepancies with the benefits already covered by the assessment run by ENTSG and this condition needs to be proved and justified.

Description of Other benefits [Promoter]

H2ercules Network North-West:

Sustainability benefits:

A faster ramp-up of the hydrogen economy in Germany is more important than ever in order to drive forward the decarbonization program, put the German energy system on a more robust footing, and thus contribute towards a decarbonized security of supply. This is where the H2ercules can make a significant contribution, as it overcomes many challenges on a large scale. The ramp-up of the hydrogen market can thus reduce the use of conventional energy sources. This helps to reduce GHG emissions and to use more and more decarbonized energy. This grouping enables the transmission of hydrogen across the borders of the Member States Germany and Netherlands. Since no hydrogen is transported on this route via pipeline today, this will be a significant increase compared to the situation prior to the commissioning of the project. The majority of the network can be repurposed which makes it cost efficient and sustainable.

Competition, market integration, security of supply and flexibility benefits:

The project's main impact is to create new hydrogen capacities at cross-border points. It includes an import point from the Netherlands and a direct connection to the GET H2 IPCEI project as well as to the demand clusters "Ruhr area" and the "Rhenish mining area". Additionally, "H2ercules Network North-West" connects to "H2ercules Network North" and "H2ercules Network West" for onward transport to other consumption clusters in the west and south of Germany. By exchanging with the adjacent TSOs and projects, interoperability is ensured. This linkage has a positive impact on system flexibility and security of supply as well. A non-discriminatory network is established which impacts competition between market participants.

The overall H2ercules establishes direct cross-border connections to five European countries (Norway, the Netherlands, Belgium, France and the Czech Republic). In addition, the import corridors also indirectly impact the countries not directly bordering with Germany but being part of the same supply corridors.

The H2ercules Network contributes to the connection of different value chains (production, storage, demand centres). The H2ercules pipeline network will enable the connection of domestic green hydrogen production and thus connects new sources to the existing pipeline network. The H2ercules network reaches demand centres in Germany with a total demand of about 90 TWh in 2030 - that is nearly 2/3 of Germany's hydrogen demand. Furthermore, several storage facilities in the north of Germany can be connected. The H2ercules network thus makes a significant contribution to European supply security and facilitates the development of a European Hydrogen Backbone.

The H2ercules project received several Letters of Support from partners / consortia from the hydrogen value chain:

- Federal Ministry for Economic Affairs and Climate Action

- The Ministry for the Environment, Energy and Climate Protection of the State of Lower Saxony
- Ministry of Economic Affairs, Industry, Climate Action and Energy of the State of North Rhine-Westphalia

Gasunie: Hydrogen is expected to make up 20-25% of the total energy demand of the EU and the UK by 2050 but infrastructure connecting H2 producers and consumers is lacking. The objective of the H2 Backbone project is to create an open access non-discriminatory national and cross-border network for hydrogen transportation. The existing natural gas network will be repurposed for H2-transport (85% of the network), with the addition of new pipes in areas where connections are not yet available. Once complete, the Dutch H2 Backbone will connect on- and off-shore H2 sources with consumers in the Netherlands, Germany and Belgium. As such, the H2 Backbone will form a vital part of the European Hydrogen Backbone and help kickstart the shift towards carbon-neutral energy in Europe.

F. Useful links [Promoter]

Useful links:

[H2ercules \(h2ercules.com\)](https://h2ercules.com)

<https://www.hynetwork.nl/>

<https://www.hyway27.nl/>