HI WEST 28 (Less-Advanced)

H2 Storage in Xanten, Germany

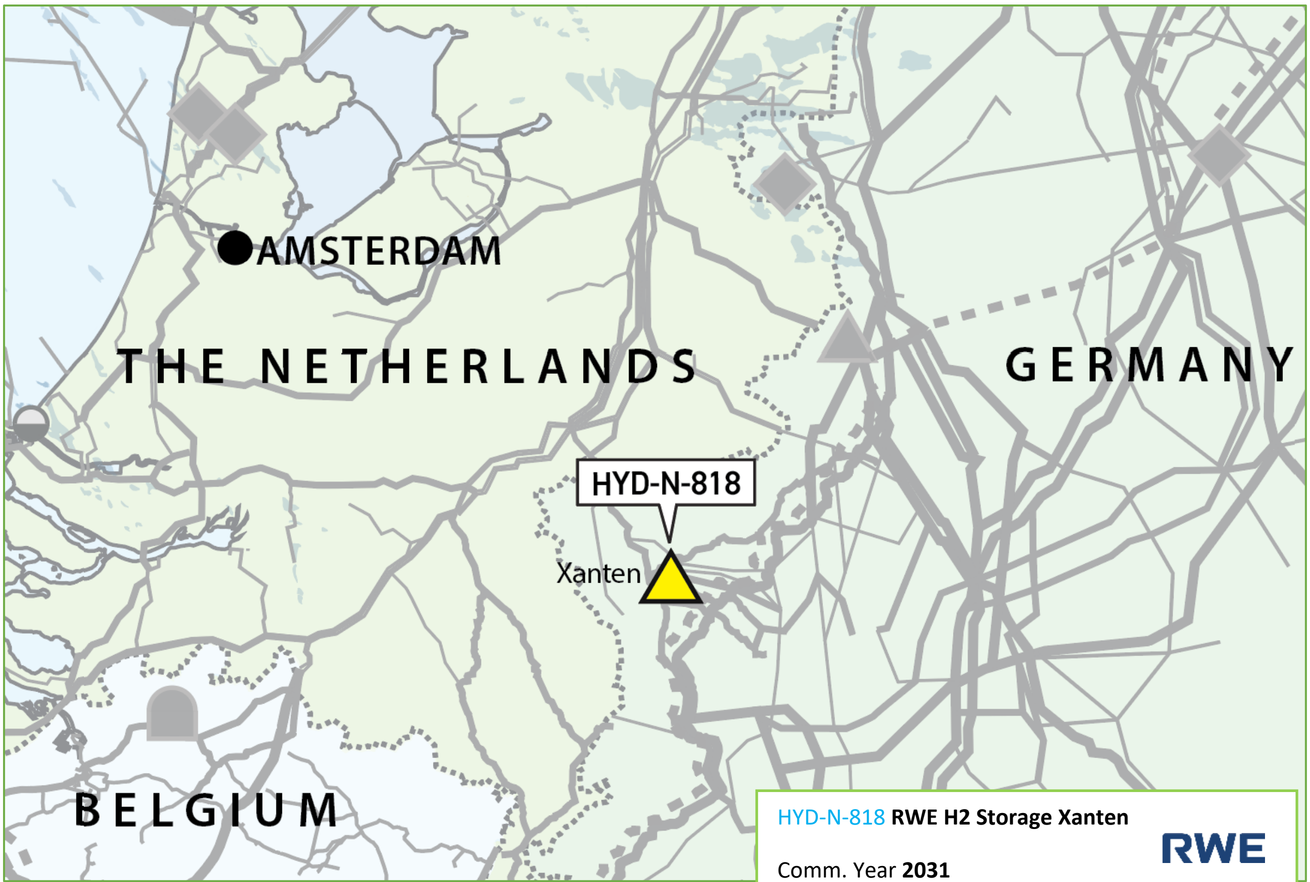
RWE

Reasons for grouping [ENTSOG]

The project group is a stand-alone underground storage in Germany. This project will enable storage of hydrogen in Germany from 2030 (HYD-N-818).

Objective of the group [Promoter]

The project deals with the development of a H2 storage including planning, permission, construction, commissioning and operation of H2 storage capacities. The H2 storage will be located at RWE Gas Storage West's existing natural gas cavern storage site Xanten in Germany nearby the Dutch border. Commercial start is supposed to be in 2030. The connection to a natural gas storage gives the advantage of a step-by-step approach in repurposing caverns and a timely limited parallel operation of the H2 and natural gas storage. The construction of large-scale H2 storage facilities will complete the H2 value chain and H2 infrastructure, supporting the growth of interconnected H2 clusters in Europe and enable market parties to balance and structure the increasing H2 flows matching the needs of the end users.



HYD-N-818 **RWE H2 Storage Xanten**

Comm. Year **2031**

RWE

A. Project group technical information [Promoter/ ENTSOG]

Project technical information [Promoter]

Storage

TYNDP Project code	Maximum Injection rate [GWh/d]	Maximum Withdrawal rate [GWh/d]	Working gas volume [GWh]	Geometrical Volume [m3]
HYD-N-818	3.6	3.6	139	433,819

Capacity increment [ENTSOG]

TYNDP Project code	Point name	Operator	From system	To system	Capacity increment [GWh/d]	Comm. year
HYD-N-818	H2_ST_DE	RWE Gas Storage West GmbH	Transmission Germany (DE Hydrogen)	Storage Germany (DE Hydrogen)	3.6	2031
HYD-N-818	H2_ST_DE	RWE Gas Storage West GmbH	Storage Germany (DE Hydrogen)	Transmission Germany (DE Hydrogen)	3.6	2031

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-818	323.1	15	8.20	30

Description of the cost and range [Promoter]

RWE Gas Storage West GmbH is developing a first H2 storage in Gronau-Epe and has applied for IPCEI funding (Project consortium GET H2 IPCEI –- IPCEI funding and FID is pending) with an expected start of the commercial operation as of 01.01.2027. The learnings from this project - including information on costs - will be used for the planned development of the H2 storage in Xanten (HI WEST 28 / HYD-N-818). The H2 storage in Xanten will co-exist to the natural gas storage until storage of natural gas is phased out.

The planned project in Xanten (project phase 1) will consist of a sub-surface installation – mainly three salt caverns currently used for storing natural gas that will be rededicated to the usage for H2 (in total five repurposed salt caverns at the end of the second project phase) – and a newly developed above surface installation consisting of injection and withdrawal facilities and general installation as buildings, metering stations etc.. It is planned to connect this project to the planned pipeline system of Thyssengas GmbH (TYD-N-855) which is expected to be connected to the evolving H2 cluster of GET H2 IPCEI and with the pipeline H2ercules North-West (HYD-N-1075) of Open Grid Europe GmbH.

The following table shows the essential trades of the investments to be made.

Asset group	***Details – main installations***
General installations *(part of the above surface facility)*	(1) energy supply (2) control & instrumentation (MSR) (3) civil and noise protection (4) safety installations (5) metering and gas quality assurance for the grid connection to the H_2-grid
Injection facilities	(1) compressors (2) cooling (3) filters

(part of the above surface facility)	
Withdrawal facilities *(part of the above surface facility)*	(1) H_2 purification (2) H_2 dehydration (3) H_2 cooling, pressure and volume control systems
Caverns	(1) caverns (2) well completion and well head (3) control instrumentation (4) cushion hydrogen gas (5) temporary equipment for debrining (6) well–services
Pipeline	(1) pipeline construction (2) power and control cables

The estimates of the investment costs in this project are based on the findings from the H2 storage IPCEI project Gronau-Epe (further on IPCEI project), which is scheduled to go commercially operational in 2027. Thereby, some approaches still come from a feasibility study which was carried out in 2019 in combination with an engineering report in 2021. Significant parts, however, come from current, concrete offers from manufacturers and service companies that were received in tenders for the IPCEI project.

Current developments on the procurement markets, supplemented by experience in the construction and operation of large-volume gas storage facilities, lead to the understanding that new construction projects cause unexpected measures that lead to additional investment costs. A range for these unplanned investments is usually 30-40%. Against the background of the findings from the IPCEI project, some risks can already be avoided, so that according to current estimates the range can be halved and therefore the CAPEX range is 15%.

OPEX

No significant findings from the current IPCEI project can be used with regard to operating costs (OPEX), as the IPCEI project will not go into operation until 2027. Therefore, the estimate of OPEX is generally derived from figures relevant to the operation of a natural gas storage facility which is the core business of RWE Gas Storage West over decades. They represent a sufficient approximation to the OPEX for a H2 storage facility, as it is assumed that the salt caverns for H2 have comparable requirements. This is especially relevant for the cost items materials and services and H2 consumption as well as personnel / administrative costs. In contrast, energy costs of operating a H2 storage facility do show significant variance to a natural gas storage facility. This is due to expected differing cycle patterns for the injection and withdrawal of H2, which mainly determines the costs mentioned. It is expected that H2 storage facilities show, unlike natural gas storages which have to meet seasonal variation in natural gas demand, regular injection and withdraw operations as they are meant to balance and structure fluctuating supply and demand conditions of H2.

With regard to OPEX, no significant findings from IPCEI can be transferred, so the full range für unplanned measures must be taken into account for OPEX especially against the background of the large share of electricity costs in the OPEX and their developments in the recent past.

C. Project Benefits [ENTSOG]

C.1 Summary of benefits

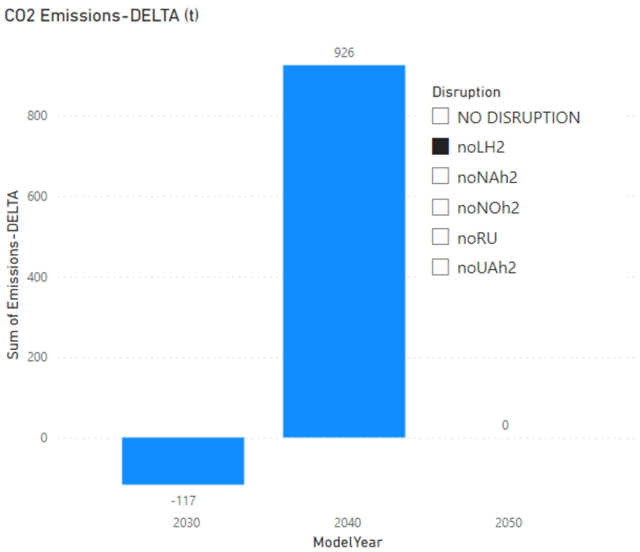
This section provides a summarised analysis by ENTSOG of the main benefits stemming from the realisation of the overall group. More details on the indicators are available in Annex D of TYNDP 2022[1].

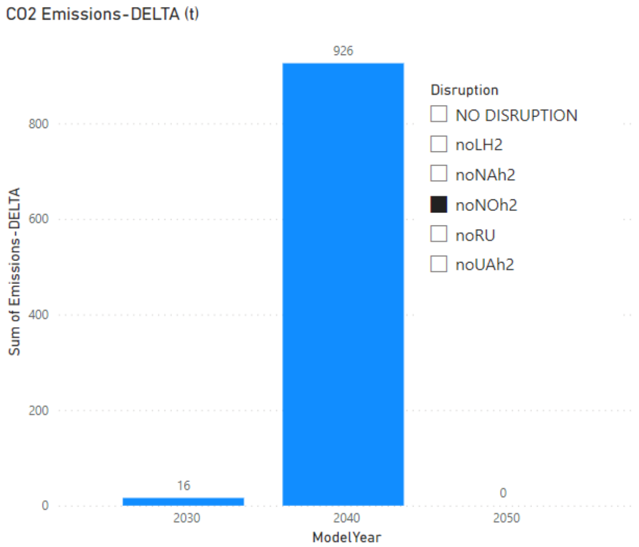
Distributed Energy

Sustainability benefits

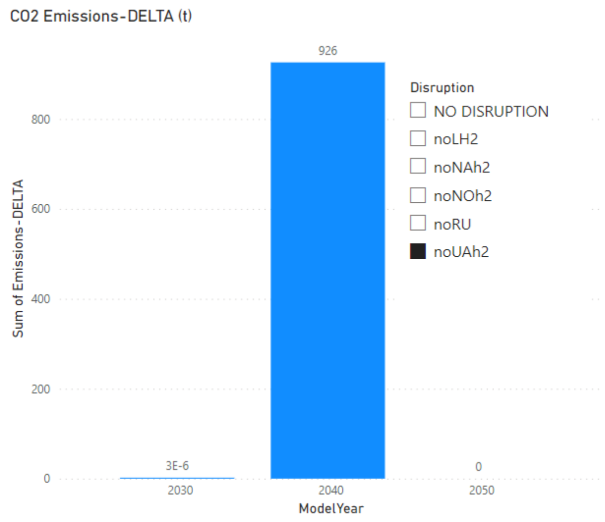
Project group does not show sustainability benefits for reference case (Yearly summer and yearly winter demand assumptions).
Under yearly supply disruption cases, project group shows sustainability benefits. Despite project group increases the overall CO2 emissions, as it enables the storage of hydrogen supplies and therefore reduces the use of SMR in order to avoid demand curtailment in 2040.

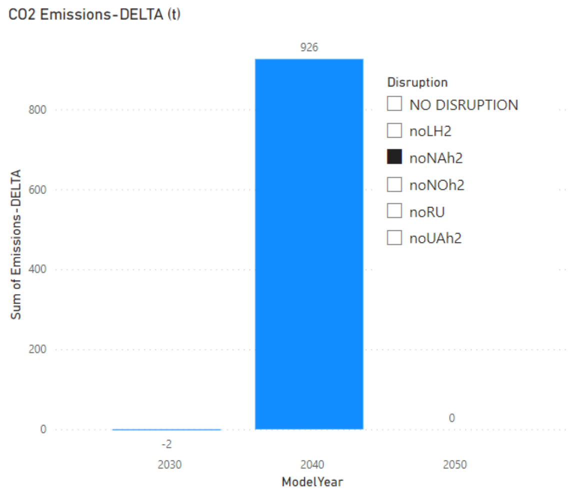
1. *NoLH2: Liquid imports disruption/ 2. noNOh2: Norway disruption / 3. noUAh2: Ukraine disruption/ 4. noNAh2: North Africa disruption*





[1] TYNDP 2022 Annex D
https://www.entsog.eu/sites/default/files/2023-04/ENTSOG_TYNDP_2022_Annex_D_Methodology_230411.pdf

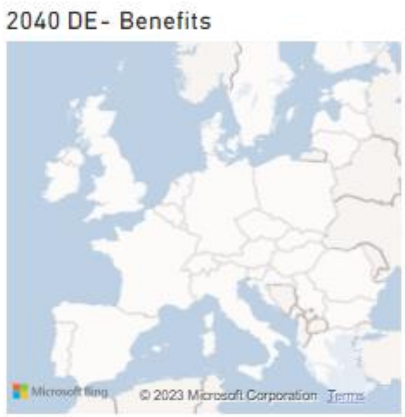




Security of Supply:[2]

> Reference case:

No security of supply benefits observed under reference case (summer/winter average demand).



> Climatic stress cases:

Under climatic stress cases (peak day, 2-weeks and 2-weeks dunkelflaute), project group does not show additional SoS benefits.

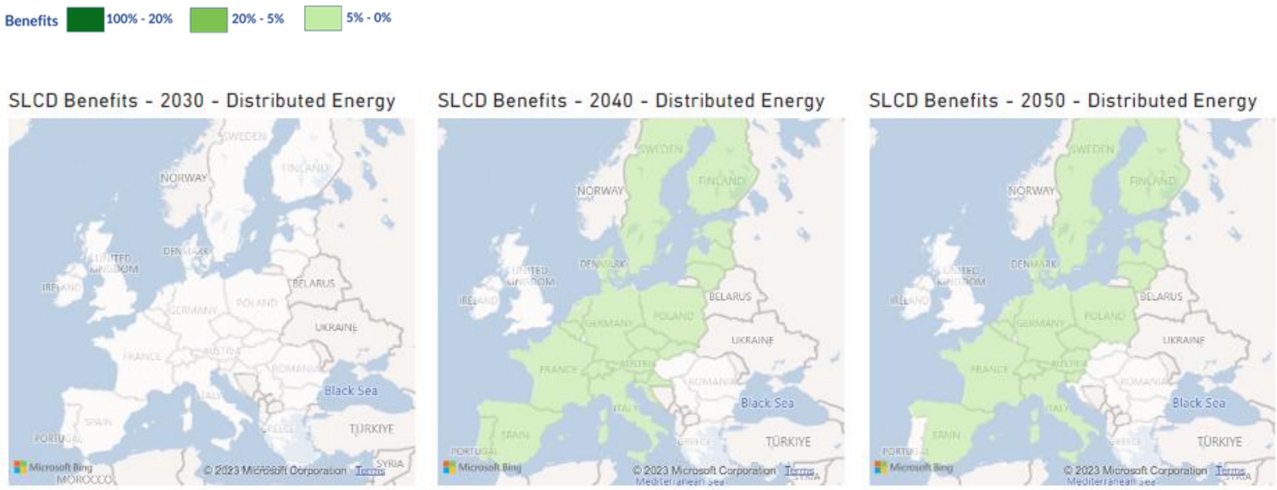
[2] *As for the hydrogen system there is no existing infrastructure level available yet, ENTSOG has identified a possible hydrogen network according to the information provided by promoters in their project submission for the TYNDP/PCI process (i.e., H2 Infrastructure level). Therefore, the System Assessment 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.*

> Disruption cases (S-1):

Under yearly disruption cases, project group does not show additional SoS benefits.

> Single largest capacity disruption (SLCD):

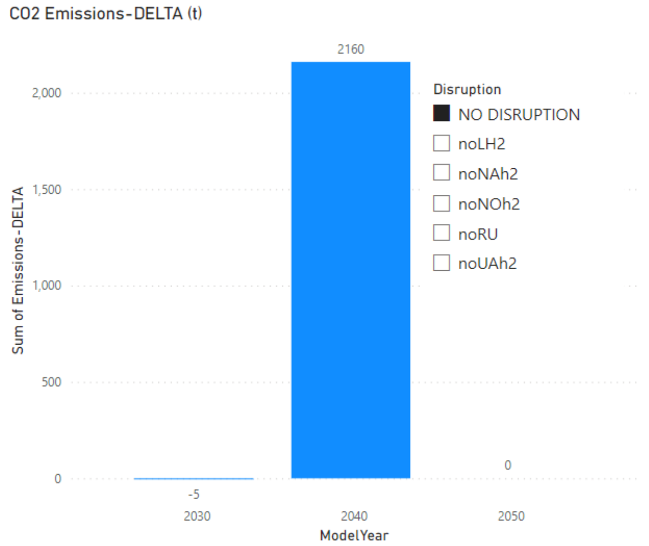
Project group slightly reduces the risk of demand curtailment under SLCD in Europe from 2040. Project group enables storage of supply allowing for further cooperation between Germany and its neighboring countries.



Global Ambition

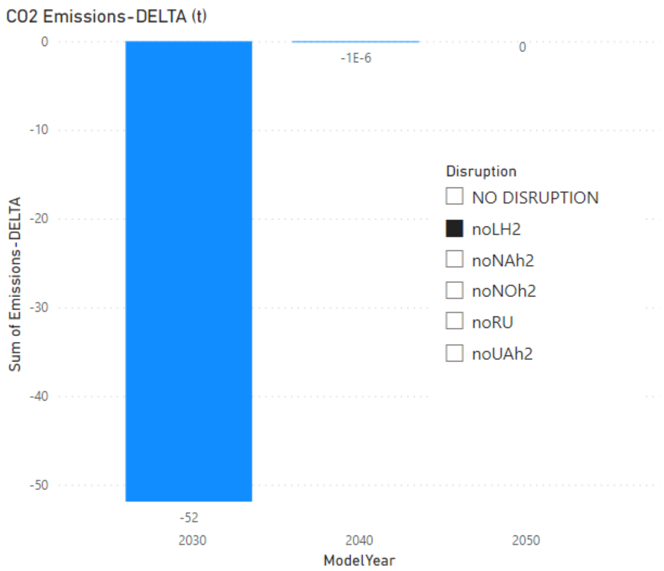
Sustainability

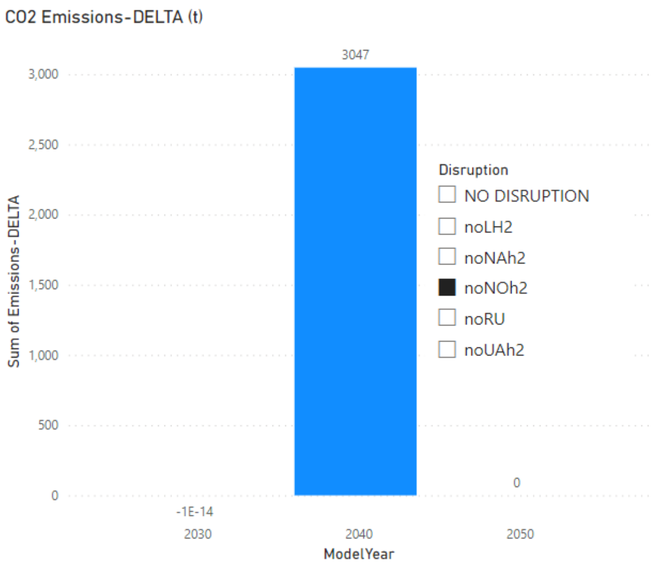
In the reference case, which analyses yearly demand in two periods (average winter and average summer), the project group increases overall CO2 emissions in 2040. This is explained as due to the higher demand in 2040, and the supply flexibility enabled by the storage, project group improves supply availability in Germany and The Netherlands, reducing hydrogen demand curtailment.

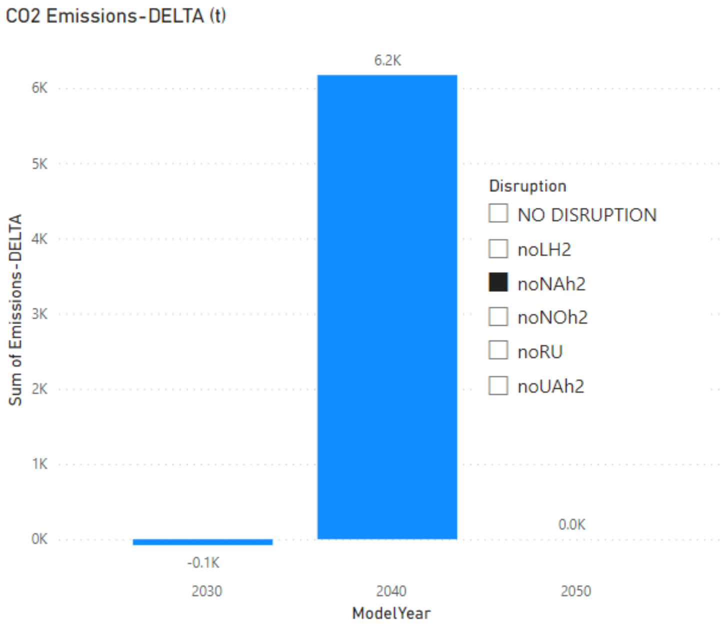


Similar trend is expected under yearly supply disruption in 2040 for liquid imports, Norwegian and North African supply disruptions.

1. *NoLH2: Liquid imports disruption/ 2. noNOh2 : Norway disruption / 3. noNAh2 : North Africa disruption*







Security of supply benefits

> Reference case:

No security of supply benefits observed under reference case (summer/winter average demand).

> Climatic stress cases:

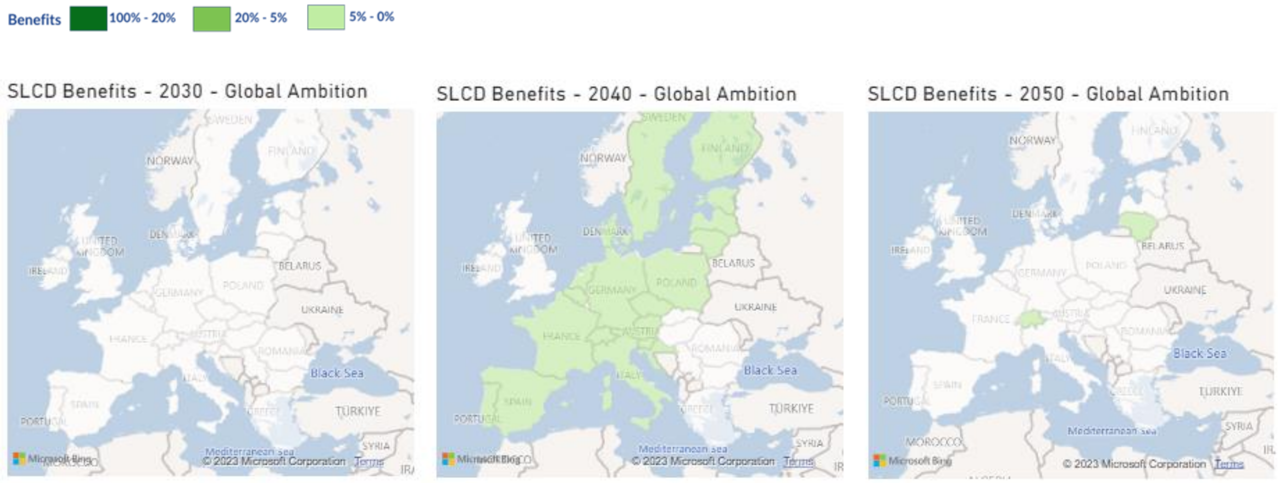
Under climatic stress cases (peak day, 2-weeks and 2-weeks dunkelflaute), project group does not show additional SoS benefits.

> Disruption cases (S-1):

Under yearly disruption cases, project group does not show additional SoS benefits.

> Single largest capacity disruption (SLCD):

Project group slightly reduces the risk of demand curtailment under SLCD in Europe mainly in 2040. Project group enables storage of supply allowing for further cooperation between Germany and Netherlands.



C.2 Quantitative benefits [ENTSOG]

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
2030	NO DISRUPTION	DE	tonne	0,00	538677299	538677299
2030	noLH2	DE	tonne	-117,45	540175890,2	540176007,7
2030	noNAh2	DE	tonne	-2,40	539785356,1	539785358,5
2030	noNOh2	DE	tonne	16,01	538877197,8	538877181,8
2030	noUAh2	DE	tonne	0,00	539378771,9	539378771,9
2030	NO DISRUPTION	GA	tonne	-5,21	592910448,4	592910453,7
2030	noLH2	GA	tonne	-51,90	594817481,2	594817533,1
2030	noNAh2	GA	tonne	-78,45	594141433,2	594141511,6
2030	noNOh2	GA	tonne	0,00	593310994,3	593310994,3
2030	noUAh2	GA	tonne	0,00	593627617,9	593627617,9
2040	NO DISRUPTION	DE	tonne	0,00	392077044	392077044
2040	noLH2	DE	tonne	925,88	392213883,4	392212957,5
2040	noNAh2	DE	tonne	925,88	392188097,7	392187171,8
2040	noNOh2	DE	tonne	925,88	392144022,6	392143096,7
2040	noUAh2	DE	tonne	925,88	392399182,9	392398257
2040	NO DISRUPTION	GA	tonne	2160,39	396523251,6	396521091,2
2040	noLH2	GA	tonne	0,00	397455196,7	397455196,7
2040	noNAh2	GA	tonne	6172,54	397301976,6	397295804,1
2040	noNOh2	GA	tonne	3047,33	397450977,1	397447929,8
2040	noUAh2	GA	tonne	0,00	397478498,3	397478498,3
2050	NO 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
2050	NO DISRUPTION	GA	tonne	0,00	228306706,5	228306706,5
2050	noLH2	GA	tonne	0,00	228306706,5	228306706,5
2050	noNAh2	GA	tonne	0,00	228306706,5	228306706,5
2050	noNOh2	GA	tonne	0,00	228306706,5	228306706,5
2050	noRU	GA	tonne	0,00	228306706,5	228306706,5
2050	noUAh2	GA	tonne	0,00	228306706,5	228306706,5

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%	0%	-2%	-1%	0%	-1%
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%	-2%	-1%	-2%	0%
Austria	0%	0%	-1%	-1%	-2%	0%
Croatia	0%	0%	-1%	-1%	0%	0%
Denmark	0%	0%	-1%	-1%	-1%	0%
Italy	0%	0%	-1%	-1%	-2%	0%
Slovakia	0%	0%	-1%	0%	0%	-1%
Spain	0%	0%	-1%	-1%	-1%	0%
Greece	0%	0%	-1%	0%	0%	0%
Hungary	0%	0%	0%	-1%	0%	0%
Bulgaria	0%	0%	0%	0%	0%	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%	-1%	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%	-1%	0%	0%
Average2W	Estonia	0%	0%	0%	0%	0%	0%
Average2W	Finland	0%	0%	0%	0%	0%	-1%
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%	-1%	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%	-1%	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%	0%
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%	-1%	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-818	H2 Storage	H2 storage site - no new impact - H2 storage is planned to be installed on an existing natural gas storage site and neighboring areas	Surrounding of the H2 storage plant, further explanations please see below
HYD-N-818	H2 Storage	pipeline routes between H2 storage site and caverns – at the moment it is not expected that sensitive areas are affected	

Potential impact	Mitigation measures	Related costs included in project CAPEX and OPEX	Additional expected costs
HYD-N-818	N/A	N/A	N/A

Environmental Impact explained [Promoter]

The project complies with the principle of ‘do no significant harm’ (DNSH) within the meaning of Article 17 of Regulation (EU) 2020/852, please find below further explanations:

GHG emissions - Emissions from the planned H2 storage facility are limited to the secondary emissions from the use of electrical energy. The usage of electrical energy is necessary for the systems for injection (compressors with electric drive) and withdrawal (gas-cleaning with electrically-driven heaters and refrigeration-systems).

The plant is specially designed for the minimization of emissions and to the possible use of renewable energies, e.g.:

- Compressors with electric drive and optimized efficiency will be used instead of compressors with combustion drive and standard efficiency
- Heating of the process gas during gas-cleaning is done by the immediate effect of electric heaters instead of combustional heaters
- Appearance of tail-gas is avoided due to the use of appropriate techniques; related to that, utilization or dissipation of the tail-gas is not necessary.

Climate change adaptation - An adverse impact on the climate is not to be seen. Contrary to that, the project leads secondary to significant positive impacts on the climate due to structuring of the production and usage of renewable H2.

Negative effects to nature, people and assets are taken into account with the environmental impact study as a part of the permit procedure. The permission for the operation will only be given, if only minor negative effects are evaluated by external experts.

The sustainable use and protection of water and marine resources – planned project does not involve the use of water. The operation of cavern storage since the 1980s in Xanten displays the continuous compliance with specific water protection measures for the site.

The transition to a circular economy, including waste prevention and recycling - The planned facility only leads to a narrowed amount of hazardous waste which will be incinerated (if not recyclable) or exploited (if recyclable) by accredited disposal contractors and in accordance to the guidelines of circular economy laid down in the national waste regulations.

Pollution prevention and control - direct emissions to the environment are reduced to a minimum level by design of the plant.

Emission of pollutants is prevented, on the one hand, by the renouncement of combustional compressor-drives or heating processes and, on the other hand, by the absence of tail-gas.

Emissions of pollutants are strictly limited to the mandatory requirements for emergency-handling (e.g. emergency-flare).

The activity complies with Directive 2012/18/EU of the European Parliament and of the Council. The Directive has been implemented in national law which is applicable for the approval process before building and getting the facility into operation and the operational process itself.

protection and restoration of biodiversity and ecosystems - Based on the evolvement of cavern storage since the 1980s at the cavern field Xanten, the environmental obligations regarding the implementation and operation of new caverns are high.

The H2 storage will be built on an existing storage site and is subject to an environmental impact assessment under national legislation during the permitting process.

By building the new H2 storage the following aspects have to be handled:

- Minimization of direct emissions due to the plant-operation (see explanations above)
- Prevention of direct H2-emissions related to the normal operation (tail-gas)
- Selection of components, which are as quiet as possible
- Having a sound concept for the whole storage site, not only the H2 storage, but also including the natural gas storage by creating an added value also for the natural gas storage
- Compensative measures for the necessary interventions into the landscape
- Keeping light emissions as small as possible by having a lighting concept – lighting only when necessary and usage of light sources, which are light scattering
- The used cooling medium will only be used in closed loops and is state of the art
- By building the H2 storage on the site of the existing natural gas storage and neighbouring areas the interventions into the landscape will be kept as small as possible
- If possible, already existing pipeline routes will be used and will also keep the intervention into the landscape as small as possible.
- There will be no impact from the projected storage site or related pipelines toward restricted areas (e.g. as conservation areas)
- Having a concept for the construction works to ensure species protection and keep the measures environmentally compatible

E. Other benefits [Promoter]

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

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

Description of Other benefits [Promoter]

Furthermore, with connecting the Thyssengas pipeline system latest in 2030 to the GET H2 pipeline system the H2 Storage Xanten will also be connected to the H2ercules North-West pipeline of OGE and thus to further H2 sources, e.g. from Norway. The H2 storage is then connected to the same system as the H2 storage Gronau-Epe Project HYD-N-767. Unfortunately, the benefit analysis for both projects differs and cannot be understood.

Comment RWE Gas Storage West – request for explanation – to the benefit analysis (please see C1/Distributed Energy/Sustainability benefits and C1/Global Ambition/Sustainability)

We doubt the results of the sustainability benefits analysis. From our point of view the project group decreases the overall CO2 emissions instead of increasing the emissions. We cannot understand that result as H2 storages is offering the possibility to optimize the generation of renewable hydrogen to avoid CO2 emissions. If the renewable H2 production will be interrupted H2 storages and the delivery of H2 stored in theses H2 storages shall be used to avoid using additional SMRs.

F. Useful links [Promoter]

Useful links:

https://www.rwe-gasstorage-west.com/en/hydrogen/

https://get-h2-netz.de/leitung-hep-2/

https://www.h2ercules.com/en

https://h2.thyssengas.com/unser-h2-startnetz/