

Gasunie H2 network: Progress, opportunities & challenges

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Harry Smit, Gasunie







Gasunie H2 network: progress, opportunities & challenges

- 1. From roll-out plan to a NW European network
- 2. Progress in cross border cooperation
- 3. Opportunities to seize
- 4. Challenges to overcome

Phase 1: 2025-2027

First regional networks developed





hynetwork

Phase 1: 2025-2027

International connections

- Eemshaven to north-east Germany
- Zeeland to north-west Belgium



Image: Hydrogen networkImage: Hydrogen networkImage: Hydrogen storage (salt cavern)Image: Hydrogen storage

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Phase 2: 2028-2029

National connections

- North, east, west & south regions interconnected
- Connected to storage





Phase 2: 2028-2029

International connections

• Eemshaven, Zeeland, Rotterdam & Amsterdam connected to Germany and Belgium





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Phase 3: 2030 and beyond

National connections

- North, east, west, south regions interconnected
- Connection with future offshore network •





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Phase 3: 2030 and beyond

International connections

 All Dutch harbors to 4 German border points and 2 Belgian border points







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Phase 3: 2030 and beyond

Cross border connections

- 6 connections with Belgium and Germany
- Requires full cooperation to align with respective national developments



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Cross-border cooperation, EU embedding, contract development

crossing borders in energy

NL / DE / BE Border point	Neighboring Network Operators	RFO Planning			EU embedding	NNO Contract development	Alignment	
		HNS	NNO	Match	PCI	Level of detail	Capacity	Specs
Vlieghuis	Thyssengas	2027	2027	\checkmark	\checkmark		\checkmark	±
Oude Statenzijl	Gasunie DE Open Grid Europe GTG Nord	2028	2028	\checkmark	\checkmark		\checkmark	×
Zevenaar	Open Grid Europe Thyssengas	2029	2030	±	\checkmark		\checkmark	×
Winterswijk	Open Grid Europe	2030 ⁺	2030	\checkmark			\checkmark	×
Zelzate	Fluxys	2027	2027	\checkmark	\checkmark		\checkmark	±
Zandvliet	Fluxys	29/30	29/30	\checkmark	\checkmark		\checkmark	±
						0% 50% 100%		

Overview of hydrogen networks Cuxhaven Hynetwork Gasunie Hyperlink GUD amburg Bremerhaven Hercules OGE & GetH2 Thyssengas, Nowega Lüneburg Groninge Fluxys hydrogen Bremen Older oprudo Naturpark Wildeshauser Geest Alkma Celle Zwolle Wolfsb Hannover Amsterdam Osnabrück Braunschweig Bielefeld Hildesheim ünster otterdan Paderborn Göttingen Eindhoven Kasse verpen kerke Brussel Information regarding other Riise networks (not Hynetwork) is based on public information Berg from respective websites. Charleroi Frankturt

hynetwork

- All border point connections are now being developed in cooperation with the cross border NNO's
- Cooperation includes full alignment on timing, capacities, specifications (pressure, quality)
- Capacities to and from Germany according to Kernnetz publication
- Capacities to and from Belgium according to mutual HNS / Fluxys estimates
- Between 2027 and 2032 the main near border industrial areas in NL, BE and GE planned to be interconnected



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High "near network" industrial demand

Sune

crossing borders in energy



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Good storage opportunity's

- Map of European salt deposits and salt structures as a result of suitability assessment for underground hydrogen storage
- European storage potential for salt-caverns located in onshore areas is estimated to be 23.2 PWh, 19.0 PWh of which is located in salt domes.





References: Caglayan, D. G., Weber, N., Heinrichs, H. U., Linßen, J., Robinius, M., Kukla, P., A. u. Stolten, D.: Technical potential of salt caverns for hydrogen storage in Europe. International Journal of Hydrogen Energy 45 (2020) 11, S

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We knew it wouldn't be easy

Briefing

Oct 9th 2021 edition >

A very big balancing act

Creating the new hydrogen economy is a massive undertaking

It is also a delicate one

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We see projects "wait" for demand commitment



Committed blue and committed green hydrogen capacity just a sliver of total plans

Production capacity (Mtpa)





Tweede Kamer akkoord met subsidie van €3 mrd voor ombouw fabriek 20



But: Governments are willing to support



Kick-start role of steel

ArcelorMittal signs letter of intent with the governments of Belgium and Flanders, supporting €1.1 billion investment in decarbonisation technologies at its flagship Gent plant

ArcelorMittal Belgium will reduce CO2 emissions by 3.9 million tonnes per year by 2030, by building a 2.5 million-tonne direct reduced iron (DRI) plant and two electric furnaces at its Gent site, to operate alongside its state-of-the-art blast furnace that is ready to take waste wood and plastics as a substitute for fossil carbon.



And continue putting effort in bridging supply / demand

The average levelized cost of renewable hydrogen of bids from displayed countries* ranges from 5.8-13.5 EUR/kg



Top-10 off-take subsectors* within "Industry"

- Methanol
- Fertilizer
- Refining
- Injection into gas/H₂ pipeline
- Steel
- Chemicals
- Ammonia
- Glass
- Electricity or heat generation
- Industrial gases

- Lowest costs in southern Europe and partly in northern Europe
- NW Europe less attractive due to high electricity costs

EU pilot auction shows wide range in costs





And the hydrogen landscape moves

- Netherlands: New government right wing parliament. Continue focus on investments in innovation and technology like CCS and (green) hydrogen
- Also: Increasing interest in carbon intensity instead of H2 color
 - Low carbon H2 required for scale, speed, infrastructure coverage and affordability for industry
 - Capture technology should improve through innovation to make the difference between green and low carbon even smaller in the future.
- Gasunie CEO: " Green and blue hydrogen should be used to increase the volumes and improve affordability."





Challenges & next steps

What can help...

- Reduce complexity in rules that need to be adopted by the market
- Incorporate low carbon hydrogen as part of the green/blue plan
 - Streamline national / EU policies on green / blue certification
- Align on permitting across the value chain and EU borders
- Align on cross border market commitment approaches

A pragmatic approach is required to overcome initial hurdles and to make sure that network usage will reach an acceptable level to proceed economically as soon as possible.







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