

Pioneering the Future: Hydrogen-Powered Heating in Lochem's Historic District

1-11-2023
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Content

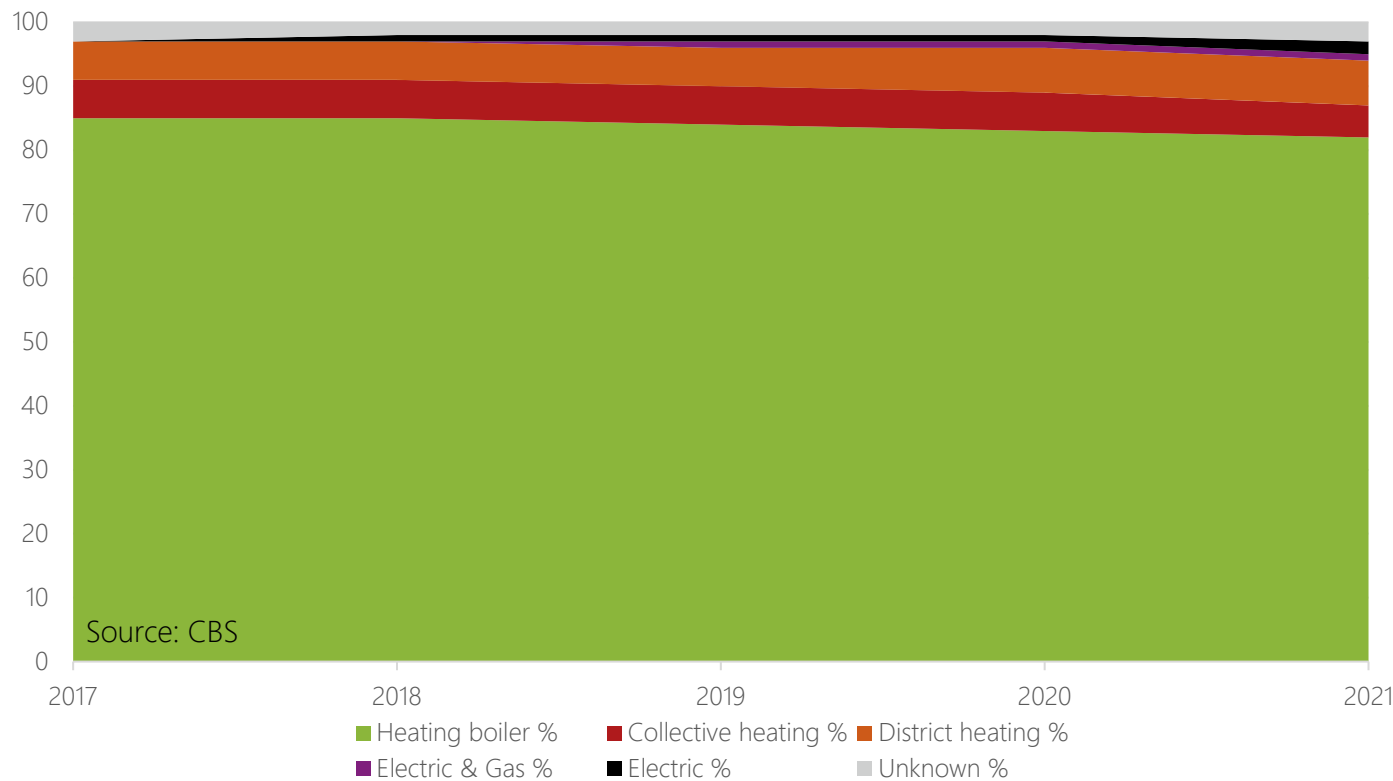
- Status of heating in the Netherlands
- Dutch policy on hydrogen
- Residential pilot projects & Collaboration
- Hydrogen to Lochem

Heating in the Netherlands

Slowly moving away from natural gas

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Heating of Dutch houses



Vision on heating:

1. Reduction of energy use is most important. Focus on insulation, now;
2. Electrify as much of the heat demand as possible. By using electric heat pumps or other efficient means;
3. Only for the residual heating demand renewable gases should be used.

Point of debate:

Future role of hybrid systems consisting of electric heat pumps and gas boilers.

Dutch policy on hydrogen



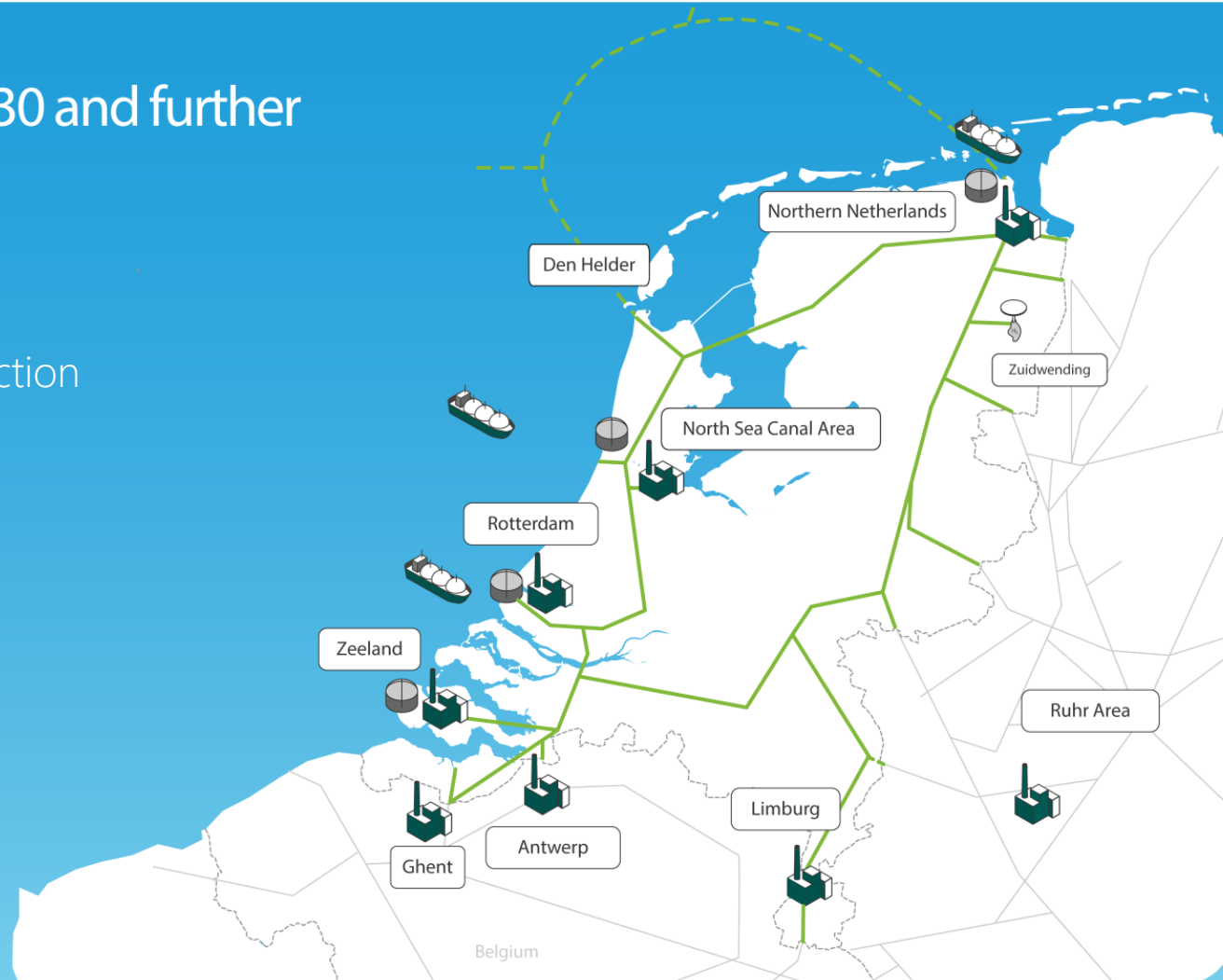
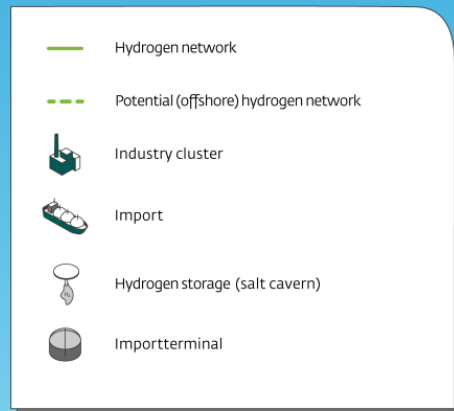
National hydrogen grid is essential starting point

From 200 PJ in 2020 to 1000 PJ in 2050

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Hydrogen Network 2030 and further

- (Chemical) Industry
- (International) Mobility
- Sustainable fuels
- Strategic energy storage
- Flexible electricity production



HYNETWORK
SERVICES

Jun 2023

Sources:

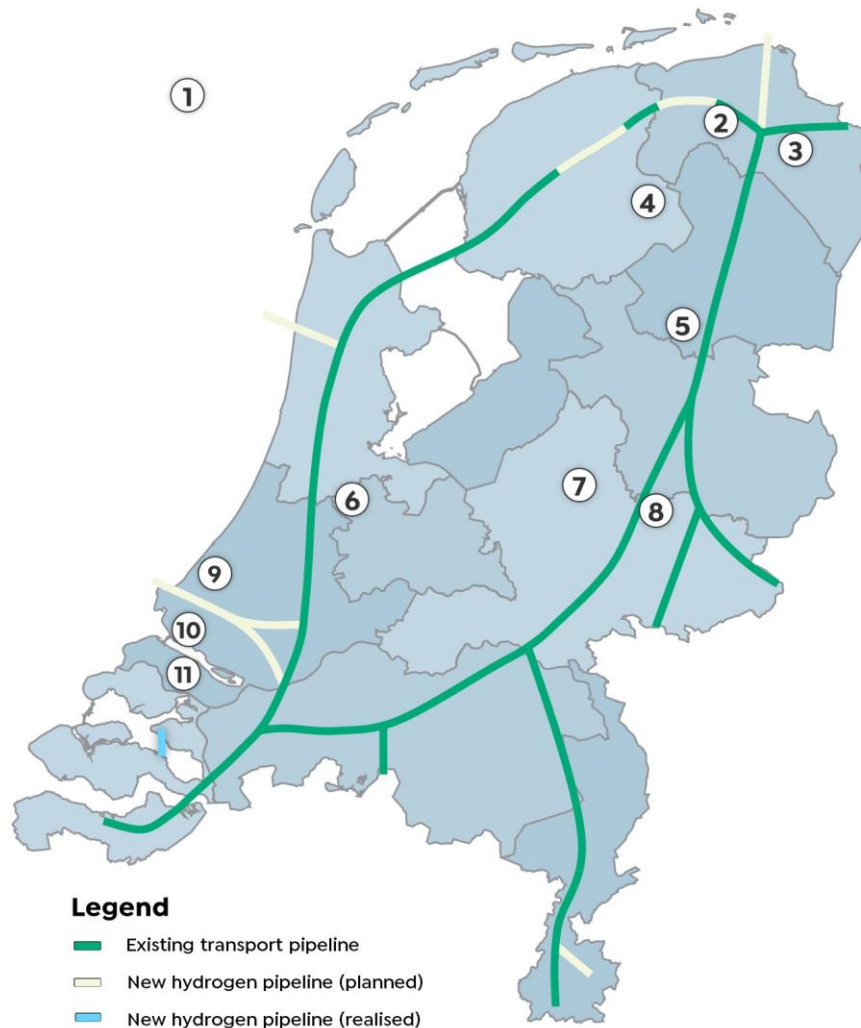
- hynetwork.nl/en
- waterstofkaart.missieh2.nl/en/
- Nationaal Plan Energiesysteem



Residential pilot projects & collaboration

Hydrogen Neighbourhoods

You only learn by doing



Name	Location	Run-time	Description	System operators
1. North Sea Wind Power Hub	Eiland in de Noordzee	2030-2050	Electrolysis for the transport of hydrogen to the mainland.	Tennet gasunie
2. Entrance terrain Hanzehogeschool	Groningen	2019-2023	Tests with a hydrogen network including hydrogen boilers.	RENDO coteq
3. Hydrogen district Wagenborgen	Wagenborgen	2020-2032	30-40 existing residences with hybrid hydrogen heatpumps.	enpuls
4. Hydrogen pilot H ₂ Oosterwolde	Oosterwolde	2021-2026	Hydrogen for the integration of large scale solar-PV energy generation.	alllander
5. Hydrogen pilot H ₂ Hoogeveen	Hoogeveen	From 2022	H ₂ application in existing infrastructure and built environment.	RENDO gasunie
6. Temporary conversion Uithoorn	Uithoorn	2020	Converting 14 (vacant) residences from natural gas to hydrogen.	STEDIN
7. Demo- and training residence	Apeldoorn	2021-2026	Demo and training residence for hydrogen on the KIWA terrain.	alllander
8. Hydrogen pilot H ₂ Lochem	Lochem	2022-2025	Hydrogen as an alternative to natural gas in monumental premises.	alllander
9. Hydrogen pilot The Green Village	Delft	2019-2025	Managing a 100%-hydrogen network.	STEDIN alllander enpuls
10. Hydrogen pilot Power-to-gas	Rotterdam Rozenburg	2013-2023	Closed hydrogen system in the built environment.	STEDIN
11. Pilot Stad aan 't Haringvliet	Stad aan 't Haringvliet	From 2025	Preparing for the distribution and application of hydrogen in the built environment.	STEDIN gasunie

Increasing complexity and size of residential pilot projects

Extensive collaboration between grid operators



Year of realisation	Name	Housing type	Number of housings	Freedom of choice	Type of heating	Duration	Single or double grid	Grid pressure	Source of hydrogen	Initiative
2022	Green Village	Rental, copy of a '70's house	1	Yes	Boiler	2-3 months	Double	100 mbar	Cylinders	Consortium
2022	Lochem	Private property, monumental	12	Yes	Boiler	3 years	Double	100 mbar	Tube trailers	Residents
2023	Wagenborgen	Rental, '70's	33	Yes	Hybrid	15 years	Double	8 bar en 100 mbar	Tube trailers → elektrolyser	Grid operator
2024	Hoogeveen (new built)	Private property, new-build	100	No	Boiler	Permanent	Single	4 bar en 100 mbar	Tubetrailers → elektrolyser → grid connection	Consortium
2024	Hoogeveen (existing)	Private property, '00's	100+	Yes	Boiler	Permanent	Single	4 bar en 100 mbar	See above	Consortium
2025	Stad aan 't Haringvliet	Mixed in type and age, including utility	628	No	Boiler and Hybrid	Permanent	Single	30 bar, 100 mbar, 8 bar	Elektrolyser	Residents



Hydrogen experience centre, together with Kiwa



- Showcase;
- Public perception;
- Training;
- Practical testing.

Hydrogen pilot in the city of Lochem



- **Lochem**
Small town in the eastern part of the Netherlands with about 13,500 inhabitants.
- **Pilot**
 - 12 monumental buildings, end of the 19th century (heat pumps, district heating and PV not possible);
 - Using the existing natural gas grid for 100% hydrogen;
 - Duration 3 years, start on 14 November 2022;
 - Dedicated hydrogen supply for this pilot only.

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Thank you for
your attention



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BERKELOORD
Beschermd stadsgezicht in Lochem



LochemEnergie
je eigen energie



Westfalen

remeha



Kimenai
installatiebeheer bv



**provincie
Gelderland**



Lochem
Gemeente



ekinetix
Realizing energy transition



ALPHA
STUDIEBURO BVBA

COMBI



gavilar
goed geregeld!



antea group



EUROPESE UNIE
Europees Fonds voor Regionale Ontwikkeling
Mede gefinancierd in het kader van de respons
van de Unie op de COVID-19-pandemie.



operationeel programma oost
Europees Fonds voor Regionale Ontwikkeling