



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

IPHE Country Update November 2020: The Netherlands

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1. New Initiatives, Programs, and Policies on Hydrogen and Fuel Cells

“After presenting its hydrogen ambitions in de Dutch Climate Agreement in June 2019, The Netherlands has recently presented in March 2020 its [hydrogen strategy](#) to the Dutch Parliament. Here is the systemic role of clean hydrogen recognized in a zero-carbon energy supply and the unique starting position for The Netherlands is highlighted. Namely:

- Large offshore wind potential in the North Sea that can be used to produced green hydrogen.
- Gas infrastructure will soon be available for hydrogen transport in relation to the stopping of gas production in Groningen.
- Industry ready to make the transition to hydrogen (3 of the 23 flagship projects from the Hydrogen Council are in The Netherlands).
- Cooperation between gas and electricity national network operators Gasunie and Tennet via the infrastructure outlook 2050 (putting sector coupling in practice).
- High potential to develop large scale hydrogen storage in salt caverns and empty gas fields.
- Favorable geographical position to become a hydrogen hub while utilizing existing port infrastructure to connect Europe and the world in a global hydrogen market.

This strategy targets 3-4 GW electrolysis capacity in 2030 and provides details on support measurements while identifying key challenges that need to be addressed for clean hydrogen covering a wide range of sectors and applications. Furthermore, the strategy provides a policy agenda that is aligned with the targets established in the National Climate Agreement and serves as basis for the development and implementation of the National Hydrogen Programme to be executed as of 2022 as a joint public-private partnership. A policy agenda is presented based on four pillars:

1. Legislation & Regulation: utilization of existing gas grid for hydrogen transport, market regulation and temporary task for network operators, guarantees of origin and certification and safety.
2. Cost Reduction & Scaling up Hydrogen: linking hydrogen to offshore wind energy (possible combined tenders), blending obligation and support schemes for research, scaling up and rolling out with the announcement of a new and temporary exploitation subsidy of €35million per year in addition to the existing €40million [Demonstration Energy and Climate Innovation](#) (DEI+) scheme.
3. Sustainability of Final Consumption: ports and industry clusters, transport including synthetic fuels, built environment, electricity sector and agricultural sector.
4. Supporting and Flanking Policy: international strategy, regional policy and research & innovation.”

Further, we would like to point out the following new initiatives:

- [Joint Political Declaration of the Penta-lateral Energy Forum on the Role of Hydrogen to Decarbonize the Energy System in Europe](#): the Netherlands and Austria have taken the initiative to develop the joint Political Declaration by Ministers on Hydrogen



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from Austria, Belgium, France, Germany, Luxembourg, the Netherlands and Switzerland, which was published in June 2020.

- [HyWay27](#) Study: The Dutch Ministry of Economic Affairs and Climate Policy, TenneT and Gasunie run study on the development of a national hydrogen infrastructure.
- [Memorandum of Understanding](#) between The Netherlands and Portugal in the field of hydrogen: The Minister of Environment and Climate Action of the Portuguese Republic and the Minister of Economic Affairs and Climate Policy of the Netherlands signed an Memorandum of Understanding (MoU) to affirm their intention to connect Portugal's and the Netherlands's 2030 hydrogen plans and develop a strategic export-import value chain to ensure production and transport of green hydrogen from Portugal to the Netherlands and its hinterland via the ports of Sines and Rotterdam.
- [Collaboration Between the United States and the Netherlands Focuses on Hydrogen Technology](#): Statement of intent to collaborate on collecting, analysing, and sharing information on hydrogen production and infrastructure technologies between the U.S. Department of Energy's (DOE's) Office of Energy Efficiency and Renewable Energy (EERE) and the Dutch Ministry of Economic Affairs and Climate Policy's Directorate General for Climate and Energy
- [HY3 Project](#): The Dutch, German and North Rhine-Westphalia governments have asked TNO and FZ Jülich to study the pre-feasibility of a transnational hydrogen economy at the border of the Netherlands and North Rhine-Westphalia.
- [IPCEI Open Call](#) organized by RVO and 83 projects signed up.
- €10million subsidy for two hydrogen pilots in the residential area were granted in the second round of the [Natural Gas-Free Neighbourhoods Program](#) (PAW). The aim of the program is to learn how Natural gas-free neighbourhoods can be organized and scaled up. This requires real gas-free homes and other buildings to be established through a neighbourhood-oriented approach. As part of it, municipalities gain knowledge and experience on how to make existing neighbourhoods free from fossil fuels in an affordable way. In fact, all Dutch municipalities are making plans for natural gas-free transition and some are already very far along. Within the PAW, approximately 50,000 homes and other buildings are expected to be made more sustainable.
- Reports sent to the Parliament about hydrogen:
 - [The Dutch hydrogen balance, and the current and future representation of hydrogen in the energy statistics, TNO 2020.](#)
 - [Hydrogen exchange for the Climate: a preliminary study, Bert den Ouden, 2020](#): A hydrogen exchange, along the lines of the electricity and gas exchanges, could act as a catalyst for a market for climate-neutral hydrogen. It could also help the economic growth of a hydrogen market. This is evident from the exploratory study, 'A Hydrogen Exchange for the Climate', which was presented online to Minister Wiebes of Economic Affairs and Climate Policy on 30 September. As a result of the study, Gasunie and four Dutch port authorities are now arranging for a definition study to be carried out into the practical design of an exchange on which hydrogen can be traded freely. A hydrogen exchange could be set up in stages and grow incrementally along with the formation of a market for climate-neutral hydrogen. The follow-up study that is currently being launched will be headed by Bert den Ouden, former CEO of the Dutch Energy Exchange, and will run for a maximum of one year
 - [Hydrogen in inland shipping and short sea: an inventory of innovative projects, 2020, EICB 2020](#)
 - Combined tenders for offshore wind energy and hydrogen production, Guidehouse 2020



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2. Hydrogen and Fuel Cell R&D Update

No update available. This is not something that our government agencies are actively tracking.

3. Demonstration, Deployments, and Workforce Developments Update

There are numerous projects undertaken by Dutch industry, small and medium enterprises, research institutes, consultants, NGOs and regional governments aiming at realizing the potential role of hydrogen as established in the National Hydrogen Strategy. TKI New Gas has published an update of the overview in the summer of 2020 with over 80 active Dutch pilots and demonstration projects on hydrogen. This overview can be found [here](#).

Relevant to mention is the [Northern Netherlands Hydrogen Investment Plan](#) published on 30th October 2020 by businesses and government bodies in the Northern Netherlands. The plan includes investments up to €9billion and could secure some 66,000 existing jobs in areas like gas infrastructure and mobility and help create between 25,000 (in 2030) and 41,000 (in 2050) new jobs in areas like maintenance and operations

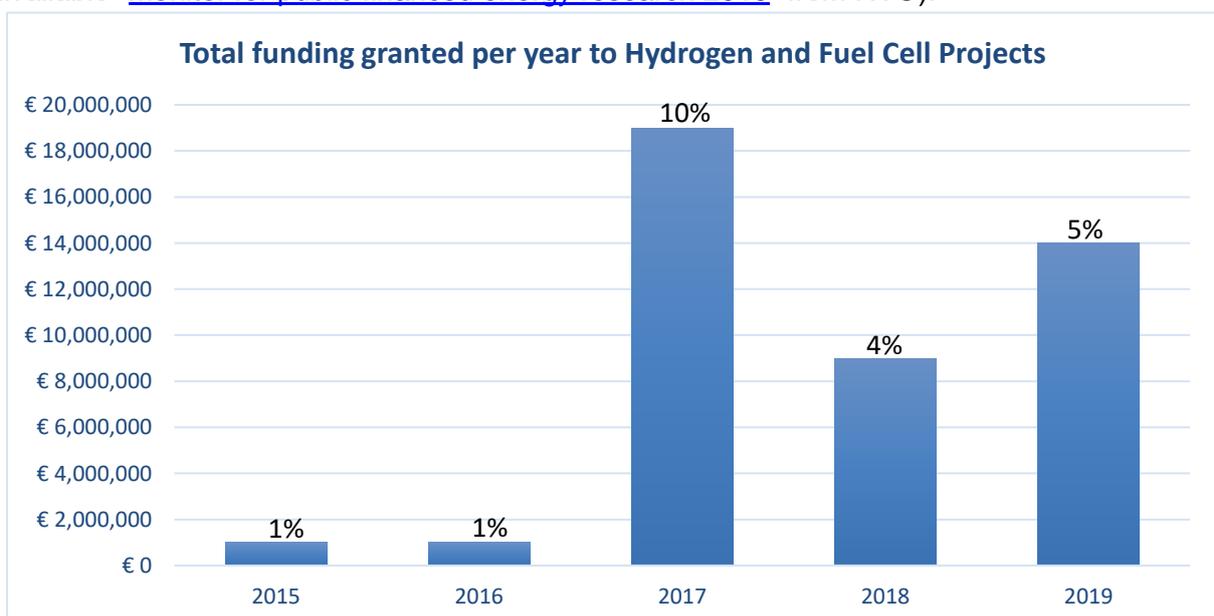
4. Events and Solicitations

Events:

- The Netherlands Digital Innovation Mission on Hydrogen to California and British Columbia, 7-9 December 2020. Sign up: <https://ecc.mentorjam.com>.
- Workshop-Webinar 'Scaling Up Clean Hydrogen Around the North Sea', The Hague, The Netherlands, March 2021 (EZK, CIEP, CEM, IPHE, final date to be decided)
- Wind meets Gas symposium, 7th and 8th of October 2021 in Groningen

5. Investments: Government and Collaborative Hydrogen and Fuel Cell Funding

The figure below shows the government funding awarded per year to hydrogen and fuel cell demonstration and deployments projects, with the tag above the columns corresponding to the percentage of the total energy research budget granted each year (data from the public available "[monitor for public financed energy research 2019](#)" from RVO).





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6. Regulations, Codes & Standards, and Safety Update

The National Climate Agreement mandates that statutory and regulatory flexibility can be created for experiments to allow regional and national network operators to gain experience in the transport and distribution of hydrogen. In that case, the network operators will begin collaborating with market participants to launch hydrogen pilot projects, with the purpose of jointly exploring a workable supply chain.

The Netherlands is facing a great reorganization of the environmental laws per 2022, which also include the Hydrogen Refuelling Stations (HRS) safety regulations. An unofficial translation of this “Environment and Planning Act” is available [here](#). Together with the implementation of the Environment and Planning Act the determination of safety distances might change: it is expected that fixed safety distances will be obligatory for HRS rather than requiring Quantitative Risk Assessments (QRA).

At the start of 2020, the Netherlands launched the four-year Hydrogen Safety Innovation Programme, which is a public-private partnership between the national government, network operators, emergency services, knowledge institutes and companies. The programme identifies safety issues in the area of hydrogen and proposes policies and agreements that allow these issues to be adequately addressed.

The Safety Programme focuses on the national level but aims to implement international developments. The work concentrates around six working packages:

1. WP1: harmonization of the permitting process for HRS by developing guidelines
2. WP2: risk and incident management
3. WP3: legal aspects, including the finding of white spots
4. WP4: safety risks inventory for production, storage, transport and hydrogen use
5. WP5: HAZID-studies on the use of hydrogen in public spaces
6. WP6: International knowledge and lessons learnt



Summary Country Update November: The Netherlands

Transportation	Target Number	Current Status	Partnerships, Strategic Approach	Support Mechanism
Fuel Cell Vehicles ¹	2.000 by 2020 15.000 by 2025 300.000 by 2030	314 as of November 2020	<ul style="list-style-type: none"> Working Group Demand Gathering, (part of the Dutch Hydrogen Platform). New strategy to be developed in 2020 for hydrogen in mobility 	<ul style="list-style-type: none"> - DKTi transport subsidy - Fiscal measures: <ul style="list-style-type: none"> • No purchase tax • No road tax • Low addition of 4% per year income tax (instead of 22%) • Fiscal rebate on investments in a hydrogen car or bus (9% of investment costs)
FC Bus	100 by 2020 300 by 2025	7 buses as of November 2020	<ul style="list-style-type: none"> National Agreement on Zero Emission Regional Public Transportation By Bus Dutch provinces (South-Holland and Groningen) are partner in JIVE-2 (i.e. FCH JU project on scaling up Public Transport FC buses) 	
Fuel Cell Trucks ²	500 by 2020 3500 by 2025	14 light duty trucks and 8 heavy duty as of November 2020	<ul style="list-style-type: none"> Green Deal Zero Emission InnerCity Logistics https://greendealzes.connekt.nl/en/the-livable-city/ 	
Forklifts	No target	0		
Trains	No target	1 pilot project	Status: finished	
H ₂ Refueling Stations	Target Number	Current Status	Partnerships, Strategic Approach	Support Mechanism
70 MPa On-Site Production	20 by 2020 50 by 2025	6 as of November 2020	<ul style="list-style-type: none"> Sustainable fuel vision Covenant (Green Deal) sustainable Hydrogen Economy 	Subsidy Scheme <ul style="list-style-type: none"> • Up to 100% subsidy of the investment costs for a public HRS. No subsidy for operation.
70 MPa Delivered				

¹ Includes Fuel Cell Electric Vehicles with Range Extenders

² As above



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35 MPa On-Site Production			<ul style="list-style-type: none"> • Joint call for the deployment of hydrogen fuel cell trucks Waterstofnet • Stations located in (Rhoon, Helmond, Delfzijl, The Hague, Arnhem and) • Helmond has on-site production and tanks both 350 and 700 bar • Arnhem tanks both 350 and 700 bar 	
35 MPa Delivered				
Stationary	Target Number ³	Current Status	Partnerships, Strategic Approach	Support Mechanism
Small ⁴	No target	0		
Medium ⁵	No target	0		
Large ⁶	No target	0		
District Grid ⁷	No target	0		
Regional Grid ⁸	No target	0		
Telecom backup	No target	0		
H ₂ Production	Target ⁹	Current Status	Partnerships, Strategic Approach	Support Mechanism
Fossil Fuels ¹⁰	Climate neutral H ₂ by 2050	175 PJ/year (Total hydrogen supply in NL)	<ul style="list-style-type: none"> • Covenant (Green Deal) sustainable Hydrogen Economy • National Climate Agreement 	

³ Targets can be units installed and/or total installed capacity in the size range indicated

⁴ <5 kW (e.g., Residential Use)

⁵ 5kW – 400 kW (e.g., Distributed Residential Use)

⁶ 0.3MW – 10 MW (e.g., Industrial Use)

⁷ 1MW – 30 MW (e.g., Grid Stability, Ancillary Services)

⁸ 30MW plus (e.g., Grid Storage and Systems Management)

⁹ Target can be by quantity (Nm³, kg, t) and by percentage of total production; also, reference to efficiency capabilities can be a target

¹⁰ Hydrogen produced by reforming processes



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Water Electrolysis ¹¹ (PEM, Alkaline, SOEC)	500 MW by 2025 3-4 GW by 2030	1 MW (HyStock)	National Climate Agreement and H ₂ Programme	EIA (45 % fiscal deduction), DEI+, SDE++ & new upscaling instrument
By-product H ₂	No target	A small part of the 175 PJ/ year	Production based on chlorine-alkali production process where H ₂ comes as by product in Rotterdam and Groningen harbour area.	
Energy Storage from Renewables	Target¹²	Current Status	Partnership, Strategic Approach	Support Mechanism
Installed Electrolyser Capacity	500 MW by 2025 3-4 GW by 2030	1 MW (HyStock)	National Climate Agreement and H ₂ Programme	EIA (45 % fiscal deduction), DEI+, SDE++ & new upscaling instrument
Power to Power ¹³ Capacity	No target			
Power to Gas ¹⁴ Capacity	No Target			

¹¹ Please indicate if targets relate to a specific technology (PEM, Alkaline, SOEC)

¹² Can be expressed in MW of Installed Capacity to use the electricity from renewable energy generation, and Annual MWh of stored energy capacity

¹³ Operator has an obligation to return the electricity stored through the use of hydrogen back to electricity

¹⁴ Operator has the opportunity to provide the stored energy in the form of hydrogen back to the energy system through multiple channels (e.g., merchant product, enriched natural gas, synthetic methane for transportation, heating, electricity)