INTERNATIONAL PARTNERSHIP FOR
HYDROGEN AND FUEL CELLS IN THE ECONOMY

IPHE Country Update June 2020: The Netherlands

Name	Noé van Hulst
Contact Information	Noe.Hulst@minbzk.nl
Covered Period	October 2019 - June 2020

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

After presenting its hydrogen ambitions in the Dutch Climate Agreement in June 2019, The Netherlands presented in March 2020 its hydrogen strategy to the Dutch Parliament. The strategy describes the systemic role of clean hydrogen, recognized in a zero-carbon energy supply, and the unique starting position for The Netherlands, including:

- 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 de infrastructure outlook 2050 (putting sector coupling in practice);
- High potential to develop large scale hydrogen storage in salt caverns and empty gas fields; and,
- 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 deployments with the announcement of a new and temporary exploitation subsidy of €35M per year in addition to the existing €40M DEI+ (Demonstration Energy and Climate Innovation) innovation 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.

National Hydrogen Programme

This programme will be adaptive in nature and in principle be based on the phased hydrogen plan leading up to 2030 that is included in the National Climate Agreement. This means that the period up to and including 2021 will be used as the preparatory phase, with ongoing initiatives and projects to be used as a point of departure. Consultations with stakeholders will take place regarding the structure and implementation of the programme, which will use the report on the Multi-year Programmatic Approach for Hydrogen of TKI New Gas as a basis.

International Strategy

The Netherlands seeks to achieve a EU-wide approach on key issues, such as common standards for hydrogen sustainability, safety, quality, blending in gas grids, and market regulations. These efforts include investigating the potential for creating an Important Projects of Common European Interest to support hydrogen import/export. Within the Pentalateral Forum (Austria, Belgium, France, Germany, Luxembourg, the Netherlands and Switzerland), the Netherlands and Austria have taken the initiative to develop a joint Political Declaration by Ministers on Hydrogen, which will be published in June 2020.

The Netherlands participates in the Hydrogen IEA Technology Collaboration Programmes (TCP). Also, The Netherlands takes part in the Mission Innovation Challenge 8: Renewable and Clean Hydrogen, and in the Hydrogen Initiative of the Clean Energy Ministerial.

2. Hydrogen and Fuel Cell R&D Update

The Netherlands provides several RD&D support schemes for hydrogen, from fundamental to applied research and demonstration. Below is a summary of these schemes provided:

- **The Electrochemical Conversion & Materials (ECCM) programme**, which connects strong knowledge positions in the Netherlands in the fields of chemistry, energy and high-tech manufacturing. Within this programme there were in total €25,7M granted in June 2019 to execute four initiatives related to sustainable energy storage and conversion:
  - Dutch Research Center (NWO) tenure/track position Call (TRL 1-3).
  - National research agenda (NWA) call storage and conversion (TRL 1-3)
  - TNO Faraday Lab and VoltaChem Programme (TRL 3-7): new electrochemistry laboratory in Petten for PEM hydrogen production. VoltaChem program is for industrial electrification and carbon capture and storage.
  - ISPT-HydroHub MW Test Centre (TRL 4-7): to support technological development of water electrolysis.

- **Mission-Orientated Research, Development and Innovation (MOOI) scheme**: New scheme as of 2020 for projects with TRL 4-6 with four categories: Offshore wind, renewable energy on land, built environment and industry. The total budget is €65M. All topics are applicable to hydrogen.

- **Hydrogen tender**: This scheme is for innovative projects for hydrogen as energy carrier that provides in lower costs, better efficiency and reliable products, methods and services. The innovation must be scalable and must have a robust business case. The total budget is €2,2M, with a maximum of € 500.000 per project.

- **Demonstration Energy and Climate Innovation grant scheme (DEI+):** This is a key mechanism to support deployment of hydrogen pilot projects oriented to projects with TRL 7-9. Projects selected for DEI+ funding receive grants covering up to 45% of project costs with a maximum of €15M per project. For hydrogen there are €40M reserved per year.

3. Demonstration, Deployments, and Workforce Developments Update

There are numerous amount of 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. In March 2020, TKI New Gas published an overview of over 80 active Dutch pilots and demonstration projects on hydrogen. This overview can be found here.

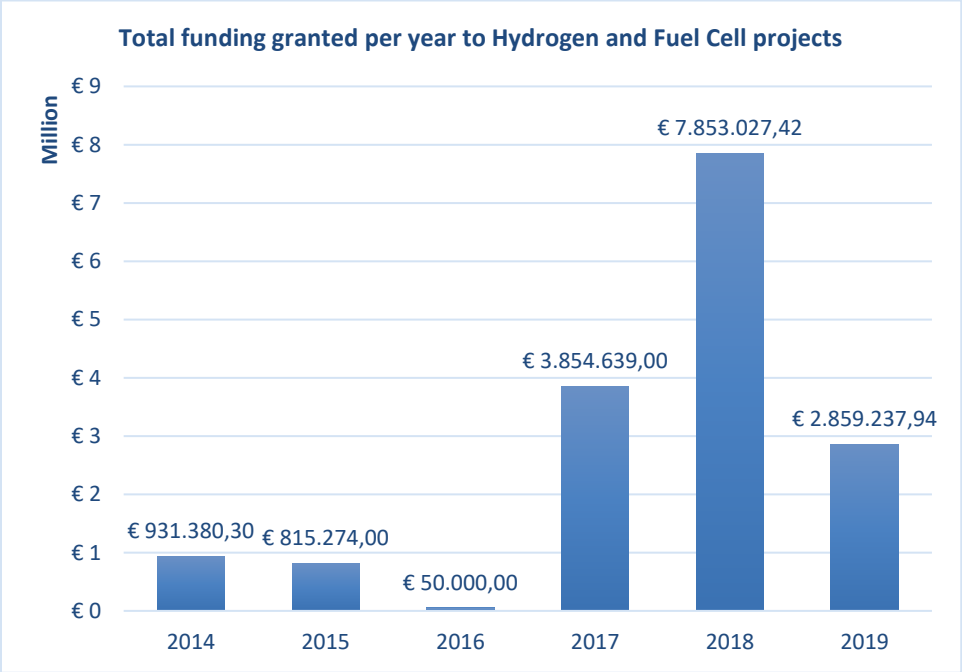
4. Events and Solicitations

EVENTS:

- North Sea Energy Event: 'Unlocking potential of the North Sea', online, 15th June 2020
- Energeia energy Day 2020, Amsterdam, The Netherlands, 27 October 2020
- Workshop 'Scaling Up Clean Hydrogen Around the North Sea', The Hague, The Netherlands, 15th January 2021 (EZK, CIEP, CEM, IPHE)

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.



Funding levels for hydrogen and fuel cells R&D have increased in the last years as shown in the figure (data for 2019 is not complete. *An update will be provided in two months*). In 2018

these activities received €7.85M (around 5% of the total energy R&D budget, including a small share for fuel cell research).

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. A process has been initiated to enable this through the General Administrative Order on 'Temporary Tasks' under the current Gas Act. A swift approach will be required to prevent any obstacles. The aim is to have the General Administrative Order finalised in 2020.

The Netherlands is undertaking a fundamental reorganization of its environmental laws to be completed by 2022, which also include some small changes in the Hydrogen Refuelling Stations (HRS) safety regulations on safety distances. 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 will be implemented as 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

7. Websites

Government website: https://www.rijksoverheid.nl/onderwerpen/duurzame-energie/overheid-stimuleert-de-inzet-van-meer-waterstof

H2 Platform: https://opwegmetwaterstof.nl/

Waterstofnet: https://www.waterstofnet.eu/nl

Summary Country Update June 2020: 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	251 as of May 2020	• Working Group Demand Gathering, (part of the Dutch Hydrogen Platform). • New strategy to be developed in 2020 for hydrogen in mobility	- DKTI transport subsidy - Fiscal measures: • 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	11 buses as of May 2020	• 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	13 light duty trucks and 7 heavy duty as of May 2020	• Green Deal Zero Emission InnerCity Logistics https://greendealzes.connekt.nl/en/the-livable-city/	
Forklifts	No target	0		
H_2 Refueling Stations	**Target Number**	**Current Status**	**Partnerships, Strategic Approach**	**Support Mechanism**

[1] Includes Fuel Cell Electric Vehicles with Range Extenders

[2] As above

70 MPa On-Site Production	20 by 2020 50 by 2025	5 as of May 2020	• Sustainable fuel vision • Covenant (Green Deal) sustainable Hydrogen Economy • 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	Subsidy Scheme • Up to 100% subsidy of the investment costs for a public HRS. No subsidy for operation.
70 MPa Delivered				
35 MPa On-Site Production				
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		

[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)

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)	• Convenant (Green Deal) sustainable Hydrogen Economy • National Climate Agreement	
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	**Target[12]**	**Current Status**	**Partnership, Strategic Approach**	**Support Mechanism**
Power to Power[13] Capacity	No Target	0		

[9] Target can be by quantity (Nm^3, kg, t) and by percentage of total production; also, reference to efficiency capabilities can be a target
[10] Hydrogen produced by reforming processes
[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

Power to Gas[14] Capacity	No Target	1 MW (HyStock)		

[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)