Government of the Netherlands

# The Netherlands Perspective on Clean Hydrogen

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# The Dutch Climate Agreement

- 49% $CO_2$ reduction in 2030 (48.7 Mton)
- 84 TWh of renewable electricity by 2030 (70 % of the mix)
- SDE subsidy scheme for $CO_2$ reduction techniques
- Phasing out coal in power plants by 2030
- $CO_2$ levy in industry above ETS
- All new cars in 2030 electric
- Prominent role for hydrogen:
  - **3 – 4 GW** of electrolysis capacity by 2030**; 500 MW** by 2025
  - In 2025: 50 tank stations, 15.000 FCEVs en 3.000 heavy duty vehicles
  - Pilot projects to enable use of hydrogen for **urban heating** by 2030
  - Until 2030, the government will contribute €30-40 million extra **subsidy** annually for demonstration projects (DEI+)


# National Hydrogen Strategy 2020

- Systemic role of clean hydrogen recognized in a zero-carbon energy supply
- NL unique start position for clean hydrogen
- Use strong momentum: adequate funding & regulation
- Opportunities for companies and regions
- International strategy: accelerate scaling-up
- Policy agenda with 4 pillars
- Joint public-private partnership: national H2 programme
- Financial support: € 70 mln subsidy (DEI+ & new upscaling instrument) + SDE++ for green and blue hydrogen production

*30 March 2020 sent to the House of Representative's of the Dutch Parliament*
*DOWNLOAD: https://www.government.nl/documents/publications/2020/04/06/government-strategy-on-hydrogen*

# Policy Agenda

## Legislation & Regulation

- Use of existing gas grid
- Market regulation and temporary tasks for network operators
- GoOs & certification
- Safety
- Location of electrolysers

## Cost reduction & Scaling up H2

- Support schemes for research, scaling up and rolling out (temporary operating cost support)
- Linking hydrogen to offshore wind energy
- Evaluation of blending obligation

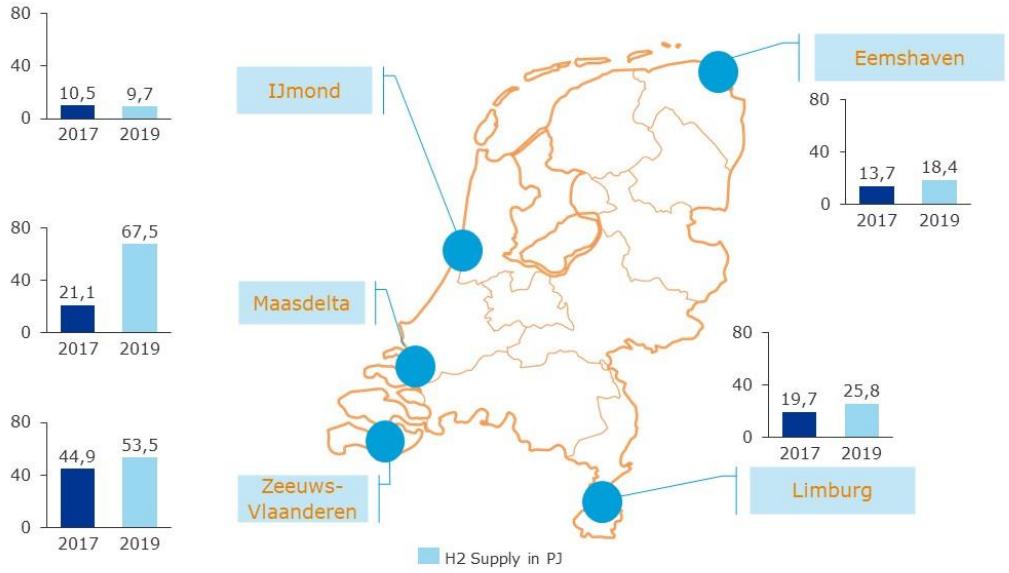
## Sustainability of final consumption

- Ports and industry clusters
- Transport (including synthetic fuels, REDII)
- Built environment (alternative to natural gas)
- Electricity sector
- Agricultural sector

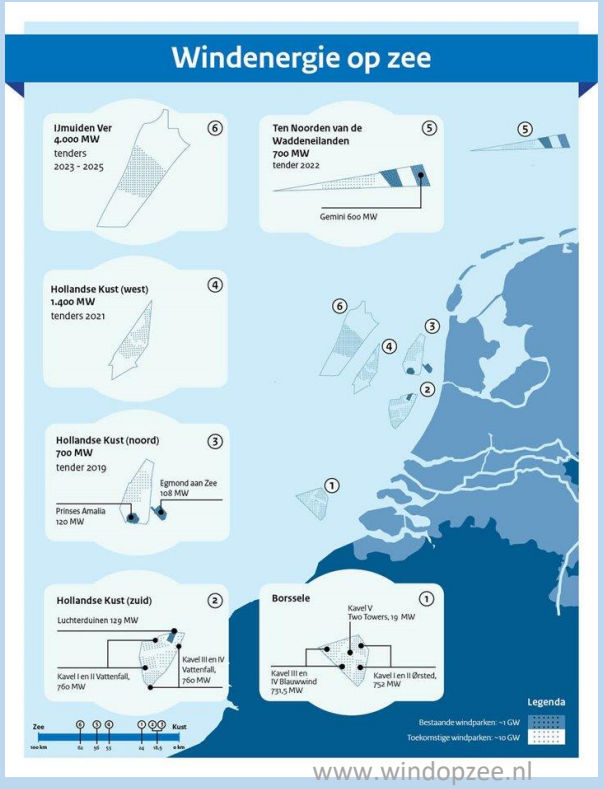
## Supporting and flanking policy

- International Strategy (IPCEI, Pentalateral Forum, North Sea cooperation, bilateral cooperation, EC)
- Regional policy (link to regional energy strategies)
- Research and Innovation

# Drivers for Clean Hydrogen in The Netherlands




Source: DNVGL (2019) Filling the data gap: an update of the 2019 hydrogen supply in the Netherlands



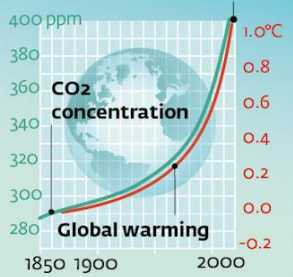

www.windopzee.nl

Existing hydrogen production, 175 PJ per year (10% of national natural gas consumption used in SMR)

Large offshore wind potential, 11.5 GW in 2030; >> 40 GW possible

# Moving towards 2030 and 2050 with hydrogen

The earth has warmed up by 1.1°C since 1850




If we do nothing the global temperature will rise by another 4° C by 2100

**22 April 2016**
**Paris Agreement**
Global warming set at a max. 2° C. This requires **CO2-reductions** in the Netherlands of:
- **40-50%** by 2030
- **85-100%** by 2050

Hydrogen as a fuel and as a raw material can help to achieve CO2-reduction targets

**Hydrogen pipeline**
Linking hydrogen industries in Zeeland and the Delta region

**Pilot project HyStock**
Converting solar energy into hydrogen in Zuidwending


The energy transition requires new forms of infrastructure and intelligent use of existing networks. Gasunie wants to invest in new infrastructure for renewable gases such as hydrogen.

*Hydrogen is a clean energy carrier: $H_2$ combustion yields only water vapour.*

**19 North Sea Wind Power Hub**
An island where power from offshore wind farms is partially converted into hydrogen that is piped onshore

**18 National hydrogen transport network**
H2-pipeline network links major industrial areas Eemshaven, IJmuiden, Rotterdam, Chemelot, Zeeland and the Ruhr area

**17** Further deployment H2 - and CO2 network Zeeland

**3 Wind turbine** generating hydrogen

**4 ISPT Hydrohub** 1 MW test centre

**5 Hydrogen refuelling station network** North of the Netherlands

**6 20 H2 buses** Province of Groningen

**7 GZI Next** Hydrogen plant including a hydrogen fuel station

**8 20-40 MW Electrolyser** Green power into H2. 100 MW in 2024

**9 Element 1** Gasunie / TenneT / Thyssengas power-to-gas pilot

**10 Green hydrogen value chain** with Engie: towards a 100 MW electrolyser

**11 Hydrogen storage** in salt caverns

**12 Magnum power station** First turbine on hydrogen (± 700,000 households)

**13 100 MW Electrolyser**

**14 IJmuiden Ver** Wind farm, possible onshore electrolysis

**15 h-vision** Large-scale switch to hydrogen for power stations and chemical processes. Capture and storage of CO2

**16 Magnum power station** All three turbines on hydrogen: > 2 million homes supplied with power

gasunie

NortH$_2$

# Europe's largest green hydrogen project starts in Groningen

*A consortium of Gasunie, Groningen Seaports and Shell Nederland has launched ambitious NortH2 green hydrogen project*

NortH2 vision:

- Energy from source to customer – from renewable power to green hydrogen distribution – where different partners can collaborate on achieving the scale to realise this ambition.
- New wind farms in North Sea feed a mega-hydrogen facility in Eemshaven, possibly complemented with offshore hydrogen production.
- The ambition is to generate around 3 to 4 GW of wind energy for hydrogen production before 2030, possibly 10 GW around 2040.
- Green hydrogen production of 800,000 tonnes, avoids around 7 megaton $CO_2$ emissions annually.
- Gasunie infrastructure transports green hydrogen to industrial customers in the Netherlands and Northwest Europe.
- A large green hydrogen buffer provides the necessary flexibility because solar and wind energy are susceptible to fluctuations.