Ministerie van Economische Zaken
en Klimaat

Dutch hydrogen policy and the potential for NL-BEL cooperation

9 March 2023

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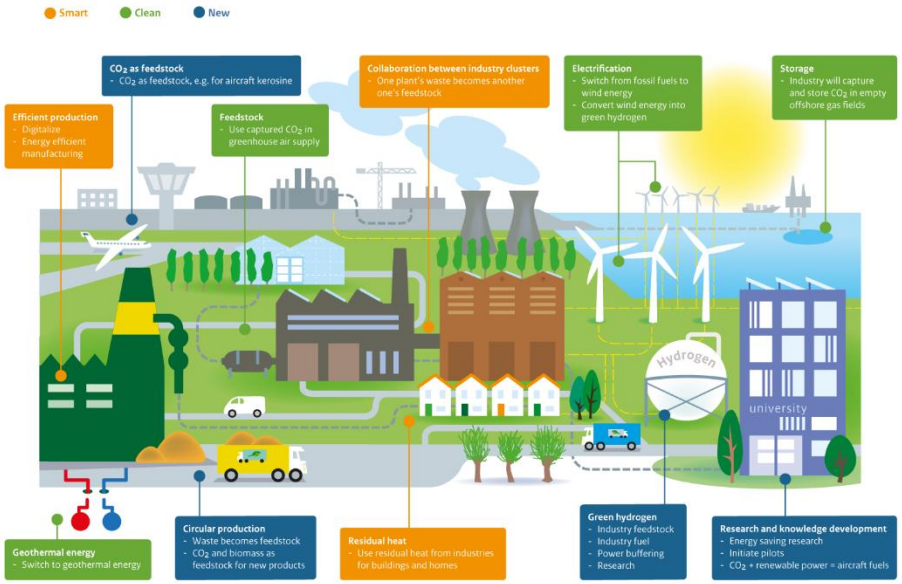
Consul General of the Kingdom of the Netherlands

Context



- **Dutch Coalition Agreement (2021-2025):**
  - At least 55% GHG emission reduction in 2030; policy aims at 60% to ensure reaching target.
  - € 35 billion Climate and Transition Fund.
  - Appointment of Minister for Climate & Energy policy.
  - Binding, customised agreements with 10-20 biggest emitters.
  - Helping SMEs to become more sustainable.
  - Stimulating supply of renewable energy, e.g. extra offshore wind farms
  - Increasing capacity for carbon capture and storage (CCS).
  - Investing in clean transport (road, shipping, aviation).

INDUSTRY

Hydrogen ambitions

- **Electrolysis**:
  - Targets: 500 MW in 2025 and 3-4 GW in 2030.
  - Industry ambition: 6-8 GW in 2030 => new government target 8 GW in 2032

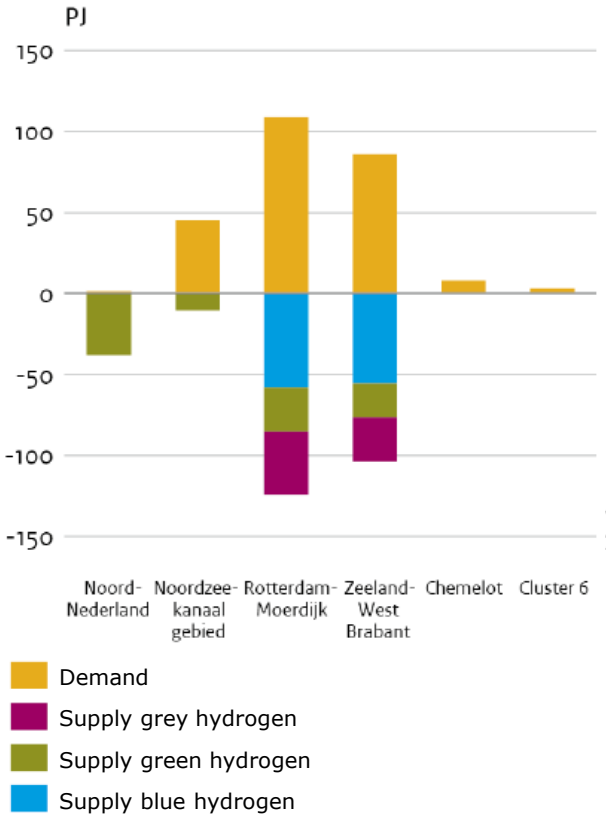
- **Production**:
  - according to the energy-strategies by the 6 Dutch energy-clusters: 95 PetaJoule (PJ) of renewable hydrogen production in 2030 in addition to grey and low-carbon hydrogen and import.

- **6 Dutch Clusters:**
  (1) North-Netherlands (Eemshaven); **(2)** North Sea Chanel area; **(3)** Rotterdam-Moerdijk; **(4)** Zeeland-West Brabant; **(5)** Chemelot/Limburg and **(6)** other industries (a.o. paper, ceramics).

Hydrogen production and consumption

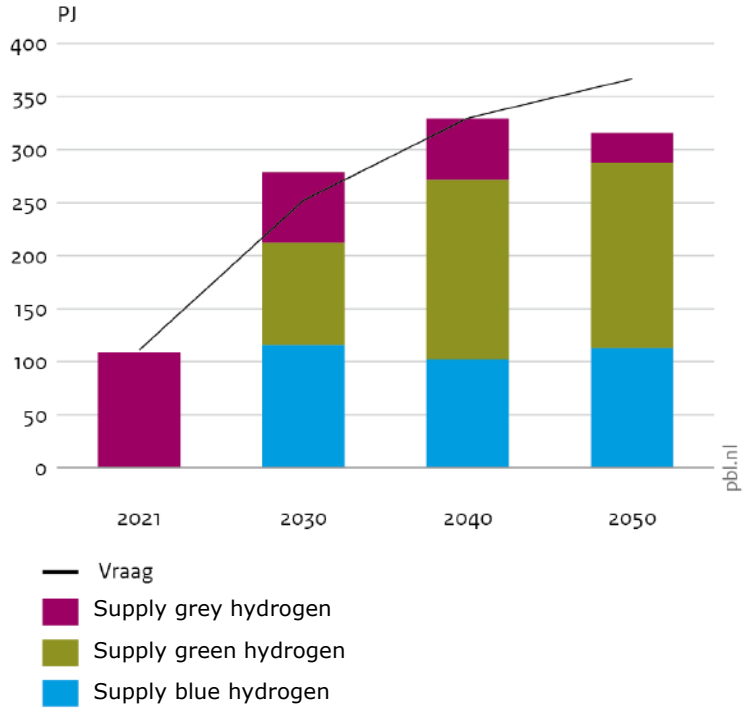
- Hydrogen consumption **in 2020** was ~180 PJ (152 PJ as raw material and 28 PJ as fuel)
- Towards 2050 use of both renewable and low-carbon hydrogen, taking into account:
  - Availability of / access to renewable hydrogen
  - Cost effectiveness of CO_2 emission reduction
  - Company specific production processes (e.g. residual gases, co-products)

Demand and supply per cluster in 2030 according to CES 2.0



SOURCE: PBL reflectie op CES 2.0, 2022

Demand and supply of hydrogen towards 2050 according to CES 2.0



SOURCE: PBL reflectie op CES 2.0, 2022

Electrolysis

- Large-scale electrolyser projects to be located in four chemicals clusters with direct access to renewable electricity from offshore wind farms.
- Budget allocated in Dutch Climate Fund for upscaling onshore and offshore electrolysis, including innovation, in addition to existing instruments.
- Several small-, medium- and large-scale electrolyser projects announced or in development.

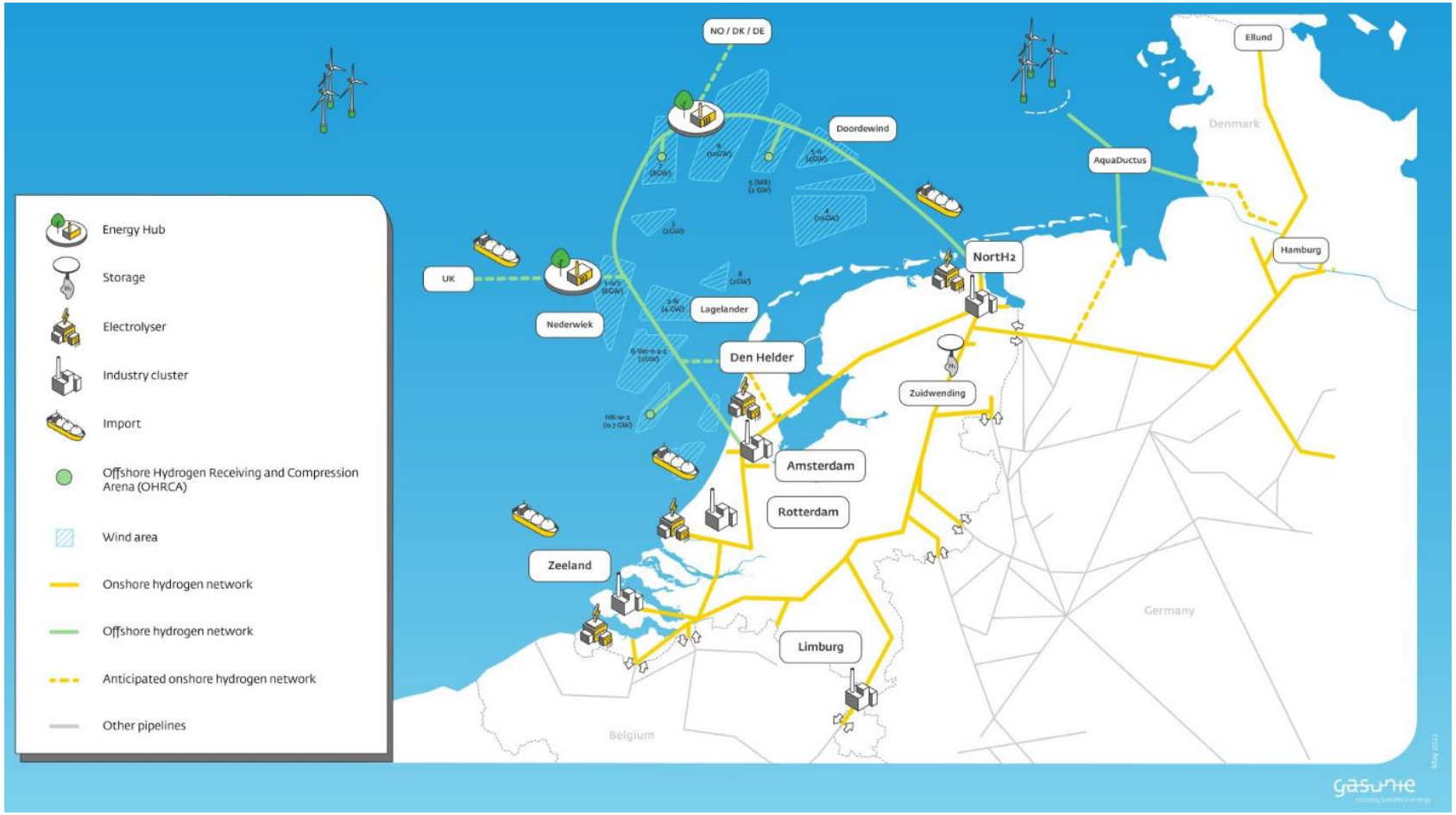
TKI Nieuw Gas = Top consortium for Knowledge and Innovation within the Top Sector Energy.
Select picture to download overview of hydrogen projects in the Netherlands including electrolyser projects

Hydrogen Manufacturing industry

- About 1.000 Dutch companies active in hydrogen market serving different sectors
- Several opportunities identified in field of electrolysers, fuel cells, measurement systems, compressors and other components
- Establishment of *NL Electrolyser Manufacturing Platform* to create an ecosystem for developing and upscaling electrolysis technologies and electrolysers
- Stimulating ecosystems / innovation districts connecting interdisciplinary education, research and enterprises

Select picture to download guide with Dutch organisations involved in hydrogen [based on voluntary registration]

Hydrogen infrastructure (‘backbone’)



- Connecting five Dutch chemical clusters
- Link with offshore wind connection (electricity and in future also hydrogen)
- Interconnectivity with Germany and Belgium

Hydrogen import

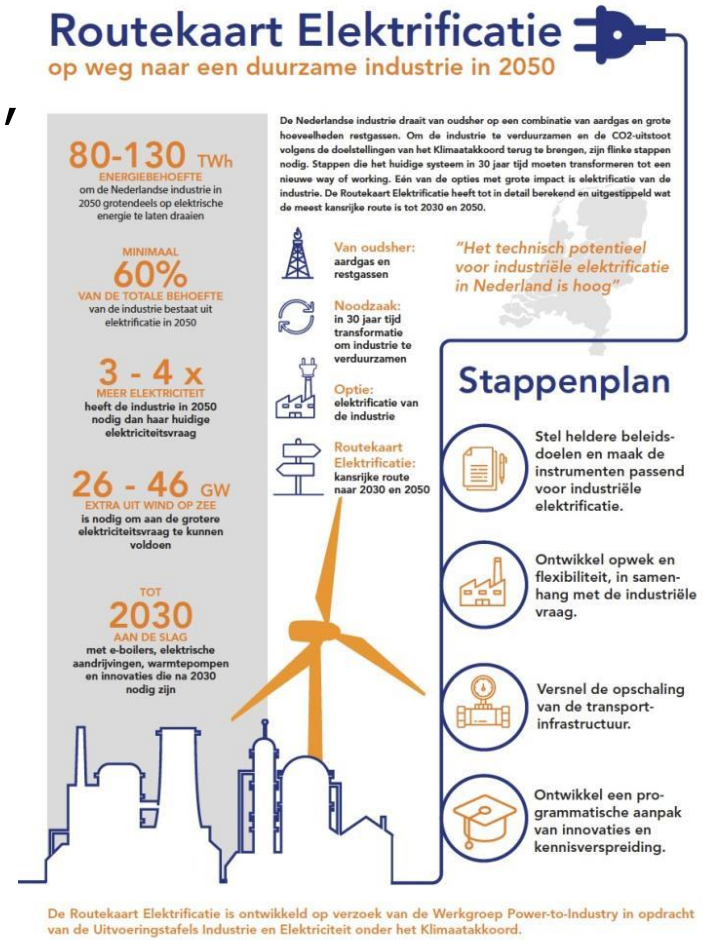
- Different hydrogen carriers: liquefied hydrogen, ammonia, methanol, liquefied organic hydrogen carriers.
- Development of import facilities (terminals, conversion units, transfer/transit systems, network connection)
- Development of regulations for safe handling and certification
- MoU’s with possible exporting countries
- Multilateral cooperation (e.g. IEA, IPHE*, IRENA**)
- Acting together with Belgium and Germany

* International Partnership for Hydrogen and Fuel Cells in the Economy; Belgium not a member.

**International Renewable Energy Agency.

Dependency on offshore wind and electrification

- Offshore wind ambitions: 21 GW in 2030, 50 GW in 2040 and 70 GW in 2050
- Offshore electrolysis: before 2030 on pilot / demo scale, after 2030 upscaling including offshore energy hubs.
- Reuse / retrofit of existing gas infrastructure => first pipeline certification received



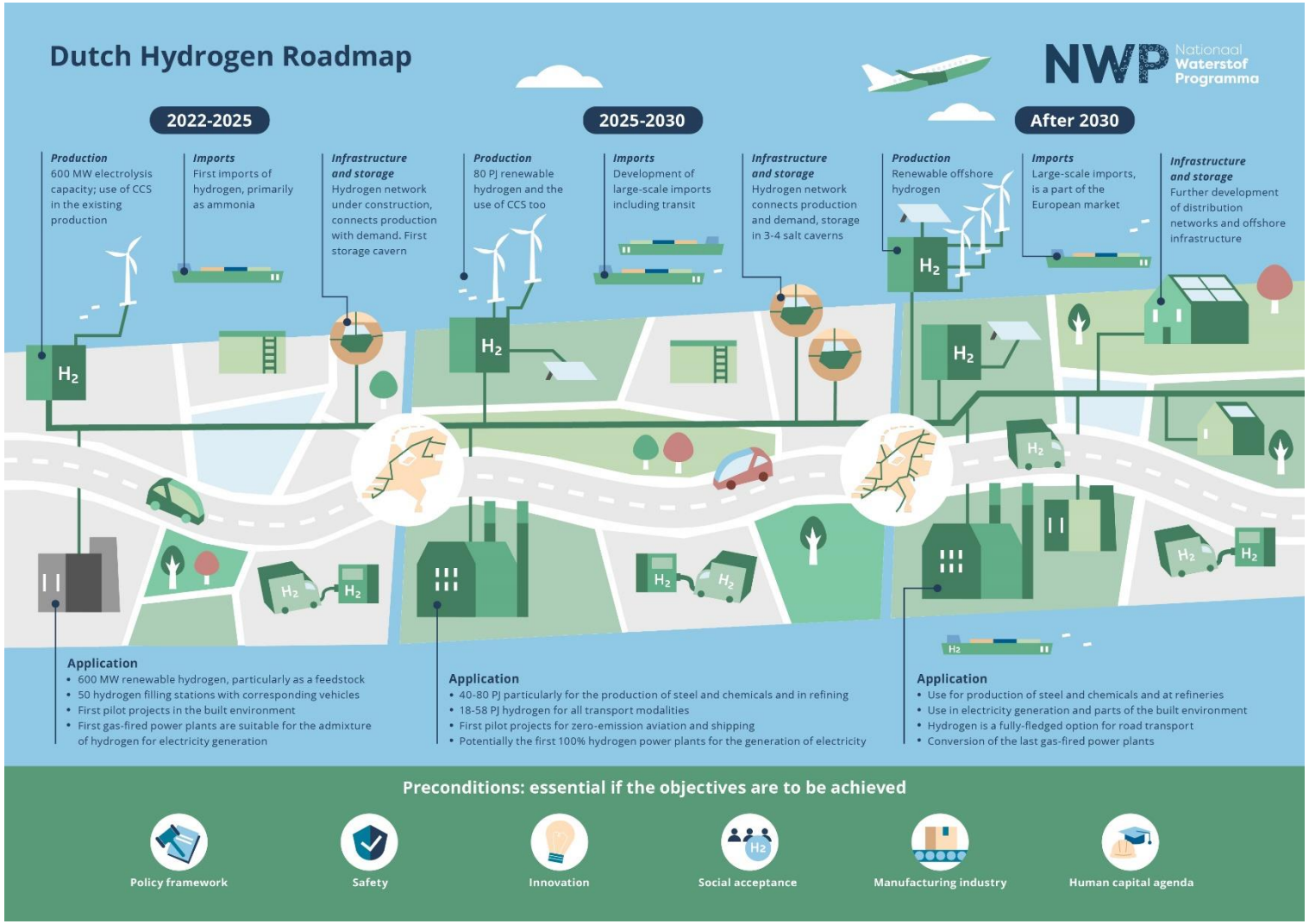
Some hydrogen related projects

Shell Holland Hydrogen I 200 MW electrolyser, R'dam:annual >60 kton green hydrogen production

Nedstack Fuel Cell Giga Factory: annual production of 1 GW fuel cell capacity (IPCEI-H_2 project)

Battolyser: annual 1 GW integrated battery-fuel cell system capacity [FID in 2023]

Hydrogen roadmap



- Developed by National Hydrogen Programme (public-private partnership)
- Ambitions for 2022-2025, 2025-2030 and after 2030
- No policy, but will inform policy making

Select picture to download English summary of Dutch hydrogen roadmap

Recent letters to Parliament and other publications *(in Dutch)*

1

Letter: progress hydrogen policy (including production, import, infrastructure and use)

2

Letter: progress multi-year program energy and climate infrastructure (MIEK) (including power and hydrogen grids)

3

Letter: national raw materials strategy (also in view of electrolysers and batteries)

4

Letter outline program main energy structure (also dealing with spatial planning for electrolysis and batteries)

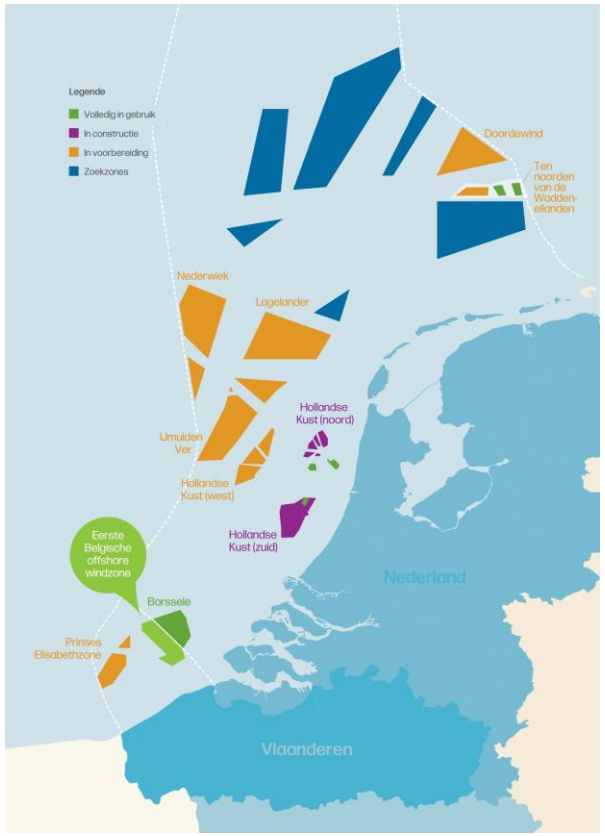
5

Report RFNBO certification pilot

6

Press release IPCEI Hydrogen 2nd wave projects (support of 7 electrolyser projects up to 1.150 MW)


Noord-Nederland/Delfzijl-Eemshaven 3
14 Aramis
Leeuwarden
Groningen
Assen
Den Helder
6 Netten op Zee
7 Landelijke waterstofinfrastructuur
Emmen
Alkmaar
Noordzeekanaalgebied 1
9 Waterstofimport en -doorvoer
Lelystad
Zwolle
Haarlem
Amsterdam
Apeldoorn
Enschede
Leiden
Landelijke waterstofinfrastructuur 7
Porthos 13
Den Haag
Utrecht
11 H-Vision
Arnhem
Waterstofimport en -doorvoer 8
Rotterdam
Rotterdam-Moerdijk 4
10 Delta Corridor
6 Netten op Zee
12 Carbon Connect Delta
Breda
Gelsenkirchen
12
Vlissingen
Eindhoven
Duisburg
Zeeland/Schelde-Deltaregio 5
Delta Corridor 10
Venlo
Antwerpen
Duitsland
Gent


Legende
Volledig in gebruik
In constructie
In voorbereiding
Zoekzones
Doordewind
Ten noorden van de Waddeneilanden
Nederwiek
Lagelander
IJmuiden Ver
Hollandse Kust (noord)
Hollandse Kust (west)
Hollandse Kust (zuid)
Eerste Belgische offshore windzone
Borssele
Nederland
Prinses Elisabethzone
Vlaanderen

Belgium and the Netherlands

In common:

Ambitious government policies related to offshore wind and hydrogen.

Expertise in the installation and maintenance of offshore wind farms

Differences:

Netherlands:

Size of Dutch North Sea makes a much larger offshore wind capacity possible

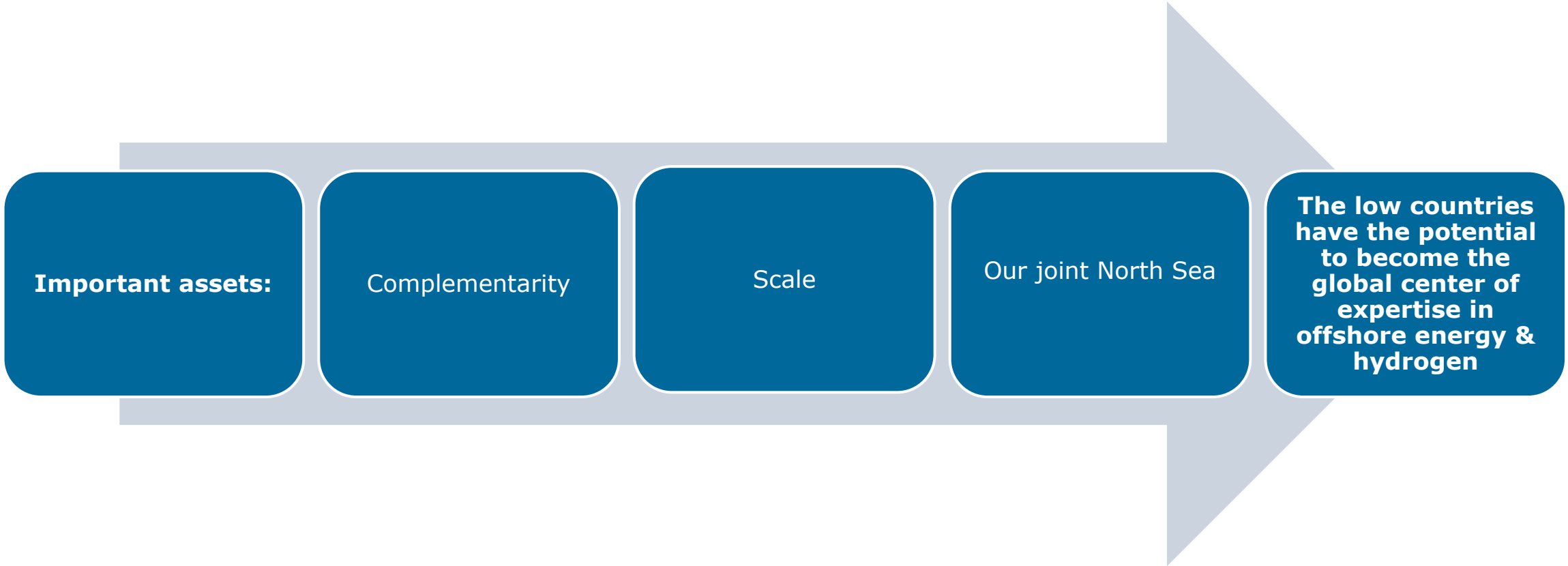
Belgium

Emphasis on import of hydrogen

In particular progressed in development and production of electrolysers

Chooses to deploy offshore wind capacity for electrification

There is a lot to be gained from cooperation between Belgium and the Netherlands



Dutch-Belgian Climate Tech Forum, Brussels, 21 June 2023

Global Challenges, Smart Solutions

Scan and stay informed