

Production d'hydrogène en mer – la Mer du Nord
à l'avant garde.



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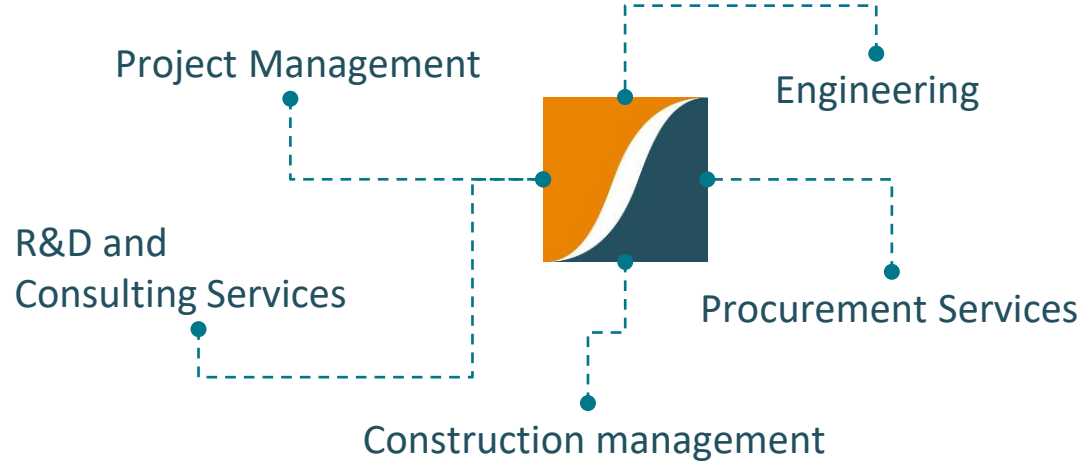
1958
YEAR OF CREATION
année de création

330
EMPLOYEES
Collaborateurs

250
PROJECTS / YEAR
Projets / Année

35
TURNOVER M€
Chiffre d'affaires M€

Activities



Sectors



25%
Energies



30%
Naval



30%
Oil & Gas



15%
Industries



Context:

OFFSHORE GREEN HYDROGEN

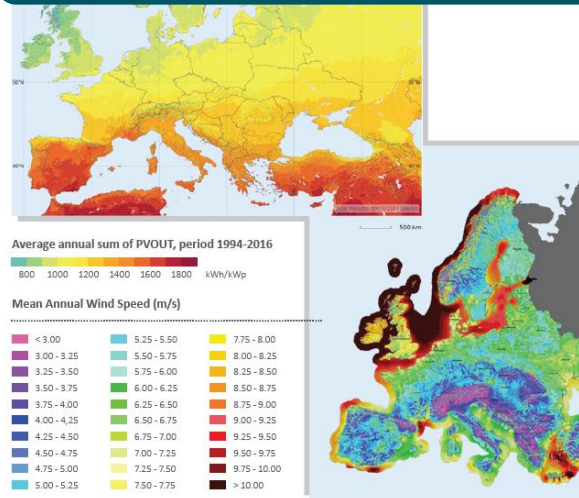
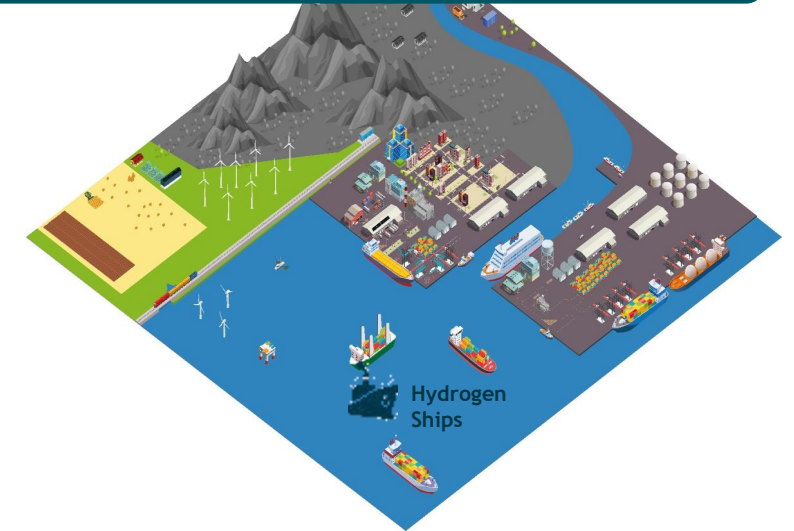
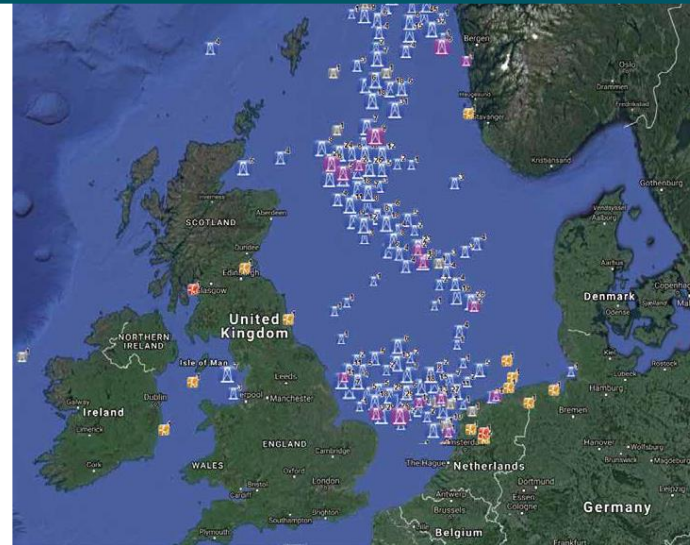


Figure 2 Solar irradiation (left) and wind speed at 80 m height (right) in Europe



A LARGE RESSOURCES TO BE VALORIZED:

- Offshore wind power 22 GW in 2019 to 127 GW in 2040.
- PV annual growth rate (CAGR) over the last 15 years overhauls 40%, which makes **PV one of the fastest growing industries nowadays.**
- Limitations due to the high cost of long-distance electricity power chain and to the grid capacity

AN OPPORTUNITY:

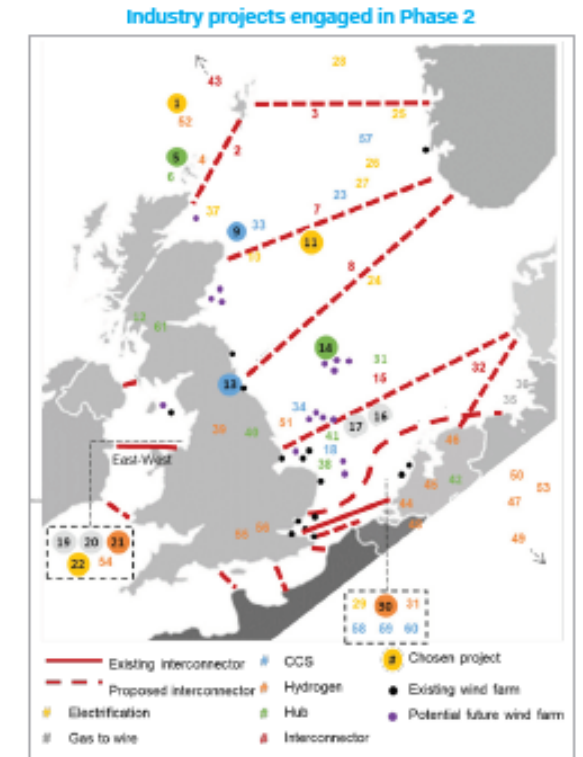
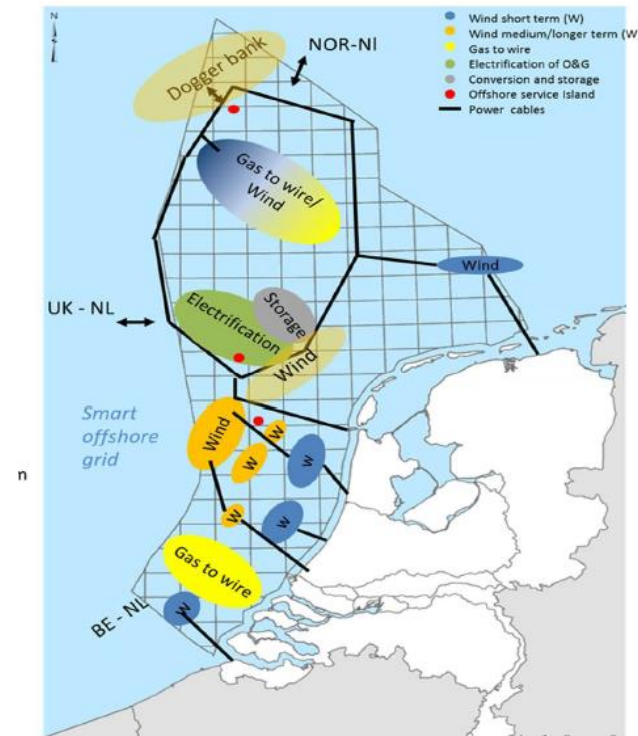
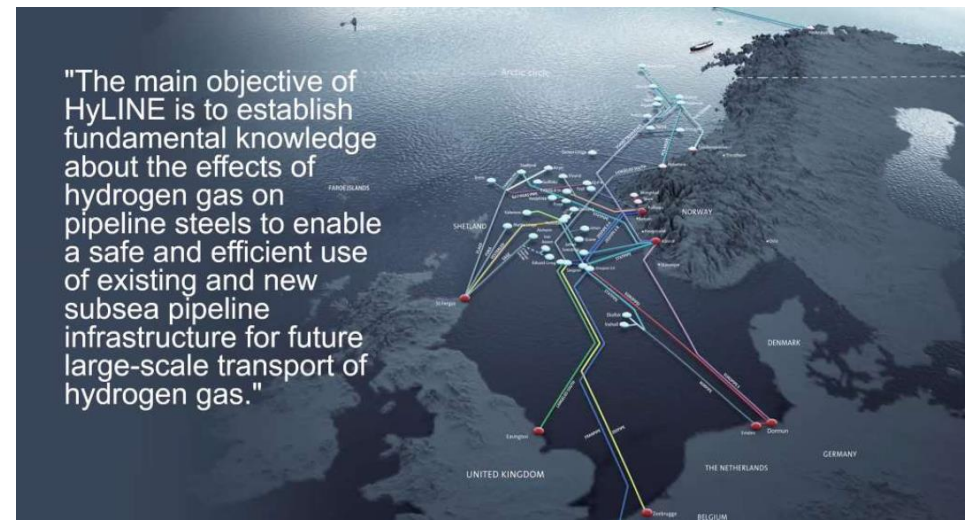
- Reuse of existing assets : A high amount of money can be reinjected in transforming platform to produce green hydrogen instead of decommissioning them.
- Decrease cost of overall project compared to onshore new built plant.

A NEW ECONOMY TO BE BUILT:

- In harbour synergies can be created around offshore hydrogen
- Hydrogen is a way to decarbonize harbour and marine industry
- Creating a link between human activity and biodiversity

North of Europe plan:

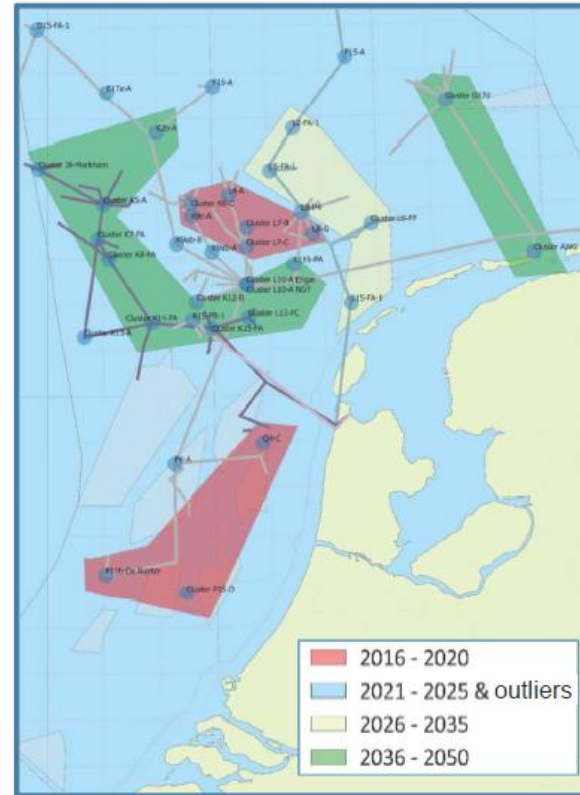
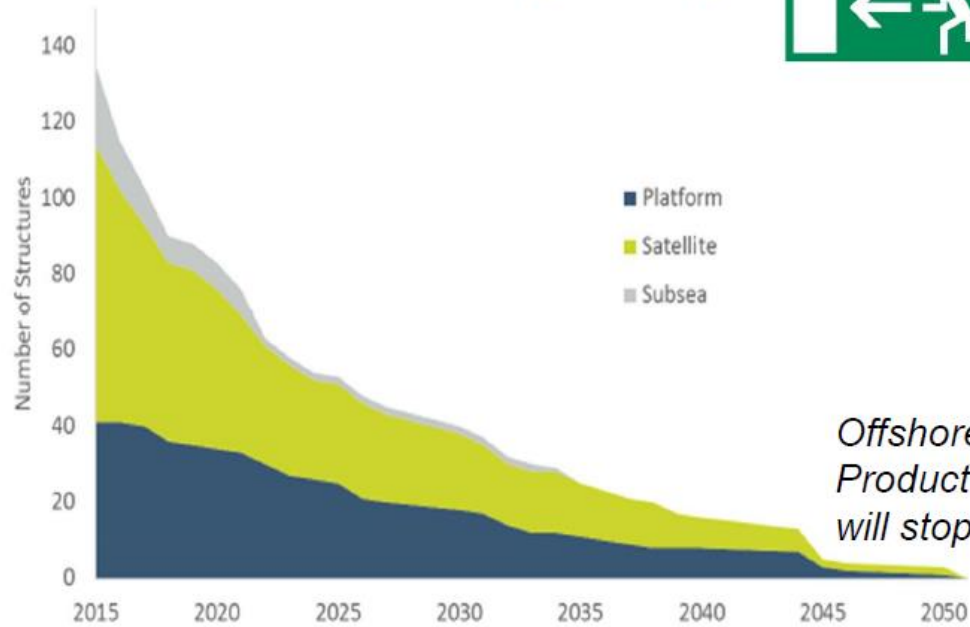
- North of Europe was pioneer in offshore oil&gas today they are looking how they can convert assets like offshore platforms and pipelines.
- North of Europe was pioneer in offshore wind and is now leading this industry. Those countries are now facing problems because of the size of the new wind farms, the capability of onshore grid and the need to share maritime space with others..
- Since 2016 they anticipate those problems and they have prepared themselves through several studies



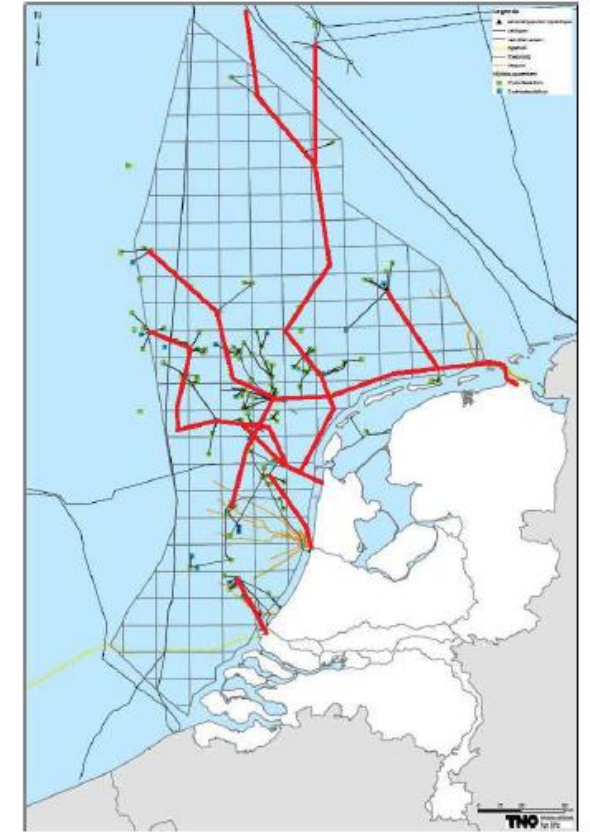
Focus on Netherlands situation

FUTURE DECOMMISSIONING OF OFFSHORE INFRASTRUCTURE

› In a business as usual scenario (EBN 2016)

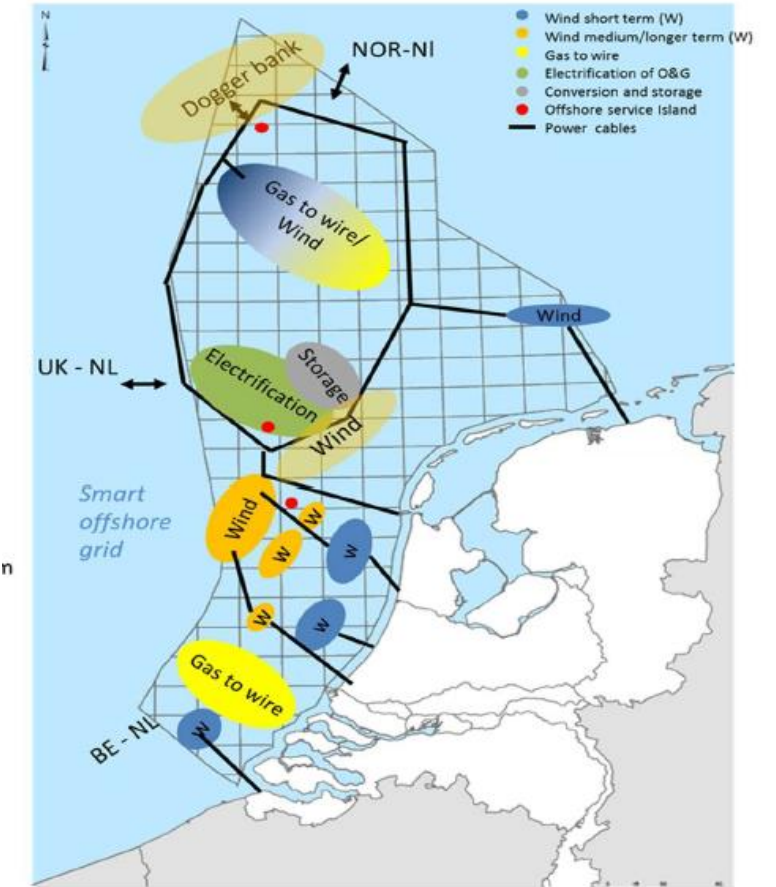
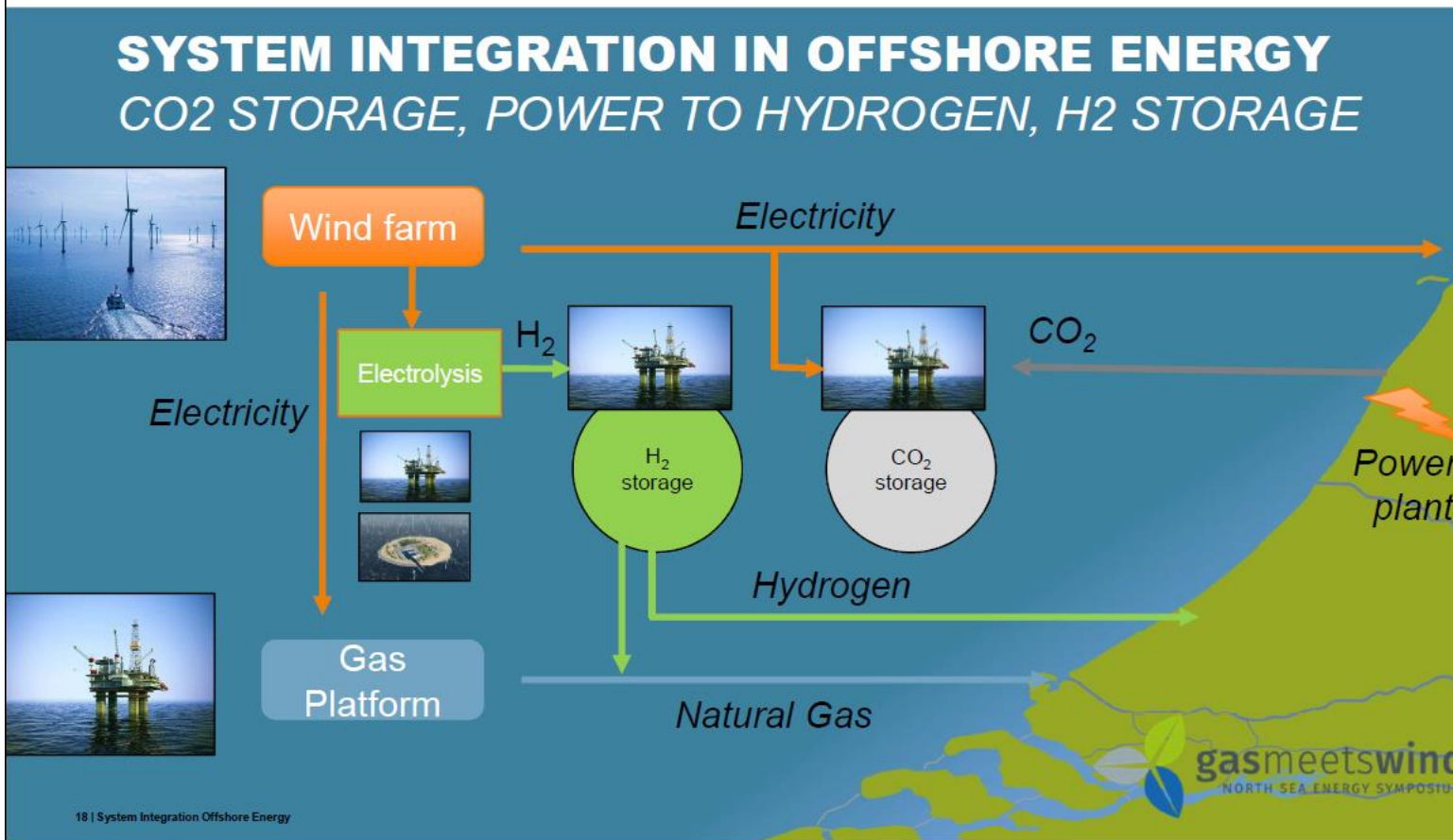


26 January 2016



19 December 2016

The Netherlands plan

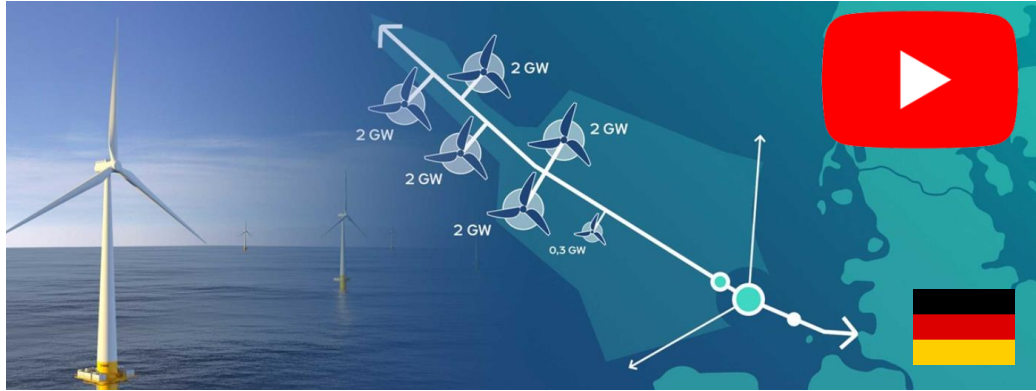


PosHYdon : the first H2 offshore production demo project

- Initiative of Nextstep (Dutch association for decommissioning and reuse of O&G infrastructure)
- Electrolysers 13 km off the coast of Scheveningen (NL) on Neptune Energy's Q13a platform
- 1 MW by mid 2022



AquaVentus



- An association of +70 companies
- Upscaling roadmap from 2 x 14 MW to integration in European off- and onshore hybrid grid
- 290 MW by 2028, 10 GW by 2035



AquaPrimus

2 x 14 MW offshore green hydrogen production directly at the wind turbines



AquaDuctus

Centralised H₂ export pipeline (equivalent to 5 HVDC export lines)



AquaCampus

R&D on 2 offshore jacket platforms & H₂ storage



AquaPortus

Port infrastructures on Helgoland including LOHC storage and export



AquaNavis

Development of H₂ based maritime applications and propulsion (2030)



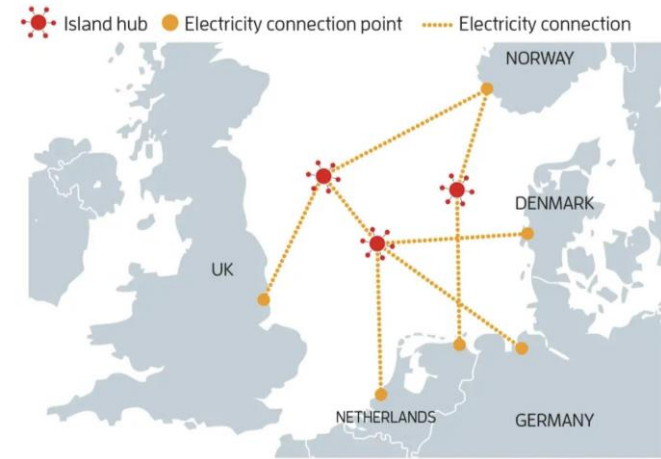
AquaSector

290 MW offshore wind H₂ production park by 2028 in island or grid mode (tbd)

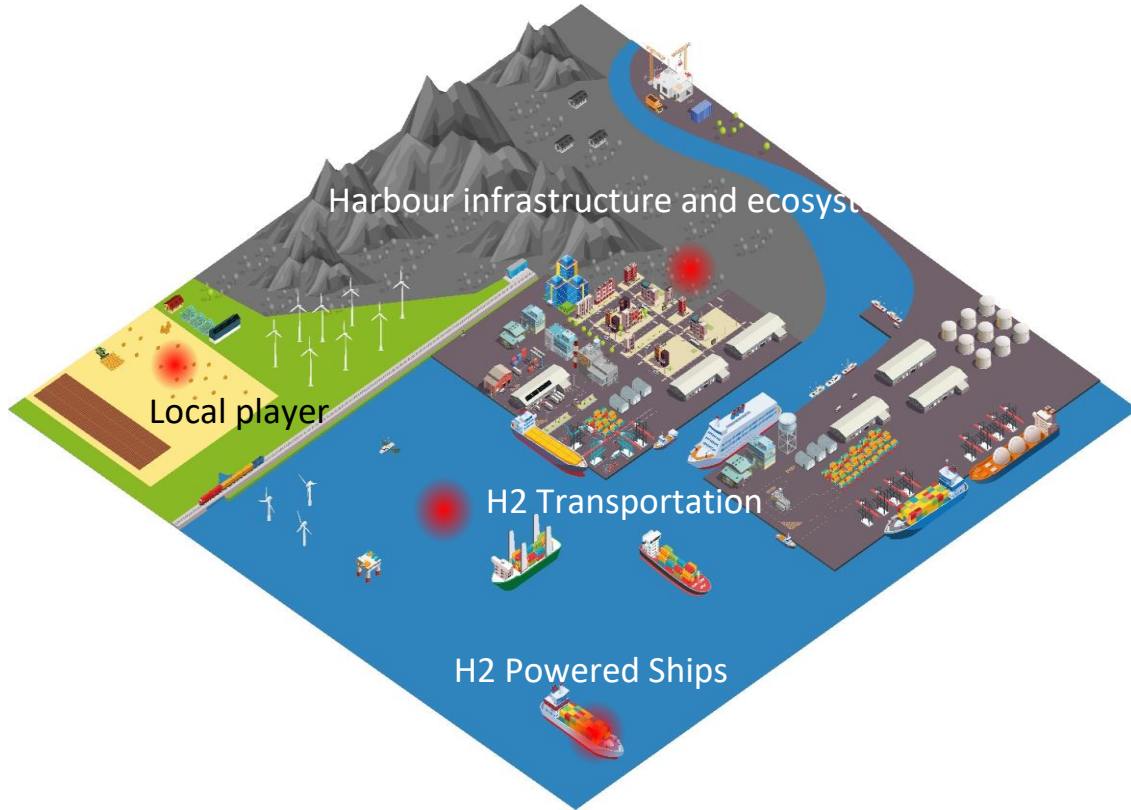
North Sea Wind Power Hub (NSWPH)



- 3 GW by 2033 with potential up to 12 GW
- Combine interconnection of countries with the connection of offshore wind farms through hub-and-spoke concept -> share risk and cost
- Sector coupling by integrating different energy & industry sectors and energy carriers (Power-to-X) -> create synergies between actors

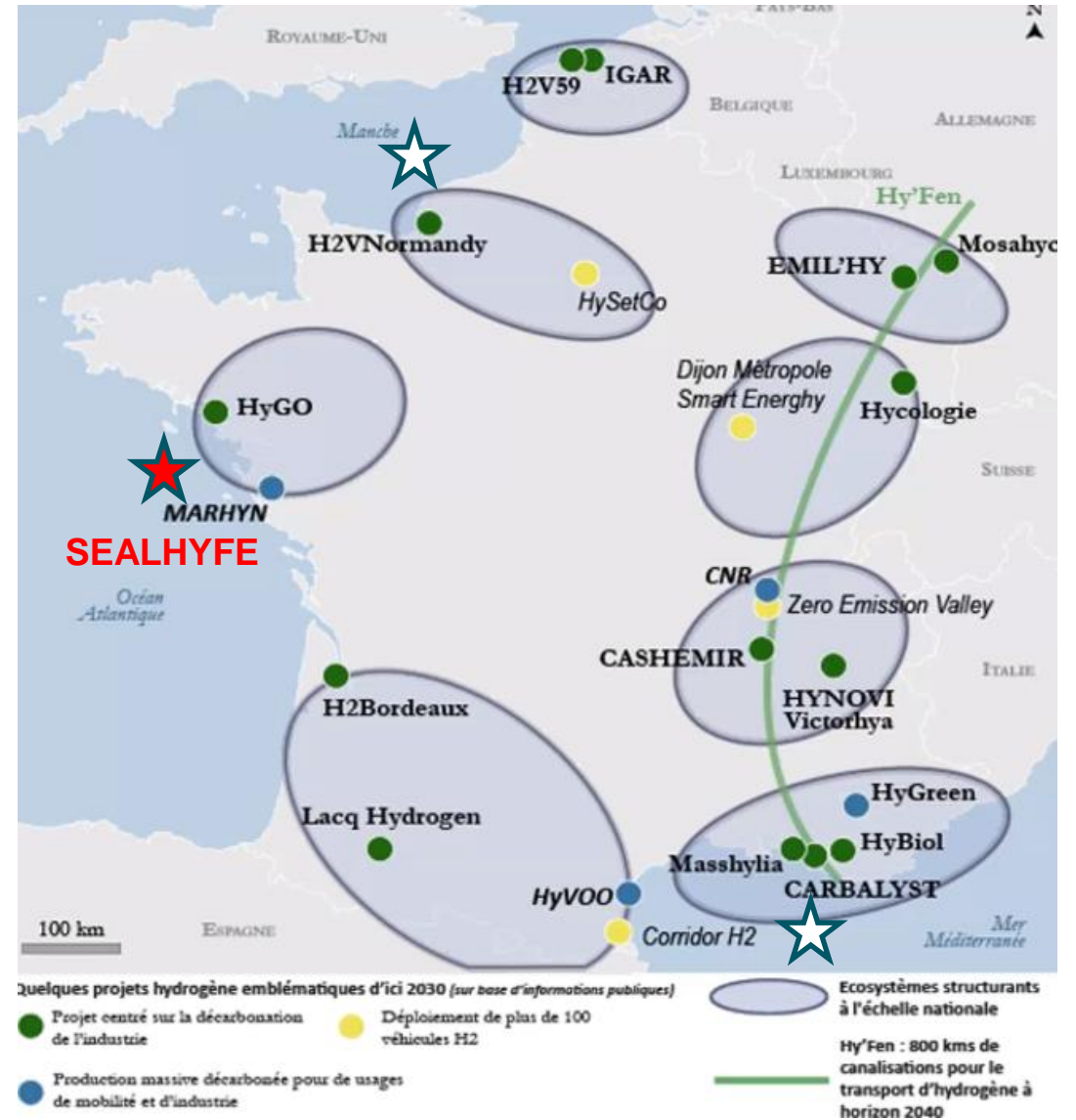


Potential Wind to H2 hub in France:



Develop Hydrogen Valley around harbour:

- Create synergies between offshore wind and other industries
- Decarbonized heavy transport and heavy industries
- Create local added value and new activities



An example SEALHYFE consortium in Loire Atlantique:



VESSEL
100MW



JACK-UP
100MW



FIXED PLATFORM
105MW



SEMI-SUBMERSIBLE
550MW