



Hi – we're Equinor

We energise the lives of 170 million people.
Every day.

Equinor | A broad energy company

Equinor is an international energy company committed to long-term value creation in a low-carbon future.

Our purpose is to turn natural resources into energy for people and progress for society.

Equinor's portfolio of projects encompasses oil and gas, renewables and low-carbon solutions, with an ambition of becoming a net-zero energy company by 2050.

Headquartered in Stavanger (Norway), Equinor is the leading operator on the Norwegian continental shelf. We are present in around 30 countries worldwide.



Hydrogen Ambitions:

3-5 Major industrial clusters

Clean hydrogen projects by 2035

>10%

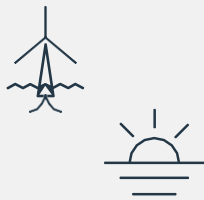
Clean hydrogen market share in Europe by 2035

- A net zero carbon future will need hydrogen at scale
- We are developing both **renewable-based (green)** hydrogen and **low-carbon (blue)** hydrogen by using low emission natural gas from the Norwegian Continental Shelf (NCS)
- We believe both are needed to meet the projected demand for hydrogen in line with decarbonization targets

Hydrogen Value Chain

Feedstock

Electricity from renewable sources

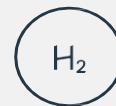


Production

Electrolysis



Output



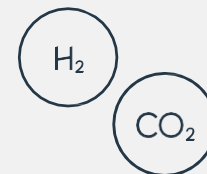
Link to CCS value chain

The CO₂ is transported to the injection facility, injected and safely stored at depths typically > 1 km below the sea bed

Low emission natural gas from the NCS



Natural Gas Reforming



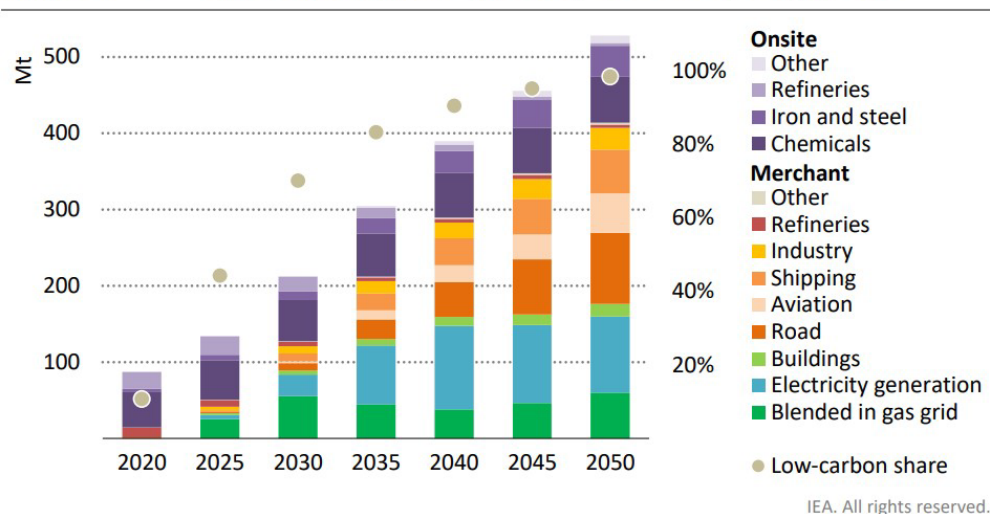
Why H₂ | A requisite to meet climate goals

The International Energy Agency (IEA) states that now is the time to scale up technologies and bring down costs to allow hydrogen to become widely used. Hydrogen offers ways to decarbonise a range of sectors – including long-haul transport, chemicals, and iron and steel

Global hydrogen use | Scenario to achieve net zero by 2050

From IEA's Net Zero by 2050 | A roadmap for the Global Energy Sector ([link](#))

Figure 2.19 ▶ Global hydrogen and hydrogen-based fuel use in the NZE

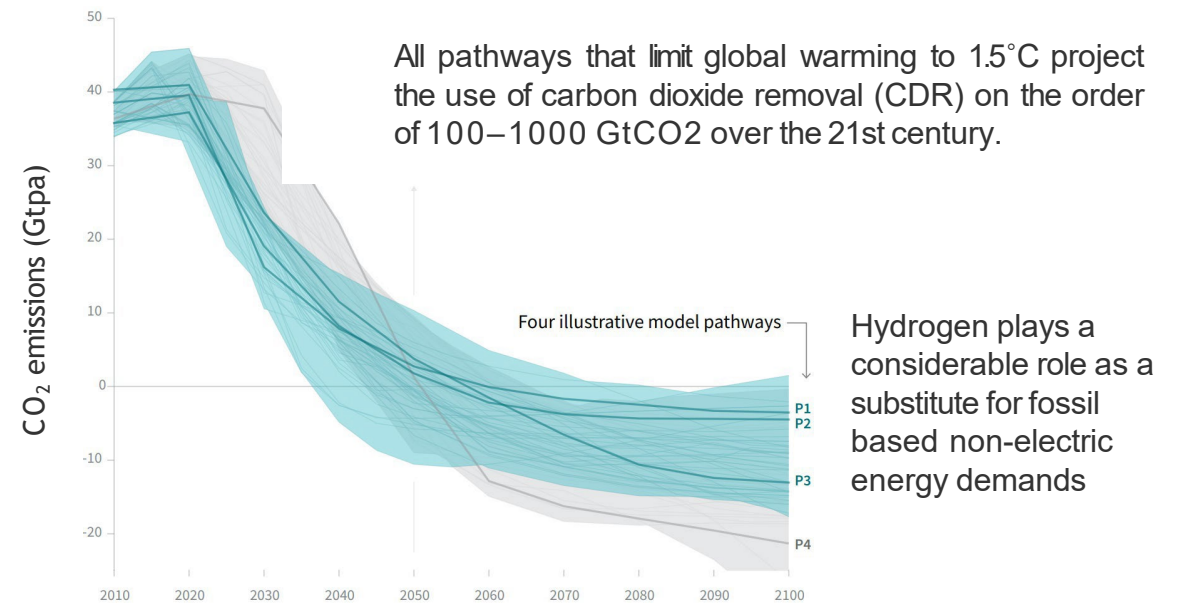


The initial focus for hydrogen is to convert existing uses to low-carbon hydrogen; hydrogen and hydrogen-based fuels then expand across all end-uses

Note: Includes hydrogen and hydrogen contained in ammonia and synthetic fuels.

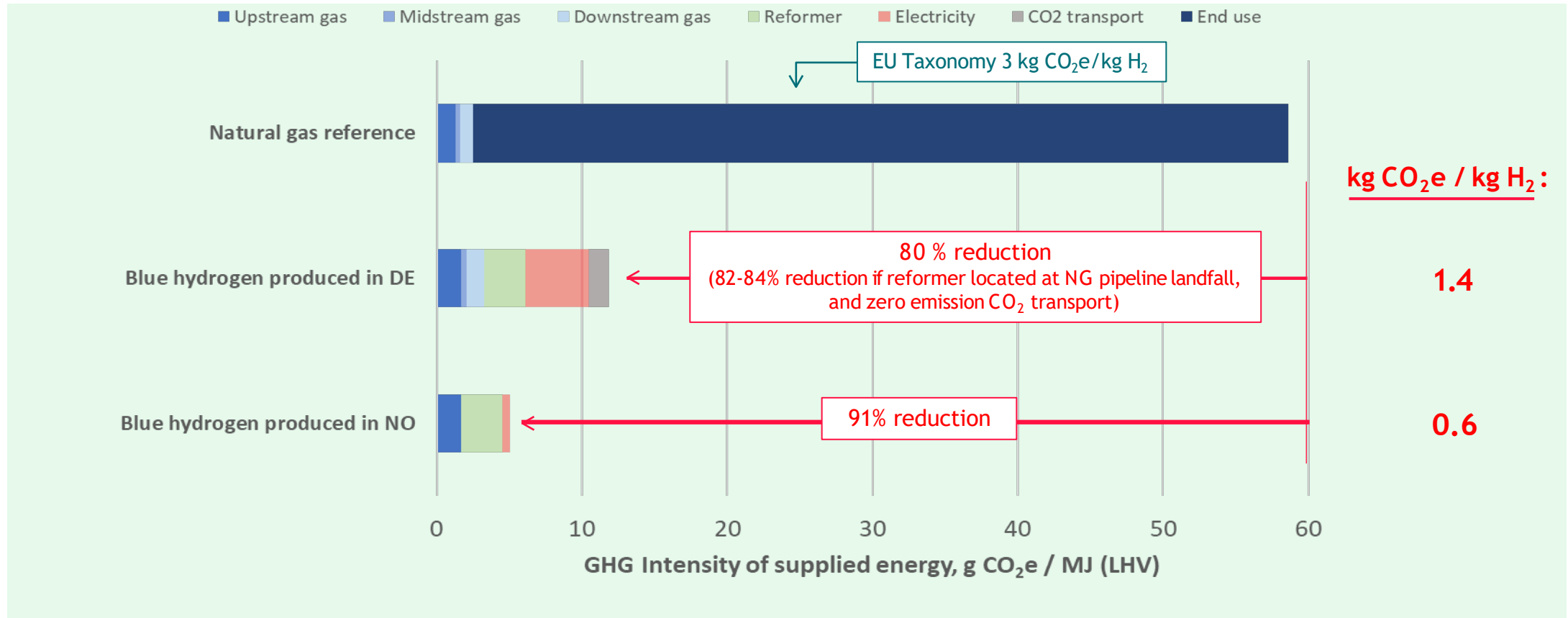
Global total net CO₂ emissions | Pathways to reach 1.5°C

From IPCC Special Report on "Global Warming of 1.5°C" ([link](#))



Norway | Best place in the world to produce low carbon H₂?

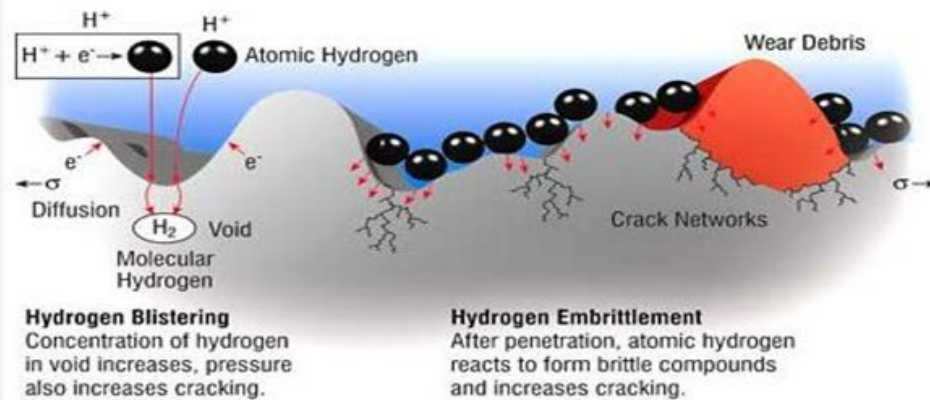
NCS gas versus blue H₂ to end use in Germany as example



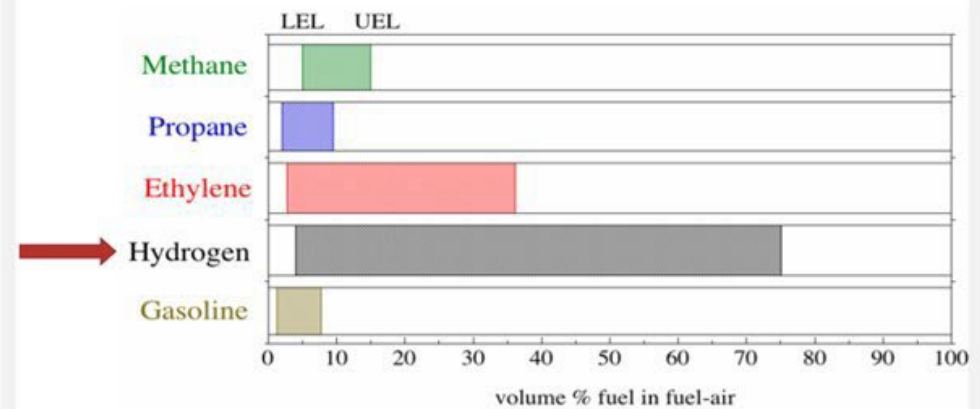
GHG intensity of natural gas supply from Norway to Germany: Upstream /Midstream /Downstream 1.3/0.3 /0.9 g CO₂e/MJ (LHV) (Equinor, 2021), Gas reforming carbon capture ratio 96%, natural gas input to reformer 3.25 kg/kg H₂, electricity need of reformer 3.5 kWh/kg H₂. Future (2030) grid electricity in DE assumed at 150 g/kWh, NO at 17 g/kWh. Including 2% loss in ship-based CO₂ transport from DE to NO.

H₂ has some challenging properties but with safety in design and operation it can be done in a safe manner

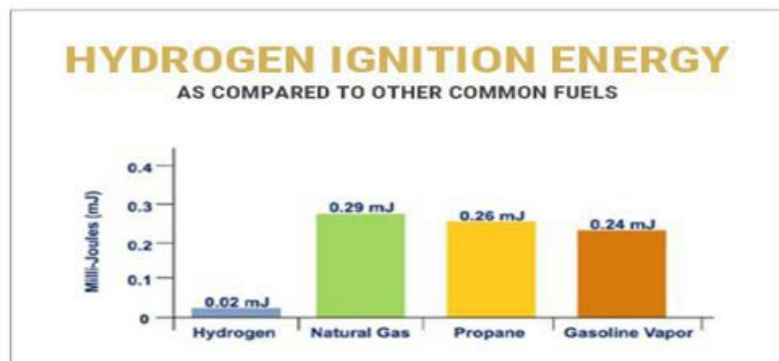
Containment (small molecule + failure mech.)



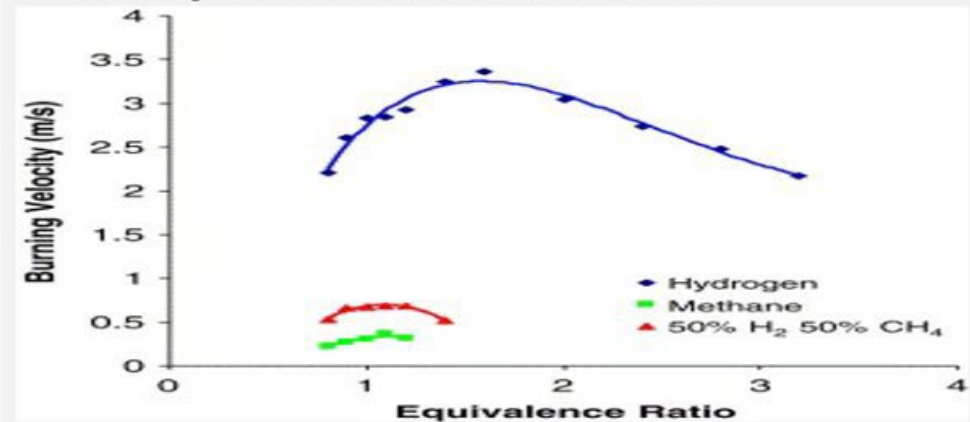
Flammability (wide range)



Ignitability (low energies)



Reactivity (fast flame acceleration and DDT)



A broad pipeline of H₂ projects targeting Northwest Europe

 **H2BE Ghent**



GW-scale low-carbon H₂ from natural gas for hard-to abate industry.

Transport to off-takers by pipeline.

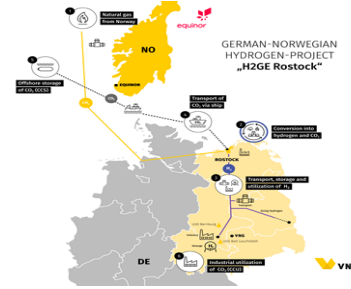
 **H2M Eemshaven**



GW-scale low-carbon H₂ from natural gas for hard-to abate industry and power.


Transport to off-takers by pipeline.

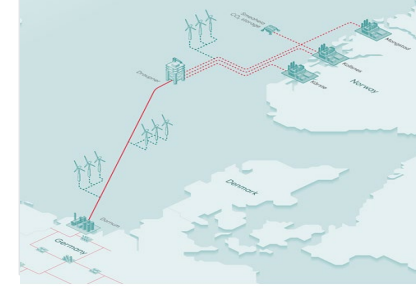
 **H2GE Rostock**



GW-scale low-carbon H₂ production from NCS gas


Transported to off-takers by pipeline.

 **Clean H₂ to Europe**



Multi GW-scale low-carbon H₂ production from natural gas for export.


Transported via pipeline to continental Europe and off-takers.

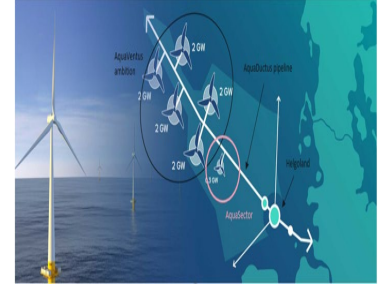
 **NorthH₂**



H₂ production from offshore wind.

Power to shore via cable– electrolyzer onshore.

 **AquaSector**

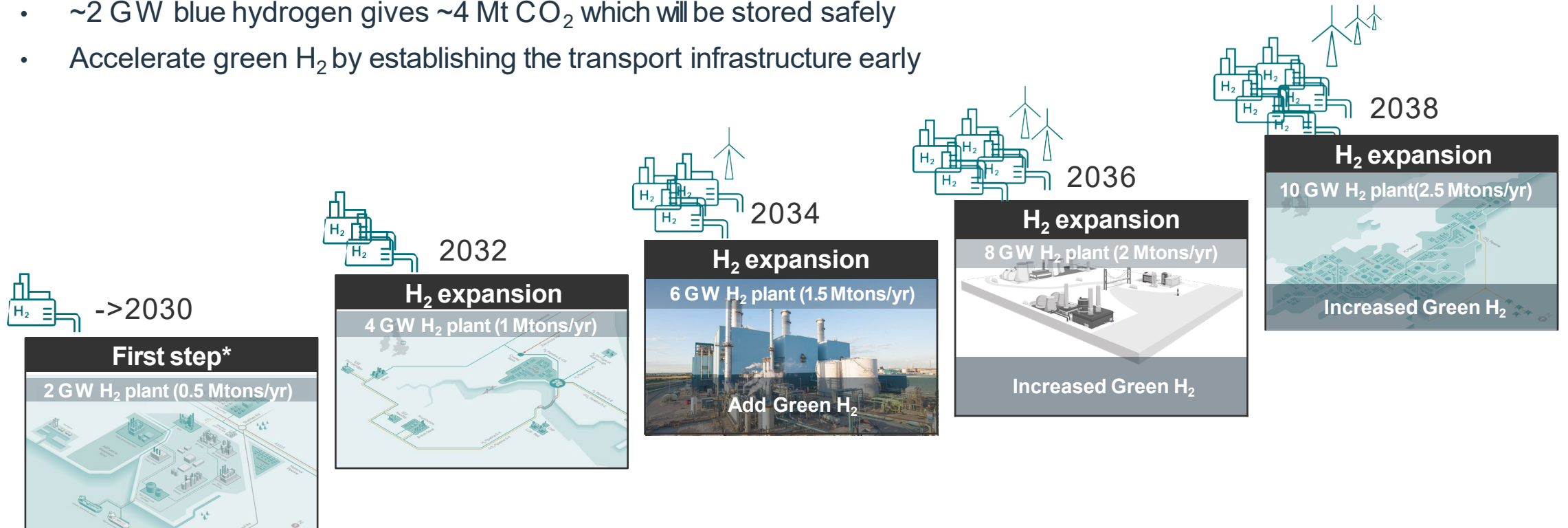


H₂ production from offshore wind.

Transported to shore via pipeline.

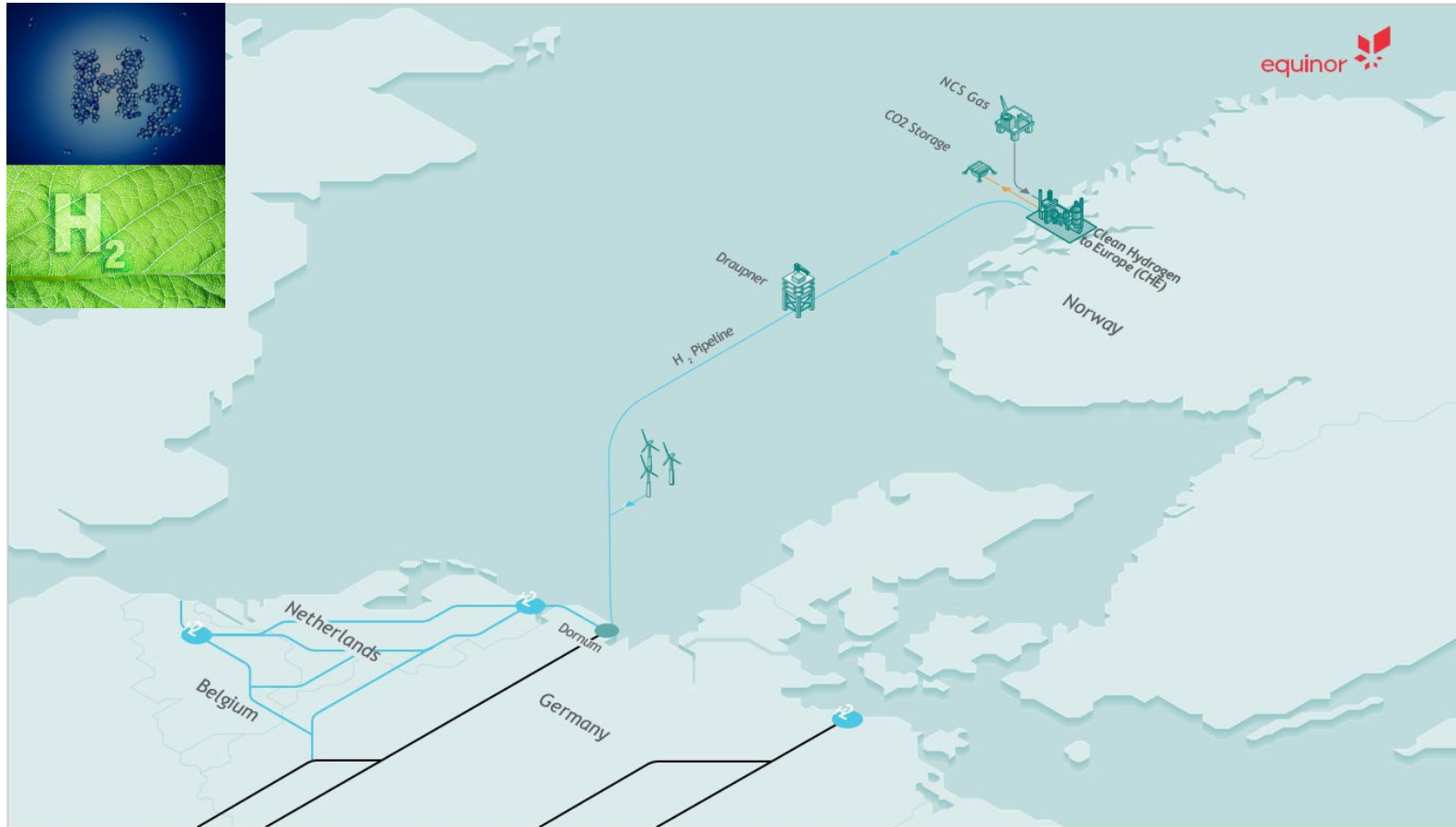
Large Scale H₂ Production in Norway enabling exports to Europe

- Step by step scale up to manage market risk
- Blue hydrogen can be provided at scale earlier than green hydrogen
- Steps of ~2 GW every ~2 years
- ~2 GW blue hydrogen gives ~4 Mt CO₂ which will be stored safely
- Accelerate green H₂ by establishing the transport infrastructure early



H₂ infrastructure can accelerate green H₂ to Germany and rest of Europe

H₂ Export Pipeline



Low-carbon H₂ from natural gas produced in Norway serving industrial off-takers in GER/ NWE.

New or partly new and partly repurposed natural gas pipeline. Feasibility study with Gassco ongoing.

PCI process initiated seeking to connect with the EU Hydrogen Backbone.

Built for future expansion and tie-in of H₂ from offshore wind along route.

[PCI Interactive map \(europa.eu\)](https://europa.eu)