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Offshore Green Hydrogen & Wind Farms

Offgrid / Ongrid scenarios review

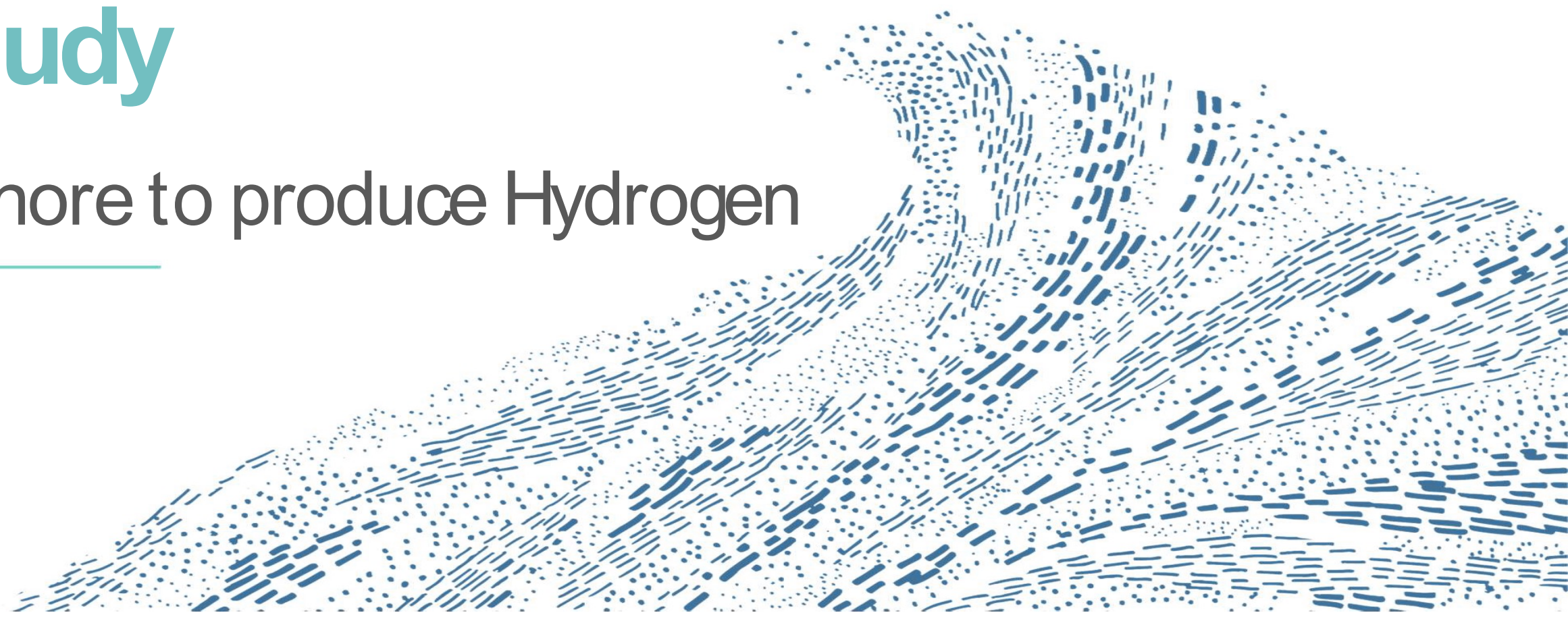
March 2022



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Case Study

Going offshore to produce Hydrogen



Offshore Green Hydrogen – a good solution ?

Delocalize
potential
risks



Leverage
Wind Power
Production



Greater
superficies



Direct
Access to
Water



More
Societal
Acceptance



PROS

VS

CONS



Case Specific
Economics

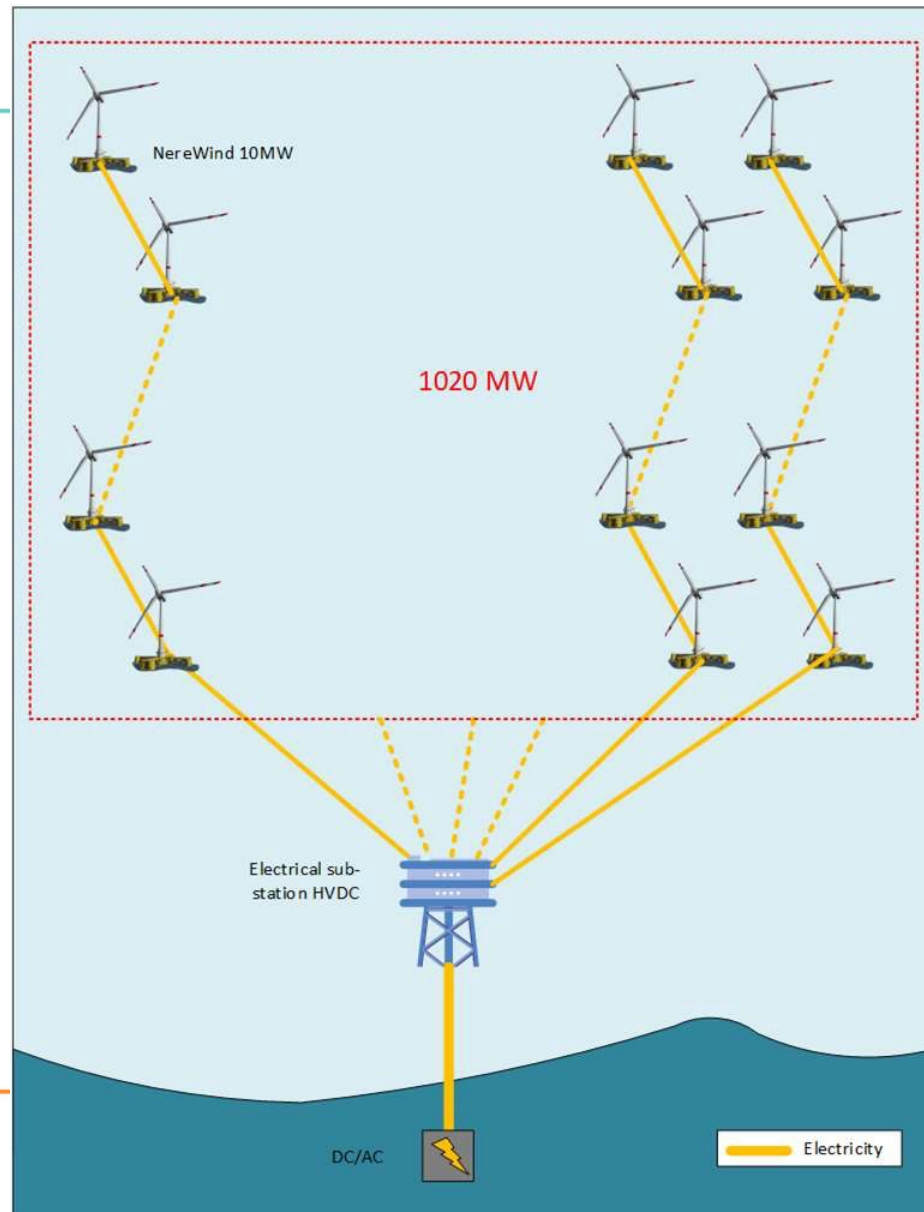


New
Technologies



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Case Study – Offshore floating wind farm 1GW



- **Water depth : 90 m**
- **Distance from shore : 60 km**
- **102 floating wind turbines**
- **1 HVDC sub-station**
- **Design life : 20 years**
- **Production cost : 88€/MWh**



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Offshore development – Scenarios overview

Electricity & hydrogen production

Pure hydrogen production

Offshore H2 production

Onshore H2 production

Offshore H2 production

Onshore H2 production

Centralized production

Distributed production

Centralized production

Centralized production

Distributed production

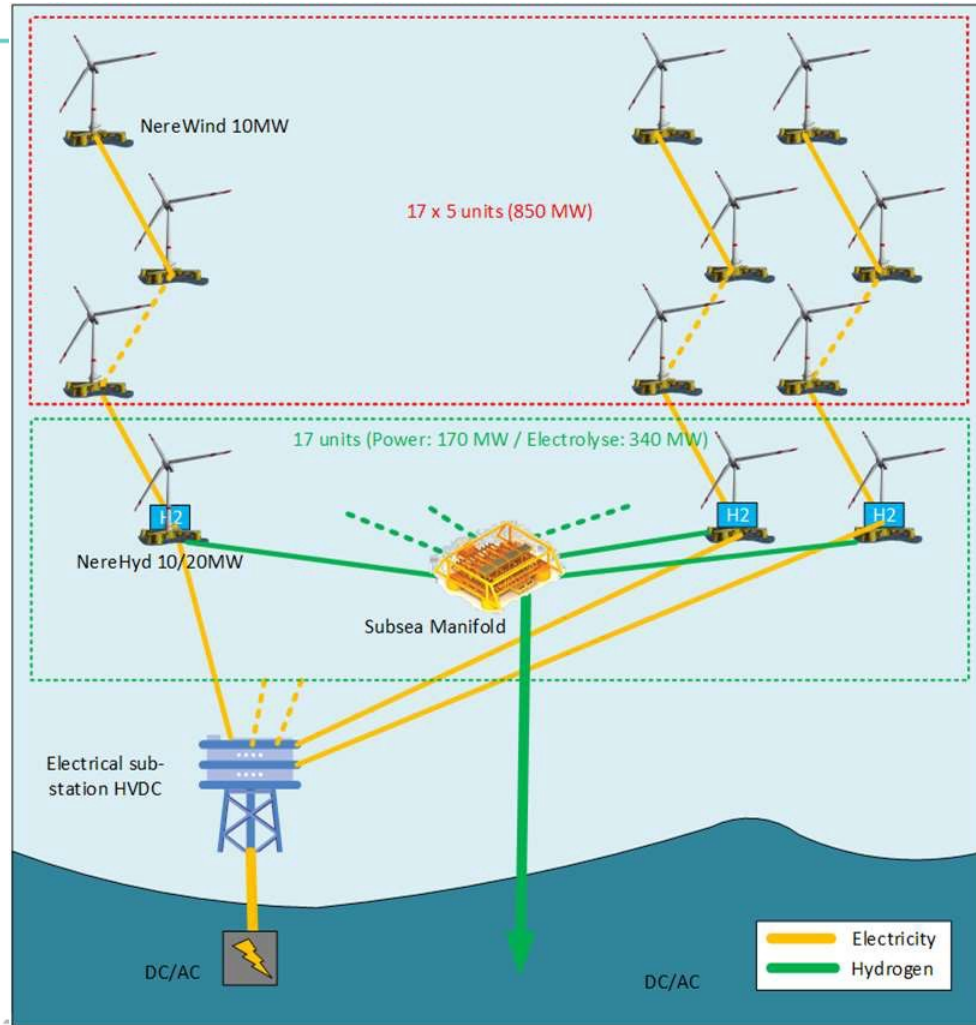
Centralized production

DORIS

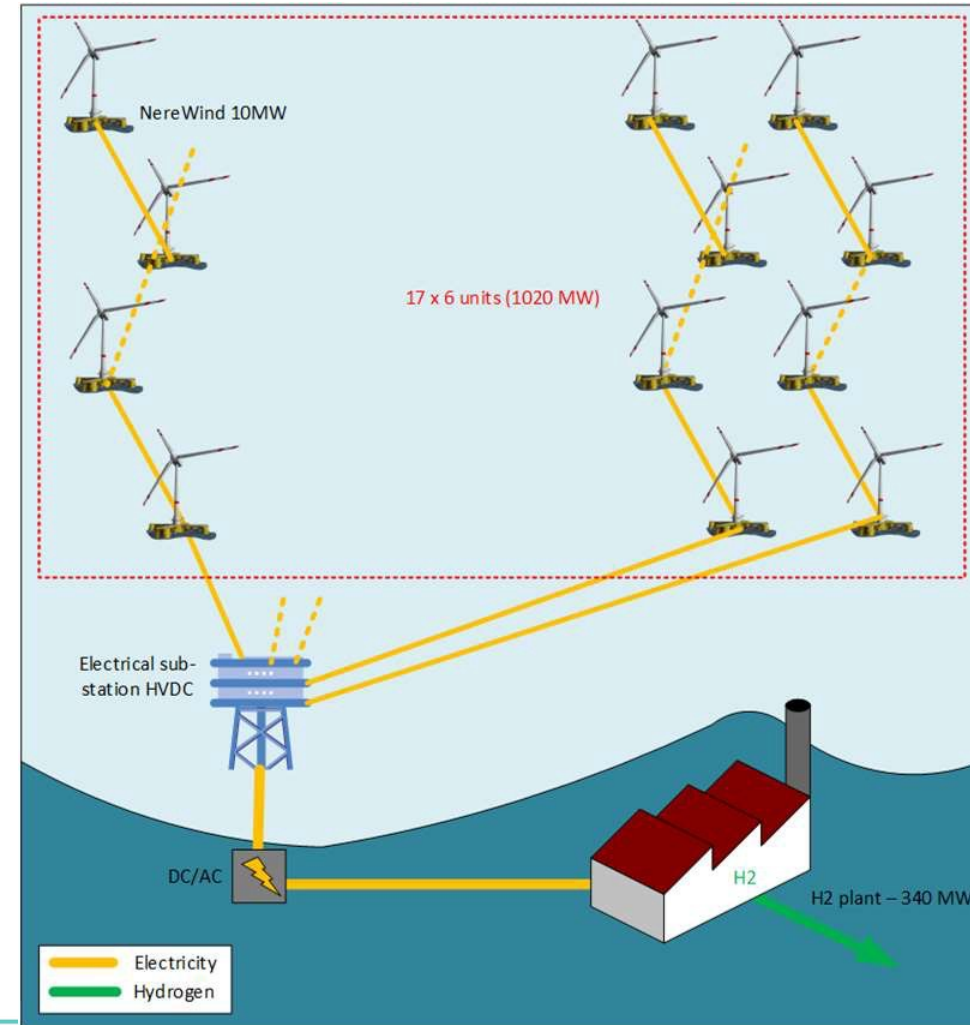
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OnGrid Scenarios – Hybrid electrical and H2 production

H2 offshore production distributed

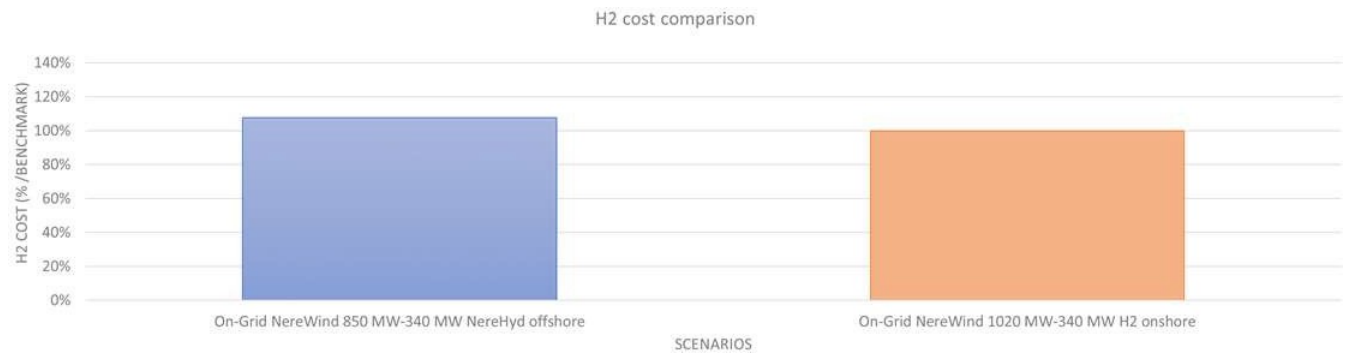
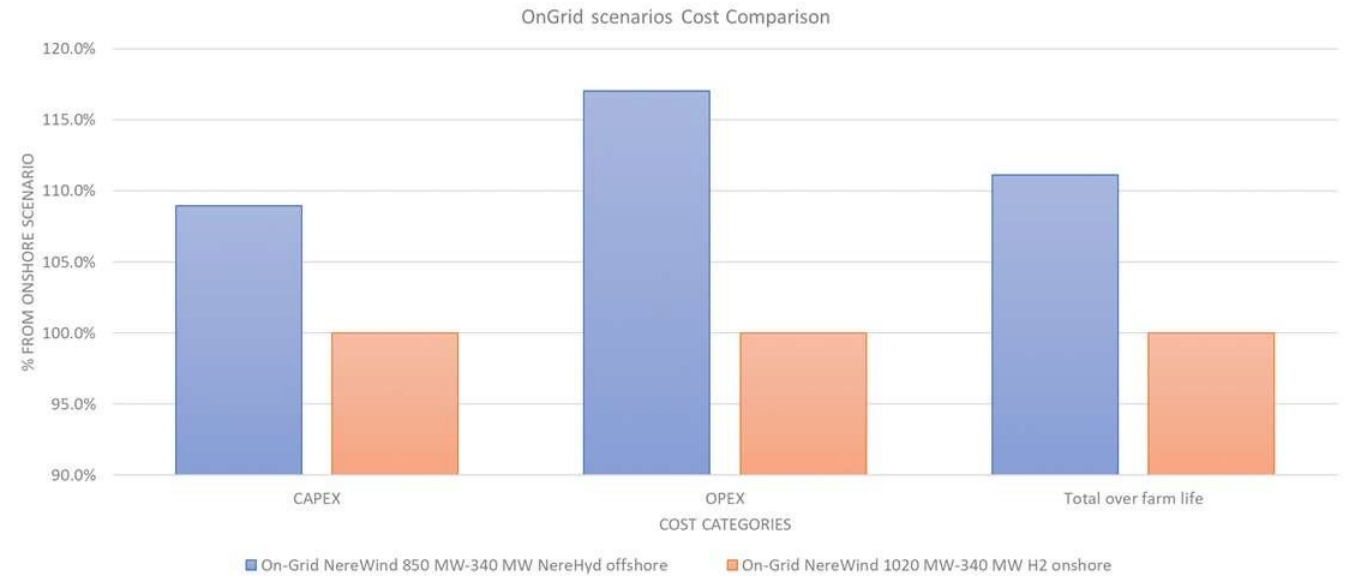
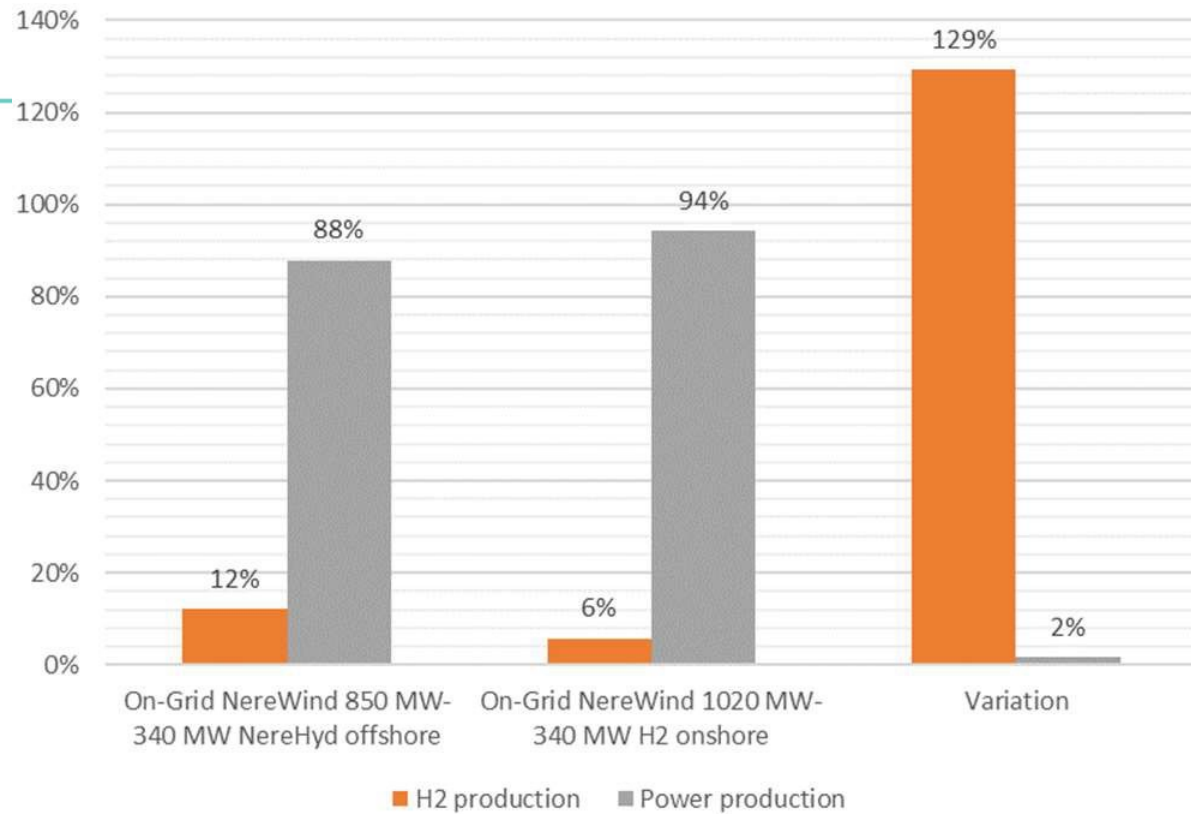


H2 onshore production [benchmark]



□ Maximum capacity factor of Electrolyser considered in this scenario

On-Grid Scenarios – Costs comparison



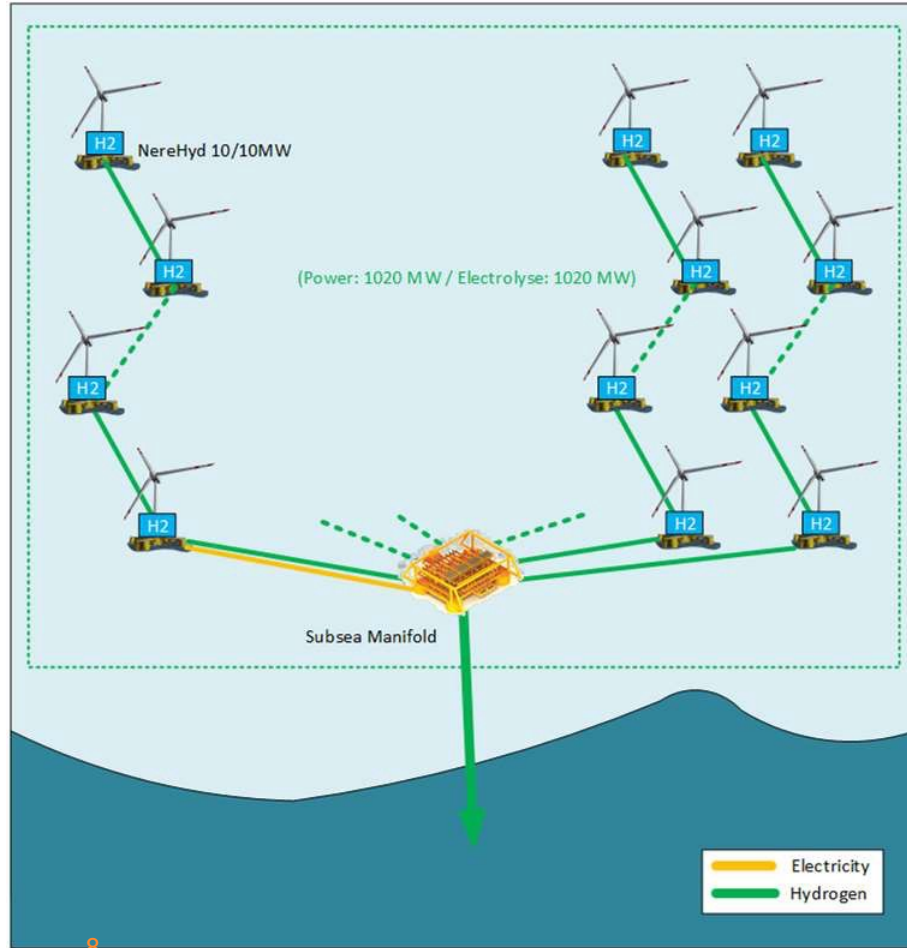
☐ Increase of CAPEX/OPEX compensated by less inline electricity losses

☐ 7 May be of interest to go offshore to overcome onshore regulation constraints

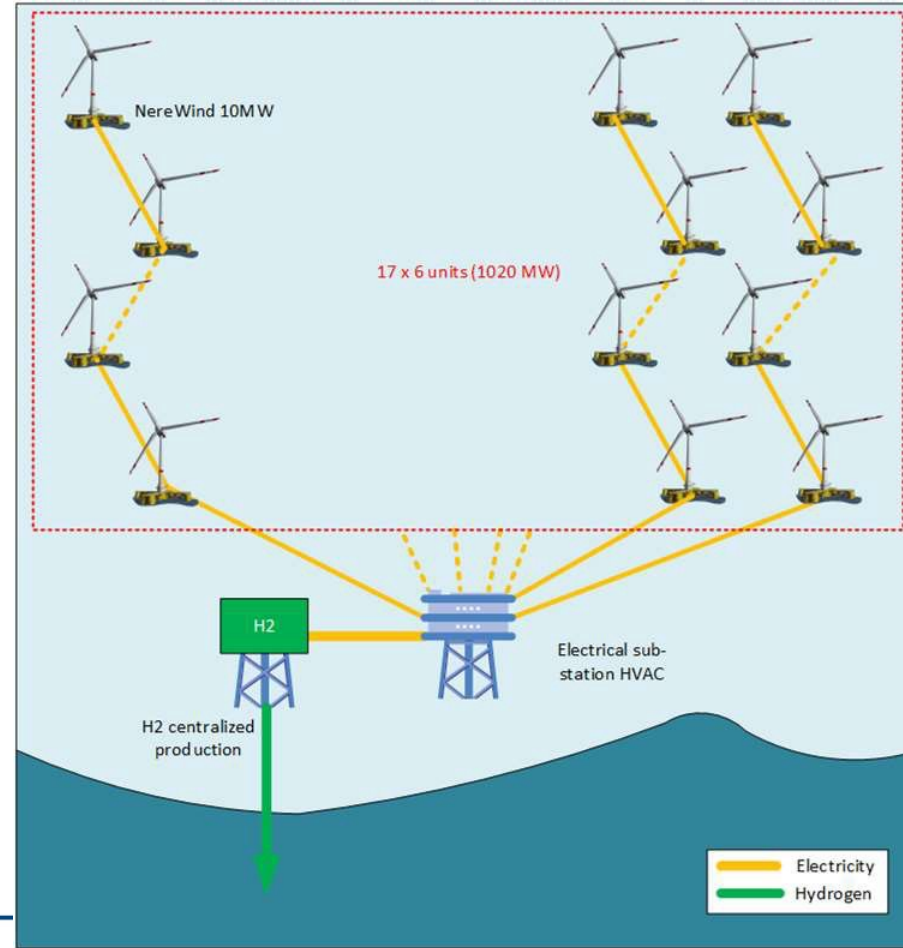


OffGrid Scenarios – Pure H2 production

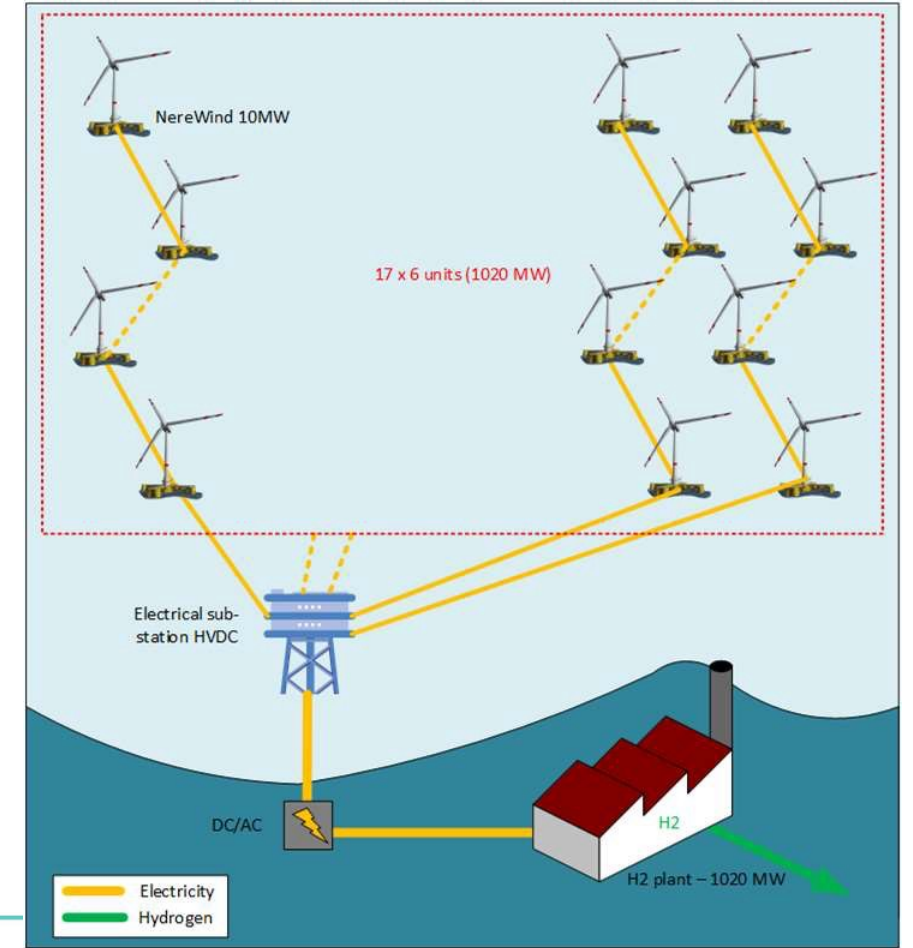
H2 offshore production Distributed



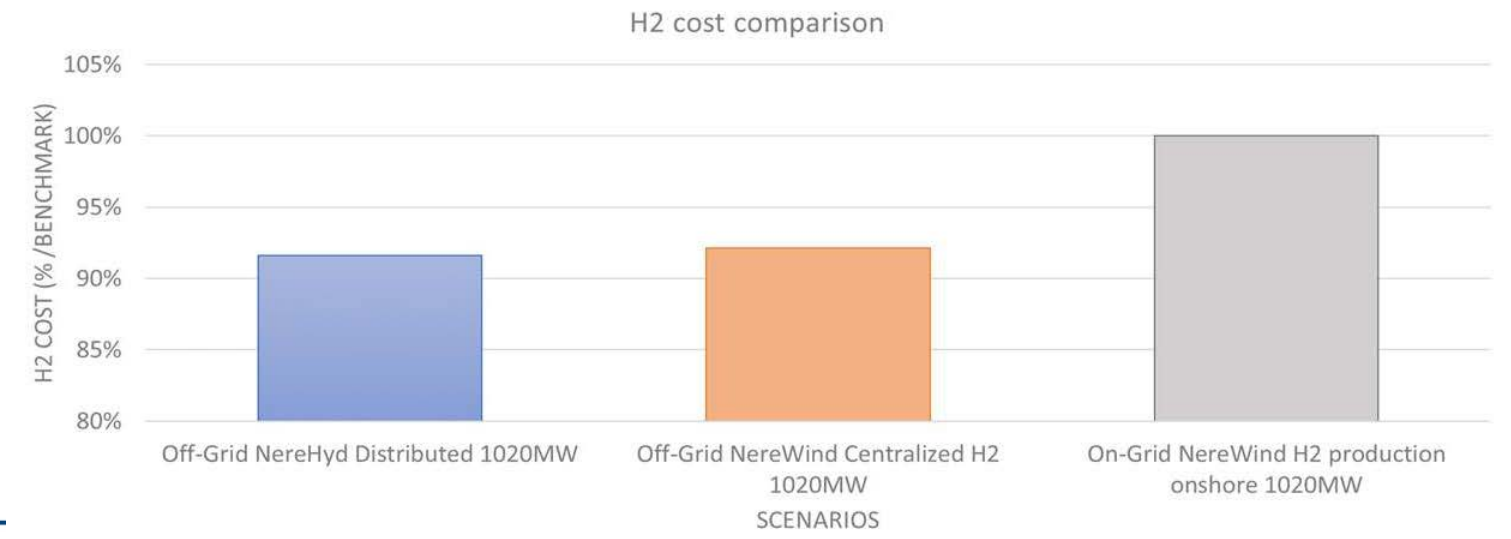
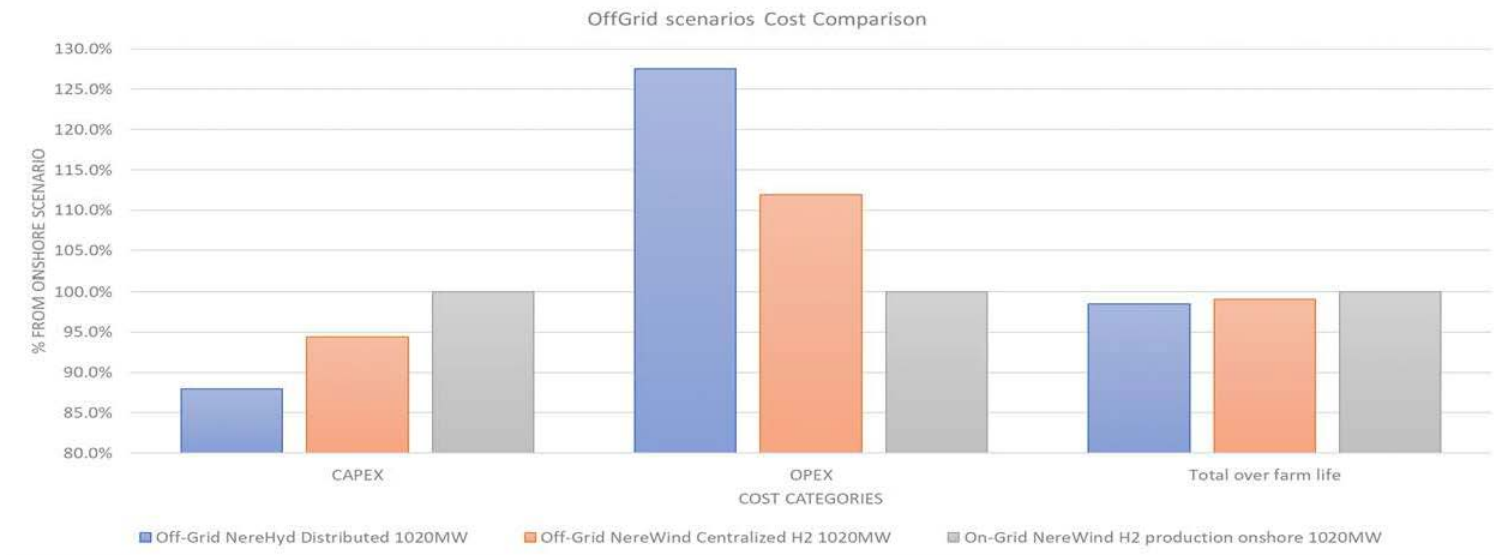
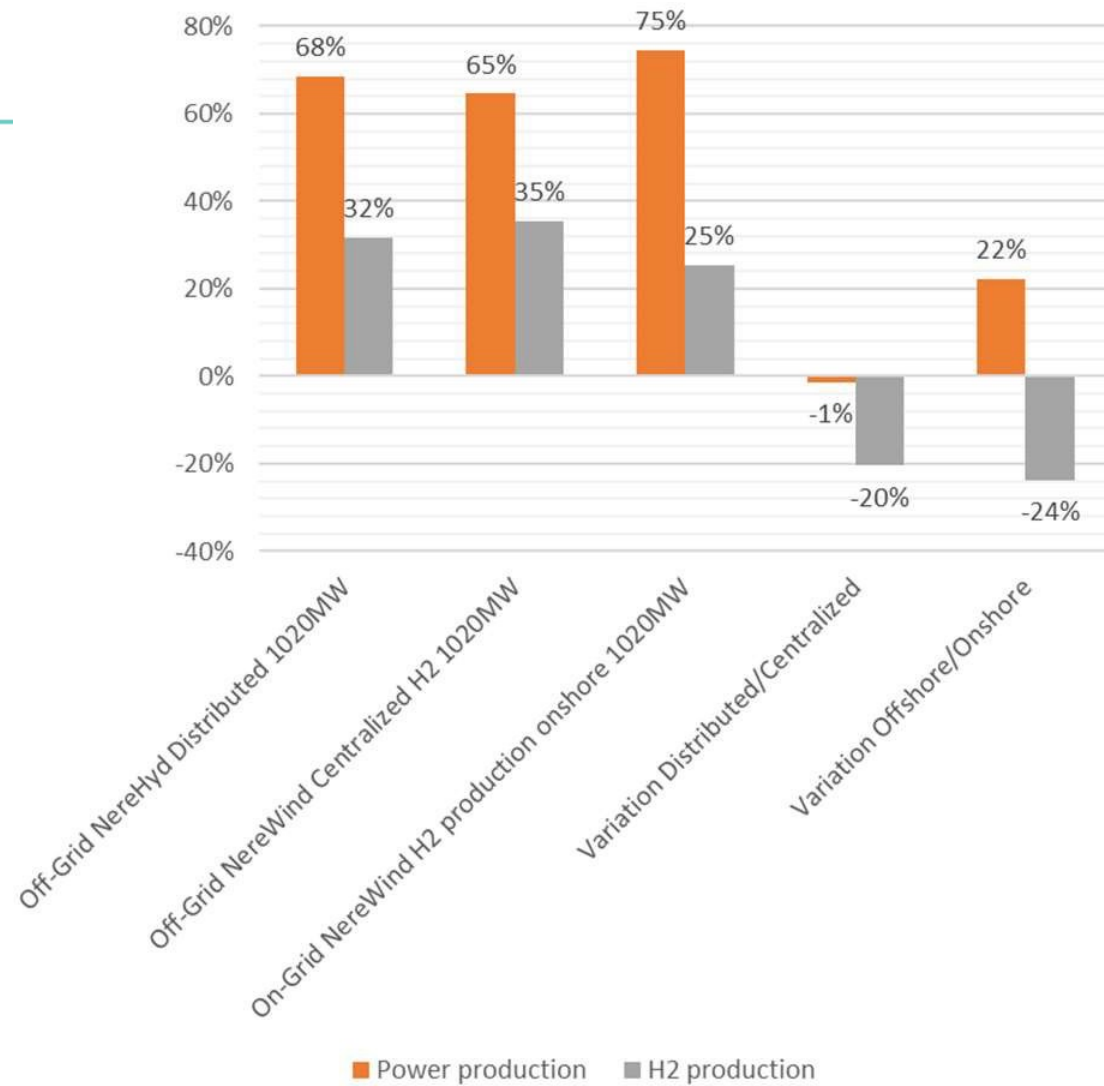
H2 offshore production Centralized



H2 onshore production [benchmark]



OffGrid Scenarios – Cost comparison



9 **H2 production cost is decreased in offshore scenario when distance from shore increases**



Conclusion

- 1. Decentralized Hydrogen production seems to be a good concept when mutualized with floating power production**
- 2. Exporting Hydrogen instead of electricity is cheaper for long distances with less losses plus e-storage benefits**
- 3. Decentralized Hydrogen production is a good enabler to exploit remote fields where electricity export is too expensive and/or limited connections to the electrical grid & temporary e-storage needs**



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NereHyd™

Combined Power and H2 Production



Lhyfe & DORIS Partnership – A common objective



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Strengths

Expertise in hydrogen value chain
Expertise in hydrogen production
Network of H2 end users
Network of investors

Our Objective

“Becoming one of the first massive & affordable offshore green hydrogen producers”



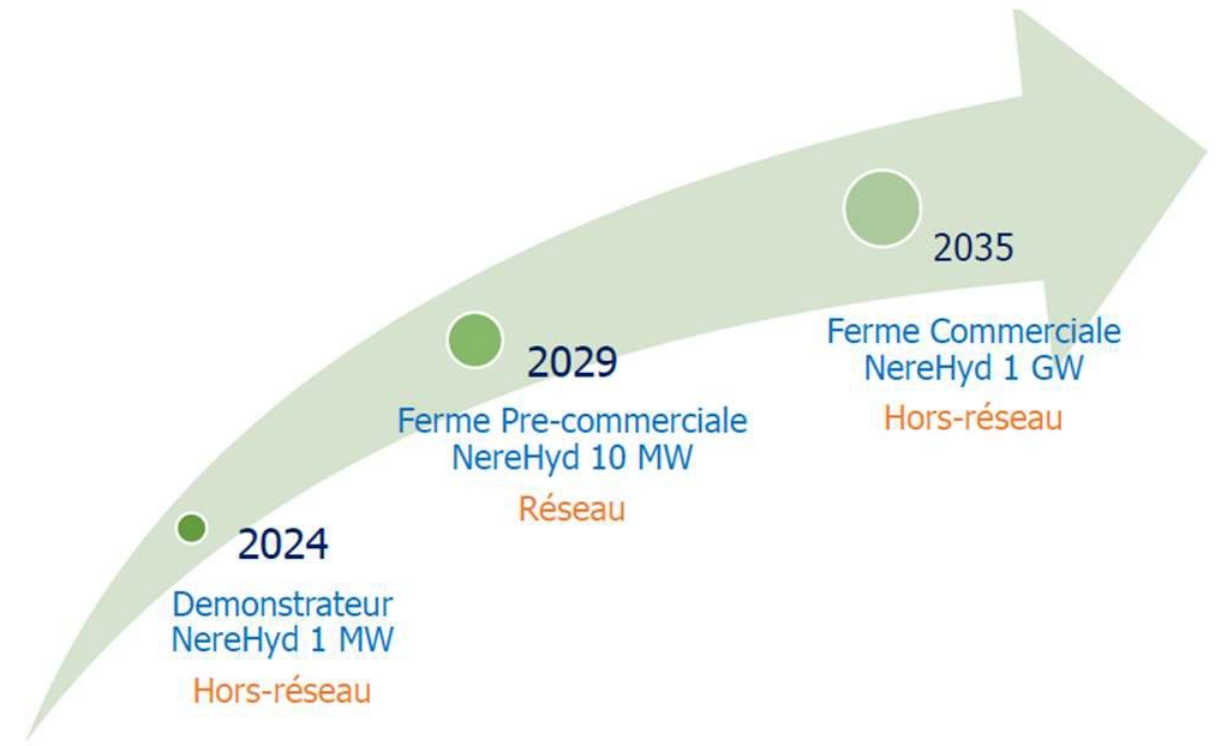
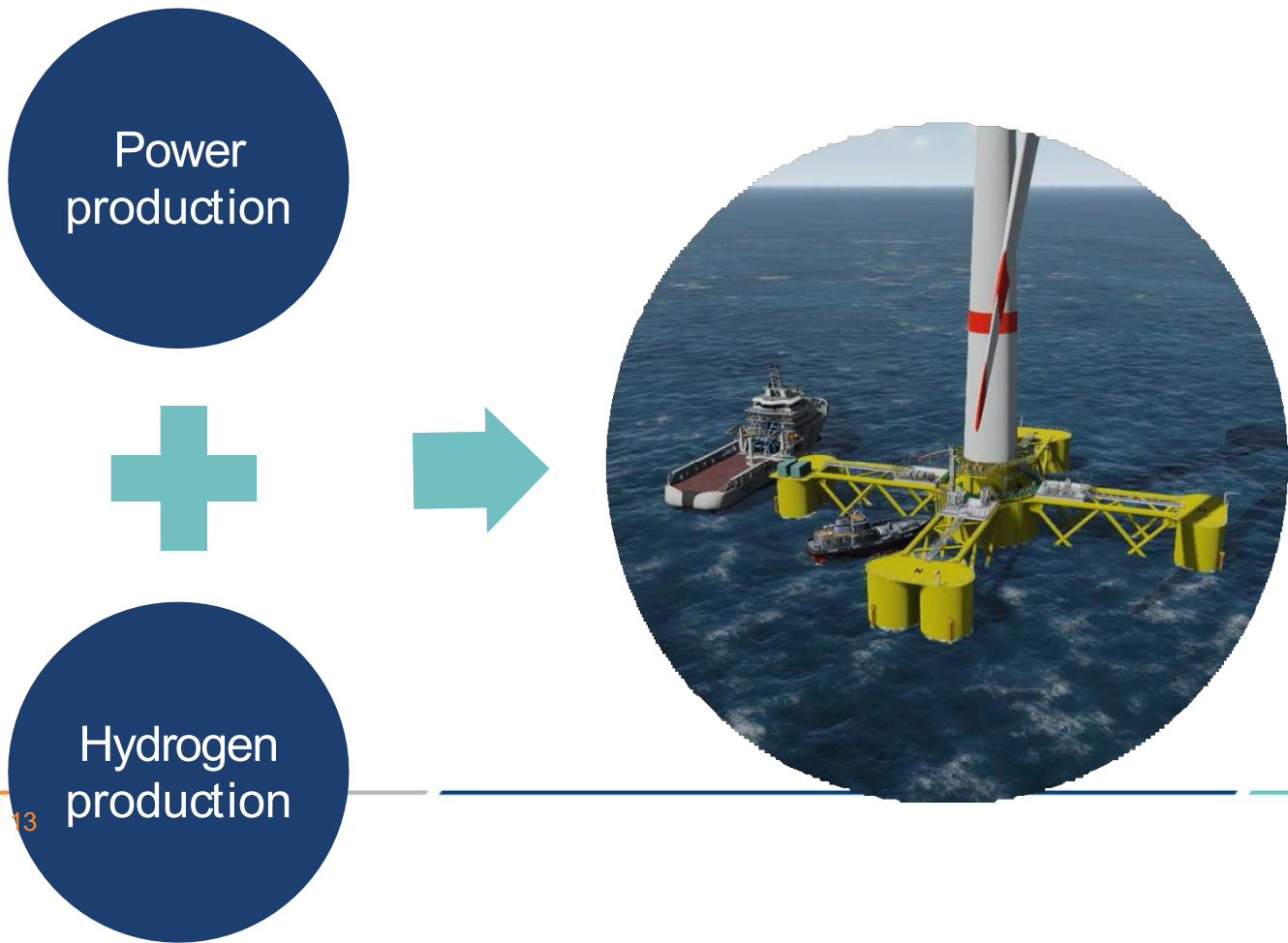
Strengths

55 years of offshore experience
North Sea O&M experience
Offshore wind expertise
Network of partners

NereHyd™ – Roadmap

DORIS: offshore expertise + DNA of innovation

Lhyfe : Partner pioneer in green H2 production



- Power production by NereWind™
- Hydrogen plant fully integrated:
 - PEM Electrolyser technology
 - Water treatment onboard
 - Gaz treatment
 - Specific Electrical Equipment



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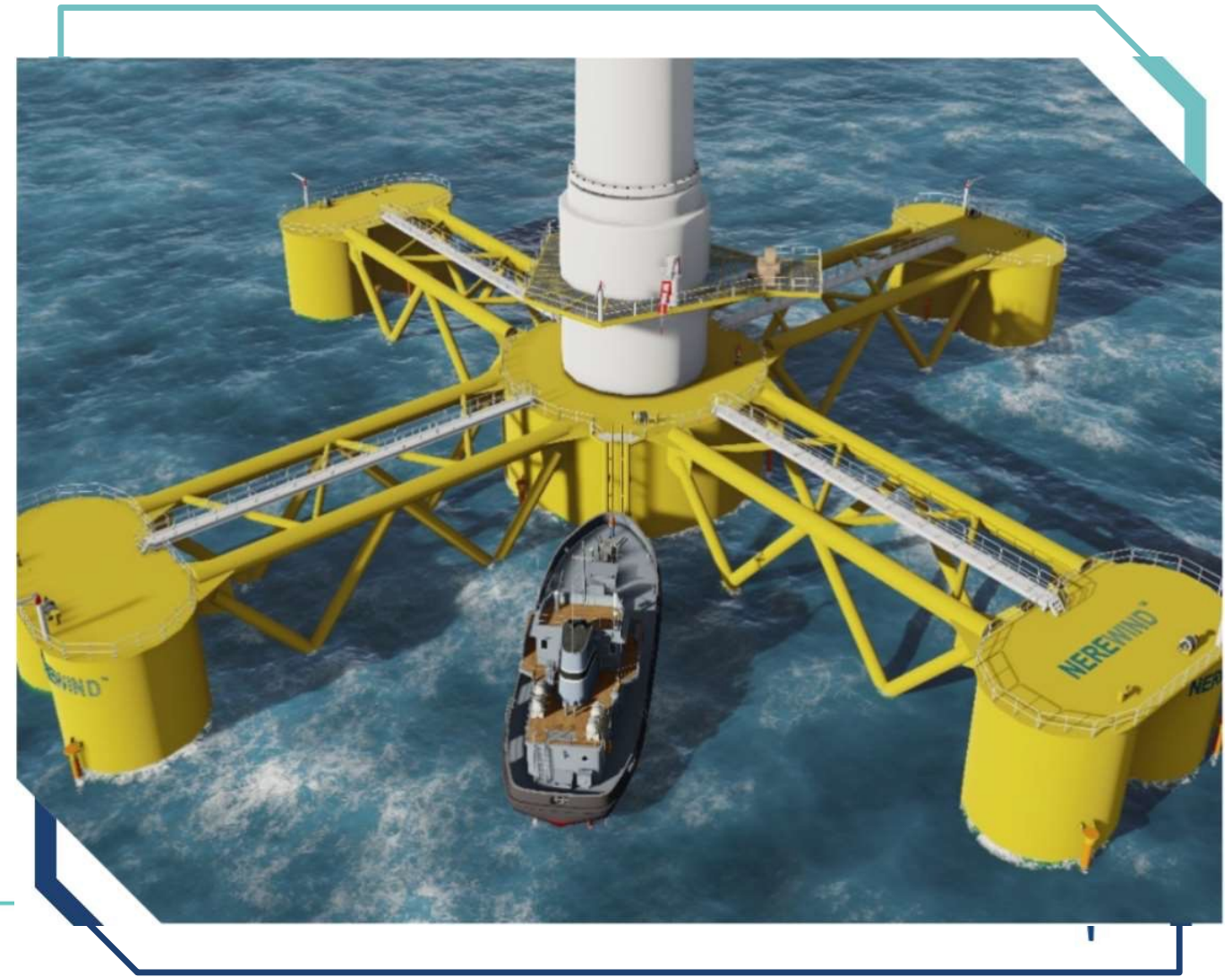
NereWind™ floater

With 20 years of expertise in offshore wind, DORIS brings a competitive, versatile and efficient semi-submersible design, named NereWind™.

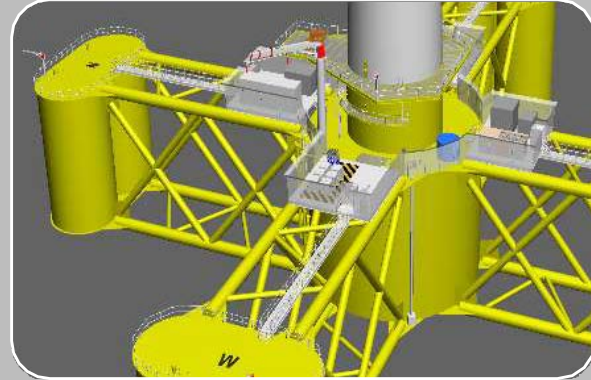
Designed with:

- Multi-columns
- Double Trusses
- Attenuation Chambers
- Steel, Concrete or Hybrid Alternatives

- For Largest Turbines (10 and 15 MW)



NereHyd™ – Main bricks & features



NereWind™

Smart integration

Unmanned Asset
&
Optimized
Control

Ongrid
&
Offgrid
Architectures

NereHyd™ overview





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THANK YOU

