

Is a Combined Hydrogen Production and Storage Solution Key to the Energy Transition?

Subsea Expo

Diana Jelenova

22nd February, 2024



Agenda



• Introduction to Offshore Hydrogen

• Hyfloat Project

• Challenges



Over 35,000 professionals, across 60 countries

Advise

- Feasibility studies
- Concept design
- Pre-FEED
- Strategy planning

Design

- FEED
- Detailed design
- Owner's engineer

Deliver

- PMC
- EPCm
- Commissioning

Operate

- Maintenance
- Modifications
- Brownfield engineering
- Asset management
- Asset optimisation

Repurpose

- Life extension
- Asset repositioning
- Decommissioning



Unlocking Solution to the world's most critical challenges



What we do across the project lifecycle

Feasibility

- Opportunity and market assessment
- Concept development & appraisal
- Technology selection
- Techno-economic modelling
- Site screening and selection
- Decarbonisation studies
- Stakeholder engagement
- Risk management

Develop

- Full pre-FEED and FEED services
- Technical Safety
- Procurement support, including technology benchmarking
- ITT preparation, procurement process management and evaluation support.
- Contract evaluation and negotiation support
- Owner's engineer services

Execute

- Detailed design support
- Supplier documentation review
- Pre-Commissioning Operational hazards assessment
- FAT witness
- Construction management, including liaison with contractors
- Full EPCm capability

Operate & Maintain

- Full site/plant operating partner delivering fit for purpose solutions
- Operational Readiness assessments
- Design, Build, Commission, Startup, Operate capability
- Operator training, HAZOP
- Smart scalable digital and AI led maintenance solutions



Hydrogen Case Studies

Some recent relevant examples of Wood's undertaking hydrogen projects are detailed below:



Pre-Feasibility to FEED - onshore

- Ongoing 1.2GW green hydrogen and ammonia project (SA, confidential client)
- **Ongoing** 3.0GW green hydrogen project (UK, confidential client)
- 2023 1.0GW green hydrogen and ammonia project (Norway, confidential client)
- 2023 1.0GW green hydrogen project (Lithuania, confidential client)



Concept Design - Offshore

- **Ongoing** 1.0GW green hydrogen decentralized (North Sea, EETF)
- 2023 1.0GW green hydrogen both (UK, confidential client)
- 2023–10MW green hydrogen onshore from offshore wind (UK, confidential client)
- 2021 1.5-1.8GW green hydrogen centralized (Baltic Sea, confidential client



Owners Engineering - Onshore

- Ongoing 1.8GW green hydrogen and e-methanol project (US, confidential client)
- **Ongoing** 2.2GW green hydrogen and ammonia project (US, confidential client)
- Ongoing 500MW green hydrogen project (Spain, confidential client)
- Ongoing 3GW green hydrogen project (Australia, confidential client)

Offshore Hydrogen



Why Produce Hydrogen Offshore?

- Better wind resource
- Alleviating grid constraints
- Direct access to existing shipping lanes and/ or pipelines

• Public acceptance



Offshore Hydrogen Production

• **Centralised offshore production:** one or more offshore platforms exist as part of the wind farm where electrolysis equipment is housed to produce hydrogen. E.g. PosHYdon, H2Mare,...

• **Decentralised offshore production:** separate electrolysers within each offshore turbine, connected to central storage, or storage housed within each independent turbine. E.g. Dolphyn, Oyster,...





- Project funded by the EETF Scottish Government
 - Scope:
 - Validation of the foundation design
 - Computational modelling
 - Experimental validation
 - Technoeconomic studies
 - Literature review
 - Concept design
 - Supply chains
 - Hydrogen production
 - LCOH
 - Risk and environmental assessment



wood







Assuming 1.005GW wind farm (67 turbines), 2030 FID, producing 2034-35





Hyfloat Concept

- 15 MW floating spar buoy turbine with integrated hydrogen storage
- 10 MW electrolyser housed within the tower
- Onboard desalination













Impact of integrated storage on hydrogen supply





Challenges & Next Steps

- Lack of technology suitable for hydrogen and/ or offshore operation
- Motion compensation
- Offshore environment

• Lack of regulations





