Why we need modularity for floating offshore wind with green hydrogen

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This winter, wildly fluctuating access to gas is having an acute impact on energy poverty. Central and Eastern European countries have been especially hard hit. Runaway fuel costs will see residents burn wood, lignite coal and even rubbish to keep warm – a move condoned by Polish ruling party leader Jarosław Kaczyński, who told his countrymen to burn "everything except tyres".

The resulting air pollution will have huge ramifications to human health, not to mention the impact on climate change. However, for many global citizens, energy poverty is a daily struggle. In fact, 840 million people live without access to electricity, and hundreds of millions more experience frequent outages. We need a vast supply of affordable renewable electricity to extend access to the world's unserved and underserved population. Could green hydrogen coupled with floating offshore wind be the panacea?

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From demonstration project to panacea

What makes green hydrogen produced using electricity from floating offshore wind so attractive is some of the key challenges that it sidesteps. It unlocks huge swathes of ocean acreage that would otherwise be technically or financially impossible to develop using fixed-bottom solutions, and it can be shipped, making it almost globally exportable. It can also give a second life to existing oil and gas infrastructure, further supporting the energy transition while reducing costs. Altogether, the potential for floating offshore wind with green hydrogen is huge.

As such, there are already several small demonstration projects globally, and Italy, with its central location in the Mediterranean, is ideally situated to become a hub for the hydrogen trade. By 2050, Italy is targeting for green hydrogen to account for 20% of national energy consumption; one of the most ambitious targets globally. In addition, several pipelines already connect southern Italy with northern Africa, priming it for export.

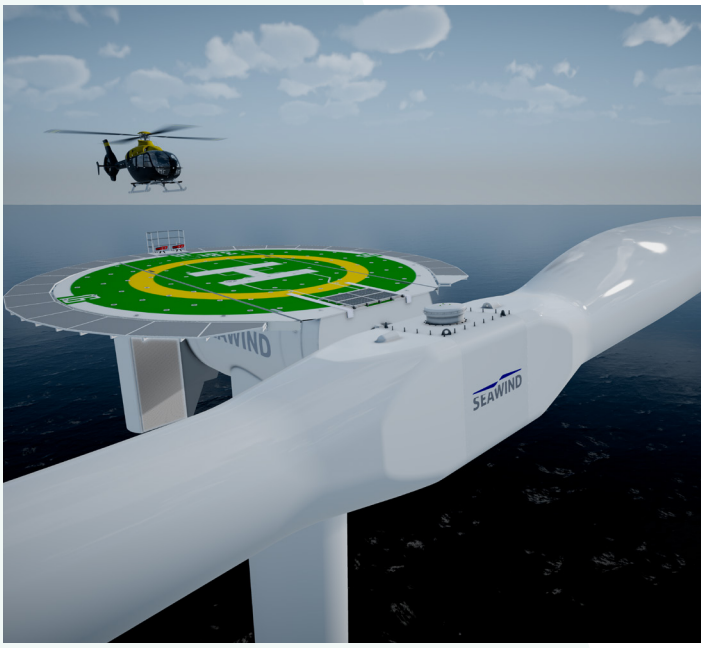
To unlock green hydrogen with floating offshore wind's potential, there are two key challenges that must be addressed. The first is establishing a conducive regulatory and licensing framework in which to operate, and the second, reducing the cost and complexity of its deployment.

Supportive regulations and licensing frameworks

Given the complexity of today's political and regulatory landscape, green hydrogen innovation projects are taking anything from seven to ten years to progress from inception through to operation. To ensure green hydrogen can meaningfully contribute to the world's journey to net zero, this process needs to be slimmed down and sped up.

With no clear permitting or licensing framework in the UK, existing demonstration projects have ambled their way through. Recognising the need to address this barrier, a Hydrogen Regulators Forum has been established to determine current and future non-economic regulatory responsibilities across the hydrogen value chain.

The case is similar in Italy, although there is a regulatory framework for hydrogen produced using fossil fuels, revisions are required to accommodate green hydrogen, as well as a simplification of authorisation procedures. Key considerations include the transportation of green hydrogen through existing and new pipelines, in addition to technical specifications around injection and network pressure.



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Modular and future proofed designs

The second challenge is how best to translate learnings from fixed-bottom offshore wind and the oil and gas industry to accelerate green hydrogen roll out, while reducing the cost and complexity. With many oil and gas assets beginning to reach the end of their useful life, the green hydrogen industry has some 50 years of installation and operation learnings to lean on, alongside innovations in design, technology, and materials. By bringing all this together, we could feasibly be designing and installing green hydrogen assets that are still operating in 2100.

Bringing its offshore energy engineering expertise to bear, to the benefit of green hydrogen, is what Aquaterra Energy will now do with Seawind Ocean Technology. Together we are developing HyMed, which will be the world's largest floating offshore wind and green hydrogen production asset. Designed using the very latest 16MW turbines with a hub height of 260 metres, the project will have a total 3.2GW capacity, with more than 1GW allocated to produce green hydrogen. At over 300km offshore, the site will float in ultra-deep waters, nearly 2,900 metres above the seabed.

Achieving the vision

In the 1920s, the highly regarded scientist JBS Haldane envisioned a world 400 years in the future powered by "rows of metallic windmills" which would generate electricity that could be "used for the electrolytic decomposition of water into oxygen and hydrogen". Through intelligent, innovation-led engineering we stand to make that vision a reality 300 years early. Floating offshore wind with green hydrogen will be the marvel of our time and could viably be the only way for the world to achieve SDG7 – access to affordable, reliable, sustainable and modern energy for all – by 2030. The benefits of modular design have been proven again and again, it's time we brought it to bear for green hydrogen.

Find out how we can support your offshore green hydrogen project and get in contact

Contact us to learn more

About Aquaterra Energy

From seabed to surface, oil and gas to wind and hydrogen, Aquaterra Energy is the offshore energy industry's first choice for offshore products, systems, and projects around the world. Swift, flexible, and responsive, Aquaterra Energy's engineers and analysts create the solutions customers need, while delivering operational improvements, efficiency gains and supporting decarbonisation efforts – whatever their circumstances

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