

Offshore 3.0:

# How green hydrogen is transforming the offshore landscape (again)

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*There was a time, not so long ago, when the phrase ‘offshore energy’ referred solely to oil and gas. Then the advent of offshore wind fundamentally transformed the offshore landscape.*

*Now, just as that ‘new normal’ has grown familiar enough to just be ‘normal’, we have another, equally transformative shift on the horizon: the first stirrings of the offshore hydrogen economy, notably green hydrogen. So – what will Offshore 3.0 look like?*

### Green versus blue

First, let’s clear up a question you may already have had while reading this: why specifically green hydrogen?

Of course, the other major conversation around offshore hydrogen is that around blue hydrogen – the practice of creating hydrogen through traditional carbon-intensive methods then capturing and storing the carbon offshore. Blue hydrogen will have a major role to play in the context of the energy transition and total hydrogen supply by volume, but it won’t alter the very fabric of offshore energy in the way that green might. This is for two reasons.



# The success and impact of offshore green hydrogen is far from a forgone conclusion, but the potential is tantalising.

Firstly, blue hydrogen doesn’t look like it will do much to change the topography of offshore energy. In the UK context, it is likely the industry will be concentrated in a handful of very large projects where there is existing oil and gas infrastructure and a favourable geology (such as depleted hydrocarbon reservoirs or aquifers) in which to store the carbon. This may well give a new lease of life to existing assets and require some degree of new infrastructure, but to a large degree it looks and sounds like the energy industry we have today: largely the same players using largely the same platforms with many of the same technologies.

Secondly, that concentration of the blue hydrogen economy in a few core industrial hubs means it simply won’t be as widespread as green hydrogen has the potential to be – if the industry plays its cards right.

### A vision of a possible future

The success and impact of offshore green hydrogen is far from a forgone conclusion, but the potential is tantalising. **According to Aurora Energy Research**, there is over 200GW of global electrolyser capacity under development – more than a thousand times current capacity, with the lion’s share in Europe (including the UK).

The same research also states that individual project sizes could scale from today's sub 10MW standard to 100-500MW within five years to deliver on ambitious targets set by the UK and EU. Aurora's Richard Howard has added that, "hydrogen made directly from renewable energy rather than the power grid can achieve the lowest carbon footprint – and this may be the only type of hydrogen that can meet the carbon intensity thresholds set by the EU."

If that is the case, where can investors in green hydrogen projects go to find reliable sources of renewable energy at a low (and falling) levelised cost of energy? The answer, of course, is offshore. Co-locating green hydrogen projects with offshore wind is an attractive proposition for a developer looking to get the most out of an electrolyser while minimising carbon intensity.

And – crucially – it's attractive to other stakeholders too. For offshore wind developers, there is always the question of how to fetch a good price for power when grid demand is low – offshore green hydrogen projects could offer a complementary second source of demand, improving project economics and de-risking investments.

This could prove a boost to the wider offshore energy economy as well. Vessel owners, oilfield services companies, offshore engineering and equipment providers would similarly find a new source of demand for their specialist products and services. In some instances, oil and gas operators are already finding a new prospect for revenue-generation with demonstrator projects in progress for refitting existing platforms to accommodate electrolysers.

Unlike blue hydrogen – which must follow the geology and onshore industry – this model allows green hydrogen projects to go pretty much anywhere offshore wind projects can.



## A tantalising possible future then, but is it a likely one? There are multiplying reasons to think so.

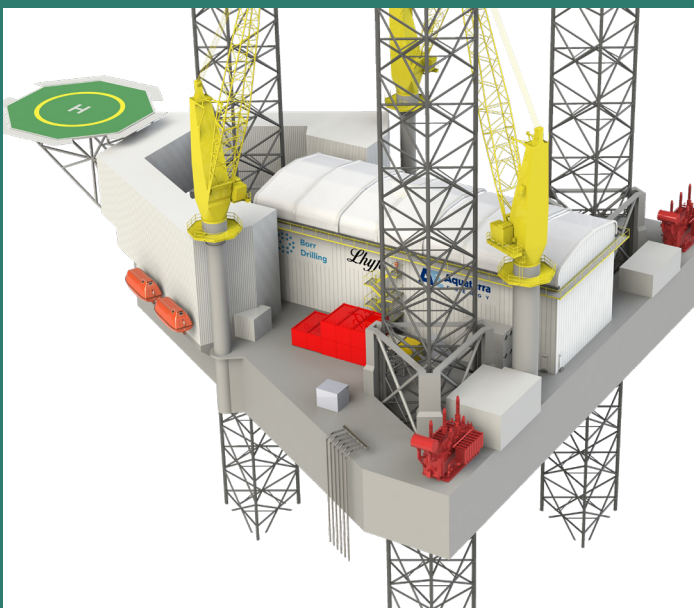
The significance of this is that the green hydrogen industry can begin to do what the oil industry has done so well – go to where production is cheapest and export the product to wherever it's needed, decoupling local supply from local demand. The oil industry has built a ruthlessly efficient global market this way, with gas latterly catching up through the rise of LNG, offering a model for what is possible for green hydrogen.

Assuming that economies of scale can be achieved over time as they have been with offshore wind, and that cost-effective models emerge for exporting the hydrogen back to shore, then this potential future really could redesign the fabric of the offshore energy landscape. It could even tilt the economic balance of new field development, with all manner of hybrid project configurations possible.

### Mounting momentum

A tantalising possible future then, but is it a likely one? There are multiplying reasons to think so. For a start, here in the UK, the government's recently published hydrogen strategy has committed the country to a 'twin-track' hydrogen ambition that promises blue and green capacity developed in parallel. In Brazil meanwhile, developer **Enterprise** has announced its aim to power sea-based production of hydrogen and ammonia with gigawatt-scale offshore wind by the end of decade.

These announcements – particularly those from government – are crucial. On a purely economic basis, green and blue hydrogen can't compete with traditional grey production without something changing. Whether this is in the forms of subsidies for the greener technologies or penalties for the dirtier ones (e.g. carbon taxes), it will take regulation to tip that balance, and these announcements give encouragement that it will arrive.



There are still fine details to emerge and uncertainties to resolve, but we have enough confidence in this offshore energy future that we have begun investing in it. Partnering with renewable hydrogen producer and supplier **Lhyfe** and jack-up drilling specialist **Borr Drilling**, we are working on an innovative concept that brings together the best of traditional hydrocarbon infrastructure and skills, newer renewables, and even newer green hydrogen offshore expertise. Project Haldane will see our consortium develop an industrial scale offshore green hydrogen production concept, through the deployment of an electrolyser system on a converted jack-up rig. The project aims to produce over 100 tonnes of hydrogen per day – enough to power 20,000 hydrogen cars for a 500-mile range. What's more, this approach has added sustainability benefits – the jack-up rig has useful infrastructure such as helideck, accommodation and workshops that could prove a useful support vessel for the wind farm itself.

It's this type of innovation that continues to push the industry forward. We can be confident that things won't stand still, so as an industry we must take this possible future seriously and collaborate to navigate a route to Offshore 3.0.

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

**Contact us to learn more**

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