OFFSHORE WIND

Commercial collaboration

There are commercial opportunities for the oil and gas industry through collaboration with the UK's offshore wind sector, write Westwood Energy's *David Linden*, Head of Energy Transition, and *Michelle Gomez*, Senior Analyst, Offshore Wind.

The UK's path to reaching net zero by 2050 will require significant investment in new technologies and business models. The UK Continental Shelf (UKCS) is expected to see a decline in oil and gas production, with other offshore technologies – including hydrogen production; carbon capture, use and storage (CCUS); and offshore wind power – set for significant expansion.

The UK's transition will only be successful through collaboration. There are potential opportunities for synergy and between the offshore oil and gas and wind sectors.

The UK Committee for Climate Change's (CCC) recently released *Roadmap to net zero* calls for 100 GW of offshore wind to be built – a 900% increase from today's capacity.

To date, the UK's oil and gas and wind sectors have largely operated in relative isolation from one another despite the installation of some 10 GW of offshore wind capacity. Synergies have not been effectively explored. However, this is now starting to change through joint initiatives such as the Energy Transition Alliance set up between the Oil & Gas Technology Centre (OGTC) and Offshore Renewable Energy (ORE) Catapult in July 2020.

The main commercial drivers for exploiting synergies across these two sectors are to:

- Reduce the levelised cost of electricity (LCOE) of offshore wind (especially floating wind) and support its continued growth.
- Ensure the oil and gas sector's skills, capabilities and infrastructure are leveraged to support the wind sector's growth, as well as maintain the oil and gas sector's own commercial viability.

Transfer of knowledge and capability

The International Energy Agency's (IEA) 2019 *Offshore Wind Outlook* report highlighted an opportunity for the oil and gas sector of up to $350bn in European offshore wind over the next 20 years. This is based on the calculation that 'about 40% of the full lifetime costs of a standard offshore wind project' has 'significant synergies with the offshore oil and gas sector'.

Impression of the Hywind Tampen floating wind project, which will provide 35% of the annual power demand of five platforms

Photo: Equinor

There will be only certain aspects of an offshore wind project where the oil and gas industry can add value – for example, the supply of turbines is a well-established and competitive industry, with little synergy with the oil and gas sector. However, it is the oil and gas industry's experience in offshore infrastructure that will be of most benefit to the offshore wind sector, whether it be in foundations/structures, project management, vessel operations, working with moving cables, seabed survey/investigation, or balance of plant (BoP) operations and maintenance (O&M). The oilfield support/services sector also has transferable assets and skills, such as in the provision of tugs, mooring systems, heavy lifting vessels and cabling.

It is likely that increased synergies will be realised in floating wind as wind farms move further from shore and require more complex supply chain operations and activities, as this will require a set of capabilities that many offshore wind players do not have. The UK hosted the world's first commercial floating wind farm (Hywind Scotland) in 2017 and has now set itself a 1 GW target by 2030 for floating wind, with the aim to retain the value of a local supply chain, including leveraging its oil and gas heritage. **Table 1** provides a summary of some of the trends from floating wind that create potential opportunities for the oil and gas supply chain.

Offshore floating wind is still at an early stage of development, with only 113 MW of capacity installed globally (of which just over 70 MW can be labelled as 'commercial'). Standardisation will be needed in the design and development to create scale (and the underlying supply chain).

The parts of the oil and gas offshore supply chain that are currently servicing the offshore wind sector (primarily in engineering, procurement, construction and installation – EPCI) are at present doing so at very low prices. There is uncertainty on whether rates can stay at such levels if activity ramps up, especially if oil and gas activity returns. Significant changes in rates could impact the accessibility of the synergies between the two sectors.

To enter the market effectively, it will also be important for the oil and gas sector to understand the differences in how the offshore wind market functions – including different tender processes, contracting terms, supplier relationships, the focus on innovation together with cost reduction etc. The oil and gas sector is also not as accustomed to working with other stakeholders – such as transmission/grid operators – and will need to navigate a different landscape.

Joint commercialisation

There is also potential for collaboration of the two sectors through oil and gas platform electrification and repurposing existing infrastructure.

Platform electrification can create demand for the renewable electricity generated by a (fixed or floating) offshore wind farm that is in close proximity and displace gas and/or diesel power generation.

Supply chain category	Floating wind trends that create opportunities for the oil and gas supply chain
Pre-front end engineering and design (FEED)/FEED	• Increased engineering complexity as wind farms move further from shore
Engineering, procurement, construction and installation (EPCI)	• Evolution of the type of EPC yards (from fixed foundations towards yards which can manufacture floating substructures) • Mooring of floating foundations (includes pre-lay mooring capability) • Evolution in both the nature and type of installation activity and assets required, including the use of offshore support vessels (OSVs)/multi-purpose supply vessels (MPSVs)/subsea construction assets (as opposed to wind turbine installation vessels – WTIVs) for floating wind farm installation (quayside integration/assembly) • Installation of subsea electrolysers/subsea substations/hydrogen pipes, including use of pipelay and subsea construction assets, as overlap between and combinations of offshore technologies increases
Operations and maintenance (O&M)	• More complex offshore logistics and operations • Increased safety standards/HSE needs • Subsea inspection requirements
Decommissioning	• Need to consider end-of-life/decommissioning

Note: This list is not exhaustive

Table 1: Floating offshore wind trends – opportunities for the oil and gas supply chain *Source: Westwood Energy*

This can reduce emissions from the platform and make available fuel that once would have been burnt on the platform, extending the field's life. On average ~5% of production is used offshore to power platforms.

This combination alone may justify the investment cost, but there are several technical challenges that need to be overcome. Offshore wind generated electricity is variable – therefore requiring backup, potentially in the form of batteries, hydrogen fuel cells or connection to the main grid. Equinor's 88 MW Hywind Tampen floating wind project, for example, will only provide 35% of the annual power demand of the five platforms, illustrating some of the constraints of 100% variable power supply.

A balance needs to be struck between the benefit of platform electrification and the cost of achieving this. Platforms that are nearer to land could make power-from-shore a more viable alternative to offshore wind, while others may be too old to justify the necessary investment for the remaining life of the asset.

Existing oil and gas infrastructure can also be repurposed, primarily to support the development of the green hydrogen economy from offshore wind. Hydrogen can be produced at sea by electrolysis – either on a repurposed oil and gas platform, on an energy hub island (eg North Sea Wind Power Hub), or directly from an electrolyser housed in an offshore wind turbine. It can then be delivered back to shore through repurposed natural gas pipelines.

The PosHYdon pilot project off the coast of the Netherlands is an example of this concept, bringing several partners together to realise the opportunity. Similar projects are being considered across the North Sea.

The business case is based on reduced capital investment and O&M costs through the use of existing infrastructure, the lower cost of transportation of hydrogen versus electrons, and the value of using hydrogen as 'storage' for variable offshore wind (and using this energy when commercially favourable). The cost savings through using existing oil and gas infrastructure will vary depending on the state of the infrastructure available, whether it can be repurposed, the distance from shore of the facility, and the remaining asset life.

Projects need to be considered in the context of the market dynamics and subsidy regime in the UK. Joint developments with the oil and gas sector could be a benefit or hindrance as a route to market for renewable projects depending on the offshore wind capture price outlook (the average price achieved in the wholesale market when the wind blows), or the level of revenues already supported by a subsidy (such as the current Contract for Difference (CfD) regime) or power purchase agreement (PPA).

The emerging opportunity

The opportunity that the synergy between oil and gas and offshore wind presents – in the UK and beyond – is becoming clearer, with impacts across the value chain:

- E&P companies are well positioned to deploy their capital and project management skills and, importantly, have a need to diversify their portfolio and to address the emissions intensity of their existing oil and gas production.
- EPC contractors and the broader supply chain can support the design, manufacture, and installation of wind farms – with the most synergies likely to be realised in floating wind. Further opportunities exist in supporting platform electrification and the repurposing of oil and gas infrastructure (primarily for green hydrogen).

But while there are synergies, the oil and gas community needs to recognise the differences between the two sectors to understand where the opportunity really lies and what value they can add.

Joint commercialisation concepts such as platform electrification by offshore wind are at an early stage of development, and there are technical and commercial hurdles still to overcome. Floating offshore wind – the area where the skill and knowledge transfer could be very strong – is also an emerging technology, for which the ambition needs to be turned into the reality. ●