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SUSTAINABILITY

GOVERNANCE AND IMPACT
Part of the Horizon Scanning series

DELIVERING NET ZERO

Part 1 - The Winds of Change: Is the Floating Offshore Wind Market set to take off?

Building on our recent publication looking at the use of corporate power purchase agreements (PPAs) and the increasing appetite amongst companies to procure renewable power in order to meet their sustainability goals, this is the first of a series of publications focussing on the energy transition to net zero carbon emissions by 2050 ("Net Zero").

The energy transition will require a varied and complementary energy mix, a major part of which is expected to be contributed by offshore wind technologies. IHS Markit has predicted that worldwide construction of new offshore wind power will increase exponentially, with 135GW to be added in the coming decade with a 600GW, $1.4 trillion market by 2050. In the UK, the 2019 Offshore Wind Sector Deal has set out a pathway to reach 30GW of offshore wind capacity by 2030. The European Commission's "Recovery Strategy", published in light of the coronavirus pandemic, identifies wind energy as a major contributor to the policy fundamentals of the recovery.

These forecasts have been made possible by the enormous success of the traditional fixed foundation technology. However, in this publication, we consider the potential for floating technology to contribute towards these figures and the challenges which will need to be overcome.

The remarkable growth of offshore wind

- Offshore wind attracted investment nearing $30 billion in 2019, up from around $10 billion in 2010
- Total global installed capacity has doubled in the last 4 years, from 14.5GW in 2016 to around 29GW today
- In the UK, latest quarterly figures reveal that offshore wind output in Q1 2020 grew by 53% when compared to Q1 2019

The fixed foundation success story

The fixed foundation offshore wind market has been a major success story. However, we should remember that two key charges levelled against floating wind – the unproven technology and the prohibitively high cost – were also faced by the fixed foundation market at the outset. Those twin challenges have been resoundingly overcome, principally by a combination of technological innovation and scale. On the technical side, whilst there have been some issues with cable failures and leading edge erosion, the story has predominantly been of rapid technical development and reliable operation. The industry has rapidly scaled-up from the 2MW turbines seen at the Scroby Sands offshore wind farm in the UK to the giant 11MW Siemens Gamesa turbines to be deployed at the 1.5GW Hollandse Kust Zuid 1-4 offshore wind farm in the Netherlands. The increased size of the turbines has meant fewer turbines (and foundations) are required and hence lower installation and O&M costs.

Together with the scaling-up of the supply chain, this has resulted in cost reductions which far exceeded expectations a decade or so ago. This has been reflected in the level of the subsidies these projects are attracting. In the most recent Contracts for Difference (CfD) auction scheme in the UK in 2019, the 1.2 GW Doggerbank Creyke Beck A offshore wind farm (among others) was awarded a CfD at a strike price of £46.00/MWh - contrast this to the strike price of £174.00/MWh achieved for the Walney Extension project in 2014 (2020 prices). Elsewhere in Europe, where developers are not responsible for delivering the offshore transmission assets, subsidy-free projects are now reaching FID (e.g., the Hollandse Kust Zuid 1-4 offshore wind farm previously mentioned).

As a result of these developments, estimates as to the total global potential of offshore wind have increased significantly.

If fixed foundation has been so successful, why do we need floating wind?

This success story has been very much focussed on north-west Europe, where conditions for offshore wind are particularly favourable. This is because of the high-winds encountered in this region but also, significantly, because of the unusually shallow waters in the North Sea. Deployment of offshore wind of the extent forecast will necessarily require turbines to be deployed in deeper waters, particularly as most of the world does not benefit from coastlines with such shallow waters. For example, the West Coast of the US (in particular, California, which is keen to deploy offshore wind) will have to turn to floating wind from the outset. Similarly, Japan – looking to accelerate its renewable energy sector but with a high population density and topography constraining onshore wind and solar – is surrounded by deep seabeds and has just launched a tender for the Goto Islands floating wind project. It is generally considered that fixed foundation turbines, which are rooted in the seabed by monopile or jacket foundations, are currently restricted to waters less than 60 metres deep due to technical limitations.

Therefore, there is clearly significant potential for floating offshore wind to complement fixed foundation technology, as it will provide access to sites with high density wind in water depths where fixed foundation is technologically impossible or economically unappealing. Floating offshore wind farms also have the added benefits of being able to help alleviate congestion in shallower waters (which is starting to become an issue in certain areas off the UK) and of offering fewer environmental concerns due to less-invasive activity on the seabed during installation.

Who will be the key players in the industrialisation and commercialisation of floating wind?

Major utilities have already shown that they will be key players in this sector. Iberdrola has announced its European Flagship project, aiming to demonstrate the viability of installing 10MW+ turbines on floating platforms, and expects to have 2GW of floating deployed by 2030. Engie is an outspoken proponent of floating technology – outlining its desire to become the "Ørsted of floating" – and holds a 25% interest in the pioneering WindFloat Atlantic project.

However, perhaps the key players in the developing market will be the oil & gas companies. Equinor has been leading the way for some time; its 30MW Hywind Scotland project became the first operational floating array in 2017 and its 88MW Hywind Tampen project in Norway – intended to provide electricity for its offshore oil & gas fields operations – will be the world's largest floating offshore wind farm when built. Repsol has also been early in investing in floating wind via its material holding in the WindFloat Atlantic project. A material recent development is that other oil & gas majors have started to follow their lead and invest in the sector. Total – which has announced a number of renewables investments in recent months – is acquiring a stake in the Erebus project, a 96MW project in the Celtic Sea which will be built in an area with a water depth of 70 metres. Shell has also shown significant interest in the sector, agreeing in late 2019 to acquire French floating wind developer EOLFI. More generally, recent weeks have seen major announcements from other majors (including BP and Eni) committing to the energy transition and, in the case of Shell and Eni, looking to major group restructurings to create renewables units.

Floating Offshore Wind - Snapshot:

- Currently in the demonstration/pilot phase (with balance sheet financing), although large scale projects anticipated to take shape around the world in the next decade
- First floating offshore wind farm, Equinor's 30MW Hywind Scotland pilot park, has been producing since 2017
- Two of the three 8.4MW MHI Vestas turbines have been installed at the WindFloat Atlantic project, off Portugal, at depths of 100 metres
- Projects are getting bigger and exploring the use of new and larger turbines e.g., Equinor's 88MW Hywind Tampen project in Norway and the 96MW Erebus project in the Celtic Sea
- According to GlobalData, by 2030, 5GW to 30GW of floating offshore capacity could be installed worldwide
- However, costs remain a significant obstacle (according to Wind Europe, the levelised cost of energy is around €180-€200/MWh for pre-commercial projects). Non-industrialised designs and costs per tonne (without economies of scale) are a contributing factor to this

Why is floating wind a good fit for oil and gas companies?

As mentioned above, the commercialisation of floating wind will involve deeper waters, further from shore and with more difficult working conditions than that encountered thus far by the fixed foundation industry. It will require huge scale to achieve the cost reductions required. The oil & gas E&P and oilfield services companies can leverage their technical and logistical expertise in offshore developments and the associated technology (such as mooring). The majors can also, of course, bring their deep pockets.

Therefore, there are clearly meaningful synergies between the two sectors. In addition, the combination of increased ESG pressures, diminishing returns from oil & gas projects, the latest oil price crash and the question marks over when and to what extent global demand for oil will recover in a post-COVID world has, for the European majors at least, made an accelerated diversification into renewables a much more attractive proposition. Renewable investments can offer:

- a diverse contribution to the corporate cash flow mix;
- a reduction in sensitivity to commodity prices;
- the means to support sustainable dividends; and
- stable IRRs.

Diversification by oil & gas companies into the renewables market, will, of course, bring questions as to how such companies can demonstrate shareholder value and create value in sectors where they might have less experience than utilities, such as in the fixed foundation offshore wind market. These questions may be less acute in the floating market, given the technical and logistical expertise noted above, and the possibility of collaborations between the utilities and oil & gas companies with their respective complementary offerings.

What challenges remain?

Firstly, it needs to be shown that floating technology will work for the mega-turbines which will need to be deployed to achieve scale. The technological success of pilot projects employing larger turbines, such as WindFloat Atlantic, Iberdrola's European Flagship project and Erebus will be key, particularly in relation to attracting third party debt (with lenders likely to be very focussed on the technical due diligence).

Secondly, the cost of floating wind must come down very significantly. Ultimately, this is only achievable through volume and scale, and key hurdles remain to attain such volume and scale:

Will there be sponsor appetite?

It remains to be seen whether there will be enough sponsors willing to deploy enormous amounts of capital on relatively untested projects, particularly when there is still plenty of capacity for fixed foundations in many parts of the world. It is noteworthy that many of the key developers in the fixed foundations space – such as, notably, Ørsted – have shown little interest, at this stage, in investing in floating technology, as they still see plentiful opportunities globally for traditional fixed foundations. We have seen that the oil & gas companies could play a key role. However, in the context of historically low oil prices, these companies are making swingeing capex cuts to preserve cash. A sustained low oil price environment could dampen the appetite of these companies to deploy significant capital in comparatively risky floating technology. It is also the case that floating technology will, of course, compete with other technologies (not least, fixed foundation offshore wind) for the capital of those oil & gas companies looking to "go green".

There is also the risk that, even if the floating industry achieves the deep cost reductions required, further innovation in fixed foundation technology could enable economic deployment of fixed turbines in ever deeper waters, thereby undercutting floating's primary advantage in certain markets, thus reducing sponsor appetite.

Will a debt financing market evolve?

A 'bankable' floating wind project on a commercial scale is an unknown quantity at this stage, but the fixed foundation offshore wind market should provide an obvious reference point for the sector, given the similarities in the respective development phases (and the comparable technologies should ease the learning curve). In order to achieve a bankable, lender-supported project with non-recourse debt, certain minimum features and mitigants will likely be required, which include:

- power purchase arrangements providing a long-term and stable route to market;
- a stable regulatory environment; and
- developers with a proven track-record deploying proven technology together with appropriate O&M arrangements, supported by robust performance warranties and "lock-in" periods to ensure those developers maintain skin-in-the-game during at-risk phases.

It will be interesting to see whether (and when) floating projects will be able to achieve construction-phase, non-recourse project financing in the same way as we have seen in recent years for fixed foundation projects. As far as the floating offshore wind market is concerned, substantial construction phase non-recourse debt is likely to be some way off. We would expect the first large scale construction phase, non-recourse financing of a floating project would reach financial close towards the end of the construction phase (with the construction risk having been substantially mitigated). It may also be that, depending on the amount of funding required, timing of construction and the identity of the developer involved, support in the form of a delivery guarantee and/or EPC style wrap may be needed from the relevant developer in order to widen the pool of debt investors and achieve the right pricing. In due course, or perhaps in the case of developers with a good proven track record of delivering fixed foundation projects on time and on budget, it may be that lenders could also get comfortable with a construction management model.

There are already some encouraging signs in the market and it will be interesting to see how things develop over the next year. By way of example, it was recently announced that ACS Cobra Instalaciones y Servicios has achieved financial close on the 50MW Kincardine floating offshore wind farm, to be built south east of Aberdeen, and which we understand involved a £380 million debt package arranged as a short-term bridge loan co-written by three established relationship banks (and then a syndication down to six other banks). The project is expected to be operational before the end of 2020 (with six turbines) and has been awarded a Certified Climate Bond by the Climate Bonds Initiative.

Will there be suitable regulatory frameworks?

To attract the scale of sponsor and lender investment required, the industry will require significant subsidies and most likely for a potentially extended period of time – at a time when subsidies for fixed foundation projects in some jurisdictions are significantly reducing or, in some cases, are no longer required. Will governments emerging from the economic havoc wreaked by COVID-19 be prepared to adopt a regulatory framework which provides that support (particularly as there will be other green technologies (e.g., carbon capture and storage) competing for government support)?

There have been some encouraging recent signs from regulators. For example, in the UK, the Department for Business, Energy & Industrial Strategy has recently proposed via consultation that floating offshore wind be defined as a new technology type under the CfD regime, which would enable it to set out a different administrative strike price for floating offshore wind, essentially meaning the formation of a specific subsidy for the sector.

Conclusion

The debate should not be about the merits of fixed foundations over floating and vice-versa. To achieve Net Zero, there will need to be a massive global deployment of offshore wind, which will necessitate the deployment of floating projects to complement fixed foundation projects, which will surely remain the predominant source of offshore wind.

As we have highlighted above, significant challenges remain to commercialise and up-scale floating wind. All eyes now turn to the latest pilot projects deploying the mega-turbines required to achieve scale, and to governments to develop regulatory frameworks to enable the industry to achieve the requisite scale and cost reductions. However, with recent momentum and the support expressed for the sector by utilities, oil & gas companies and regulators alike, the narrative for the success of the floating wind market is compelling.

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