Hywind Scotland has already taken offshore wind into the commercial arena Photo: Øyvind Gravås/Woldcam - Statoil ASA

'Floating wind will be cheaper than bottom-fixed: wait and see'

OPINION | Floating wind may be behind fixed-bottom offshore's cost curve now, but that will change, writes Trond Landbo

by **Trond Landbo** 02 November 2017

After 25 years of offshore wind the cost is about to become competitive with other mainstream energy sources, and commercially viable without subsidies.

Over the last five years the cost of bottom-fixed wind farms has been cut to less than half through the development of new technology and streamlined industrialisation.

Large-scale floating wind has only been around for less than 10 years and still there are very few wind turbines floating around. It cannot take advantage of going gradually from zero water depth and hence the hurdle in many ways is greater than for bottom-fixed.

Offshore floating wind is at a very early stage of development and all projects are pilots or non-commercial demonstration projects.

So naturally enough the cost of floating wind is today higher than bottom fixed. But will that be the case also in the future? Many parameters can help floating wind to outperform bottom fixed in the future.

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First of all, 60-80% of the worlds offshore wind resources are in water depths suitable for floating wind, and typically there are better wind resources in deep water than shallow water.

Second, there are large areas of the inhabited world that have no suitable sites for bottom-fixed offshore wind – these countries will need wind energy and hence a demand for floating wind will be created.

Third, floating substructures can be standardised to a much greater extent than bottom-fixed substructures as they are connected to the seabed through a mooring system and not directly dependant on water-depth and soil conditions. This means that all substructures in a floating windfarm can be identical and even standardised for different wind turbine models and environmental conditions, whereas bottom-fixed substructures will always vary in design, even within one windfarm.

Lastly, "soft moored" floating wind turbines – able to float stable during assembly and transportation just like they do when operating offshore – have a much greater potential for full assembly inshore in protected waters, and even at quayside, than bottom-fixed wind turbines.

This final point is very important, in particular for future offshore wind. Over the last 10 years the wind turbines has grown in size, from 3-4MW to 9MW. And with all top-tier wind turbine manufacturers now developing 10MW-plus machines, and many with 15MW models in future-planning.

In this picture, the aspect of assembly and installation becomes especially significant. How can a 15MW bottom-fixed wind turbine be assembled in harsh offshore conditions? Such operations will require all new installation tools and methods – which will hamper further cost reduction in conventional offshore wind. But if the full assembly can take place at the quayside, using land based equipment only as we will be able to do with floating units, then the industry will have a chance for still greater cost-control.

‘Floating wind is racing towards commercial viability’

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Floating wind turbines with shallow-draft, such as semisubmersibles and barges, can today be fully assembled at quayside by using a land crane to lift install the tower, nacelle and rotor-hub. The floater can even be grounded during these lifting operations to avoid any movements when wind turbine parts are installed.

In the future this inshore assembly is the only critical operation which has to be adapted to the larger wind turbines. So for floating wind units only small modifications to already established methods are needed.

This is in sharp contrast to bottom-fixed wind turbines that are typically installed offshore in several heavy-lift operations. In order to install a future 15MW wind turbine on a bottom-fixed substructure a wholly new approach both inshore and offshore will be called for.

Given that wind turbines will continue to grow in size, and that the industry manages to develop new and better mooring systems, there is a great chance that floating offshore wind will be the preferred solution in the future. This is in contradiction to what most people are thinking; that cost of floating wind is more sensitive for turbine size than bottom fixed wind. Just wait and see.

Trond Landbo is renewable energy business manager at Norwegian engineering group Dr.techn.Olav Olsen, a North Sea oil & gas engineering company now developing the OO-Star Wind Floater, a concrete floating wind power design now moving into scale tank tests under the EU's Life50+ technology acceleration programme