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Offshore wind: the power source that could blow all other power sources away just on its own

As offshore wind technology fully blooms as its own distinct mass industrial technology producing power at low prices, and as the prospect of floating wind turbines comes closer, the potential for the technology threatens to eclipse everything else - at least in countries with a large waterline, such as the UK.

In reality solar pv technology costs are coming down at least as quickly, so that what is likely to happen in the coming years is that these two technologies will compete with each other (and onshore wind of course) for market share. Indeed such is the rate of cost reductions that some are now suggesting that the way to approach 100 per cent renewables targets is to minimise the use of batteries and other storage techniques, and simply to build gross overcapacity in wind and solar. That of course ushers in the possibility of uses for excess production, such as conversion to hydrogen, but that is another story.

The story here is that **on its own the economic potential offshore wind available could generate over three times the anticipated total energy requirements for the UK in a 'net zero carbon' scenario**. That is, based upon the idea that the UK energy economy, based on electricity sources would require around 1050 TWh of annual power generation in 2050 (based on projections made by the Centre for Alternative Technology). Wind power could do this as the cheapest electricity source available - apart from solar power of course, with which the competition will probably be intense in the future.

BVG Associates, in collaboration with Wind Europe did a study two years ago of offshore wind potential in North Europe alone. It concluded that just on the basis of the North European exclusive economic zones (EEZ) (excluding Norway's EEZ) offshore wind could generate over 10,000 TWh a year - that's actually rather more than three times the current total of EU electricity consumption. Much of this potential resides in British waters. The International Energy Agency did a study last year which came to broadly similar conclusions.

The development of floating wind turbines would be important to realise this for approaching half this potential - they are not yet as developed as the monopole or jacket based 'fixed' machines that are mostly used at the moment. But even here optimisation is being achieved quickly, with Equinor recently announcing a project near the Canaries with a capital cost that has dropped quickly, traveling towards the levels at which fixed offshore is at the moment. Rapid advances in improving turbine efficiency mean that even the criteria used by BVG Associates is being surpassed with the latest machines such as the 12 MW GE machine which, says GE, boasts a capacity factor of 63%.

Costs for the fixed offshore windfarms continues to plunge downwards, with the latest contract prices dropping well below below £50 per MWh for the Dunkirk offshore windfarm granted by the French authorities as well as British offshore windfarms such as the massive projects to be built at Dogger Bank. These prices are very competitive with even power from gas fired power plant. Sceptics who say that such prices should be taken with a pinch of salt are being confounded by preparation for the commissioning of such projects, the first of these approx £50 per MWh schemes being the Danish Kriegers Flak scheme which is being installed as we speak (contract awarded in 2016).

The latest British offshore wind auction, which took place last September, produced contracts with prices of £40 per MWh. That is to be compared with the price awarded to EDF to build the Hinkley C nuclear power project. This amounts to £92.50 per MWh to be paid over 35 years from the time the plant starts generating (whenever that will be given the delays in construction).

Of course, the onward march of the offshore windfarms won't happen very quickly unless Government issues enough long term power purchase agreements, which they call 'contracts for difference' (CfDs)

David Toke, February 2020