WINDS OF

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The Northwest's offshore wind farms generate more than just electricity – jobs and carbon cutting are also part of the deal.

Words Mark Hillsdon

Photographs Dan Towers/British Wind Energy Association

FORTUNE

Late last year the UK eased past Denmark to become the world's largest producer of offshore wind energy. On the face of it, an impressive claim, but advocates of renewable energy certainly aren't getting carried away.

There are currently just six active wind farms off the British coast, which together can muster less than 150 turbines between them, some way short of the 7,000 that experts believe are needed to meet the government's 2020 target of 33 gigawatts of offshore wind energy.

However, with bids to develop a whole new generation of wind farms now lodged with the Crown Estate, and the recent introduction of a series of government initiatives aimed at easing the planning process and making wind energy more attractive to utility companies, the UK is on the verge of a massive expansion of its offshore wind farms.

Britain is perfectly positioned to take advantage of wind power. "When you look at the resources of this country, one thing we're blessed with is ample quantities of wind, particularly offshore," says Nick Medic, communications manager at the British Wind Energy Association (BWEA).

"It makes sense for us to invest in developing wind... If we try and go down different routes, such as biofuels, we might be limited by our geographical and natural resources."

The shallow waters around Britain's coast make it cheaper and easier to install the 100m high turbines needed to take advantage of winds that can gust at over 200mph.

Offshore wind farms are also able to harness 'clean wind' that hasn't had to negotiate trees, mountains and buildings, making them more efficient than their land-based cousins. And the fact that Europe is so densely populated, with land at such a premium, also gives offshore wind farms an edge.

The decision about where at sea to site them is based on factors such as shipping lanes, fishing grounds and raw materials extraction. The MOD and environmental groups also have their say.

"It's a busy, busy sea out there," says Mike Hay, the Carbon Trust's technology accelerator manager. "The first thing you should do as a developer is engage with these people and make sure you're working with them, that's the only way you can get things done. The last thing you want to do is go out there and think it's going to be easier through the planning system because there are less people; it just doesn't work that way."

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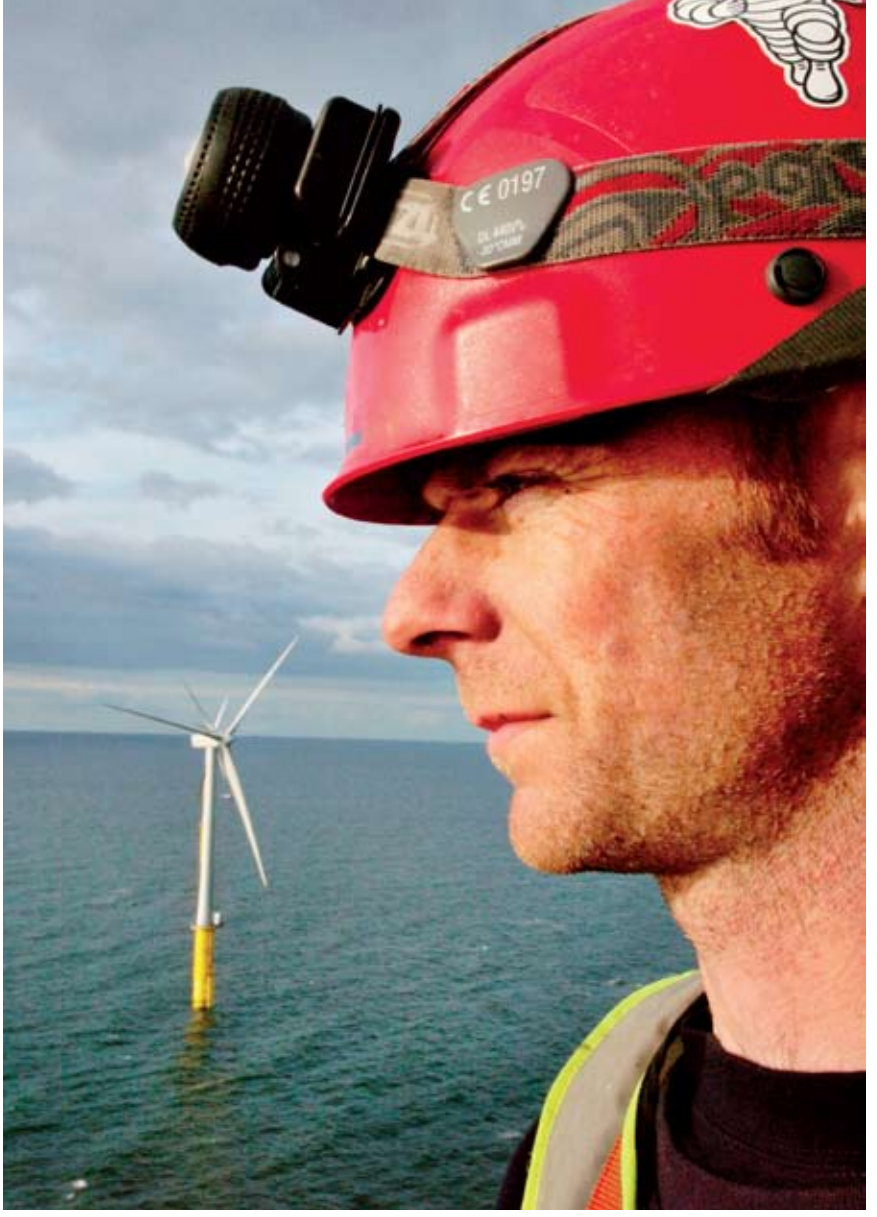

The government first began exploring the possibilities of our windy coastal waters in 2000 when the Crown Estate, which manages the seabed in British coastal waters, announced the result of the first of three phases of building. Ten wind farms, with between 20–30 turbines each, were given the go-ahead, four of which were off the northwest coast. They included the UK's first major offshore installation at North Hoyle, as well as Burbo Bank, Barrow and Rhyl Flats, which is still under construction.

By 2020, 15 per cent of UK energy must come from renewables, and with tidal and wave power still some ten years behind wind technology, it looks as if turbines hold the key to cutting carbon emissions.

Currently, electricity from wind is fed into the grid and used along with other sources, but as its contribution grows and reaches 20–30 per cent, it will have to be balanced in relation to these other sources. Put simply, the proposal is that when the wind blows, the UK's fossil-fuelled generators will be turned down and their output replaced by green energy. This will require a more flexible electricity generating network, but will, as Medic puts it: "take fossils fuels out of the economy."

For this to be truly effective, he continues: "you will also need to have lots of them [wind farms] all over the country, and when the wind isn't blowing somewhere it will be compensated for by energy coming onto the grid from somewhere else. There are also proposals for trans-European renewable energy 'super-grids' which would balance supply and demand across the continent. The Northwest coast could become an important hub of this network."

Phase two of the UK's wind farm building programme will go some way to making this happen and the Crown Estate has recently announced the location of 14 new sites. The majority are set to harness the Artic winds that howl down England's east coast, but three are also planned for the Irish Sea, including the biggest ever built.

Two will be located off the Cumbrian coast. The first, eight miles out to sea near Walney Island, will boast 139 turbines up to 180m high, and will be capable of generating enough power for 370,000 homes. A second smaller array of 30 turbines is planned closer to the Walney coast.

But both will be dwarfed by Gwynt-y-Mor, eight miles off the North Wales coast, where up to 250 turbines are set to provide enough green electricity to power the equivalent of 680,000 homes. Work starts in 2011.

The unlikely epicentre for much of this construction work is Mostyn Docks, on the Dee Estuary. This ancient port dates back to the early 1600s when, ironically, its main cargo was coal. Now its wide open spaces are perfect for assembling the turbines before they're loaded on to the huge crane barges, some the size of football pitches, and taken out to sea.

The work has given the docks a new lease of life, as well as creating local jobs, explains Jim O'Toole, the dock's managing director.

"These crane barges that they use are big, ungainly beasts," he says. "They need an open quay with plenty of space behind it, and we've got 40 acres."

O'Toole saw the potential for the docks to play a key role in wind farm development at an early stage, and deliberately resisted the urge to build warehouses on the quayside.

Much of the assembly work has been carried out by local people who have been trained up and re-skilled, says O'Toole. The docks are also the base for a permanent maintenance team of 15 people who remotely monitor the North Hoyle wind farm. "They can literally sit in the office and monitor the temperature of a bearing on any given machine," he adds.

The docks will soon be gearing up to help in the construction of Gwynt-y-Mor, a wind farm that, like so many others, has its detractors.

A vociferous Save our Scenery campaign has now sprung up in Llandudno, amid claims that the view from the promenade will be ruined, along with the town's tourist trade. But even putting aside the obvious environmental benefits of reducing carbon emissions, O'Toole believes the economic payback of wind farms alone makes them worthwhile.

"The amount of activity they bring to the local economy is very significant, certainly on the construction side. Most of the equipment and the manpower that they've used has been local," he

Gwynt-y-Mor's 250 turbines will provide enough

The scale of the new developments could kick-start an industry to rival North Sea oil and gas in the 1970s.

THE IMPRESSIVE ARRAY OF THE 60MW NORTH HOYLE OFFSHORE WIND FARM, THE UK'S FIRST EVER OFFSHORE WIND FARM, NOW OPERATED BY NPOWER RENEWABLES.

says. "I'm not so sure that people take that into account."

The Carbon Trust has estimated that by 2020, offshore wind could have created 70,000 jobs and generated as much as £8 billion for the economy each year.

In fact Hay believes that the scale of these new developments could kick-start an industry to rival the economic benefits brought by North Sea oil and gas in the 1970s.

Medic talks of an 'energising jolt' throughout the economy that will provide work for all sorts of different companies in the supply chain. "It's a win, win, win scenario," he says.

However to achieve these figures the UK needs to develop a base for manufacturing the turbines, not simply assembling them – a fact that's not lost on Joe Flanagan, head of energy at the Northwest Regional Development Agency.

"We are working to try to improve the financial benefits [of wind farms] but the bottom line is that all those wind turbines are made in Germany or Denmark," he says. "We want to try and attract one of these Danish or German companies to do more of their work in the UK, so we're in discussions with some of them about setting up a base in Barrow or possibly on Merseyside."

To do this, says Hay, we need to create the conditions that are going to attract foreign investment. "There's not enough confidence in [the market] for those companies to come over and put in the millions of pounds that are required to build new factories," he says. "But it's getting there – everything is lining up quite nicely, and I think you'll see, over the next year, things falling into place."

Crucial to this is the third round of building work. By the end of the year, the Crown Estate will have awarded

green electricity to power 680,000 homes.

contracts for wind farms in nine huge new zones, including the Irish Sea. The size and complexity of wind farms have increased with each phase of building and this final round offers developers the chance to draw on all their past experience to develop a new generation of more efficient, more powerful wind farms.

"It's a very positive move," says Hay. "The idea is that by providing such scale, developers will be able to take more risks, build bigger projects, cut costs further and drive forward innovation."

The Carbon Trust has also created a consortium with five international energy companies to help share the costs and risks of developing the new technology that developers of these new mega-projects will need. And this may also encourage more of them to take up the challenge of building wind farms out at sea rather than concentrating all their efforts onshore.

The government is also boosting demand for green energy with a new 50 per cent subsidy on power produced by offshore wind. Part of the Renewables Obligations Initiative, it is designed to encourage a greater take up by the utilities. "It makes utilities and power providers more incentivised to look for offshore wind, and that helps the market develop," says Hay.

More controversially, the government's new planning bill will create the Infrastructure Planning Committee, a body that will take decisions on large infrastructure projects, such as airports, nuclear power stations and wind farms.

Some green campaigners are up in arms that the new quango will simply by-pass future public enquiries. But Hay believes that with many of our existing power plants, whether gas, coal or nuclear, due to be decommissioned over the next decade, this is an important way of ensuring that what comes through the pipeline next is carbon-free power.

"It will take decisions that are pretty tough and controversial but take them quickly in order to give security to developers. Whether they get a positive answer or not, at least they know quickly rather than spending money and letting things drag on," says Hay.

So far the capital costs of building wind farms have been met by the industry itself, with no government subsidies. "It's an industry that stands entirely on its own two feet," says Medic.

"We're now in a situation where we are rushing to meet these 2020 targets [for carbon reductions] and we can see that the credit crunch is really biting," he continues, adding that he hopes the government will now do all it can to support the nascent industry and ensure that funds are available to finish all the current projects.

And there's one final, often over-looked factor, which could make sure the government does just that – wind is free.

"Once you've built the installation you're tapping into a free source of energy," he says. "With renewable energy you know where your price of fuel is going to be in ten years time – it's going to be zero, just like today. So you can build an energy supply that you can predict."

Hay agrees: "We've got the skills base, the ports, the seabed conditions, the wind. We have everything in place to be able to do this."