



The UK offshore wind power programme: A sea-change in UK energy policy?

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ABSTRACT

The British offshore windfarm programme presages the emergence of Britain as more of a leader than a laggard in renewables, the latter being the status it has hitherto endured in comparison to countries such as Denmark, Germany and Spain. Britain looks increasingly likely to exceed 20% of electricity being supplied from renewable energy by 2020, provided there continues to be adequate financial incentives for renewable energy. This turnaround is associated with increased British concerns about energy dependence on imported natural gas as well as pressure from EU legislation. However there are many planning pressures that countervail the drive for offshore wind power. British planning policy on offshore wind is distinctive (compared to other EU states) for its pragmatic, 'criteria based', approach that appears to favour offshore wind power development. The extent of the British offshore wind power programme is likely to depend heavily on consumer reactions to price increases caused by the offshore wind power programme.

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1. Introduction

The UK has threatened to be an industrial innovator in offshore renewables for many years. This paper examines how far this programme is working and how the programme is negotiating the various (sometimes literal) sandbanks, both financial and planning, the latter being the biggest focus of this paper. Since the appeal of the programme has been based stereotypically on a perception of how offshore wind power avoids many planning problems experienced with the onshore programme, this study will spend some time doing a comparison with onshore wind power. Given that economic issues are involved in judgements about renewable energy policy, there will be some analysis of the UK system of financial incentives for offshore wind, although a detailed analysis of costs of offshore wind is undertaken in this special section by Green and Vasilakos (forthcoming).

This is an important study for three reasons. The first is that offshore wind power is emerging as an important (sub) renewable technology with its own policy considerations which need to be analysed. The second is that the UK is now clearly the leading country in its deployment, and likely to remain so for some years to come. The third reason is that a study into British offshore wind power planning issues may help other countries that are in earlier stages of offshore wind programmes.

The following research questions are addressed:

- What is the scope and context of the programme?
- What are the main planning and financial opportunities and challenges facing the programme?
- What are the similarities and differences with policy issues surrounding the onshore wind programme?
- What does this case study say about the distinctiveness of British renewable energy approaches?

This paper is constructed by having an explanation of the UK wind power programme to date and the UK policy context; then a section that discusses a method used to analyse the policies; then there will be a discussion of the policy issues. This will focus mainly on the planning issues, although there will also be a section on the funding issues. In doing this references will be made to relevant aspects of onshore wind power policy for comparison purposes.

2. Expansion of UK wind power

Altogether, at the end of July 2010, around 1200 MW of offshore wind power was generating electricity in the UK, making it the country with the largest portfolio of offshore wind projects. The UK's offshore wind programme began in earnest in April 2001 with the award of 13 leases to prospective offshore wind power to develop proposals for offshore windfarms (initially of no more than 30 machines each). These 'Round 1' schemes had a total capacity of approaching 1500 MWe, of which just over 1000 MWe has been constructed to date. A 'Round 2' tranche of projects was

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announced, and leases were awarded for development in 2003. These involved a planned 7.2 GW of capacity, and the first turbines from this tranche came on line in the summer of 2010. At the end of 2007, the UK Government announced a 'Round 3' of offshore development, which amounted, in early 2010, to the issue of leases for 31.8 GW of offshore windfarms. Soon after then 6.4 GW worth of leases were issued for development of offshore windfarms in Scottish waters and a further 2 GW of projects were signalled as extensions to Round 1 and 2 projects (TCE, 2010). In 2010 a further (second) Strategic Environmental Assessment (SEA) for offshore energy was announced, which signals the way for more offshore windfarm leases to be issued (DECC, 2010b).

The extensive size of this programme needs to be emphasised. If completed it would exceed the French nuclear construction programme of the 1970s and 1980s in capacity. The 48 GWe of offshore wind power capacity involved in the tranches published by the Government so far would generate around 44% of UK electricity demand, assuming the 35% capacity factor that was achieved for offshore wind in 2008 (DECC, 2009a, Table 7.4) and 336 TWh (28.9 MTOE) of UK electricity demand projected by DECC for 2020 (DECC, 2010a). Added to the likely onshore wind power installation this would mean well over 50% of electricity could, in theory, be generated from wind power alone if all these capacities were installed. The Government's intentions to have this all done by 2020 are widely regarded as being rather optimistic, but even if it took a few years longer this would represent a sea-change in the mode of UK electricity production.

If, as argued in this paper, the planning barriers to such a programme are likely to be overcome, then the main barrier to the achievement of such a target is financial. As also argued below, barring unforeseen declines in the costs of offshore windfarms and 2010 UK electricity prices, providing, for example, 30% of UK electricity from wind power would raise UK electricity prices to the domestic consumer by 17%.

As can be seen in Table 1 there are many projects in the pipeline, and making assumptions that 50% of the onshore projects are currently in planning and that 75% of the consented projects (75% of the offshore windfarms in planning) will actually be built, then it is likely that there will be over 17 GW operating by the end of 2017 generating over 11% of UK electricity. With more projects coming on line at a more rapid rate by 2020 it is also likely (assuming a continuation of the current level of incentives) that at least 15% of UK electricity will be generated by wind power by the end of 2020. Together with other renewable energy sources (which in 2010 supplied over 3% of UK electricity), a 20% by 2020 target looks likely to be achieved, indeed overshot. These calculations are based on Government projections for future UK electricity consumption (DECC, 2010a).

In theory there are immense resources for offshore windfarms within the UK's extended waters. Under UNCLOS countries are entitled to make use of water up to 200 miles from land or midway in waters which are less than 400 miles from another states' borders. The National Grid Company, which is responsible for maintaining the grid infrastructure and which also has responsibility for security of supply, is confident that at least

the first 40 GWe of offshore wind (generating around 30% of UK electricity supply) can be managed by the system (interview with Julian Leslie, National Grid Electricity Customer Services Manager, 18/08/2010). The National Grid has a programme to develop an offshore grid to facilitate this development (National Grid, 2010).

3. Methods

This paper adopts an interest-oriented analysis, that is, to examine the different interest groups and associations with policy outcomes. Much research on wind power issues has been focussed on a debate about and around 'Nimbyism' or at least local public perceptions of windfarm schemes (Devine-Wright and Heath, forthcoming; Devine-Wright, 2009; Wolsink 2000; Bell et al., 2005; Haggett, 2008). Other work has focussed on how particular interests or attitudes of selected institutions are associated with or affected by planning outcomes (Toke, 2005; Gray et al., 2005). However, so far such interest-based work has focused either on onshore windfarms or mainly on one interest group (fishing in the case of Gray et al. (2005))—but not on offshore windfarms. What is done here is, in addition to analysis of development of the policy programme, to examine how interest groups have been involved in different venues of influence. The main focus will be to look at the arena of the strategic environmental assessment rather than individual case studies of projects since it is at the level of strategy that many key decisions about offshore wind are taken. The analysis will begin with a brief account of the developing national policy context.

4. Policy change and context

The history of British renewable energy policy has been analysed as one of timidity and poor performance compared with countries leading in the field of renewable energy development (Mitchell and Connor, 2004, Mitchell et al., 2006). The first UK renewable programmes were small and this was followed by the Renewables Obligation which was widely felt to offer too little financial long term security and insufficiently high incentives for much investment to occur in offshore wind. Yet the acceleration of the British offshore wind power programme presages a reversal of this lacklustre record. The announcement of very large capacities of leases for offshore wind coincides with shifts in policies in different aspects of renewables policies. Arguably, the UK (at least in the last few years) made some innovative policies in support of renewable energy development.

4.1. Policy innovation

British policy has

- Strengthened the onshore wind power planning regime. A planning policy guidance note, PPG22 (ODPM, 2004), gave firm guidance to local authorities in support of renewable energy. This forbade the local planning authorities from declaring 'no go' planning zones for windfarms and established a 'criteria based' evaluation of proposed projects. This encouraged developers to appeal directly to the Government if local authorities rejected planning applications and increased the rate of successful planning appeals. This 'criteria-based' approach established a pattern for offshore wind power planning.
- Expanded the Renewables Obligation (RO)—the RO was first expanded to 20% of electricity by 2020 (DTI, 2006). Then powers were given to government ministers to extend the RO target upwards to suit the needs of deployment of renewable

Table 1
Wind power capacity – operating, under construction and in planning (MW) – July 2010.

Source: RenewableUK (2010) and inspection of project websites

	Operating	Under construction	Consented	In planning
Onshore wind	3500	950	4100	7750
Offshore wind	1200	1250	2530	1920
Total	4700	2450	6630	9670

energy, with an aspiration of supplying 30% of electricity from renewables by 2020 (DECC, 2009b, p. 13). This expansion was done in the context of the EU Renewable Directive, which set a UK target of supplying 15% of its final energy by 2020 from renewable energy.

- Increased incentives for offshore wind and other technologies. The RO was initially designed to give a single level of incentive for all RES-E on the basis that (in the words of the then cabinet minister responsible) 'it is no longer Government's job to pick winners or to introduce artificial distortions into the market-place' (DTI, 2000, p. 3). However this strategy was changed in 2008 after it emerged that technologies like offshore wind power could not be implemented in sufficiently large volumes with the previous policy (Toke, 2010). Different technologies were given different incentives within the RO. In 2008 the Government decided to give 1.5 renewable obligation certificates (ROCs) for offshore wind power (as opposed to 1.0 for onshore wind power) (DBERR, 2008). In 2009 this was increased to 2 ROCs for offshore wind schemes accredited between 2010 and 2014.
- Introduced feed-in tariffs for smaller renewable energy projects, including solar PV. A system of (by comparative standards) relatively generous funding for a range of renewable energy technologies for projects up to 5 MW was introduced, with feed-in tariffs available from April 2010 (DECC, 2010c).
- Given precedence in marine planning considerations to allocating offshore windfarm leasing areas ahead of other considerations, including allocating Natura 2000 conservation sites. This will be discussed more later.
- Shifted, overall, away from 'market based' towards more interventionist tools to give more precise support for particular renewable energy technologies, with appropriate support for offshore wind power as a particular priority.

4.2. Policy context

One major influence during recent years has been the prospect of what has become the 2009 EU Renewable Directive with its ambitious target of deriving 20% of all EU final energy from renewables by 2020 (15% in the UK's case). This would require something of the order of 40% of UK electricity from renewables. In addition the increase in energy prices from 2004 onwards, leading to the oil crisis of 2008, was also influential on the UK energy policy setting. This acted as a powerful driver for renewable energy sources which were seen now as plausible. These factors also influenced other EU states.

What was a distinct change for the UK is the growing realisation of, and worry about, increase in energy dependence. For years various analysts and self-interested non-fossil energy lobbies had been warning about the run down in UK gas supplies. Indeed much of the UK's reduction in carbon dioxide emissions since 1990 had been achieved by the replacement of coal-fired generation with combined cycle gas turbines (CCGTs). However UK North Sea gas production 'peaked' soon after 2000 and since 2005 the UK has become a net importer of natural gas. Gas production is running down rapidly. This coincided with the oil crisis and knock-on increases in natural gas prices, and also UK's market oriented system of buying natural gas. Hence UK's industrial, commercial and domestic consumers were subjected to especially volatile increases in electricity and gas prices.

The 'Eurobarometer' survey of EU public opinion shows how energy rose up the UK political agenda even faster than in most other EU countries. By 2008 some 19% of British people identified

energy as one of the two most important issues facing them. Indeed energy came third as the most important policy area of all. What is especially interesting is that energy became more important for the UK people than any other nation in the EU with the exception of Malta (EU Eurobarometer, 2006–2010).

The UK Government has responded to this changed public mood by reversing some of the 'market oriented' approach that had been archtypical of British energy policy since the 1980s. The Department of Energy had been abolished in 1992 following the privatisation of the gas and electricity industries, but it was re-invented in 2008 in the guise of the Department of Energy and Climate Change (DECC). The new energy ministers sought to push the levers in the direction of more control from the centre in favour of what they called 'an energy revolution' that included offshore wind power at its heart.

At the end of March 2009 the UK's Energy Minister of State, Mike O'Brien, addressing a hall full of company executives involved in the offshore wind industry said: 'We need to bring about a revolution in the way energy is produced ... Imagine you are pin-striped revolutionaries in the spirit of Che Guevara on the Sierra Madre' (O'Brien, 2009).

In a later interview O'Brien said in relation to the energy regulator, the Office of Gas and Electricity Management (OFGEM):

Both Ed (Miliband, the Secretary of State) and I were much more interventionist in terms of approach. We took the view that in order to ensure that we were able to make an energy revolution, that we had to get OFGEM to stop being pedantically market driven (interview with Mike O'Brien, 23rd June 2010).

The drift in public opinion towards seeing energy security as an issue that rose to the top of the political is important, although using the Hood et al. (2001) model it can be argued that what is key to understanding the outcomes of 'risk' regulation issues, is how interest groups mobilise their resources in this context—perhaps mobilising public opinion as a 'resource'. The renewable energy lobby was able to mobilise public concern about perceived energy dependency, and it was also able to use the likely commitments in the (then developing) EU Renewables Directive as a resource to extract policy concessions from the Government. All renewables benefited from this in political terms, but offshore wind power was especially well placed as it offered the prospect of very large resources in a way that avoided the limitations of the onshore wind power resource.

Although, as will be discussed, a number of interest groups are affected and often concerned by the offshore wind programme; it is difficult to find important interest groups that are actively opposed to the programme per se. On the other hand, the offshore wind programme has enthusiastic support from environmental NGOs. Groups such as Greenpeace, the Royal Society for the Protection of Birds (RSPB), Friends of the Earth and the World Wide Fund for Nature (WWF) have been in the forefront of campaigning in support of the practicality of large offshore wind programmes. Renewable interests within the main electricity companies were small in the 1990s, but they have been growing in size and influence, and the British Wind Energy Association (now renamed 'RenewableUK' to take in wave and tidal interests) has rapidly expanded its membership income and staff.

However, the drive towards offshore wind in terms of what would only a few years earlier be seen by the energy industry as wildly ambitious renewables targets has met with some resistance from some electricity majors. EDF, who now own 'British Energy', which owns British nuclear power stations, said that the renewable share of electricity should be limited to 25% of UK electricity. It justifies this by alleging that producing more than

this amount would conflict with nuclear power production (DECC, 2009c).

Nevertheless, the fact even the notion of 25% of electricity from renewables by 2020 commands such widespread support (at least as an aspiration) puts offshore wind, which seems essential for attaining this target in this time period, in a very strong political position. Some companies, including EDF, may see renewables as a competitor to nuclear power in the drive for non-fossil energy supplies, but overall the offshore wind programme is not seen as a major threat to the interests of the energy majors. By and large (and in the offshore sector, almost exclusively) it is the energy majors who are doing the investment in a renewables market where there is a perception that retiring coal fired power stations would otherwise have to be replaced by more fuel (gas) that is sourced from abroad.

Indeed, the political strength of the renewables sector, and in particular the offshore wind sector, in the UK, is now analogous to the political strength of the renewables lobbies in the 1980s and 1990s in Denmark and since the beginning of the 1990s in Spain and Germany. The UK's relative backwardness in the size of its renewables programme is no longer so much because of deficiencies in its renewable funding arrangements, but more because it started later. Construction rates are now comparable to Germany and Spain and could compare with the earlier peak rate of German construction as Round 3 projects come through to completion. The UK is catching up, and in the medium term future a large proportion of this catch-up may be provided by offshore wind. However, as implied already, this depends on the costs and funding and planning arrangements being adequate. Let us look at the issue of funding arrangements.

5. Funding offshore wind power in the UK

The issue of the costs of offshore wind power is being dealt with in detail elsewhere in this special section. Here the focus is on the manner in which offshore wind power is being funded. As was discussed in the earlier section on policy innovation, the move towards making the Renewables Obligation (RO) into a more interventionist device has a lot to do with pressures to produce a renewables funding regime that would fund offshore wind power and also a range of other renewable energy technologies. The path towards doing this for large renewable projects was to 'band' the RO. This means that different technologies receive different numbers of renewable obligation certificates (ROCs), for example, 2 ROCs in the case of offshore windfarms that are currently under construction, while only 1 ROC for onshore windfarms.

The RO works through electricity suppliers needing to possess ROCs in order to avoid having to pay 'buy-out' penalties. Such 'buy-out' penalties are payable for each of the missing, but required, number of ROCs that they are supposed to hold to achieve their obligation to supply renewable energy. The penalties are recycled to the holders of the ROCs, thus giving electricity suppliers an extra incentive to invest in renewable energy. Of course the extra cost of the investment in renewables is passed onto the consumer through higher electricity bills.

Even though extra incentives have been given to different renewable energy technologies, the uncertainty surrounding future income streams continues to be an issue, at least for some. In order to deal with this problem, the UK Government signalled (DBERR, 2008) that it would effectively impose a 'minimum' price for ROCs and ensure sufficient 'headroom' to allow expansion of the renewable obligation target so that ROC prices did not fall. Uncertainty is a little less of a problem for the major electricity companies since they can raise capital on the basis of confidence

in their company strength, something that is usually not possible in the case of independents. The main current and prospective owners of the offshore windfarms are electricity majors such as E.ON, RWE, Scottish Power, Scottish and Southern Electricity and Centrica (and also other multinationals such as DONG, Vattenfall, Siemens and Statkraft).

The ROC price for offshore wind projects being developed in the period until April 2014 is worth 2 ROCs. If the RO target at any one time is around 70% fulfilled, this gives ROC an income of about £100 per MWh, to which can be added the wholesale value of the wind power electricity sales. The value of the sales has varied in any one year in the 2006–2010 period, between around £40 and 80 per MWh (NFPA, 2010), meaning that offshore wind operators may receive anything between £140 and £180 per MWh. This rate is above the rate implied by the equivalent German offshore feed-in tariff of 15 eurocents/KWh, though the extent of this depends on the £/euro exchange rate at the time. However, set against this apparently higher UK tariff is uncertainty about the income stream.

There is still an important argument that says that the cost of supporting offshore wind power would be significantly cheaper for the consumer if it was funded by a feed-in tariff since the developers may swap a slightly lower income stream for guarantees about its future value. Certainly, cost arguments are likely to increase as the size and cost of the renewables programme increase. The Conservative Liberal Coalition Government have stated that: 'We will establish a full system of feed-in tariffs in electricity—as well as the maintenance of banded Renewables Obligation Certificates' (HM Government 2010, p. 16).

Some are interpreting this to mean that there is a possibility of introducing a feed-in tariff for offshore wind. If so this is most likely to be much the same as a German style 'standard' rate rather than one set by a competitive auction of contracts (such as in Denmark). Apart from anything else, The Crown Estates would like a high probability that the projects to whom it has given leases (and invested development funds) are able to proceed and not be rendered uneconomic through a 'bidding' contest.

It is also plausible that a feed-in tariff will be more actively considered for onshore wind as well, and highly likely if, as also seems plausible, cost concerns about the RO increase. Indeed it is something of a testament to the consensus support for the British renewables programme that there has not been more pressure on the RO on account of its alleged expensiveness for the consumer. Part of the background to this is that the anti-wind lobby has a difficult argument to pursue in that while it may criticise onshore wind financing as being expensive, what is seen as the main alternative is offshore wind, which is of course rather more expensive. The arguments of the anti-onshore wind lobby thus can be cast as being anti-renewables in general, which reduces much their force in a context of consensus (all party) support for a strong renewables programme.

It seems likely that (assuming the RO continues as now designed) at least 12 GW of offshore wind and 12 GW of onshore wind will be built under the RO to provide around 20% of electricity from wind power, assuming capacity factors of 28% and 35% for onshore and offshore wind, respectively (using figures from DECC, 2009a). According to OFGEM (2010) the consumer price for electricity was estimated at around £100 per MWh for 2010. Let us assume that the cost of offshore wind declines to something around £120 per MWh and onshore wind to £50 per MWh, and the wholesale electricity price is £40 per MWh. Hence there would be funding subsidies of £80 per MWh for offshore wind and £10 per MWh for onshore wind.

So for 20% of electricity supplied by wind power the cost increase would be just under 10%. This cost rises as the amount of relatively expensive offshore wind power increases, and if 30% of

electricity came from wind power alone, two-thirds from offshore, then the consumer would pay an extra 17% for this over and above a bill of £100 per MWh (ie. £117 per MWh).

This cost does not include the bulk of the necessary grid connection costs which are allocated in the proportion 73:27 to the national grid and the developers, respectively. In fact the exact extra cost to the consumer for grid connection is relatively opaque, not least because the extra cost is included in the other charges on the consumer made by the National Grid, and also because there is doubt over the future cost structure. Hence I do not attempt a calculation of this extra cost which is anyway subject to differing interpretations.

Of course if electricity wholesale prices fall then the proportions of extra cost to the consumer rise accordingly. In this case of falling prices the political pressure for maintaining ambitious renewables targets would hinge more on the strength of support for combating climate change and resistance to alternative non-fossil generation sources in the form of nuclear power. In considering these issues it should be borne in mind that though 30% of UK electricity supply sounds a lot, it is about 5.1% of the final UK energy supply (in 2009), and as such amounts to only half of the UK's target of 15% of energy from renewables by 2020 under the terms of the 2009 EU Renewables Directive.

6. Planning UK offshore windfarms

Offshore wind power planning in the UK has, as stated at the start of this paper, gone forward in what is really five blocks so far. Although 'Rounds 1, 2 and 3' are given as the main elements, the other two tranches being projects in Scottish coastal waters and extensions to Round 1 schemes announce in 2010.

6.1. Similarities and differences with onshore wind planning

As will be discussed, there are some overlapping themes between onshore and offshore wind power planning processes (some that are specific to the UK). There are also some clear differences. Offshore wind power is much more under the control of the central government(s), although an added complication is that some powers are exercised by the devolved governments of Scotland, Wales and Northern Ireland.

On the surface an obvious difference between onshore and offshore wind planning is that in the case of offshore windfarms consent is dispensed centrally with local authorities having no more than a consultative role. In contrast, in the majority of onshore windfarm planning applications, a local authority is the principal planning authority. In fact the planning system does not treat onshore and offshore windfarms very differently.

A lot of the difference in the way that the planning procedure treats onshore and offshore windfarm proposals is to do with the smaller size of (most) of the onshore schemes rather than the planning system *per se*. This is because even onshore proposals for windfarms over 50 MW in size are dealt with by central government. Almost all of the offshore schemes are over 50 MW in size.

At the time of writing the administrative structure is in flux because of changing policies of the new (Conservative-Liberal Democratic) Government, but essentially, offshore wind consents will continue to be administered centrally, with the caveat that the Marine Management Organisation (MMO) will play an increased role. The MMO was set up in the wake of the 2008 Marine and Coastal Access Act and a process of preparing a thoroughgoing system of marine spatial planning (MSP) for the UK is underway. Other countries are more advanced with MSP. According to Jay (2010, p. 496) 'MSP is being advanced the most

vigorously by those nations where interest in offshore wind energy is greatest; indeed, it is one of the explicit intentions of MSP to facilitate the expansion of offshore renewables'. A senior official at the MMO also has the opinion that the prospect of offshore renewables was a, if not 'the' major spur for MSP in the UK (interview with senior official of the MMO 18/08/2010).

There is much more strategic planning assessment of offshore wind power (compared to onshore) through 'Strategic Environmental Assessments' (SEAs). The SEAs follow the tradition adopted for the oil and gas industry; indeed the SEA that coincided with discussion of Round 3 of the offshore wind programme was a combined offshore wind and oil and gas assessment. There have been attempts to set regional renewable energy targets for onshore wind, but delivery on this is beyond the direct means of central government since they do not usually own suitable land.

In fact the biggest element of central control of offshore wind strategy resides not in the planning and consenting procedure itself but in the ownership of the seabed assets. The seabed is owned by a government body, The Crown Estates (TCE). This works closely with the Treasury and follows the contours of Government policy in the way it operates, including in its crucial role in the offshore wind programme in awarding leases in designated areas for windfarm development.

TCE has become involved in the development of offshore windfarms in Round 3. The TCE has not only chosen those bids for development to which it will grant leases, but also it will be a partner in the consortia involving major companies with whom it can work to develop the sites:

Some of Rounds 1 and 2 (projects) were not completed; some developers sat on their licences. We want all 9 (Round 3) zones to be operating. We do not want sell-ons (to other developers). We share development costs (with the developers). We have a centralised system of consents. This helps to de-risk things. We have set out strict guidelines, we do not want people to just sit on licences (interview with senior Crown Estates Officer 25/02/2010).

The issue of leases to companies to develop sites within the leased areas precedes the consenting process for individual sites. Initially, in Round 1 developers had to obtain three separate licences for navigation, coastal protection, and also for an electricity power plant. The system has been consolidated so that consents can be obtained simultaneously under Round 3.

It should be noted at this point that the discussion of 'zones' mentioned by The Crown Estates here refers to areas that are to be leased by The Crown Estate. The Crown Estates, acting as a landlord, will lease different areas at different times (e.g. Rounds 1, 2 and 3 so far), and such leasing (or even areas that are not leased) does not have any meaning in planning law. Hence this use of the term 'zone' should not be confused with planning zones, which are discussed later, although of course developers given leases will later apply for planning consent for their projects.

Although there have been planning controversies surrounding some schemes, only one scheme has so far failed to be consented. This was a proposal to develop Shell Flats off the North West coast; this proposal being withdrawn after concerns about impact on feeding bird populations. Nevertheless the controversies have had a major impact on the shape of the programme, and the way that The Crown Estates have developed succeeding rounds. Round 1 leases were very prescriptive in terms of where exactly the projects should be located, but this has been loosened so that in Round 3 the developers have a large discretion to negotiate with

the various interests so as to select sites within the leasing areas indicating this would minimise key clashes with other interests.

6.2. Planning interests and controversies

Part of the allure for the general public's support for offshore wind power lies in the general impression that there is much less competition for sea resources compared to land. This notion is, to a greater or lesser extent, rather misleading. There are numerous interests in the sea which have to be balanced:

- **Landscape and tourism:** These issues have generated the most controversy since they are not 'hard' constraints in that they are matters of interpretation of aesthetics and tourism impacts. Jay (2008), Haggett (2008) and Devine-Wright and Heath (forthcoming) have, in different ways, studied individual controversies, and this paper will not repeat these studies. However the controversies have much in common with arguments about onshore wind and even sometimes involve similar networks. Implicit in Jay's summaries of the Round 1 project controversies (Jay, 2010, p. 495) is that where opposition occurred it was a mixture of landscape interests, some local conservation interests, local tourist and recreational interests and existing (onshore) anti-windfarm interests that were prominent. Nevertheless a reading of this literature (Jay, 2009, Haggett, 2008, Devine-Wright and Heath, forthcoming, Haggett and Toke, 2006, Toke, 2005) suggests that overall the near-shore offshore windfarm proposals have been no more controversial than proposals for large onshore windfarm schemes and on balance perhaps even less, so on average.
- **Fishing:** Gray et al. (2005) have chronicled claims that fishing interests have been downgraded in the offshore windfarm programme. Fishing interests tend to be especially strong near the shore, but still much in evidence elsewhere. It is impractical for fishing to be done in windfarms because of hazards to fishing nets. The National Fisherman's Federation Organisation (NFFO) is already objecting to one of the proposed Round 3 projects in the Bristol Channel. According to Dale Rodmell of the NFFO 'One of the main reasons for offshore wind development is primarily because there is too much opposition to land based wind energy generation and it affects less people, but we are talking about people's livelihoods that are actually affected, not how nice or ugly these wind turbines are. What is certainly missing from the argument as far as fisheries are concerned is taking into account the important fishing grounds to the coastal communities concerned.' (interview with Dale Rodmell, 16/02/2009). The issue of compensation to fishing is also an issue for the nascent wave power industry (West et al., 2010).
- **Defence and aviation:** The Ministry of Defence (MOD) has concerns about interference with radar and also overflying some areas where there might be windfarms for practice purposes. There is an argument about the extent that such issues may impose 'hard' or 'soft' constraints.
- **Birds and wildlife:** Different flora and fauna have different issues. The biggest concern for birds is interference with feeding sites, while for mammals and fish it may be the disturbance (especially noise) caused by windfarm construction. Recent research suggests that bats may be at a bigger risk of collision with wind turbines than most bird populations (unattributable interview with senior government environmental consultant 11/06/2010). Local wildlife trusts may have concerns about the impact on near coastal projects. However, what is also notable is the strong support for the offshore wind

programme that has emanated from conservation organisation such as the WWF and the RSPB (Langston, 2010).

- **Natura 2000 sites:** These are sites, or proposed sites, for protection under either the EU Birds or Habitats Directive (special protection areas—SPAs or special areas of conservation—SACs). This is put separately to the previous bullet point since some argue (particularly in the UK) that the Natura 2000 sites (which amount often to large planning zones) are not always fit for purpose, as is discussed later. Certainly there are clashes between operational, consented and proposed windfarms and the existing or proposed Natura 2000 sites. Conflicts are more common closer to the coasts, although they also occur farther out to sea.
- **Oil and gas installations:** These are 'hard' constraints in that windfarms cannot co-exist with them, although there are arguments about the amount of separation that is necessary.
- **Dredging:** the voracious appetites of industry and the construction industry for stone, which manifests itself in dredging activities on the seabed, is another hard constraint that excludes windfarms, although like oil and gas it is a question of 'who is there first stays'.
- **Shipping:** Although it may be casually assumed that shipping companies and ferries can alter their routes, they are loathed to incur the extra costs that this involves. The developers of one offshore windfarm, West of Duddon Sands, had to negotiate with shippers about a compensation package. Shipping lanes are especially common around the coasts. The shippers are well-resourced and liable to take legal action if their interests are seriously threatened.
- **Yachting and recreational boating:** These interests have sometimes expressed concern about offshore windfarms, again mainly near the coast.

7. Solutions to controversies?

As can be seen, those projects nearer the shore are likely to evince the greatest number of conflicts with other uses, although this varies considerably between different cases. One academically inspired solution to such controversies was to suggest involving local authorities more in the consenting process, so moving away from a centralised approach (Jay, 2008). A problem with this is that if this led to some proposals being vetoed by local authorities then the developers are likely to go through the planning appeals system, once again engaging the central government. Another issue is that, as mentioned above, the centralised nature of the offshore wind power consenting procedure is in many ways similar to that for large onshore windfarms. It is true that under the offshore windfarms planning procedures local authorities cannot demand a public enquiry, but then the offshore windfarms are not within the boundaries of any of the local authorities. Local planning authorities cannot veto onshore windfarms that are not sited within their own boundaries.

A different approach, and one that seems to be increasingly deployed in other EU states, is simply to bar offshore wind developments from the range of the traditional 12 nautical miles of territorial waters, but this has not been a consistent British practice. Round 1 projects tended to be close to the coast in order to exploit shallow waters in the early phase of the programme. Then Round 2 projects were stipulated to be at least 8–13 km (4–7 nautical miles) from the coast. When the UK Government's Strategic Environmental Assessment (SEA) for offshore energy was conducted in 2008–2009 there was strong pressure from some (especially landscape protection) interest groups to recommend a firm presumption against development within 12 nm of

the coasts (DECC, 2009d). In the end what emerged in the Government's final SEA consultation response recommendations was a typical British 'pragmatic' position. The final Government verdict read:

Reflecting the relative sensitivity of multiple receptors in coastal waters, it is recommended that the bulk of this new generation capacity should be sited away from the coast, generally outside 12 nautical miles (some 22 km). This recommendation is not intended to exclude OWF (offshore windfarms) from this area, since there may be scope for further offshore wind development within this area (DECC, 2009e, p. 116).

There is, indeed, no exclusion in practice, especially since the first 'Scottish' tranche of 6.4 GW of offshore wind leases was announced in early 2010 as being within the 12 nm limit. A fairly small minority of the capacity Round 3 is also earmarked within the 12 nm limit. However, it is clear (as the final Government recommendation says) that the bulk of future offshore wind development will be outside the near-coastal waters. So far, (at the time of writing) out of 26 offshore windfarm projects which have been determined, 24 have been given consent, with just two being withdrawn, one because of concerns about impact on feeding birds and another (off the Irish coast) because of jurisdictional planning uncertainty.

What has been advanced as a governmental practice here is that windfarm siting should, as is the case with onshore schemes, be examined on a 'criteria' basis. This involves study of whether the windfarm meets various standards, mainly environmental and safety criteria, rather than whether the proposed site is on the right or wrong side of what may be an arbitrarily drawn line on a map. Indeed, a criteria based approach is clearly in evidence when it comes to considering offshore windfarms and wildlife protection issues and the distance from the coast.

A still developing source of controversy is over Natura 2000 designated planning zones. As mentioned earlier Governments are obliged (by EU Directives) to designate large areas of the sea either as SPAs (birds) or SACs (habitats). UK based conservation interests, quite apart from windfarm and other developers, question the value of this designation. It certainly differs from traditional British practice of identifying areas that are important to rare, fragile ecosystems or threatened species. A leading UK environmental conservation consultant commented:

The habitats directive is an eclectic mixture drafted by terrestrial experts including exotic items that are not under any particular threat that are designated but there are others that are under threat that are not being protected. An example of an item that does not need so much protection are sandbanks which are a constantly shifting phenomena and although they are important for diving sea ducks e.g. Scoters, I struggle to see any threats to these, for instance by offshore windfarms. The inclusion of this kind of item (sandbanks) in SACs is a bizarre distortion. Various deeper water features which are ignored by the habitats directive are being destroyed and which affect examples such as the bivalve mollusc. They are being destroyed by seabed trawling. This is mentioned by OSPAR but not by the Habitats Directive (unattributable interview with senior marine spatial environmental consultant 11/06/2010).

Prior to Round 2 there was an initial decision (but later reversed), taken by the Government and The Crown Estates, to exclude offshore windfarms from SPAs where the water depth was less than 10 m. This was a compromise since a threatened species of diving duck (misleadingly) called the 'common scoter'

can dive up to 20 m, and ruling out all windfarms up to 20 m depth would eliminate a large proportion of the offshore windfarm resource. However even the 10 m depth exclusion was abandoned. An RSPB spokesperson commented:

This blanket exclusion was found to be unhelpful as it failed to exclude the most important area for common scoter from a proposal for a wind farm which has since been withdrawn (Shell Flats). No similar blanket exclusion (planning) zone has been applied to subsequent offshore wind development rounds, instead cases have been determined on an individual basis, starting at the site selection stage (Personal communication from senior official of the RSPB, 25/06/2010).

Indeed, not only are proposed and operating offshore windfarms sited in SPAs around the Merseyside coast, but also the much projected 1000 MW Thames array project is in a SPA. Unsurprisingly in view of all of this, the Government's SEA recommendations stated that: '[As] part of the Natura 2000 initiative, further offshore SACs and extensions to SPAs are being identified. Such sites are not intended or treated as strict no-go areas for other activities'. (DECC, 2009e, p. 117).

However, this topic may be a subject for both domestic and international disputes. There is controversy (currently) by an attempt by the Government's own Joint Nature Conservation Council (JNCC) to propose that the Dogger Bank (in the middle of the North Sea) to be designated as a SAC. However, the Dogger Bank has been earmarked (and had leases issued) for no less than 9 GW of Round 3 offshore wind power. Yet, there is scientific doubt (from the British Geological Survey) that the Dogger Bank is really a sandbank at all, let alone one that requires a conservation designation. A senior environmental conservation consultant commented:

In a marine spatial planning sense I am concerned that the conservation section of government is making a massive land grab which is not necessary for ecological protection. If you can demonstrate that the construction maintenance or operation will not disrupt important aspects of wildlife e.g. Terns, Scoter, Red Throated Divers etc., then development is reasonable (unattributable interview with senior marine spatial environmental consultant 11/06/2010).

What complicates matters is that the other two countries to have completed MSPs (by summer 2010), Germany and The Netherlands, have specifically excluded offshore windfarm development from Natura 2000 areas. This is partly because these countries designated their nature areas before the windfarm development started, but it also appears that the UK has a more pragmatic approach to interpreting these designations.

There is potential for international disagreement here and even (at least threats of) international litigation at the European Court of Justice. This is because The Netherlands has a Natura 2000 planning zone adjacent to the UK's Dogger Bank Round 3 windfarm lease area (the eastern edge runs along the international sea-use boundary with The Netherlands). The UK Government Department of Energy and Climate Change (DECC) is resisting suggestions that Dutch agencies be given anything resembling a 'veto' over British offshore windfarm developments.

In addition, it is not totally inconceivable that British fishing interest groups could mount legal challenges to alleged windfarm incursions of Natura 2000 sites, though the extent to which this will be supported by dedicated wildlife conservation groups is open to question. Although many will sympathise with disruption and loss of income for fishermen, there is a feeling on the part of many conservation interests that restricting fishing through allocation of windfarm sites will benefit conservation interests,

both in terms of conserving fish resources, and in terms of providing ecological protection for threatened species.

There is no room here to discuss the political philosophy of deliberation, but it is possible to make a brief practical point. A key issue is that the deliberation of offshore wind power issues occurs in a number of different arenas each with their own language and interests. However, thorough and democratic, the deliberative mechanisms may be in any one arena; different arenas will often come up with conflicting demands, and Government has the task of balancing these conflicts to further what can be interpreted as a common democratic good.

If one answers every interest group's demand by giving them an effective veto on development then the development wanted by what (at least among all the main political parties) is a consensus, in this case for a major offshore wind programme, may be frustrated. The offshore wind case is not just a matter of competing demands for 'development' against 'environment' requiring some sort of compromise based on a notion of 'weak' sustainability, it is also a matter of competing environmental demands. The opportunity cost of not putting into practice offshore windfarms may, in practice, be more fossil fuel or nuclear generation leading to more environmental problems associated with these technologies. The solution to these conflicts depends on the value orientation of the 'meta-policy' on offshore windfarms that transcends the various policy networks and venue-based deliberative settings.

What does seem to be the case is that if one presumes in favour of windfarm development, then the British tradition of 'criteria based' planning appraisal of windfarm proposal is the optimum approach. The result is an ongoing series of proposals for offshore windfarms orchestrated by the UK, and also, latterly, the Scottish Government, that would amount to increasingly large proportions of UK electricity supply if implemented. This is as opposed to introducing planning regulations to restrict windfarm siting.

The Carbon Trust's detailed study on the costs of the offshore wind programme suggests that not only could the offshore wind resource be highly circumscribed if all 'hard' and 'soft' constraints are applied to offshore wind development, but the costs of the offshore windfarm programme could be significantly increased. If offshore wind was forced, for example, to be entirely in relatively deeper water, as opposed to shallow (often) near-coastal waters, the resulting levelised electricity costs could be increased by over 20% (Carbon Trust, 2008, pp. 20–23). Given the earlier discussion about a major (perhaps the major) limitation on the future UK offshore wind programme being consumer sensitivity to rising costs, the issues raised by the Carbon Trust cannot be easily dismissed.

8. Conclusion

A clear conclusion from this study is that barring unforeseen circumstances a target of supplying 20% of renewable energy from UK electricity by 2020 seems not only very plausible, but also likely to be achieved. It may be that even in 2020 more of this comes from onshore wind rather than offshore wind, but the contribution of offshore wind is likely to be rising very steeply at around the time of 2020. The main barrier to a continued expansion of the offshore wind programme is consumer sensitivity to increased electricity prices, something which is more likely to be a major issue as the renewable proportion rises above the 20% target rather than below. Although planning issues are procedurally distinct from funding ones, the more offshore wind power is subject to planning constraints of different sorts; the higher the costs of the programme become (Carbon Trust, 2008), which as discussed, may lead to greater consumer opposition to extensions of incentives for more offshore windfarms.

There are some specifically British ways of doing things in the planning sphere that are applied to both onshore wind and offshore wind sectors. One is a preference, at least by the UK Government (though rather less in the case of Wales), for 'criteria' based assessment of individual proposals rather than designating planning zones either for windfarm development or excluding windfarm development. This is rather different from the continental experience where there is a tendency to legislate for planning zones where windfarms can be developed and to explicitly exclude them from elsewhere. This distinction is obscured a little by the fact that The Crown Estates, in effect the UK Government acting as a landlord, decides, on an ongoing ad hoc basis, what areas should be leased to developers. This is not the same thing as setting up planning zones for wind power, as discussed earlier.

In the past the tendency towards 'zoning' (in planning terms) has been seen as part of the continental (e.g. German and Danish) support for onshore wind power, and latterly to be seen in the case of the Dutch and German marine spatial plans with regard to offshore wind power. In fact a practice of 'zoning' for wind power in spatial plans excludes wind power at least as much as it includes it. The British 'criteria based' approach to planning may be more favourable to wind power development in that it does not restrict developers to particular planning zones and exclude them from others.

What makes British context relatively unfavourable to onshore wind power is the pressure of the landscape protection interests against windfarms, especially in England and Wales. Only around 40% of planning applications are successful at a local authority level. However, that proportion rises to over half when planning appeal outcomes (which are assessed on the national policy 'criteria based' approach) are taken into account (Toke, 2005). The criteria based procedures implicit in documents like PPG22 (for British onshore wind power), and, as discussed in this paper, the criteria based approach to British offshore wind power, are more favourable to wind development. That is, as opposed to adherence to planning zones, whether intended for coastal or nature protection 'against' windfarms.

The British approach, both in terms of siting windfarms in near-coastal waters and in SPAs and SACs, is one of pragmatism and consideration on a case-by-case basis rather than a more procedural or ideological approach that is emerging in other states. It is possible that such differences may translate into disputes about projects sited near international boundaries.

Certainly the British offshore windfarm programme enjoys a heady confluence of positive pressures in its favour. It enjoys the inertia provided by British expectations and industrial interests favouring utilisation of its offshore energy resources that began with oil and gas exploitation; it enjoys the timely boost of heightened British concerns about growing energy dependence on imported natural gas, and it also enjoys the enthusiastic support of many important environmental NGOs. Overall, the 'criteria based' approach to planning onshore and offshore wind power is a distinctive British tradition, which acts as a positive asset in the development of the offshore wind programme.

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