# UNITED KINGDOM (Including SCOTLAND)

## MARKET OVERVIEW

The United Kingdom (UK) has one of the best wind regimes in Europe both onshore and offshore. As of 2012 the country had installed a cumulative capacity of 8 445 MW. It has the largest installed offshore wind capacity worldwide, with 2 947.9 MW installed capacity as of 2012. The majority of onshore wind farms in the UK are located in Scotland. The national renewable energy strategy has a target of generating 15% of all its energy from renewables by 2020 (RenewableUK, 2012)[178].

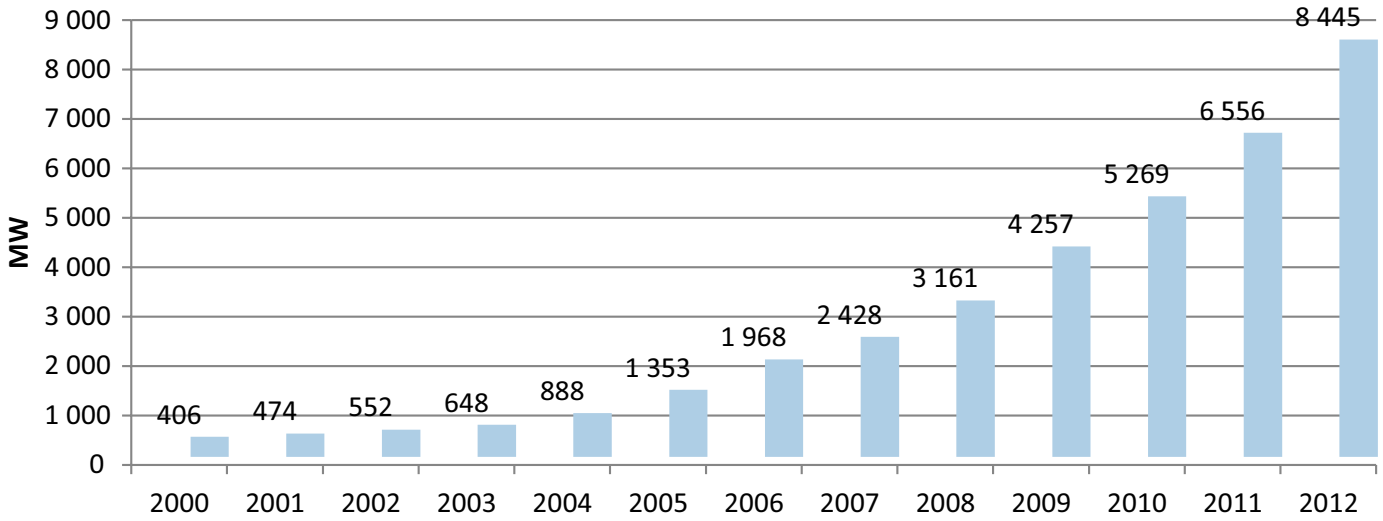


Figure 16: Cumulative Wind Installation (MW) in the UK (GWEC, 2013)

## HISTORY AND EVOLUTION OF POLICY AND REGULATORY FRAMEWORK FOR WIND ENERGY

The UK has long been regarded as one of the best places in Europe for wind energy development.

After a slow start, developments over the last few years indicate that the country has started to realise its wind power potential.

### Phase 1:

#### Electricity sector reform and privatisation (1982-1990)

The development of electricity production from renewable sources in the UK was largely driven by the reform and privatisation of the energy sector in the late 1970s and the 1980s[179]. The erstwhile Central Electricity Generation Board (CEGB) during the mid-1970s and the 1980s was involved in research and demonstration projects for renewable energy technologies. As early as 1980 the CEGB supported the development of several demonstration sites across the UK to promote the commercial use of wind energy (Price, 2006).

In 1982, the Oil and Gas (Enterprise) Act paved the way for the privatisation of British Gas and British Petroleum (BP). This Act set the stage for much of the national privatisation programme[180]. Over the following decade

[178] The UK has one of the highest offshore wind resources in the world with over 33% of the total European potential. The UK now has more than 1.8 GW of wind capacity installed offshore. A further 7.4 GW is under construction, approved, or in planning. The next round of offshore wind farms, Round Three, will add a further 32 GW, bringing the country's total to more than 40 GW before 2030 (RenewableUK, 2012).

[179] The Conservative government elected in 1979 had an unfavourable outlook towards providing subsidies and research grants for renewable energy technologies (Elliott, 2005).

[180] Pre-1990: A single nationalised organisation, the Central Electricity Generating Board (CEGB), was responsible for generating and transmitting the bulk supply of electricity in England and Wales. Post-1990, the CEGB was split into three generation companies: National Power (in 2000 renamed as International Power Plc.), PowerGen, and Nuclear Electric, as well as a single high voltage transmission company, National Grid.

Scroby Sands offshore wind farm, UK ©Ben Alcraft

this process eventually led to a very comprehensive reform of the energy sector (largely in England and Wales).

The 12 regional electricity companies (RECs) responsible for distribution and electricity retailing in the UK were privatised in 1990. This was followed by the privatisation of the two dominant power generation companies in the UK (National Power and PowerGen), which had more than 70% of the market share in 1991 (MacGeorge, n.d.). The privatisation process enabled the progressive entry of Independent Power Producers (IPPs) to the market.

## Phase 2:

### Auctions via the Non-Fossil Fuel Obligation (1990-1998)

The Electricity Act of 1990 provided the first real opportunity to deploy renewable energy in the UK. Under this act, the Non-Fossil Fuel Obligation (NFFO) was proposed in order to provide financial support for nuclear but also for renewable energy[181]. To pay for the NFFO, the Electricity Act of 1990 allowed a fossil fuel levy (FFL) to be raised.

The newly privatised regional electricity companies were obliged to purchase power from both nuclear and renewable energy generators at a premium price. The proceeds from the fossil fuel levy were used to reimburse them for the difference between this premium and the average monthly purchasing price in their regions. Based on this model, the first commercial wind farm in the UK was built at Delabole, Cornwall in 1991.

The Non-Fossil Fuel Obligation remained in place from 1990 to 1998[182]. Several bidding processes took place during this period, with proposals focusing on the best wind sites[183]. The NFFO bidding process focused on getting the lowest price and did not impose penalties on companies who were awarded a site, but did not initiate contracting. Contracts

[181] The definition of non-fossil fuel technologies under the 1990 Act included renewable energy technologies although initial support was directed towards nuclear power plants. The European Commission sanctioned the adoption of the NFFO to support nuclear power only for an eight-year period running between 1990 and 1998. Source: Interview with Dr. Gordon Edge of RenewableUK in September 2011 and in June 2012.

[182] Five NFFO rounds were organised: NFFO-1 (600 MW), NFFO-2 (1 000 MW), NFFO-3 (1 500 MW), NFFO-4 (1 700 MW), NFFO-5 (1 177 MW).

[183] The successful bidders received an allowance of five years to build and commission a project, followed by a 15-year power purchase contract. As all contracts for each round were awarded on the same day, the developers were all working in parallel to one another and to similar time-scales. It became particularly evident with wind projects

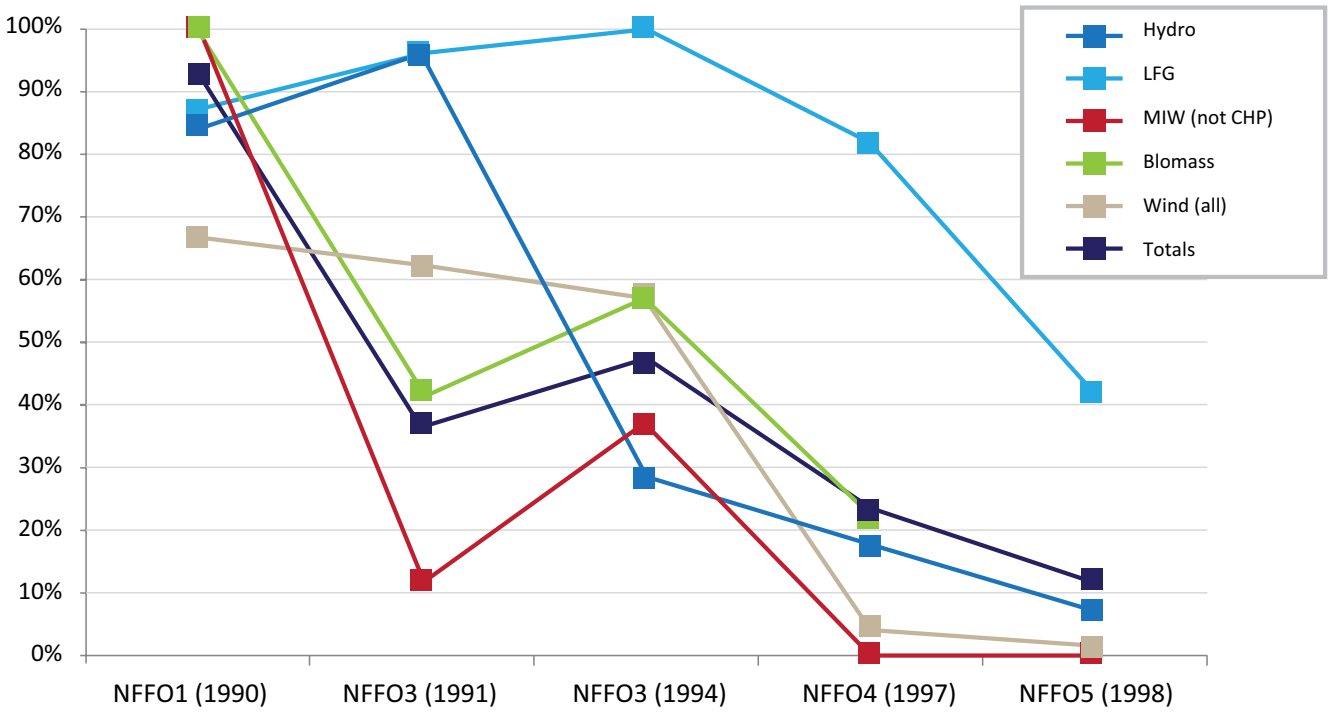


Figure 17: Overall completion rates for NFFO contracts up to 2003 in UK (Mitchell and Peter, 2004; Hartnell, 2003)

were also awarded very early in the development process, before planning permission was even applied for. Many projects failed to receive permission and a proportion of those that received permission were uneconomical due to their extremely low bid prices. As a result, a significant part of the awarded capacity was left unused (RenewableUK, 2012).

When the NFFO mechanism began in 1990, no specific capacity target was set for renewables. When the NFFO-1 contracts were announced, the target was set at 600 MW declared net capacity (DNC[184]).

The payments per kWh for NFFO-1 contracts were agreed between the public authorities and the power producers before the bids were proposed, leaving limited room for competition. Unlike the NFFO-1 contracts, most of the NFFO-2 contracts were for "new" capacity and there was some degree of competition. The declared net capacity for NFFO-2 was for 1 000 MW (Mitchell and Peter, 2004).

The integration of renewable sources into the NFFO-1 and 2 had wide-ranging impacts. The initial rush for setting up wind farms created a high level of anxiety among local communities and a high degree of "push-back" was created towards wind farms. The negative image engendered in the early 1990s continued to be felt into the next decade (Mitchell and Peter, 2004). In 1993, three more rounds of the NFFO were announced. The declared net capacity for NFFO-3 was set at 1 500 MW.

By 1997, the UK's newly constituted Labour government investigated a mechanism to overcome the problems of the NFFO, yet continued to use competitive markets to deliver the least-cost renewable energy solutions (Gross and Heptonstall, 2010).

The next round was announced in 1997[185] when NFFO-4 provided a capacity target of 1 700 MW for new contracts for renewables. The NFFO-5 order was announced at the end of 1998 with a capacity target of 1 177 MW but much

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that planning permission was being applied for at approximately the same time by a host of developers, and the construction of wind farms was also taking place on similar sites simultaneously (Mitchell and Peter, 2004).

[184] DNC is the amount of base load capacity required to produce an equivalent amount of energy over a year – 4 MW of wind at a 25% capacity factor equates to 1 MW DNC (Wiser, 2002).

[185] In 1997 the manifesto of the newly elected Labour Party stated the party's target of procuring 10% of UK's electricity supply from renewable energy sources by 2010.

of this capacity was again left unutilised. As the NFFO did not provide penalties for companies who won at auction but failed to take up a contract, it created the opportunity for companies to make unrealistic low bids in order to prevent competitors from securing contracts (Mitchell and Peter, 2004).

No more NFFO auction rounds were held after 1998, although there were variations. The general trend for the later rounds of auctions was an allowance of five years to build and commission a project, then a contract period for Power Purchase Agreements (PPAs) of 15 years. The last of these contracts is set to expire in 2018.

The marginal bids set the price for Rounds 1 and 2, whereas Rounds 3, 4 and 5 were "pay-as-bid"[186]. The last rounds of auctions were largely considered to be financially unviable. Until recently these agreements constituted a major part of the UK's current renewable energy capacity, not including large hydropower (Department of Energy and Climate Change (DECC), 2003).

Table 5: Average price results (listed in GBP) for NFFO Rounds (1 to 5) in UK (Wiser, 2002)

| | NFFO-1 | NFFO-2 | NFFO-3 | NFFO-4 | NFFO-5 |
|---|---|---|---|---|---|
| Period of guaranteed contract | 1990-1998 | 1991-1998 | 1994-2009 | 1997-2012 | 1998-2013 |
| Capacity of winning bids (MW, DNC) | 152 | 472 | 627 | 843 | 1 177 |
| Installed capacity (MW, DNC) | 145 | 172 | 293 | 156 | 55 |
| Average price (GBP/kWh) | 0.065 | 0.066 | 0.044 | 0.035 | 0.027 |
| Average price (USD2011/kWh) | 0.093 | 0.092 | 0.055 | 0.045 | 0.034 |

## Phase 3:

### Targets, Renewables Obligation Certificates and the Climate Report (2000-2010)

Until the early 2000s, the UK's policies were largely supportive of the privatisation of the energy sector. In 2000 the government announced a target of 10% of UK's electricity to be supplied from renewable energy by 2010, provided the costs were acceptable to the consumer (Department of Trade & Industry (DTI), 2003). The Utilities Act of 2000 further reformed energy markets in England and Wales, and the New Electricity Trading Arrangements (NETA) came into operation in April 2001. The regional electricity companies were separated into regulated distribution network companies and supplier functions.

In February 2000[187], the DTI published a call for public consultation on the Renewables Obligation[188]. The primary legislation was included in the Utilities Act 2000. In 2002, the Renewables Obligation (RO) came into effect, and succeeded the NFFO.

The RO imposed an obligation on all registered electricity suppliers in England and Wales to supply their customers in the UK with specified amounts of electricity from renewable sources. No distinction was made between the different renewable energy technologies, and all received the same level of support per kWh. As such, the RO was set up as a "pure" trading scheme[189] (Gross and Heptonstall, 2010).

The RO mechanism set a target for renewable energy, and allowed the trading of Renewable Obligation Certificates (ROCs), which would deliver the lowest-cost renewable generation. The ROCs were allocated on the basis of technology groupings, where emerging technologies[190], would be awarded more certificates per unit of electricity generated than mature technologies.

The RO required all licensed electricity suppliers to comply with their target for the supply of electricity from renewable sources. Suppliers could comply with these obligations by either presenting ROCs or by making a buy-out payment[191].

By 2003, the government had consented to more offshore wind power capacity than all the wind farms built over the decade 1990-2000. The first large-scale offshore wind farm in the UK, North Hoyle, was commissioned in December 2003 (RenewableUK, n.d.a).

The publication of the Stern Review (Stern, 2006) on the economics of climate change resulted in a substantial increase in the political profile of climate policy in the UK and had a strong impact in raising public awareness about clean energy choices.

The 2006 Energy Review provided an explicit recognition that there was room for significant improvement in the UK's renewable energy policy (DECC, 2006). The report proposed establishing a public consultation on adapting the RO, to reflect the fact that some technologies would no longer require its full support and that support for emerging technologies – such as offshore wind – would need to increase. It further proposed a formal consultation to "band" the RO and to provide differentiated levels of support to different renewable technologies.

In 2007 wind energy overtook hydropower to become the UK's largest renewable generation source, contributing 2.2% of the country's electricity supply, with onshore wind providing the major share.

The 2008 Climate Change Act committed the UK to reducing its emissions by 80% by 2050. This required a rapid advance in the growth rate of renewable energy. The Act further specified a reduction in emissions of at least 34% by 2020, on a 1990 baseline[192].

In 2008, the UK government revised the Electricity Act. In practice, due to the implementation of "banding" by 2009, 1 MWh from an onshore wind farm received 1 ROC while 1 MWh from an offshore wind farm received 2 ROCs, which was a shift from the earlier practice where all renewable energy technologies received 1 ROC per MWh.

Banding helped provide more economically viable support for the more costly technology options.

The annual compliance period for ROCs runs from 1 April in any year to 31 March in the following year. Separate ROCs are issued to generators in Scotland (SROCs) and Northern Ireland (NIROCs), but the three types of certificate are fully tradable and can be used by any UK electricity supplier for compliance with the RO.

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[186] In a pay-as-bid auction, prices paid to winning suppliers are based on their actual bids, rather than the bid of the highest price supplier selected to provide supply. For this reason, pay-as-bid auctions are also known as "discriminatory auctions" because they pay winners different prices tied to the specific prices offered in their bids.

[187] This was followed by a consultation on the mechanism for the Renewables Obligation in October 2000. The DECC published a response to this consultation in March 2001, alongside the Draft Renewables Obligation Order. A statutory consultation on the order was issued in August 2001.

[188] The RO is set out in the legislation called the Renewables Obligation Order (ROO). This is a form of secondary legislation known as a Statutory Instrument. It sets out the details of the RO and can only be amended if it is first subject to a consultation and then debated and approved by both Houses of Parliament. The powers enabling the government to introduce the ROO are set out in the enabling primary legislation. The ROO was made under Section 32 of the Electricity Act 1989 and imposes an obligation ("the renewables obligation") on all electricity suppliers, which are licensed under that Act and which supply electricity in England and Wales, to supply customers in the UK with specified amounts of electricity generated from renewable sources. See page 13, Schedule 1 for yearly obligations (DTI, 2002).

[189] The government supported the RO with its broader privatisation and markets-oriented policy development strategy in the 2003 Energy White Paper and until its Energy Review of 2006.

[190] The rationale being that emerging technologies needed more support, since they were carrying more technological and financial risk, and were more expensive due to the lack of technology learning.

[191] As an alternative to providing ROCs, the suppliers pay the buy-out price to the Office of Gas and Electricity Markets (Ofgem) for all or any part of their RO percentage, which is not covered by the presentation of ROCs, or they can combine the two options (ROCs plus buy-out price). This money paid to Ofgem, known as the "buy-out fund", is then "recycled" to suppliers who have presented ROCs to Ofgem. This "recycling mechanism" provides an incentive for suppliers to obtain ROCs, as those suppliers who rely on the buy-out route effectively subsidise their competitors.

[192] The 2009 UK Low-Carbon Transition Plan outlines the policies needed to decarbonise the UK economy to achieve those objectives as well as a seven-fold increase in energy from renewable sources over the same period. The 2011 Climate Action Plan describes the activities to be implemented in the next five years.

There is no minimum or maximum price for ROCs. The prescribed level of the RO and the level of compliance determine the price of a ROC through the "recycle mechanism" funded by the buy-out fund[193].

In April 2010, there were further changes, including the extension of the Renewable Obligation scheme for new projects from 2027 to 2037 which provided greater long-term certainty to investors and increased support to offshore wind projects[194]. The RO helped increase the share of electricity generation from renewables in the UK from 1.8% in 2002 to 6.8% in 2010.

A feed-in tariff scheme was introduced in April 2010 for small-scale renewable energy producers. The feed-in tariff opened electricity generation to communities, households and to micro-renewable generators with a capacity of less than 5 MW. It also offered an adaptable tariff that varied by technology and size of installation.

The UK government announced in December 2010 that it would introduce "phasing" for offshore wind projects accredited after 31 March, 2011 where generators can register the installed capacity for their projects in up to five phases (with a minimum of 20% in the first phase) (DECC, 2010a). Each phase will be eligible for support for 20 years (up to 2037).

By 2011, wind was generating 15 TWh, accounting for almost 5% of all UK power supplies, out of a total renewables contribution of 9.5%. Onshore wind provided two-thirds of this amount and offshore wind the remainder.

Under the RO system, the UK produced 7% of its electricity from renewables in 2010/11, a poor wind year, compared to less than 3% before the obligation was introduced (RenewableUK, 2012). An important point is that the UK support system was not financed through the central taxation system, but as an addition to consumer energy bills.

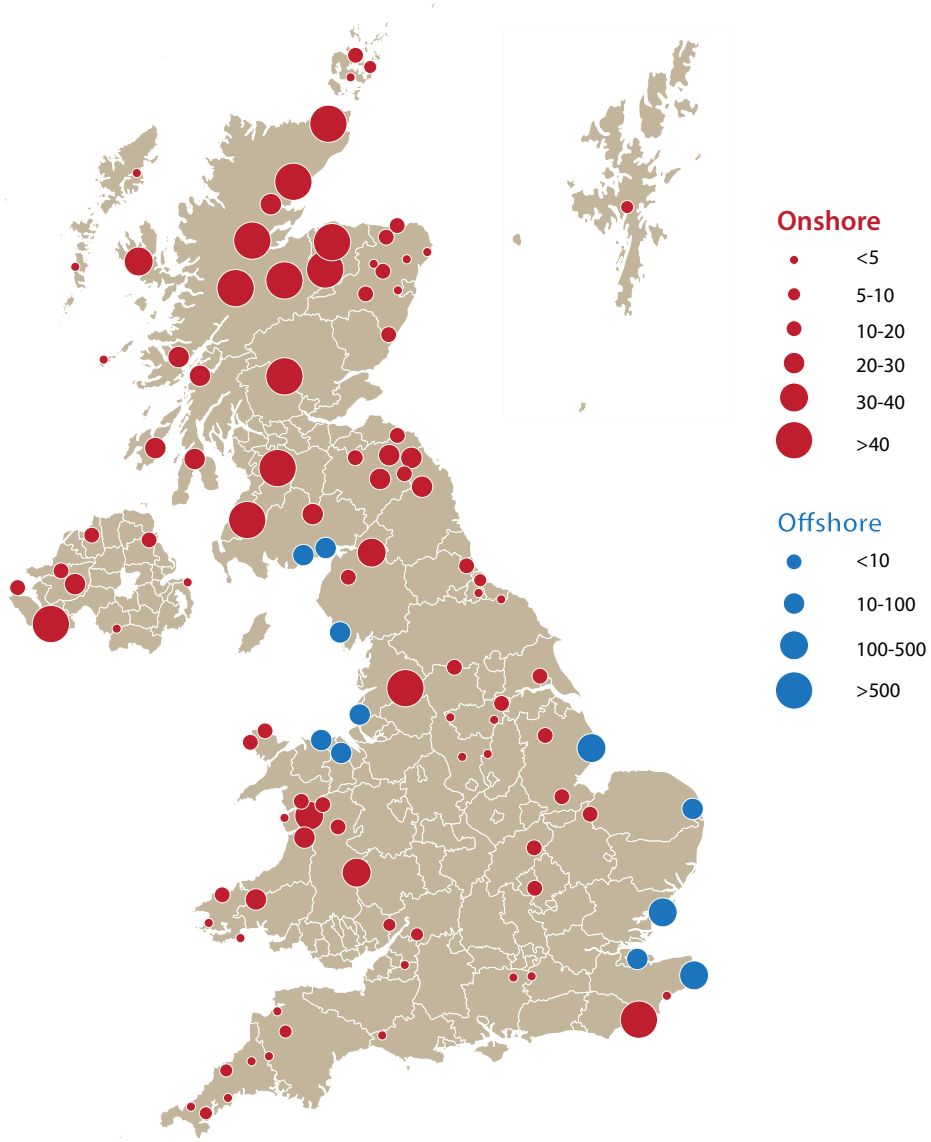


Figure 18:
UK Wind Farm Location and Capacities Map (2010) (DECC, 2011a)

## Growth of offshore wind

In February 2012, less than a decade after the first marine wind farm became operational in the North Sea off Blyth in Northumberland, the UK's offshore capacity exceeded 1.7 GW. The UK coast has very large wind resources, with an area of sea about the size of London capable of meeting 10% of the country's electricity needs. In order for this resource to be properly exploited, the British Wind Energy Association[195] initiated discussions with the government in 1998 with the aim of drawing up formal guidelines for negotiations with the Crown Estate[196]. These were published in September 1999.

A group of prospective developers proceeded to co-operate with the Crown Estate, which released information on the process for site allocation and leasing in December 2000. The resulting Round 1 of UK Offshore Wind Development, consisting of 18 sites of up to 30 turbines around the UK coast was announced in April 2001.

Shortly after the start of Round 1 a series of capital grants for offshore wind farms was announced through the New Opportunities Fund. Approved projects received grants of up to GBP 10 million (USD 20.5 million in current value) per project, approximately 10% of the project costs, on condition that construction had started. These grants complemented the RO and mitigated the high offshore project costs.

Over the past decade some onshore wind developments had attracted strong local opposition, which led to lengthy and expensive development processes in many cases. To make sure that offshore wind development would not face similar difficulties, the industry association (RenewableUK) conducted "stakeholder dialogues" with parties having an interest in the development of an offshore wind energy industry, including fishermen, tourist boards and bird protection groups. The Environment Council mediated this process as an independent third-party convenor. As a result of the stakeholder dialogue, RenewableUK helped establish Best Practice Guidelines (RenewableUK, n.d.a) on consultation and public participation in offshore wind energy developments in 2001.

In 2003, the UK Department of Trade and Industry concluded its "Future Offshore" consultation. Its purpose was to develop a strategic framework for the offshore wind and marine renewables industries. Many issues were raised, including the consenting process and the legal framework, the need for Strategic Environmental Assessment (SEA), and the necessary electrical infrastructure.

On completion of the first phase of the SEA and the publication of the Energy White Paper, the Crown Estate invited expressions of interest from potential developers of new offshore wind sites under Round 2 in 2003. Only those companies that submitted an expression of interest were eligible to bid formally for Round 2 sites. The results were announced in December 2003, with 15 projects, with a combined capacity of up to 7.2 GW, allowed to apply for leases to operate offshore wind farms under Round 2.

The extension of the RO target to 15% by 2015 improved the economic viability of large-scale offshore projects. Furthermore, the Energy Act 2004 helped by creating a legal framework for development outside UK territorial waters.

In 2010 the Crown Estate announced the results for the Round 3 projects. Nine zones were awarded and the developers had to sign Zone Development Agreements committing them to developing 32 GW of wind farms that would be operational by 2020. Those projects would represent an investment of GBP 100 billion (USD 167.7 billion), excluding the cost of the grid. The Crown Estate also issued a framework document on zonal appraisal and planning (ZAP) to aid Round 3 developers identify sites within the zones, and to manage the risk of cumulative impacts arising from clustered development (The Crown Estate, 2011).

Rounds 1, 2, 3, the Round 2 extension and the projects in Scottish Territorial Waters zones represent a total project capacity of 48 GW awarded by the Crown Estate

[193] All buy-out payments are pooled together to form the buy-out fund. The buy-out fund is proportionally redistributed back to suppliers for every ROC submitted for compliance. This is known as the "recycle payment" and is dependent upon the volume of renewable energy generation, the size of the RO target, and timely payments into the buy-out fund by the electricity suppliers.

[194] The Renewables Obligation (Amendment) Order 2010 came into force on 1 April, 2010.

[195] Now known as RenewableUK.

[196] This body officially owns all the ocean floor out to 12 nautical miles equivalent from the UK's shores. It is in effect the landlord for the ocean floor in this area and hence must give its permission for any offshore development to take place.

for possible development in the UK. At 2011 costs those developments represent an investment of GBP 150 billion (USD 242 billion) (DECC, 2011b).

Two ROCs per MWh of offshore generation are available until 2015, possibly reducing to 1.9 ROCs per MWh in 2015/16 and 1.8 in 2016/17 as a result of the "banding" consultations held in October 2011 (DECC, 2012). The future support level for offshore farms is still under discussion and one option would be to replace the RO with a feed-in tariff. However, due to delays in obtaining the planning permission and financing of projects, the expected commissioned capacity from all offshore projects should reach 5.5 GW by 2015 (Garrad Hassan, n.d.).

## Evolution of wind in Scotland

As in the case England and Wales, the power sector reforms in Scotland led to the creation of a policy and regulatory environment favouring clean energy sources. Prior to 1990, Scotland's power sector was comprised of two vertically integrated, geographically distinct electric utilities, combining generation, transmission, and distribution, one serving the north and the other the south. The two electric utilities were privatised as vertically integrated regulated companies in 1991 after ownership of the nuclear power plants was transferred to a state-owned company (Choynowski, 2004).

Scottish Power[197] and SSE Plc[198] electric utilities are free to sell to the English market and use the English wholesale price as a reference price for Scottish trading. These utilities also compete for customers. Strong support for renewables was shown by those power companies at an early stage. Furthermore, with devolution of more political power to Scotland in the late 1990s, the regional power companies could influence the energy policy development towards their preferred sources of power generation.

Unlike in England and Wales, renewable energy developments were supported by Scottish local communities, as they would allow Scotland to harness its own resources and provide energy security. In addition, Scotland had a highly technically skilled population, which was helpful in scaling up wind farm development. Overall the public debate on renewables tended to be more favourable in Scotland than in England or Wales.

With 25% of Europe's offshore wind potential (estimated at 206 GW), and a strong manufacturing capacity, Scotland had a strong growth opportunity (The Scottish Government, 2011) for both the onshore and offshore wind industry[199].

The Renewables Obligation (Scotland), or ROS, also came into force on 1 April 2002, and was the key incentive to implement the renewable energy objectives. Early incentives for renewable energy development under the Scottish Renewables Orders (SRO) and the NFFO schemes were superseded by the ROS, which obligated the regional electricity suppliers to source a proportion of their power from renewable sources. In addition, given that Scotland was a net energy exporter in 2000 (due to hydro power), renewable energy development in Scotland could be used to fulfil suppliers' obligations elsewhere in the UK, either by the supply of renewable electricity through interconnectors or by the sale of ROCs (Scottish Natural Heritage, 2011).

The Scottish government is responsible for the planning system in Scotland. The Planning (Scotland) Act 2006 introduced substantial changes, and is part of a wider reform and development package set in the White Paper on Modernising the Planning System from June 2005 (The Scottish Government, 2005).

The White Paper allowed for the development and prioritisation of Scotland's resources. Its measures included increased devolution of decision-making with the possibility of appeals to local authorities, and the exemption of very minor developments from the planning application process. Local authorities in Scotland then became responsible for determining all wind farm proposals under 50 MW. The Scottish government, in

[197] Scottish Power has a renewables arm which operates over 20 wind farms with an installed capacity of over 1 000 MW [2010].

[198] SSE currently owns 740 MW of onshore wind capacity in the UK and Ireland, and has 695 MW in construction, including 350 MW at the Clyde wind farm in southern Scotland, which is expected to cost GBP 500 million (USD 806 million) when it is commissioned in 2012. By 2020, SSE aims to have over 3 GW of onshore wind in operation. SSE is entering the offshore market beginning with the construction of Greater Gabbard, a joint venture with RWE Power, which at over 500 MW, was expected to be the largest offshore wind farm in the world when commissioned in 2012.

[199] In March 2011 Doosan Power Systems announced an investment of GBP 170 million(USD 274 million) in Scottish wind power over the next 10 years. An R&D centre was to be set up near Glasgow, creating 200 jobs .The company is looking to establish a manufacturing and assembly facility in Scotland. Doosan expects its offshore wind plans in Scotland to create 1 700 jobs. In January 2011 the Spanish company Gamesa announced its intention of establishing an offshore wind technology centre in Glasgow. Dundee could also see the establishment of a manufacturing and maintenance base.This could represent a further investment of GBP 42 million (USD 67.7 million) in Scotland and the creation of 300 jobs. In December 2010 Mitsubishi Power Systems Europe announced its intention to invest in an engineering facility in Edinburgh to carry out R&D into offshore wind turbine technology. Mistubishi may create up to 200 jobs over the next five years and lever up to GBP 100 million (USD 161 million) investment into the local economy (The Scottish Government, 2011).

consultation with local planning authorities, determines all projects exceeding 50 MW.

In 2007 Scottish Power, one of Scotland's largest energy companies was taken over by Iberdrola[200]. By that time, the cumulative capacity of renewable energy sources in Scotland had exceeded that of nuclear energy. In September 2008, the Scottish government published its Energy Policy overview.

This document outlined the government's plans of establishing R&D centres for cutting-edge renewable technology in Scotland and conducting joint development with other European countries. This would allow Scotland not only to maximise its energy exports but also maximise the preservation of wealth, the development of skills, intellectual property rights, and manufactured products (The Scottish Government, 2008).

By 2008 Scotland already met 16% of its demand for electricity from renewable sources – primarily hydro and onshore wind. Progress towards renewable energy targets has mainly been driven by the RO legislation and by the demand from England and Wales via the RO.

The Renewables Action Plan was published in June 2009. Under the 2009 EU Renewable Energy Directive, Scotland would produce 50% of its electricity demand from renewables by 2020. And, following the election of a new majority government in May 2011, this objective was increased to 100% of Scottish demand to be met by renewables in 2020.

Although Scotland will be contributing to the UK objectives for the reduction of greenhouse gas emissions, and is sharing the same 2050 greenhouse gas reduction targets, it has set a more aggressive national plan whereby a 42% reduction on 1990 levels is to be achieved by 2020. This ambitious target has been based on the availability of large renewable resources in the country, strong public support, and active regulatory support to renewable energy development.

Furthermore, the government has taken several steps to ensure that local communities would benefit from the renewable energy generated in their area. A community benefit register was established in 2011, which will help empower communities and help generate loans for community-owned renewable energy projects.

The share of renewable electricity in the gross electricity consumption grew from 12.3% in 2002 to 27.4% in 2009. This placed the country on course to meet its interim target of 31% by 2011, and provides a platform to move towards the 100% target by 2020 (Taylor, R., 2011).

In June 2011 the government published the "2020 Routemap for Renewable Energy in Scotland[201]". This updated and expanded routemap reflected the new target of 100% electricity demand from renewable energy by 2020. By 2011, 2.4 GW of onshore capacity had been installed in Scotland with 1 GW under construction. There were two offshore wind sites within Scottish territorial waters[202].

In comparison to England and Wales, Scotland has been successful in ensuring significantly higher community buy-in, long-term targets and political support. This has been made possible by the government's strategy of developing wind as an energy source with several parallel benefits for Scotland –a cutting- edge industrial base, enhanced energy security, as well as environmental and community benefits.

## CURRENT CHALLENGES

The UK wind sector has faced several barriers over the past two decades, some of which have been persistent. The UK government has launched a number of initiatives to support the growth of the wind sector by confronting critical issues such as grid access (Transmission Access Review), national planning (Planning Bill), local planning (the Killian Pretty Review), and the supply chain (establishment of the Office for Renewable Energy Development) among others.

[200] Iberdrola, S.A is Spain's largest energy group and the fourth-largest utility company in the world by market capital. As part of the Iberdrola group of companies, ScottishPower is the fifth-largest energy company in the world. Iberdrola's sister company ScottishPower Renewables, was the UK's largest developer of onshore wind farms as of 2010.

[201] This document was an update and extension to the Scottish Renewables Action Plan of 2009.

[202] (1) The Beatrice wind turbine demonstrator project in the Moray Firth – two 5 MW turbines, funded in part by a Scottish government grant; and (2) Robin Rigg, a 180 MW development in the Solway Firth.

However, despite these actions, the wind sector still faces considerable challenges, especially for onshore wind.

Grid capacity is limited in areas of high wind regimes, and site approval can be difficult to get. Building significant transmission capacity out to remote locations can take up to 10 years, which creates high uncertainty for investors[203].

Much of the UK, especially England and Wales, is densely populated, and the planning process is complex. The UK still is one of the most difficult places in Europe to get planning consent, which can take five times longer than the average for European countries. On a comparative basis the UK's offshore site approval process is less complex.

The UK does not have extensive domestic wind manufacturing capacity, though this is beginning to slowly change. A number of points in the supply chain are prone to shortages – the most important of which are wind turbines, vessels, cables, and offshore substations.

## CONCLUSION

The key policy instruments for the support of renewables at the national level in the UK are the Renewables Obligation[204] (RO) and the recently introduced feed-in tariff for projects smaller than 5 MW. Prior to the RO, the wind sector was supported through the auctioning system (NFFO).

In the UK, support for renewable energy was driven by the reform of the energy sector in the late 1970s and the 1980s[205].

The RO has only contributed modestly to the deployment of renewable energy sources since 2002. Although over 20 000 MW of onshore wind projects have been proposed, their actual development has been hindered by planning and grid delays. In April 2009, the regulators looked at addressing this concern by introducing technology "banding" in the RO.

The UK government is also considering revising banding levels for the period 2013-2017. It is also consulting on its proposal to discontinue the RO from 2017 and introduce an expanded feed-in tariff to cover all electricity generation from low-carbon sources, including renewables. By 2011 the UK had secured 9.5% of its electricity from renewables, compared to less than 3% before the RO (RenewableUK, 2012).

Each NFFO round took the form of capacity auctions, where developers were invited to submit competitive "bids" for NFFO contracts. However, the lack of proper planning and a lack of penalties for not building allocated capacity led to limited growth of the wind sector.

The UK Renewable Energy Strategy, as implemented under the EU Renewable Energy Directive, mentions a binding objective of 15% of final energy consumption from renewables by 2020, implying 30% of electricity produced from renewable sources. Wind energy would be the largest contributor, with up to 33 GW of capacity, delivering over GBP 60 billion (USD 96.8 billion) of investment and creating 160 000 jobs (RenewableUK, n.d.b ).

Each of the countries of the UK has its own distinct planning system; the responsibility for town and country planning is devolved to the Northern Ireland Assembly, the Scottish Parliament and the Welsh Assembly. Planning legislation varies across the countries of the UK, and must itself take into account the European Directives and International legislation (such as the Kyoto Protocol)[206]. However, improved access to the electricity transmission network would overcome a backlog of connections from renewable energy projects and encourage further investments. There are also opportunities for streamlining the planning and consenting process.

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[203] Historically, the grid operator, the National Grid, was granting access to the grid according to non-discriminative criteria. Renewables were thus not given priority (compared to conventional generators).The Department of Climate Change (DECC) undertook two public consultations on improving grid access for renewables in 2009 and 2010.This led to the introduction of the "Connect and Manage" (Socialised) regime for grid access in August 2010, which will enable new and existing renewable energy generation projects to connect to the network more rapidly (DECC, 2010b).

[204] The legislation is divided into the Renewables Obligation (for England and Wales), the Renewables Obligation Scotland (ROS), and the Northern Ireland Renewables Obligation (NIRO). These schemes are managed by the DECC, the Scottish government and the Department of Enterprise, Trade and Investment for Northern Ireland respectively. The UK electricity regulator, the Office of Gas and Electricity Markets, Ofgem, administers the scheme.

[205] Mrs Margaret Thatcher was the Prime Minister of the UK between 1979 and 1990. By November 1990, more than 40 former state-owned companies had been privatised (Elliott and Treanor, 2000).

[206] The determination of planning applications is a primary function of Local Planning Authorities (LPAs). In the UK all wind turbine applications below 50 MW in capacity are determined by LPAs, and larger projects are submitted to the relevant national government for consideration. In Northern Ireland the situation is slightly different, with all applications currently determined by the Northern Ireland Planning Service, an agency within the Department for Environment. In determining an application, a planning officer will make a recommendation based on the content of local, regional and national planning policy and applicable legislation. All planning decisions should be based on planning considerations alone. A Local Authority Planning Committee usually makes the final decision for a wind turbine application.

## ANALYSIS ON ENABLING CONDITIONS FOR WIND ENERGY

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| **Effective rule of law; and transparency in administrative and permitting processes** | A long-term energy policy framework has been in place since 2010 although it was not specifically designed for promoting renewable energy sources. The UK is developing a large renewable energy capacity, but current projects do not generate high local benefits. Since the country is densely populated, there has been opposition to wind farms in many rural areas. |
| **A clear and effective pricing structure** | The auction system was not favourable to small, local investors. The RO created uncertainty for investors, since future ROC prices could collapse if excess renewable generation were built. Due to this risk element, the cost of capital was increased, which favoured large companies able to finance the developments on their balance sheet. Before the banding process, the ROCs were awarded per MWh regardless of the method of generation. This system favoured mature, lower-cost generation technologies, such as landfill gas, over less mature technologies like offshore wind and wave power. |
| **Provisions for access to the grid (incentives and penalties for grid operators)** | Until recently renewable energy did not have priority access to the grid, making the UK among the most difficult markets to secure a grid connection for wind projects. |
| **An industrial development strategy** | The UK did not create a domestic industrial base for onshore wind. However, this is changing with the upcoming development of the offshore wind market, especially in Scotland. |
| **A functioning finance sector** | Since the 2009 financial crisis, commercial lending has been difficult to access, and the finance sector is yet to recover completely, as of 2012. |
| **Expression of political commitment from government (e.g. targets)** | The 2008 Climate Change Act committed the UK to reducing its emissions by 80% by 2050. This required a rapid advance in the rate of growth of renewable energy. The Act further specified a reduction in emissions of at least 34% by 2020, on a 1990 baseline. |
| **A government and/or industry-led strategy for public & community buy-in.** | The UK wind industry started working closely with other stakeholders to address the issue of local communities' hostility to onshore wind projects in the late 1990s. Today the UK has the most developed processes for public consultation and stakeholder engagement. |
| **An employment development strategy** | Not Applicable |

| NOTE | **The UK has some of the best wind resources in Europe. Improved access to the electricity transmission network would overcome a backlog of connections from renewable energy projects and encourage further investments. There is still room for streamlining the planning and consenting process for both onshore and offshore projects.** |
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