

Gwynt y Môr Offshore Wind Farm

Environmental Statement

Volume 1 • November 2005



Gwynt y Môr Offshore Wind Farm

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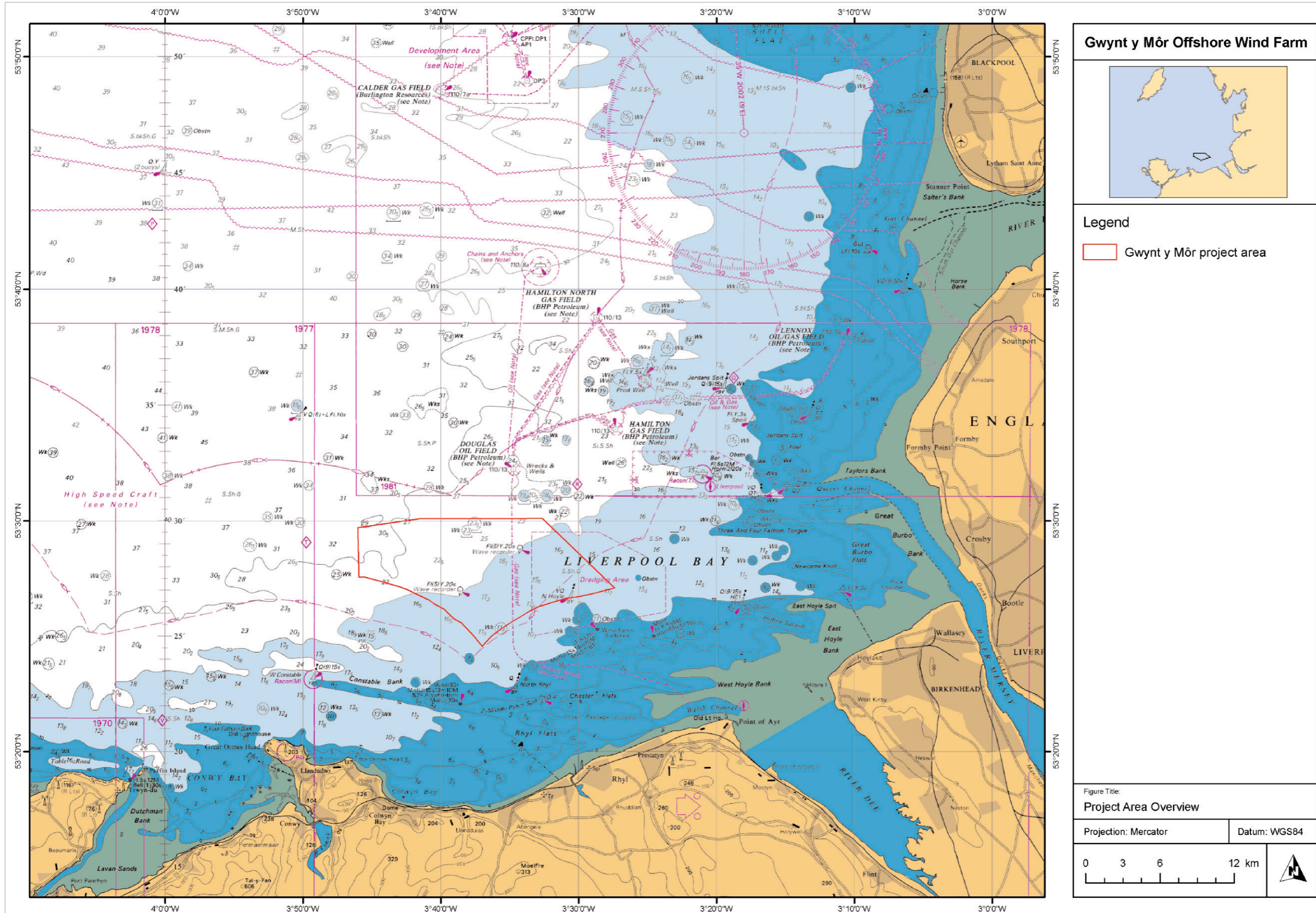
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Gwynt y Môr Offshore Wind Farm

Legend

Gwynt y Môr project area

Figure Title:
Project Area Overview

Projection: Mercator	Datum: WGS84
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0 3 6 12 km

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Figure 1.1 Gwynt y Môr offshore wind farm project overview

1 Background details

Gwynt y Môr Offshore Wind Farm Ltd wishes to apply for permission to construct and operate an offshore wind farm in an area off the north Wales coast known as Gwynt y Môr. The location of the proposed Gwynt y Môr Offshore Wind Farm project is shown in Figure 1.1. The plans showing the areas covered by the relevant consents required for Gwynt y Môr are presented in Chapter 3 of this Environmental Statement. This document fulfils the requirements under Town and Country Planning Act (TCPA) and Electricity Act Environmental Impact Assessments (EIA) regulations.

This Environmental Statement is provided in support of the application for the variety of consents required to construct and operate the Gwynt y Môr Offshore Wind Farm. It is intended to provide details on the proposed project, the need for and the benefits of the proposed wind farm, the regulatory framework controlling its development and operation, descriptions of the existing, baseline environment and an assessment of the potential positive and negative effects of the project.

This Environmental Statement provides the information required to allow the Secretary of State to come to a balanced view on the potential costs and benefits of the scheme when deciding on the award of consents and the development of the associated consent conditions.

1.1 The developer

The applicant for the proposed Gwynt y Môr project is Gwynt y Môr Offshore Wind Farm Ltd. The registered office and contact address for the Gwynt y Môr project is as follows:

Gwynt y Môr Offshore Wind Farm Limited
npower renewables, Third Floor, Reading Bridge House
Reading Bridge, Reading
Berkshire, RG1 8LS
Company Number: 2904841

Npower Renewables Ltd (referred to hereafter as npower renewables) is acting as agent for the project developer, Gwynt y Môr Offshore Wind Farm Ltd, and will be referred to throughout the remainder of this Environmental Statement. Gwynt y Môr Offshore Wind Farm Ltd is a wholly owned subsidiary of npower renewables.

npower renewables, formerly known as National Wind Power, is a wholly owned subsidiary of RWE npower, one of the UK's major integrated energy businesses. npower renewables has developed a leading position in the UK wind power market. Formed originally in August 1991, National Wind Power subsequently combined with the other existing RWE Innogy renewable energy businesses to become npower renewables, developing not only wind farms but also biomass and hydro generation plants.

npower renewables employs over 100 professional staff and operates from offices in England, Wales and Scotland. With this expertise, npower renewables has developed a considerable portfolio of wind farm projects both in the UK and overseas, and currently operates 16 wind farms in the UK, with a generating capacity totalling 267 megawatts (MW). In addition, several other projects are currently being constructed and many more are at various stages of development.

1.1.1 Previous experience of offshore wind farm development

npower renewables is one of the most experienced developers of offshore wind farms in the UK, having developed (and now currently operating) the UK's first major offshore wind farm North Hoyle, adjacent to the proposed Gwynt y Môr project area. npower renewables also owns the development rights to the fully consented site known as Rhyl Flats, which also lies off the north Wales coast to the west of North Hoyle.

The development and operation of the North Hoyle Offshore Wind Farm means that npower renewables can bring to bear a number of key lessons learned through the development and construction process in taking forward the Gwynt y Môr project. The lessons learned and experience gained from the development and operation of North Hoyle have been used, where appropriate, to inform the preliminary design of Gwynt y Môr and throughout the Environmental Impact Assessment process.

The lessons learned from the North Hoyle experience will continue to be applied to Gwynt y Môr throughout the ongoing development process and subsequently into the operational phase in a number of key ways, notably:

- experience gained from the environmental monitoring of the North Hoyle site
- knowledge gained in the design of the North Hoyle site
- experience gained in the procurement and construction of North Hoyle, in particular the use of best practice to manage, control and minimise potential environmental effects
- the experience gained from the safe and efficient operation of North Hoyle.

1.2 Overview of the Gwynt Y Môr Offshore Wind Farm project

The full details of the Gwynt y Môr project are provided in Chapter 4 of this Environmental Statement. The following introduces the main components of the project and briefly describes each in turn.

The current development described by this Environmental Statement will be known as the Gwynt y Môr Offshore Wind Farm ("Gwynt y Môr") – "Wind of the Sea" in Welsh, herein after referred to as "Gwynt y Môr" or "the project".

Gwynt y Môr incorporates the installation and operation of offshore wind turbines in an area within Liverpool Bay, located approximately 13 to 15 km off the north Wales coast, extending from Penrhyn Bay in the west to Prestatyn in the east, and approximately 18 km off the coast of the Wirral. Gwynt y Môr, as defined by the Crown Estate lease, covers an area of circa 124 km² and is shown in Figure 1.1.

npower renewables has been allocated the development rights for the Gwynt y Môr lease area as part of the Crown Estate's Round 2 UK Offshore Wind Farm Development Programme. Gwynt y Môr was selected by npower renewables after significant site investigation and evaluation work during the pre-tender phase. This extensive site selection process is intended to ensure that Gwynt y Môr represents a location suitable for the development of an offshore wind farm of this scale in terms of both engineering and environmental criteria.

The project is described in detail in Chapter 4, which is based on the preliminary design work completed to date, but in summary will feature between 150 and 250 modern, efficient wind turbines with a maximum project capacity of 750 MW_e (as defined by the Crown Estate lease). Notably, for all Round 2 sites, the definition of maximum generating capacity under the Crown Estate lease agreement means that the final number of turbines required for the project will depend on the generating capacity of the chosen turbine. This is dependent on the ongoing technological development of offshore wind turbines, and the capacity of the turbines that will be commercially available for deployment at Gwynt y Môr.

In order to progress the consent application process and satisfy the requirement for a detailed Environmental Impact Assessment (EIA), npower renewables has developed three illustrative layout scenarios using a combination of the likely minimum/maximum turbine capacities and indicative turbine numbers. Turbines with a rated capacity in the range of 3 MW class to 5 MW class machines are anticipated and have been used for these three layout scenarios.

For the purposes of this EIA a realistic worst case envelope has been assessed. The turbines that will be erected at Gwynt y Môr will have a maximum tip height of 165 m (above Lowest Astronomical Tide), representing a maximum hub height of 98 m and maximum rotar diameter of 134 m respectively.

The Gwynt y Môr turbines will be arranged in a regular grid (the “turbine array”) with a minimum distance between turbines of circa 350 m rising to an anticipated maximum of circa 900 m. Each turbine will be placed on a support structure composed of tower sections and foundations, the choice of foundations being dependent on factors such as the turbine design and ground conditions.

In addition to the turbines, up to five meteorological monitoring masts will also be constructed within the project area. Application has already been made during 2004 for three met masts, three have gained consent and one was constructed in August 2005.

Up to four offshore substations will also be needed within the project area in order to convert the electricity to a voltage suitable for transmission ashore via the buried submarine cables. The offshore cables will run from the project area towards the north Wales coast and will come ashore at a location between Abergele and Kinmel Bay. Buried onshore cables will subsequently complete the link to a proposed onshore substation, located to the south of the St Asaph business park.

The generated electricity will ultimately be fed into the national grid via a connection with the existing 400 kV overhead lines to the south of St Asaph. The final connection to the existing grid system will be the subject of a separate application under Section 37 of the Electricity Act to be submitted by National Grid Transco (NGT) and will be accompanied by detailed design information.

The construction phase of Gwynt y Môr, incorporating the offshore components and associated onshore works, is expected to last three years, assuming the continuous build of 750 MW. Following construction, servicing of the wind farm will take place from a base at a suitable port. The extent of the decommissioning of Gwynt y Môr at the end of the 50-year Crown Estate lease period will ultimately be subject to discussions between npower renewables, the regulators and The Crown Estate. It is anticipated that the methods and extent of decommissioning of any wind farm component will take a similar period of time and utilise similar methods (but in reverse) to those employed during the construction process.

1.3 Anticipated benefits of the development

1.3.1 Benefits to the environment

Gwynt y Môr is being proposed in order to provide a significant source of clean, sustainable, renewable electricity generation, to help to meet the UK government’s targets for renewable energy supply and to reduce the emissions of greenhouse gases. The national and international efforts being made to reduce the emissions of greenhouse and other harmful gases are reviewed in detail in Chapter 2.

1.3.2 The supply of clean energy

The following assessment of the amount of clean, renewable electricity generation draws on npower renewables considerable experience of resource assessment for previous wind farm developments, a detailed knowledge of the wind resource in the area and the latest information on available turbine technology.

The predicted energy that could be generated by Gwynt y Môr has been calculated using wind monitoring data obtained for npower renewables’ adjacent North Hoyle Offshore Wind Farm some 2.5 km away. This data has been extrapolated utilising wind flow modelling to make it relevant to Gwynt y Môr. This wind data has been combined with information on the characteristics of various turbines in order to obtain gross wind farm annual energy capture. The energy capture has subsequently been aligned with the experience from npower renewables’ existing wind farm project portfolio across the UK to ensure it is representative of the long-term average annual generation. A series of factors is applied to ensure that the final energy figure quoted represents the metered export expected after all losses, including electrical losses, servicing and maintenance downtime, and wake losses (turbines reducing the wind available to those downwind).

The result is a net average annual energy capture for several models of wind turbine. A representative ‘average’ result has been chosen although the precise energy capture and equivalent homes figure for Gwynt y Môr will ultimately depend on the final turbine choice and precise, layout of the array.

Estimated net average annual energy capture for the 750 MW Gwynt y Môr Offshore Wind Farm is 2,350,000,000 kWh, corresponding to a capacity factor of 35.8%.

This capacity factor of 35.8% represents the predicted energy output divided by the theoretical maximum output (that is if the wind farm was running at its maximum output power during all of the 8,760 hours of the year). It can be thought of as the constant proportion of the 750 MW maximum output that would produce the same resultant energy over the year.

However, the capacity factor does not identify how frequently the wind farm will be operating. As with other wind farms, it is estimated that Gwynt y Môr will be operating and generating electricity for 70-85% of the time. This figure takes into account the periods of time when the wind speed will be above or below the operating limits of the chosen wind turbines and also the downtime required for operations and maintenance activities.

The capacity factor is sensitive to the differences in the local wind speed, but it is also dependent on the design of the wind turbines, particularly the capacity of the generators. The capacity factor of a wind farm with fixed turbine dimensions could always be made higher by putting smaller generators in the machines.

The turbines would run at full output for a greater proportion of the time but would then be limited to this lower level in strong winds when the site was otherwise capable of producing more electricity. It is therefore a reflection of a cost-optimised design parameter and not a measure of the efficiency of the turbines.

Using the 2004 total UK domestic electricity consumption taken from the Digest of UK Energy Statistics (Digest of UK Energy Statistics, 2005) and the total number of households in the UK taken from the National Statistics Website (www.statistics.gov.uk) gives an average domestic electricity consumption of circa 4,700 kWh (units) per household per year.

Average domestic electricity consumption is the total UK domestic consumption of 117.6 TWh divided by the 25.2 million households in the United Kingdom. This gives an average electricity usage of 4,666 kWh per year per household, which has been rounded to 4,700 kWh.

The equivalent number of domestic homes whose consumption could be satisfied by the output from Gwynt y Môr is calculated as follows:

Equivalent number of homes is the total net annual energy capture of 2,350,000,000 divided by the average household annual electricity usage of 4,700. This gives an equivalent number of 500,000 domestic homes.

Thus Gwynt y Môr has the potential to generate enough electricity to supply approximately 500,000 homes.

The amount of electricity generated by Gwynt y Môr would be enough to supply the equivalent of the electricity consumption of more than 40% of all Welsh households; over 75% of all the coastal councils from Anglesey to Sefton; 2.5 cities the size of Liverpool or approximately 2% of all UK households.

1.3.3 The offset of harmful emissions

Gwynt y Môr has the potential to make a very significant contribution towards the reduction of harmful greenhouse gas emissions in north Wales and the UK as a whole through the generation of electricity from a clean, renewable and sustainable source; electricity that might otherwise need to be generated through alternative forms of electricity generation, such as from the burning of coal in thermal power stations.

It is generally accepted that wind energy provides a carbon dioxide (CO₂) offset of 850–870 g/kWh when compared with electricity generated from the use of coal-fired generation (PPG22, 1999), with a generally accepted figure of 860 g/kWh used for offset calculations (www.bwea.com/edu/calcs.html). Applying this offset figure to Gwynt y Môr allows a calculation of the potential environmental benefits that the project could deliver in the UK's endeavours to reduce its greenhouse gas emissions to be made.

National Grid Transco's Seven Year Statement of 2004 (NGT, 2004) supported the theory that wind power currently displaces high-emitting coal and indicated that an appropriate carbon dioxide emissions factor for electricity generated by wind should be higher than that of the average UK mix of generating fuels (430 g CO₂/kWh) and in the region of 860 g CO₂/kWh.

In addition to CO₂, a number of other harmful emissions are generated by conventional coal-fired electricity generation, including sulphur dioxide and nitrogen oxides, which might also be offset by Gwynt y

Môr. Using figures from the BWEA we assume that each unit (kWh) of electricity generated by Gwynt y Môr offsets 10 grams of sulphur dioxide and 3 grams of nitrogen oxides.

The calculation of the potential emissions offset from Gwynt y Môr, when compared with electricity generated from coal-fired generation, is presented in the Table 1.1.

Emission type	Annual quantity offset by electricity generated by Gwynt y Môr (tonnes)	Calculations (www.bwea.com/edu/calcs)
Carbon dioxide	2,021,000	860 g CO ₂ per kWh x 2,350,000,000 kWh per year/ 1,000,000 g per tonne
Sulphur dioxide	23,500	10 g SO ₂ per kWh x 2,350,000,000 kWh per year/ 1,000,000 g per tonne
Nitrogen oxides	7050	3 g NO _x per kWh x 2,350,000,000 kWh per year/ 1,000,000 g per tonne

Table 1.1 Estimated offset of harmful emissions by Gwynt y Môr

In estimating the potential annual offset of harmful emissions it is recognised that over the life of the Gwynt y Môr project these values may change due to, for example, variation in the generating plant mix over the 50-year life of the wind farm.

1.3.4 Socio-economic – employment

The ability to source materials and expertise for the construction and operation of Gwynt y Môr from UK suppliers provides to the Welsh and north west English economy, and the wider UK (subject to EC procurement rules) with the possibility of significant benefits from construction and spin-off effects in the local, regional and national economies.

The detailed socio-economic study of the Gwynt y Môr project assesses that up to 1,180 full-time equivalent jobs could be generated by the component supply and project construction process in the UK, of which as many as 140 could be filled from the local area (i.e. North Wales, Merseyside and Cheshire). These estimates are based on the predicted project capital expenditure and the experience gained from constructed Round 1 offshore wind farms.

It is currently projected that 89 full-time (or shift-based) staff would be required for the operation of Gwynt y Môr. This includes maintenance technicians, offshore technical and supervisory staff, shore-based administrative and managerial staff, and crew for operational and maintenance vessels. In addition, indirect or induced effects resulting from Gwynt y Môr are projected to support a further 35 full-time equivalent jobs, of which 13 would be supported locally through, for example, the sourcing of goods and services from local suppliers.

Therefore it is estimated that around 124 full-time equivalent jobs could be supported in the UK during the operational phase, with a significant number located in the local regions. This is in addition to the full-time jobs that have been generated by the operation and maintenance of the adjacent North Hoyle Offshore Wind Farm. As of July 2005, North Hoyle supported a total of 16 full-time employees through direct and induced effects. The socio-economic benefits of the project are considered further in Chapters 7 and 8 of this Environmental Statement, both in terms of potential employment and the north Wales tourism industry.

1.4 The scoping and consultation process

Scoping is an early stage in the environmental impact assessment process and is designed to ensure that the detail and focus of the Environmental Impact Assessment (EIA) are appropriate, and that the principle areas of potential environmental impact are identified.

Importantly, the scoping process is designed to allow stakeholders to have an input into the EIA process at an early stage. Developers are encouraged to follow a wide ranging scoping and consultation programme during the initial stage of development. This process should seek the views of all of the interested stakeholders both in terms of the overall development proposals and in terms of the scope of the required Environmental Statement. Subsequently, the developer may seek a formal scoping opinion from the decision maker, which in the case of the S36 application for Gwynt y Môr is the Department for Trade and Industry (DTI).

The formal scoping opinion is developed through a more focused consultation, undertaken by the regulator, with a range of organisations including other government departments, nature conservation agencies and local authorities. It seeks to provide a formal opinion as to the information to be supplied within the proposed Environmental Statement (a scoping opinion).

1.4.1 The scoping report

A scoping process has been completed by npower renewables for Gwynt y Môr, involving the preparation of a draft scoping report, which provided details of the proposed project along with baseline environmental information available for the project area. The potential effects of the development were identified within the draft report along with possible cumulative and in-combination impacts.

The Draft Scoping Report or the Non-Technical Summary of the report was circulated to over 300 organisations in late April 2004. Responses to the draft scoping report were received from a total of 119 consultees between the start of May 2004 and mid-July 2004. A total of 207 consultees chose not to respond or had no concerns or questions regarding the scoping information they received.

Draft scoping documents were sent to 18 local authorities in the north Wales and north-west regions. Replies were received from; Conwy, Denbighshire, Ellesmere Port and Neston, Isle of Anglesey, Liverpool City, Sefton, Snowdonia National Park and the Wirral. The draft document was also sent to 22 town councils in the region. Of these, replies were received from; Abergele, Colwyn Bay, Llandudno, Much Hoole and Rhuddlan town councils. A number of key statutory and non-statutory organisations were specifically consulted during the scoping process including the Countryside Council for Wales, the Campaign for the Protection of Rural Wales, the Environment Agency, the Royal Society for the Protection of Birds, the Countryside Agency, the Maritime and Coastguard Agency (MCA), Trinity House and the National Trust.

In particular, a detailed scoping review was undertaken through meetings with the Countryside Council for Wales (CCW) as one of the lead statutory advisory bodies and as scientific advisors to the Welsh Assembly. A workshop was held with CCW to discuss all topics relevant to the Environmental Impact Assessment for Gwynt y Môr, including the scope and approach for the supporting studies.

Similarly, detailed discussions with regard to the scope and details of the EIA and supporting studies

were undertaken with the Centre for Environment, Fisheries and Aquaculture Science (CEFAS), as scientific advisors acting on behalf of Defra.

Scoping documents were also sent to representatives of the following: the marine aggregates industry, shipping companies and ports, ornithological groups; recreational angling and commercial fishing interests, the telecommunications industry, Welsh Assembly, House of Commons, national and local nature conservation groups; and archaeological interest groups.

Subsequently, comments received in response to the draft scoping report were considered and where appropriate incorporated into the scope of the EIA.

A Final Scoping Report (RWE Innogy, 2004) was subsequently issued by npower renewables in November 2004 and submitted to the DTI with a request for a formal scoping opinion in relation to the Gwynt y Môr project. The formal scoping opinion from the DTI was received on the 13th June 2005.

1.4.2 Consultation with statutory and non-statutory organisations

The development of Gwynt y Môr and the accompanying EIA process has included an ongoing programme of consultation with a range of statutory and non-statutory stakeholders from the earliest stages of development.

Consultation with a number of key stakeholders began during 2003 prior to the award of the project by the Crown Estate. These consultations were continued and built upon as part of the comprehensive scoping process described above, involving a series of meetings with a range of interested bodies throughout 2004. Following the scoping process, liaison and discussions with stakeholders has continued throughout the EIA process and up to the completion of this ES and the associated consent submission. npower renewables is committed to continuing the close involvement of key stakeholders throughout the development and operation of the Gwynt y Môr project.

This process of open and comprehensive consultation forms an essential part of the npower renewables development ethos enabling the issues associated with renewable energy development to be explored fully and the concerns of stakeholders to be considered and addressed where possible through the project design and assessment process.

The discussions held with key consultees throughout the Gwynt y Môr project have led to npower renewables amending the preliminary design of some key elements of the project in order to take account of stakeholder concerns or issues. Although the extensive nature of the consultation process precludes a presentation of all of the discussions held, a number of specific discussions are particularly relevant to the preliminary project design and the EIA process, and are briefly summarised in Table 1.2.

Stakeholder	Key issue or concern arising from consultation	Resulting action
Countryside Council for Wales (CCW)	Concerns over potential visual impacts of Gwynt y Môr especially at the western limit	Amendment of the Gwynt y Môr project area to reduce visual impacts at the Great Orme headland
Llandudno Hospitality Association and Mostyn Estates	Concerns over the potential impacts on the tourism industry along the north Wales coast	Commissioning of a tourism study to support the EIA process and organisation of public meetings to help to allay local concerns
BHP Billiton	Concern over the potential impacts of the project on the operation of the Liverpool Bay oil and gas platforms and pipeline, and effects on safe navigation and helicopter access	The wind farm design has been amended to include a 500 metre safety corridor around the gas pipeline running to the Point of Ayr. Detailed risk assessments of the effects on navigation and helicopter access have been completed to support the EIA. Discussions are on-going with regard to helicopter access.
Mersey Docks and Harbour Company, Port of Liverpool and other navigational interests	Concern over the effect of the project on the safety of navigation, particularly ships approaching Liverpool to the south of the Hamilton gas platform	The northern extent of turbines within the project area has been amended to allow for greater room for ships navigating to and from Liverpool as a result of an initial risk assessment process. A further, detailed risk assessment (including traffic surveys, simulation modelling and radar studies) has been commissioned to support the EIA and a navigational working group established with key local shipping and navigation stakeholders.
Ministry of Defence	Concern over impacts on MoD radar systems	The Gwynt y Môr project area was amended at its eastern extent to avoid any impacts on radar systems.
Royal Yachting Association	Concern over maintaining safe clearance for yachts below the turbine blades	The blade clearance has been amended to ensure suitable clearance for yachts.

Table 1.2 Summary of some of the key outcomes of the Gwynt y Môr consultation process

In addition, the local members of Parliament and the Welsh Assembly representing the constituencies along the north Wales coast have all been invited to briefings by npower renewables, designed to provide a detailed review of the proposed Gwynt y Môr project and to gauge the views expressed by constituents.

Additional, focused and detailed consultation has been completed with a wide range of key statutory and non-statutory stakeholders by the independent consultants and specialists involved in the preparation of the detailed Environmental Impact Assessment reports, which form the basis of this Environmental Statement. Examples include detailed liaison and consultation with representatives of the fishing industry,

recreational scuba diving interests, archaeology interest groups, navigation and shipping interests including the MCA and Trinity House, and local authorities (particularly with regard to visual assessments).

1.4.3 Public consultation

In addition to the extensive consultation with statutory and non-statutory bodies, ongoing since mid-2001, npower renewables has kept the local populations around Liverpool Bay informed of the details of the Gwynt y Môr project and has sought to canvass their views on the proposed wind farm. The process of informing and consulting with the wider public commenced immediately after the award of the Gwynt y Môr project area by the Crown Estate at the end of 2003 and has continued throughout the development process. This public consultation is summarised in the following sections.

1.4.3.1 Public attitude surveys

Surveys of public attitude have been completed both prior to and following the construction of the North Hoyle Offshore Wind Farm during March 2003 and June 2004, respectively. The research aimed to establish the awareness and knowledge of North Hoyle, opinions about the wind farm, the importance of the sea view, the wind farm's impact on visitor numbers and the degree and nature of people's environmental concerns.

Independent research companies were commissioned to conduct the surveys. A representative cross-section of residents and non-residents who visit the area (for day trips, longer holidays, shopping, social/leisure purposes or work) were interviewed. Interviews with residents were carried out door-to-door in both Rhyl and Prestatyn. Visitors were also interviewed on the street, along the seafront and inland (e.g. at shopping centres), again in Rhyl and Prestatyn.

The post-construction survey, conducted between 1st June and 16th June 2004, interviewed a total of 256 individuals (residents, 200; visitors, 56). The main findings of the 2004 survey are summarised below and compared with the baseline established during the 2003 study:

- support for North Hoyle has increased when compared with the baseline survey, with 73% of residents saying that they now support the project compared with 62% of residents that responded in 2003
- only 5% of residents expressed opposition to the North Hoyle Offshore Wind Farm
- of the visitors interviewed in 2004, 71% said that they were in support of North Hoyle
- no visitors were reported to oppose the scheme.

With regard to the appearance of North Hoyle, the following views were expressed:

- approximately one third (31%) of residents said that North Hoyle is pleasing to look at and 14% said that it is not (no change from 2003 baseline)
- 10% of residents felt that North Hoyle had improved the view (up from 5% prior to construction).
- before the wind farm was built 14% of residents interviewed felt that the development would spoil the view, this figure increased to 22% after construction, also fewer people had neutral views on the appearance of North Hoyle.

With regard to the effect on the numbers of visitors to the survey areas, the following views were recorded:

- among the residents interviewed, 67% stated that the presence of North Hoyle had no effect on the number of people visiting or using the area



Figure 1.2 Prestatyn public exhibition

- more residents expressed the opinion that there had been an increase rather than a decrease in visitor numbers
- visitors generally felt that the wind farm would not deter them from visiting the area, with 82% saying that they would not anticipate any effect on visitor numbers.

In addition to the North Hoyle public attitude surveys, a study was commissioned, which sought to gauge the opinions of visitors to a number of locations in north Wales and the Wirral, and assess their opinion of North Hoyle and Gwynt y Môr. Conducted between 19th August and 12th September 2004 at Abergele Seafront, Colwyn Bay, Great Orme's Visitor Centre (Llandudno), Gwaenysgor Mount (Prestatyn), Hoylake (Wirral), Llandudno Promenade, Prestatyn Promenade, and Rhyl Promenade, the study interviewed a total of 830 tourist visitors.

The main findings of the survey with regard to North Hoyle were:

- of those tourists who felt able to form an opinion, two thirds (66%) supported North Hoyle and only 6% opposed it
- the location of North Hoyle was deemed acceptable by 61% of tourists able to form an opinion, with 31% saying that it is in a good location and 8% saying that it is in a bad location
- six in ten tourists (65%) stated that the appearance of the wind farm is acceptable, with one in five (19%) saying that it is pleasing and 15% saying that it is not pleasing
- nearly all of the tourists who felt able to comment (96%) stated that the wind farm has had no effect on visitor numbers in the area.

With regard to the Gwynt y Môr project, the following views were expressed:

- over half of the tourists who were able to form an opinion (54%) showed support and 22% expressed opposition
- seven in ten tourists (69%) felt that Gwynt y Môr would have 'no effect' on future visitor numbers and 17% thought that numbers may decrease
- when asked if Gwynt y Môr would put the interviewee off visiting again, only 4% of visitors said that it would discourage them.

Public attitude and potential tourism impacts of the project are considered further in Chapters 7 and 8 of this Environmental Statement.

1.4.3.2 Public exhibitions

npower renewables conducted a series of six public exhibitions between 11th Sept 2004 and 31st Oct 2004 at Rhyl, Prestatyn, Llandudno, Crosby and Hoylake. The public was actively encouraged to attend these meetings through extensive advertising. This included full-page adverts in local and regional press, project specific leaflets and posters in public buildings from Anglesey to Sefton; press editorial and articles, and the npower renewables' website.

Set up in easily accessible public buildings, these exhibitions consisted of a series of panels providing a wide range of information on renewables in general, wind energy, the North Hoyle Offshore Wind Farm, npower renewables and the Gwynt y Môr project proposals. Visual aids, including maps, charts, photomontages and a virtual 3D model of the Gwynt y Môr project, were also provided. The exhibitions were hosted by the npower renewables project team and key consultants working on the EIA. The staff attending the public exhibitions were qualified to answer questions on Gwynt y Môr or wider issues of climate change and renewable energy.

The public exhibitions also provided an important opportunity for the project team to receive feedback from members of the public. Feedback was received both directly through discussion and also through blank comment forms that were available for members of the public to complete on a confidential basis.

In total around 925 members of the public attended the six events and 419 comments forms were returned. The comments received ranged from full and unequivocal support for the project through to those opposing the scheme, but included a large number of people between these two extremes either expressing no clear view or expressing some degree of reservation or concern about the proposed project.

Positive comments commonly received with regard to the proposed Gwynt y Môr Offshore Wind Farm included:

'I am in favour of the Gwynt y Môr development and of additional "wind at sea" developments.'

'We have no objections and a good use of natural resources.'

'I offer my complete support for the proposed offshore wind farms but was disappointed that the proposed completion date was so far off.'

'Excellent – go ahead.'

Those who strongly opposed the scheme or expressed some degree of reservation were most commonly concerned about the potential visual impact of the project. Typical areas of concern expressed by respondents also included:

- visual impact
- adverse impact on tourism
- adverse impact on property prices
- health and safety
- ineffectiveness of the turbines and wind farms
- damage to bird life
- damage to marine life
- installation noise
- operational noise
- damage to fishing
- possible future expansion of Gwynt y Môr
- effect on flying schools
- effect on shipping.

In advance of each of these public exhibitions npower renewables also held briefing sessions open to local town, borough and county councillors as an opportunity for them to gain a more detailed understanding of the project prior to the public exhibitions.

A further public meeting was held on 27th April 2005 at the request of the Llandudno Town Council, primarily in response to local concerns with regard to possible impacts on the tourism industry. The meeting, chaired by the Mayor of Llandudno, consisted of presentations made on behalf of the Llandudno Hospitality Association, a presentation from npower renewables and an open discussion session. It is estimated that some 250 members of the public attended the meeting.

A further set of public exhibitions were held in November 2005 to inform members of the public about the application for consent. These were held at: Hoylake (November 16), Rhyl (November 17), Colwyn Bay (November 19) and Llandudno (November 20).

1.4.3.3 Focus group meetings/presentations

A number of more focused meetings have been held to address the specific concerns of local interest groups. npower renewables attended or presented at a range of these meetings which included representatives from:

- river Clwyd Salmon Fishing groups
- the Tidal Dee Estuary Users Group
- the Navigation Working Group
- the Dee Estuary Conservation Group
- the wildlife Trusts

1.4.3.4 Other sources of information

Information on the Gwynt y Môr project has also been made available through a dedicated website (www.npower-renewables.com/gwyntymor) where internet users can find details on the development proposals and updates on project progress.

Leaflets describing the project have been provided in numerous locations in the north Wales and north west region, for example in local libraries. These locations are listed on the Gwynt y Môr website.

1.4.4 The scope of the Environmental Statement

The scope of this Environmental Statement (ES) has been developed through the extensive process of consultation with statutory and non-statutory stakeholders and the general public. The ES is intended to provide information and assessments of a wide range of aspects, including those expressed as being of particular concern by local consultees and the general public, and to be compliant with the requirements of the EIA Directive. The scope (or terms of reference) for the ES may be summarised as follows:

- a description of the background to the project, the need for the project, and the alternatives considered by npower renewables
- a description of the construction, operation, and decommissioning of the proposed Gwynt y Môr Offshore Wind Farm and associated infrastructure
- a description of the consenting process and the planning environment controlling the development of offshore wind farms
- a description of the baseline environment including the physical, biological and human environments
- identification of key environmental sensitivities and potential effects of the project, following on from generic statutory guidance and the key concerns expressed by the local population. These particularly include, but are not necessarily limited to, a thorough consideration of the potential effects on or associated with the following:
 - noise (construction and operation)
 - radar, TV and telecommunications
 - visual effects, landscape and seascape
 - archaeology
 - marine ecology, including marine mammals
 - ornithology
 - conservation sites
 - fisheries
 - coastal processes and sediment transport including scour

- navigation and shipping
- cumulative effects
- socio-economic issues including effects on tourism
- the development of workable and effective mitigation and management measures to avoid, mitigate or monitor identified areas of potentially significant effects
- identification of residual effects that cannot be avoided or mitigated.

A variety of site-specific studies have been commissioned in order to support the project EIA process and are summarised in Section 1.6.

1.5 Structure of the Environmental Statement

The results of the EIA process are contained within this document, which comprises 13 Chapters and a stand-alone Non-Technical Summary. The chapters contained herein are as follows:

Chapter	Content
Chapter 1	Presents background details to the project and the environmental statement.
Chapter 2	Gives an overview of the need for renewable energy at Gwynt y Môr and the alternatives to the Gwynt y Môr project considered in terms of sites and turbine layouts
Chapter 3	Provides a summary of the legislative controls in relation to offshore wind farms
Chapter 4	Describes the methods proposed for the construction, operation, and decommissioning of the Gwynt y Môr project
Chapter 5	Investigates and describes the baseline physical processes of the surrounding environment.
Chapter 6	Gives a baseline review of the biology and ecology of the region covering both the onshore and offshore environments and a detailed description of the benthos, fisheries ecology, marine mammals, ornithology, terrestrial ecology and nature conservation status of the Gwynt y Môr project area and surrounding area
Chapter 7	Addresses the baseline human environment for both onshore and offshore environments including socio economics, fisheries, recreational activity, tourism, ports and shipping, noise, seascape and landscape, radar and radio, archaeology, oil and gas, dredging, spoil disposal and aviation
Chapter 8	Provides details of the assessment methodology utilised for the EIA
Chapter 9	Describes the impact of Gwynt y Môr as a source of renewable energy
Chapter 10	Presents the detailed assessment of the potential impacts of the construction, operation, and decommissioning of the Gwynt y Môr offshore components
Chapter 11	Presents the detailed assessment of the potential impacts of the construction, operation, and decommissioning of the Gwynt y Môr onshore components
Chapter 12	Presents the incombination or cumulative effects of Gwynt y Môr with other existing or possible activities within the region
Chapter 13	Provides the main conclusions of the Environmental Statement

Table 1.3 Environmental Statement chapters and content

The report has been compiled in a format which demonstrates that all of the issues required for assessment in terms of the Consenting Procedure (details in Chapter 3) have been addressed.

The stand-alone Non-Technical Summary, produced in both English and Welsh, provides a summary of the core findings of the ES in jargon-free language as a quick and easy reference for decision makers, interest groups and members of the public.

The Non-Technical Summary is available, free of charge, from npower renewables at the address given in Section 1.1 or may be downloaded from the project website (www.npower-renewables.com/gwyntymor).

Further paper copies of this Environmental Statement are available from npower renewables at a cost of £250 plus VAT. The Environmental Statement has also been produced in digital form and is available on a CD Rom from npower renewables at a cost of £5 plus VAT.

The Environmental Statement has been advertised in the local and national press and copies have been lodged at the following local authority offices:






- Denbighshire County Council Offices, County Hall, Wynnstay Road, Ruthin, LL15 1YN
- Isle of Anglesey County Council, Council Offices, Llangefni, Anglesey, LL77 7TW
- Conwy County Borough Council, Bodlondeb, Conwy, North Wales, LL32 8DU
- Wirral MBC, Town Hall, Brighton Street, Wallasey, Wirral, CH44 8ED
- Sefton MBC, Balliel House, Balliel Road, Bootle, L20 3NJ

Copies have also been lodged at the following tourist information centres:




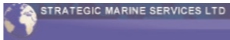










- Llandudno Tourist Information Centre, 1–2 Chapel Street, Llandudno, Gwynedd, LL30 2YU
- Colwyn Bay Tourist Information Centre, Imperial Buildings, Princes Drive, Colwyn Bay, Conwy, LL29 8LF
- Rhyl Tourist Information Centre, Rhyl Childrens Village, West Parade, Rhyl, Denbighshire, LL18 1HZ

1.6 Environmental Statement consultants and supporting studies




The consultants who have undertaken the range of assessments and supporting studies that have informed this ES and the EIA process that it embodies are listed below:

Support/detail	Company/Consultant	
ES Preparation and project management; Coastal process modelling; Renewables policy, need and alternatives, legislative framework, policy analysis, (in association with ABPmer)	RWE Group	
EIA and consent management and ES preparation	Offshore Environmental Solutions Ltd	
Archaeology and cultural heritage	Gifford and Partners	
Landscape and visual impact assessment	Environs Partnership	
Photomontages and ZVI	PDMarsh Ltd	

Continued

Onshore transport assessment	ScottWilson	
Marine ecology including marine subsea noise assessment	Centre for Marine and Coastal Studies Ltd	
Marine mammal field studies	University of Wales, Bangor	
Navigation risk assessment	Strategic Marine Services	
Navigational modelling studies	Lairdsie	
Marine traffic surveys	Anatec	
Socio-economic assessment	Regeneris Consulting	
Commercial fisheries assessment and fish and shellfish ecology baseline	Coastal Fisheries Conservation and Management	
Ornithology field studies and assessment terrestrial ecology surveys	ERM	
Project design studies	TEP	
	BOMEL	
	Pirelli	
	Areva	
	Osiris	

Continued

	Bam	
Airborne noise assessment	Hoare Lea	
Radar and helicopters and offshore subsea noise monitoring	Qinetiq	
Legal services	npower renewables	
Welsh translation of NTS	Whitedrift Translations Ltd	
Document design, layout and production	French Jones	