

NON-TECHNICAL SUMMARY

INTRODUCTION

Celtic Offshore Wind Ltd (COWL) is a partnership between First Hydro Renewables Ltd (FHR) and the Renewable Development Company Ltd (RDC). Both are companies based in North Wales, employing between them 250 people. FHR is a sister company to First Hydro Company, who own and operate the pumped storage power stations at Dinorwig and Ffestiniog. RDC is a leading developer of wind energy in Wales, and is currently working on a 60 megawatt wind farm development at Cefn Croes in mid-Wales.

COWL is proposing to develop an offshore wind farm and associated infrastructure at Rhyl Flats, approximately 10km from the North Wales coast, north-west of Rhyl (referred to as the Rhyl Flats wind farm). The site location is shown on the map included in this document.

Offshore wind farms are a central part of the UK government's strategy to tackle climate change and meet its international commitments to reduce the UK's emissions of carbon dioxide and other 'greenhouse gases'. Clean renewable energy currently only makes up some 3% of the UK's electricity supply but the Government has set a target of reaching at least 10% of supply from such sources by 2010.

The Rhyl Flats wind farm would supply up to 150 megawatts (MW) of renewable electricity into the existing North Wales electricity network. This would be sufficient to supply the domestic electricity demand of about 105,000 households on an annual basis, more than sufficient to supply the annual needs of all the homes in Conwy and Denbighshire. Subject to gaining the necessary consents, construction is planned to start in 2004 and the wind farm would then operate for 20 years before being decommissioned and removed.

A full assessment (an Environmental Impact Assessment, or 'EIA') has been undertaken of the wind farm's likely effects on the local and wider environment. The EIA has informed the design of the project and has identified measures that will be adopted during the construction and operation of the project to avoid or reduce impacts where practicable. This document is the Non Technical Summary of the Environmental Statement (ES) which reports the results of the EIA.

PROJECT OUTLINE

Rhyl Flats was chosen by COWL as an appropriate location for an offshore wind farm for the following reasons:

- *the water depth (between 3m and 21m at low tide) is suitable;*
- *there is a good wind resource on the site;*
- *Rhyl Flats is at least 8km (5 miles) from the coast; and*
- *there are no known environmental sensitivities or other uses made of the site which would prevent the installation of the turbines.*

The wind farm will consist of 30 modern wind turbines each with an output of between 2.5 megawatts and 5 megawatts. The wind turbines will consist of a tower up to 100m tall, on which will be mounted a rotor with a maximum diameter of 105m. The maximum total height to vertical blade tip will therefore be 152.5m. In addition to the wind turbines, there will be two meteorological masts to measure the wind resource and the option of an offshore substation. In addition, cables will be laid to the shore, and then connected to the existing electricity network. The cables will come onshore at a 'landfall' point to the west of Towyn. The cables will then run underground for about 1km to a substation or metering building. They will then be routed on overhead wooden poles for a further 6km to the existing electricity lines near Moelfre.

COWL is proposing to designate a limited exclusion zone around the wind farm structures for health and safety purposes. This is discussed further below.

While many of the details of the project have been decided, it is more appropriate to determine some issues closer to the construction of the project. For example, a range of turbine types are being considered and COWL will take advantage of the most efficient and appropriate design available at the time of construction. Developing technology may also allow the electricity substation to be located offshore within the wind farm, rather than onshore. All of these options were assessed during the EIA and are described in the ES.

PROJECT JUSTIFICATION

The development of offshore wind projects will assist the UK in achieving a number of targets and policy goals relating to greenhouse gas emissions, renewable energy, energy efficiency, and security and diversity of energy supply.

Key UK policies and targets include the following:

- Under the Renewables Obligation scheme, licensed electricity suppliers must supply a specified proportion of their power from renewable sources. This initiative is designed to help the UK to make progress towards a policy target of generating 10.4% of electricity requirements from renewable sources by 2010.*
- At the Kyoto Summit, the UK committed to reducing carbon dioxide emissions to a level 20% below 1990 levels by 2010.*
- In June 1994, the UK signed the United Nations Economic Commission for Europe (UNECE) Sulphur Protocol. This commits the UK to reducing its sulphur dioxide (SO₂) emissions to one fifth of 1980 emissions by 2010.*
- In a recent Energy Review, recommendations were made that the UK should set a target of generating 20% of electricity supply from renewable sources by 2020.*

These policies and targets reflect the increasing concern in relation to pollution from fossil fuelled power stations and, in particular, emissions of carbon dioxide and other greenhouse gases and the contribution that these make to global warming. By helping the UK meet these policy objectives and targets, wind farm developments will assist in reducing greenhouse gases which would otherwise result from the generation of electricity from fossil fuels. In a global context the development will, therefore, be beneficial in environmental terms.

In response to the policy objectives noted above, the Crown Estate (which owns and administers the seabed in UK territorial waters) invited developers to take up licences for areas of the sea bed for the purposes of developing offshore wind farms. COWL responded to this opportunity and in April 2001 was successful in being granted rights to seek consent for the Rhyl Flats project.

THE AUTHORISATION PROCESS

The consents procedures for offshore wind farms is complex, with the principal consents which are required being as follows:

- *consent under Section 36 of the Electricity Act 1989 (from the Department of Trade and Industry, DTI) for the generating facility itself;*
- *consent under Section 37 of the Electricity Act 1989 (from DTI) for the onshore overhead electric power cables;*
- *license under Section 5 of the Food and Environmental Protection Act 1985 (from the National Assembly for Wales) for the installation of masts and associated construction works offshore;*
- *consent under Section 34 of the Coast Protection Act (from the Department for Transport, Local Government and the Regions) for the construction, alteration or improvement of works, under or over any part of the seashore, and the movement of materials; and*
- *deemed consent under Section 90 (2) of the Town and Country Planning Act 1990 for the onshore substation (if this option is adopted), and the onshore overhead power line.*

The approach to the assessment of environmental effects has been based on meeting the requirements as set out in legislation, including the Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations, 2000.

PROJECT CONSTRUCTION AND COMMISSIONING PROGRAMME

Much of the assembly of components will take place at a designated 'staging area' where equipment will be marshalled and prepared for installation. This will reduce the likelihood of operational difficulties at sea. The assembled modules will then be lifted onto the vessels using a mobile crane. A suitable dock area will be used throughout

construction to temporarily store turbine parts and components brought to the site by sea, for example large items such as monopiles. There are a number of suitable ports local to the project, with Mostyn Docks in Flintshire being the closest.

The scale of this project is expected to require the use of three jack-up barges which will be dedicated to installing the foundations, erecting the wind turbines, installing the electrical infrastructure and installing the offshore substation (if this option is adopted). This type of barge provides facilities for stable drilling, hammering and lifting operations.

At sea, the jack-up barges, supplemented by a transport barge and tugs, will transport all components and assembly equipment to site as and when required in accordance with the construction programme.

Construction of the wind farm is scheduled to begin in March 2004 and to be completed by September 2004.

SUMMARY OF OFFSHORE ENVIRONMENTAL IMPACTS

Effects on the Physical Environment

Short term localised changes in erosion or deposition of sediments are likely to occur as a result of sediment release during construction. However, these impacts are not considered to be significant. There will be no other significant impacts on coastal geomorphology along the North Wales coastline.

The foundations of the turbines, masts and substation will physically occupy an area of up to 630 m² of seabed. An area of the sea bed will also be disturbed as a result of the installation of the subsea cable. This disturbance will take place over an area of around 1,000 m² and will depend on the cable installation method used. Given the relatively uniform nature of the sediments in the wider area, this loss is not considered to be significant.

Care has been taken in the project design to ensure that there will be no detrimental impacts in relation to the risk of flooding. The electricity cables will be laid through an existing gap in the sea defences, which is currently closed with stop boards. This brief phase of work will be undertaken at low tide to avoid the potential for flooding impacts. Following cable installation, the gap will be filled with concrete and the defence reinstated to a standard which is higher than that at present.

No other impacts are predicted in relation to water quality or sediment quality.

Given the nature of the environment and the naturally dynamic seabed, the overall physical impacts of the project are not considered to be significant.

Effects on Fish and Marine Mammals

Some minor physical impacts to fish may occur during construction but these will be limited to the effects of the physical presence of the foundations, the activities of

construction vessels and the potential for deposition of sediments on the sea bed. These impacts are not considered to be significant due to fact that the impacts are temporary and because fish will actively avoid these impacts.

In the longer term, it is likely that the combination of reduced fishing within the wind farm and improved habitat biodiversity will have beneficial effects for fish populations.

Noise from construction works and from the operation of the wind farm will be transmitted through water and could potentially affect fish and marine mammals. Highest noise levels will result from piling activities (if this construction method is used), but it is predicted that this will have no effects on fish beyond a distance of a few metres. This type of noise will be audible to marine mammals at distances of up to 20km, but it is anticipated that they will avoid the area of the works whilst piling is underway and no significant impacts are anticipated. No impacts are expected during operation.

Recent studies indicate that there is some potential for impacts to certain fish as a result of electromagnetic fields generated by marine electrical cables, although marine power cables have been used for many years with apparently no significant impacts to fish.

Potential impacts are predicted to be localised and restricted to only two species of elasmobranch, angel shark and sting ray. Impacts are therefore not anticipated to be significant. Cable insulation and the burial of the sub-sea cable will help minimise these effects.

Effects on Other Marine Ecology

Construction activities and equipment installation will result in some localised effects on benthic communities (that is, flora and fauna which exist on the sea bed). Impacts will be most significant for larger, less mobile organisms such as crab and sea urchin. However, given the already highly mobile environment, the distribution of these species in the wider area and the resilience of the species, recolonisation of disturbed sediments is anticipated to be rapid and overall impacts to benthic communities during construction are not considered to be significant.

In the longer term, the presence of scour protection measures (for example, by placing rock around the bases of the piles) has the potential to provide a habitat for other benthic communities. This is likely to improve the area in terms of biodiversity and the combination of shelter and food will be beneficial for fish species.

The construction of the cable landfall in an open cut trench has the potential to cause temporary impacts to flora and fauna between the low and high tide marks. These impacts are anticipated to be minor due to the fact that the disturbance is temporary and there are no flora and fauna of particular importance present in the vicinity of the landfall.

Effects on Ornithology

Potential impacts on birds include disturbance to or permanent loss of foraging habitat, risk of bird collisions with operating turbines and the creation of a barrier by

the rows of turbines. It is also possible that there will be creation of new marine habitat around the turbine bases which may create new foraging habitat for birds.

The EIA concluded that there may be some general disturbance effects during construction when birds normally using the area will maintain a stand-off distance from the works, but that in general the effects during operation will be limited and are not considered to be significant, particularly as the wind farm development will not give rise to any impacts on sites designated for nature conservation interest.

During the construction period, the majority of birds which will be present in the area will be fish eating species. Important fish eating species such as red-throated diver and great crested grebe are winter or passage visitors and unlikely to be present in great numbers in the summer months. Furthermore, fish are likely to leave the area temporarily during construction works because of disturbance and any fish eating predators are likely to follow their prey out of the area.

The design of the wind farm has ensured that habitat loss will be kept to the minimum necessary for the works, which will reduce the effects on benthic feeding bird species. Available data does not indicate that the wind farm site is of any special importance to seabirds and significant impacts to the use of the site by birds during operation of the wind farm are considered unlikely. With the exception of cormorant (a fish eating species), few species are considered likely to forage in the area of the wind farm because of its distance from the shore and the depth of water. In the longer term there could, in fact, be a benefit because underwater structures are likely to create artificial reefs and potential new habitats for fish which may increase the fish resource for fish eating bird species in the area.

Common scoter (which occur in nationally important numbers in the study area) is the main benthic feeding bird species which could be affected by habitat loss. However, significant impacts are not predicted because benthic habitat loss will be small; their preferred food source is scarce in the location of the wind farm and numbers are low in the months when most construction activity is likely to take place (April to August).

Common scoter are susceptible to disturbance but for the reasons given above it is considered unlikely (based on available data) that large numbers of birds will be present in the area during the summer months or during the moulting period.

Moulting common scoter could be affected by laying of the subsea cable. However, the work period will be short.

It is possible that there may be some limited mortality to birds as a result of collision with the wind turbines. Collision risk modelling indicates that the risk is greatest to red-throated diver but that no significant impacts to red-throated diver or other species in the area are likely. Proposed lighting for the site has been designed to reduce the risk of attracting birds into the turbines.

Bird flight lines are not expected to be significantly affected as there will be a gap of 335m between rotor blades which will reduce the risk of a barrier effect from the turbines.

The findings of ongoing research studies will be used to refine the scheme mitigation detail as necessary. COWL is committed to monitoring the effects of the wind farm through its life from construction to decommissioning to inform future assessments.

Effects on Fishing

For reasons of safety and security, there will be an exclusion zone of 50m around each turbine and exclusion of mobile gear over the full extent of the area, extended to 50m around the perimeter. Access will be allowed for static fishing gear within the area, excluding the 50m from each turbine.

Two local commercial fishing operators and approximately 10 local sea angling operators are likely to be affected by the wind farm development. In addition, there is a possibility that a small number of non-local vessel operators could be affected. The effects will include direct loss of traditional fishing ground and alterations to vessel movements moving to and from adjacent fishing areas. This could result in an overall increase in the sea miles travelled to reach fishing grounds of similar quality.

The potential for negative impacts as a result of the direct loss of fishing area may potentially be offset in the long term through increases in fish stocks as a result of the presence of exclusion zones around each turbine. Overall impacts to fishing interests are anticipated to be moderate. COWL will continue to liaise with affected fishing organisations as appropriate during the development of the project.

Effects on Marine Archaeology

Potential impacts on known and unknown wrecks were considered. Of particular concern was The Resurgam, which is designated under the Protection of Wrecks Act 1973. However, it is unlikely to be impacted because it is distant from the site.

The SS Penrhos lies within the development area and, although not of great historical importance, the wreck was a result of military action and involved loss of life. The wreck will therefore be protected by an exclusion zone, as will other possible sites of marine archaeological interest. A protocol will be prepared setting out procedures for dealing with any features that appear to be of archaeological importance which are discovered in the course of construction.

These mitigation measures will ensure that there are no impacts on archaeology in the area, whilst the additional information about human inhabitation and maritime activity in the area which will be generated by ongoing investigations is likely to add to understanding, appreciation and future conservation of the historic environment of North Wales. Consequently, the residual effect of the development on the archaeological heritage is likely to be positive.

Effects of Noise on People

An assessment of the potential noise impact of the wind farm was carried out. Background noise level measurements were carried out at three locations along the

coast which were identified through preliminary noise predictions as potentially subject to the greatest noise levels from the proposed wind turbines.

Predictions of wind turbine noise at 10 locations along the coast and comparison with measured background noise indicate that wind turbine noise will be substantially below the prevailing background noise levels. This demonstrates that there will be no noise impacts resulting from the operation of the wind farm.

Effects on Tourism and Amenity

Disturbance impacts during construction and operation will be limited to effects on recreational boat users and diving activities in the vicinity of the wind farm site and the effects of the exclusion zone (as described above). Given that the wind farm is not located directly within any recreational vessel routes, impacts are not predicted to be significant, provided the relevant navigational markings and warnings are displayed.

Effects on Shipping and Navigation

A shipping and navigation risk assessment has identified 16 shipping routes passing within 16 km of the proposed wind farm and three routes passing within the site boundary. The assessment concluded that minor alterations should be made to the routes as appropriate. Recommendations were made to minimise the additional risk imposed by the presence of the wind farm.

Impacts to shipping and navigation during construction will be managed through careful planning and consultation with potentially affected parties and the use of appropriate navigation notices.

Impacts Resulting from Traffic and Transport

The scale of the construction works and the time period over which it will occur is very limited, and no impacts resulting from construction traffic are therefore anticipated.

Effects on the Local Economy

The wind farm will provide opportunities for local construction firms and for local direct and indirect employment. COWL have a policy to, wherever possible, procure the services and skills of local organisations and contractors, in addition to recruiting personnel from within the locality. It is expected that up to 60 to 70 people will be employed during the construction period and up to 10 on a long term basis to operate and maintain the wind farm.

Effects on Seascape, Landscape and Visual Amenity

The assessment of the offshore components of the project considered the effects of the construction and operational phases on the seascape, landscape and visual amenity of a study area extending from Moelfre on the Isle of Anglesey to Hoylake on the Wirral.

A visibility study undertaken on behalf of the Countryside Council for Wales suggests that the marine zone of Colwyn Bay is some of the least visible of the coastal waters

around Wales as the result of the flat coastal plain (inland of Abergele). The generally low level of visibility in the study area is also the result of the high land close to the coast, which screens views of the development from all but distant elevated locations further inland. The high seawall and railway embankment along the Colwyn Bay coastline will also screen views from much of the immediate low lying hinterland.

In the long term, the only significant landscape and visual effects of the wind farm will be effects on the following:

- the character of the Llandudno Bay and Colwyn Bay seascape units (as defined in the ES);*
- the character of parts of three of the 12 landscape types, as defined in the ES - the Coastal Slopes (from Llandudno to Old Colwyn), the Limestone Farmlands (from Old Colwyn to Abergele), and the Limestone Escarpment & Hills (Little Orme, Bryn Euryn and Cefn yr Ogof);*
- views for residents and visitors in seafront and hillside properties in Llandudno, Penrhyn Bay, Rhos-on-Sea, Colwyn Bay, Old Colwyn and Llanddulas, and seafront properties in Rhyl;*
- views for people on Llandudno and Colwyn Bay promenades and views for people on the closest beaches such as in Llandudno Bay and from the long stretch of beach from Penrhyn Bay to Rhyl;*
- views for visitors to the Great Orme visitor attractions, Llandudno Pier and the Sky Tower, and views for visitors to three elevated vantage points - Great Orme, the Little Orme, Bryn Euryn and Moelfre Isaf;*
- views for motorists on the A55, rail travellers on the coastal railway between Colwyn Bay and Towyn, cyclists on Sustrans route No 5 and walkers on the coastal section of the North Wales Path; and*
- views for marine-based receptors in the Llandudno Bay and Colwyn Bay seascape marine zones, for example, people on the shipping and ferry routes, on fishing boats, yachts and those involved in inshore water-based activities.*

However, these effects will not necessarily have an unacceptable adverse effect on the seascape character, landscape character or visual amenity of the study area as the subjective reaction to changes in views and the introduction of these new features into the seascape will vary between individuals.

SUMMARY OF ONSHORE ENVIRONMENTAL IMPACTS

Effects on Ecology and Ornithology

No designated or proposed statutory or non-statutory sites of nature conservation value will be directly or indirectly affected by the grid connection.

Potential impacts to ecology and ornithology will be minimised through the adoption of mitigation measures during the design, construction and operation of the project. No significant impacts to ecology and nature conservation are therefore anticipated.

Effects on Terrestrial Archaeology

Implementation of standard mitigation proposals will avoid or reduce any significant adverse effects arising in respect of the onshore works between the landfall and the substation.

It is considered unlikely that installation of the overhead lines on wooden poles will have a significant adverse effect even without mitigation, but provision has been made for measures that will further reduce the scope for accidental damage to hitherto unrecognised sites.

The residual effect of the development on the archaeological heritage is likely to be positive as there will be the opportunity to generate additional information about human inhabitation of the area.

Impacts Resulting from Traffic and Transportation

Due to the limited nature of the construction activities, it is not anticipated that the onshore elements of the development, including the underground cabling, will give rise to any significant impacts related to traffic and transport.

Effects on the Local Economy

Due to the limited nature of the construction and operational activities, it is not anticipated that the onshore elements of the development, including the underground cabling, will give rise to significant impacts on the local economy.

Effects on Landscape and Visual Amenity

The grid connection route is not located within any national landscape designations, although small parts of the locally designated Special Landscape Area (SLA) will be affected. Any significant effects on landscape and visual amenity will therefore only occur along limited sections of the route, and these are local to the route.

Furthermore, there will be no significant effects on the visual amenity of residents in Abergele, Pensarn, Belgrano, Morfa Ruddlan, Towyn, Kinnel Bay or St George, and only a limited number of residential properties close to the grid connection route may be significantly affected by the proposal in visual amenity terms. These include Sheep Wash, Fadre Farm and some of the properties in Bodtegwel Terrace.

The visual impact of the proposed overhead lines on Listed Buildings and Kinnel Park is considered unlikely to have a significant adverse effect.

CUMULATIVE IMPACTS

Introduction

As part of the EIA, the impacts of the proposed wind farm at Rhyl Flats have been assessed in conjunction with another wind farm project proposed for development at North Hoyle.

This section summarises the key potential and predicted cumulative environmental impacts of these projects, as set out in more detail in the ES, for the offshore and onshore components of the project.

Cumulative Impacts of the Offshore Components

The development of both the North Hoyle and the Rhyl Flats offshore wind farms will result in a slight increase in the extent and intensity of the effects on seascape and landscape character, compared to the development of either project on its own. For example, the two construction phases will result in medium-term (rather than short-term) effects on the character of the Colwyn Bay Seascape Unit, and the two operational phases will result in greater effects on the character of the Colwyn Bay Seascape Unit, plus more extensive effects on the character of the Coastal Slopes and Limestone Escarpment & Hills landscape types.

There will also be a slight increase in the extent and intensity of the changes to views, particularly in views from properties, promenades, beaches, elevated vantage points and linear routes from the Little Orme to Point of Ayr, and also on marine-base receptors in the Colwyn Bay Seascape Unit.

No other potential negative cumulative impacts are predicted in relation to any other environmental aspects.

Cumulative Impacts of the Onshore Components

In the event that connection options from several offshore wind farms come ashore in the region, then it is conceivable that the construction of Rhyl Flats wind farm may have an additional cumulative effect on terrestrial archaeology. The possible impacts would be highly localised and unlikely to be significant. Moreover, archaeological information arising from the development will feed back into local and national monument records and inform subsequent curatorial decisions. Consequently, the development may have a beneficial cumulative effect on terrestrial archaeology.

No other potential negative cumulative impacts have been identified in relation to the onshore components of the development.

ENVIRONMENTAL MANAGEMENT PLAN

COWL is committed to the fundamental principles of EIA, and specifically to the incorporation of environmental considerations into the design of the project as it evolves. An important mechanism by which this process will be formalised is through

the adoption of an Environmental Management Plan (EMP). The main objectives of the EMP will be to:

- *ensure compliance with legislation, Codes of Practice and Regulations;*
- *ensure compliance with any conditions set during the authorisation process;*
- *ensure that COWL's Health, Safety & Environment policy is complied with; and*
- *ensure implementation of the mitigation measures identified during the EIA process.*

KEY CONCLUSIONS

The development of this project will assist the Government in fulfilling key policies and targets which have been set for renewable energy and emissions, thereby avoiding emissions of greenhouse gases. This is clearly positive in environmental terms, whilst resulting in only relatively minor impacts on the local environment. Any impacts during the construction phase will be minimised by the application of an Environmental Management Plan.

ADDITIONAL INFORMATION

More details about the Rhyl Flats wind farm can be obtained by consulting the Environmental Statement which can be viewed during normal office hours at the following locations:

- *Conwy County Borough Council, Civic Offices, Colwyn Bay, Conwy;*
- *Denbighshire County Council, Council Offices, Nant Hall Road, Prestatyn, Denbighshire;*
- *Flintshire County Council, County Hall, Mold, Flintshire;*
- *Abergele Library, Market Street, Abergele;*
- *Rhyl Library, Museum and Arts Centre, Church Street, Rhyl, Denbighshire;*
- *Llandudno Library, Mostyn Street, Llandudno.*

For general information visit www.wind4energy.co.uk, or for further details or to purchase a copy of the full ES contact COWL at:

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