**Beatrice Onshore Transmission Works**

**Project Context**

**Beatrice Offshore Wind Farm**

Beatrice Offshore Windfarm Limited (BOWL) is a joint venture partnership formed between SSE Renewables (50%), RepsolNuevasEnergías UK (25%) (formerly SeaEnergy Renewables) and Copenhagen Infrastructure Partners (25%). In February 2009 we were awarded exclusivity by The Crown Estate to develop the Beatrice Offshore Wind Farm in Scottish Territorial Waters.

SSE is one the UK’s largest generators of electricity with around 11,600 MW of generation capacity in total (in the UK and Ireland) from the most diverse portfolio of power stations. It is the leading generator of electricity from renewable resources with a total generation capacity of around 3,300 MW.

Copenhagen Infrastructure Partners (CIP) is a multinational team with extensive experience and knowledge within the fields of regulated infrastructure and renewable energy. The team has a broad range of competencies within corporate finance, merger & acquisitions, engineering, project development and project management.

Repsol Nuevas Energías UK Limited is developing 3 offshore wind projects in Scotland. This is comprised of 33% of the 1,116 MW Moray project, 51% of the 784 MW Inch Cape project and 25% of the 664 MW Beatrice project. Repsol combines expertise from the offshore oil & power generation industries to develop large scale offshore wind farms.

**What is the project?**

The Beatrice Offshore Wind Farm site is located 13.5 km (at it’s closest point) from the Caithness Coast in the Outer Moray Firth. The proposal is to install up to 110 turbines which will be capable of generating up to 664 MW of renewable energy.

Subject to a positive final investment decision, the Beatrice project, which was consented by Marine Scotland in March 2014, and granted an Investment Contract by the UK government in May 2014, is planned for construction in 2016. As well as generating renewable electricity if constructed, the project is expected to bring a range of socio economic benefits to both the Moray and Highland regions including job creation, skills training opportunities and opportunities for local businesses.

**Proposal of Application Notice**

Proposal of Application Notice (PAN) for the BOWL detailed planning application.

BOWL has submitted a onshore grid connection works, also known as the “Onshore Transmission Works”.

The PAN indicates BOWL’s intention to submit a detailed planning application, connecting the wind farm to the national grid with 20 km of underground cable running from a landfall point at Portgordon to a new substation adjacent to the existing substation at Blackhillock, south of Keith.

Planning Permission in principle for the works was approved by Moray Council’s Planning and Regulatory Services Committee in February 2013.

The detailed planning application will be submitted to Moray Council in early 2015.
**Landfall**

Where?

The subsea cable will come ashore, in an area known as the ‘landfall’, west of Portgordon. The figure below illustrates the proposed landfall site. The exact landing location is still to be defined.

**What is the landfall?**

The cable landfall works will involve the pulling ashore of the offshore export cables. The offshore cables will be pulled ashore through ducts installed under the beach via a drilling process which commences at the onshore launch site approximately 70 – 100 m distance landwards from the shore. The landfall construction area will be approximately 120 m x 85 m. Within this area there will be buried transition bays where the offshore cables will be jointed into onshore cables.

There will be a maximum of two offshore cables associated with the Wind Farm and therefore a maximum of three transition bays will be required. Permanent access to these will be required during the operational life of the Wind Farm but all that will be visible at each of the transition bays will be a large manhole cover.

How?

To minimise environmental effects to the beach to the west of Portgordon, the cables will come ashore via cable ducts underneath the beach installed using the technique of Horizontal Directional Drilling (HDD). This involves drilling an arc between two defined points, the ‘drilling site’ (onshore) and the ‘reception site’ (several hundred metres offshore). The image below illustrates this.

The cable will then be pulled through the ducts created by the HDD to ‘transition bays’ where the offshore and onshore cables will be jointed together.

The construction area for the HDD drilling site and associated temporary construction compound area will be located adjacent to the launch site as shown in the below image.
Onshore Cable Route

What is it?

The onshore cable route will consist of underground trenches containing transmission cables, exporting AC power from the Wind Farm; cable jointing bays and cable crossings. The route also allows space for working areas for construction access and equipment lay down.

How long is the cable and where will it go?

The onshore cable route is approximately 20 kilometres (km). It will be underground throughout its length. We have undertaken detailed engineering assessments of the route including an assessment of the construction works and access requirements. This route is outlined in the figure below.

What will be developed along this cable route?

Cable Trenches

A maximum of two cable trenches will be required; each trench would be up to 0.5 metre (m) wide and at a target depth of 1.5 m with the trenches separated by approximately 5m. An additional area either side of the trenching area would be required for construction access and all temporary works. The total width of the temporary working corridor is 30 m. A typical trench layout is shown in the illustration below.

Typical working corridor layout

Cable Joint Bays

The cable will typically be supplied in lengths of 800 – 1,000 m, and as such a number of cable joints will be required along the 20 km cable route. The individual cable lengths will be joined together in ‘jointing bays’, the precise location of these will be determined prior to construction. Jointing bays will, where possible, be positioned in locations that will minimise impacts from construction and ongoing maintenance. Link boxes will also be installed alongside the joint bays. These are used for the ongoing testing and maintenance of the cable and allow testing of the cable between joints. After the works a small manhole may be left or the joints can be entirely buried.
Construction Process

How will it be laid?

Two options are being considered for laying the onshore cable, both are described below.

Trench and Bury

Following the site preparation, excavation of the cable trenches will be carried out using a mechanical excavator. Excavated material will be stored at the side of the trenches for later reinstatement. Cables will be installed in lengths in the trench, typically 1,000 m. A cable winch will be installed at the remote end of the trench and cable rollers installed within the trench. The cable will then be winched into position running along the cable rollers at the base of the trench. The cable rollers will be removed and the cables surrounded with fill to approximately 100 millimetres above the cables. The stored material will be used to backfill the trench with the same depth of topsoil used as was originally present in that location.

Direct Bury

An alternative to the use of excavators and the excavation of a trench would be to utilise a cable plough where site access and ground conditions are suitable. The cable plough makes a narrow slit in the ground (up to 2 m in depth). The cables and marker tapes are laid via a chute in a single operation and the slit closes up after the plough has passed. The cable plough has its front wheels skid mounted and is towed behind a tracked winch that can extend to some 125 m. The cable drums are mounted on a specially designed cable trailer and these are pulled behind the plough by a tracked excavator.

Cables may be installed in ducts to allow for future ease of maintenance and to reduce ground disturbance should cables need to be replaced during the operational life of the Wind Farm.

Cable Crossings

There are a number of obstacles which the cable route will have to cross; including rivers, roads, railways, boundary markers (e.g. hedgerows, fences) and other utility cables and pipelines. Detailed consultation will be undertaken in relation to the most appropriate crossing method for each obstacle which may include Horizontal Direction Drilling (HDD). The below image shows a HDD under a river.
Why is it required?
In order to manage and export the electricity generated from the Wind Farm to the electricity transmission network a substation is required. A cable will then connect our substation with the adjacent (currently being constructed) Blackhilllock substation, owned by Scottish Hydro Electric – Transmission (SHE-T).

What will it do?
The substation will export AC power to the national grid via a connection to the existing Blackhilllock substation. The onshore substation will incorporate filters, transformers and other electrical equipment to condition the export power to be compatible with the grid and step up the voltage for the national grid. Within the substation compound there will also be temporary construction, parking and laydown areas.

Where will it be located?
Our substation will occupy a circa 13 hectare (ha) site located at NGR 342925, 848632 on land between 180 m and 204 m elevation. This site is currently used for agricultural purposes.

What will it look like?
The substation will be designed to fit with the surrounding topography. Within the substation compound there will also be temporary construction, parking and laydown areas. A description of our substation design is provided and the illustrations / figures show examples of what the substation will look like. Please also see our photomontages showing how the substation will appear once constructed.

Substation Design
The substation will be a ‘wirescape’ with a maximum height of 11.5 metres and an associated control building with a maximum height of 6 m. The dimensions of the compound incorporating the substation, control building and associated infrastructure will be a maximum of 253 m x 160 m, with the control building occupying a maximum footprint of 12 m x 30 m. Two access points are proposed for the substation which will allow components to be delivered to the site and vehicles to access the substation for ongoing maintenance requirements.

Landscaping
Due to the proposed height of the substation and the topography of the substation site, we will be constructing a landscaped bund around the substation. This bund will be planted with vegetation and trees which will in time grow to a sufficient height to partially screen the substation.
The project programme illustration below shows the main activities that BOWL has undertaken so far in the development of the Wind Farm and the offshore and onshore transmission works. It also indicates the expected timetable that will follow submission of the applications. One continuous activity that runs throughout this programme is ‘consultation’.

Consultation with decision makers, regulators, consultees and other interested parties has, and will continue to be, undertaken throughout the entire project programme. Consultation is a key tool in helping define the project design and agreeing the scope of the surveys and assessments to be undertaken. The construction programme needs to tie in with both the installation of the offshore cables and the construction of the substation. It is likely that both these items will dictate the duration of cable route construction. Although work may be undertaken in parallel with these, it is anticipated that the construction programme will last approximately 24 months.

The next steps

A planning application, for Detailed Planning Permission and the accompanying Environmental Statement (ES) for the Onshore Transmission Works will be submitted to The Moray Council (TMC) in early 2015, and the statutory determination for this application is twelve weeks.
Introduction
An Environmental Impact Assessment will accompany the planning application. This was previously undertaken for the planning permission in principle application with no significant impacts identified.

Ecology
Habitat and bird surveys have been undertaken across the Project area. There are a number of habitats within the area, including farmland, woodland, watercourses and meadow, and these are suitable for otters, badgers, bats and birds. We will wherever possible avoid doing any work that would disturb key species. Throughout the process we will consult with key consultees such as SNH to ensure all potential impacts are assessed.

Archaeology and Cultural Heritage
There are various recorded assets within the cable corridor however none of the archaeological sites identified are of national importance. We will avoid any impacts where possible. During construction we will monitor excavations and if any potential archaeology objects are uncovered, we will make sure that the finds are properly recorded.

Keith Conservation Area lies to the north of the substation. Glimpsed views along its streets of the hills to the south are important to its setting. Effects upon its setting will be mitigated through design, through the size and orientation of the substation, and also by planting trees and bushes in the area around the substation to reduce the views.

Geology, Soils and Land-use
The only known site designated for its geomorphological features within the study area is Spey Bay SSSI. Drilling the cable under the SSSI is proposed to protect the SSSI and ensure that the offshore cables make landfall with minimised environmental effects.

Hydrology
We will assess river catchments, surface water flows, flooding, groundwater, designations, fisheries and public and private water supplies. Drilling under watercourses will be used to avoid impacts wherever possible.

Access, Traffic and Transportation
The locations where the construction traffic will have access to the construction site have been identified, and we will make sure that the design of access points will be clear to all users of the roads. It is not expected that traffic levels from the construction or operation of the Project will be very high.

Socio-economics, Tourism and Recreation
The construction phase will result in direct and indirect significant effects for local businesses and people within the area. These effects will be in the form of local employment opportunities and spending in the economy as a result of employment in the Project. We will also make sure that walking and cycling routes are not disrupted by the construction works.

Noise and Vibration
The principal effects of noise are considered to relate to operational noise of the substation and the noise associated with construction.

A noise model will be used to calculate the noise outputs of the substation. The substation will then be designed to ensure that noise limits are not exceeded.

During construction, noise will be managed to ensure that there are no significant effects on local residents. This may be done through limits to the times at which noisy activities can be carried out or by using noise screening mitigation.
Beatrice Onshore Transmission Works

Socio Economic Benefits
Subject to a positive final investment decision, the Beatrice project is planned for construction in 2016. As well as generating up to 664MW of renewable electricity if constructed, the project is expected to bring a range of socio economic benefits to both the Moray and Highland regions including job creation, skills training opportunities and opportunities for local businesses through SSE's Open4Business events and online portal.

Opportunities for Local Suppliers
Offshore wind farms offer the potential for significant positive socio economic benefits through construction and operation. To make it easier for local businesses to register their interest in possible opportunities that may arise through the construction of SSE’s projects in the Moray region including the Beatrice offshore wind farm and grid route, SSE has extended its online procurement portal Open4Business into the region.

Since 2012, 12 contracts have been awarded to businesses located in Moray through SSE projects at a value of £967k.

If you are a local business who would be interested in possible opportunities through the Beatrice project, or would like to be kept updated on future Open4Business events in your area please speak to a member of staff or register on our online procurement portal: https://www.sseopen4business-highlands.com

Partnership with University of the Highlands and Islands (UHI)
SSE and the University of Highlands and Islands have signed a ‘partnership agreement’ to collaborate and work together to maximise the benefits to the people of the Highlands and Moray from the low carbon energy revolution in the Highlands and Islands. This partnership includes collaboration on skills training and research opportunities in the region.

Both SSE and the University recognise the importance of collaboration to ensure the skills and people are in place to take advantage of this opportunity.

BOWL have already undertaken initial discussions with UHI to discuss how Beatrice could provide opportunities in the Highlands and Moray, should the project progress to a positive final investment decision.

Improvements to Local Infrastructure
Throughout construction of the grid works there may be opportunities for us to provide infrastructure improvements along the grid route. If you have any suggestions on infrastructure improvements that we might be able to help with such as renovating core paths, please speak with a member of the team today or provide your suggestions on one of our feedback forms.

Community at Heart Volunteering
Community at Heart is a year round scheme that encourages SSE staff members to donate a day of their time to support a community volunteering project or charity, especially in areas where our SSE sites are situated.

Examples of past volunteering projects are planting community gardens, painting community facilities, assisting at community events, litter picking and helping out at charity races. However the projects do not need to be labour intensive and volunteering possibilities are endless depending on each community and organisation’s needs (as long as the project meets our health and safety criteria).

If there are any existing or future volunteering projects in your local area, big or small, that you think we may be able to help with or, if you would like some further information on the scheme, please speak with a member of staff.