The Transmission Works

National Grid Connection Point

- A cable will be used to connect the electricity generated by the wind farm to the existing electricity grid.
- A site selection study was undertaken to find the best route for the cable from the wind farm to the electricity grid. This looked at engineering feasibility and environmental impact.
- A grid connection offer was made by the National Grid for the substation at Blackhillock, near Keith based on available capacity and connectivity into the wider electricity grid.
- The proposed study area for the offshore and onshore cable route from the wind farm site to Blackhillock is shown below.
- More detailed assessments are now underway to select a preferred cable route within the study area.
- Submission of completed application and environmental statement for statutory consent is anticipated in Winter 2011.

What are the key transmission works components?

To enable the grid connection the project requires the following.

- Offshore: approximately 75 km of subsea cable to the landfall point.
- Onshore: approximately 24 km of underground cable to Blackhillock.
- A dedicated substation nearby the existing substation at Blackhillock.
- The construction programme is set out below.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Timescale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offshore cable installation</td>
<td>Anticipated 2014</td>
</tr>
<tr>
<td>Onshore cable installation</td>
<td>Anticipated 2014</td>
</tr>
<tr>
<td>Substation construction</td>
<td>Anticipated 2014</td>
</tr>
</tbody>
</table>
Why are we doing this?

Renewable Energy Policy
UK renewable energy policy centres around two key factors.
• Reduction of CO₂ emissions to tackle climate change.
• Security of energy supply.
There are a number of government targets set to try and achieve this.
• UK Government target of generating 15% of energy from renewable sources by 2015 and 20% by 2020.
• The Scottish Government’s Climate Change Act commits Scotland to cut carbon emissions by 42% from 1990 levels by 2020 and by at least 80% by 2050.

Offshore Wind Development
There are a number of Scottish Government and UK Government policies and statements which promote the development of offshore wind in the Moray Firth. In the 2006 Scottish Government report ‘Matching Renewable Electricity Generation and Demand’ the Outer Moray Firth has been identified as a region able to accommodate offshore wind development.

What is the timetable?
Key activities that we have undertaken so far, and our anticipated timetables going forward, are shown below.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Timescale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusivity agreement received from the Crown Estate</td>
<td>February 2009</td>
</tr>
<tr>
<td>Agree on approach and scope of Environmental Impact Assessment with the Government and consultees</td>
<td>Summer 2010</td>
</tr>
<tr>
<td>Undertake baseline surveys and Environmental Impact Assessment</td>
<td>Ongoing until autumn 2011</td>
</tr>
<tr>
<td>Wind farm public exhibitions</td>
<td>Summer 2010/Autumn 2011</td>
</tr>
<tr>
<td>Submit completed application and Environmental Statement for Statutory Consent and Licenses</td>
<td>Winter 2011</td>
</tr>
<tr>
<td>Consent potentially granted</td>
<td>Anticipated Autumn/Winter 2012</td>
</tr>
<tr>
<td>Construction commencing</td>
<td>Anticipated 2014/2015</td>
</tr>
<tr>
<td>Fully operational</td>
<td>Anticipated 2017/2018</td>
</tr>
</tbody>
</table>
**Who are we?**

Beatrice Offshore Windfarm Limited (BOWL) is the joint venture partnership formed between SSE Renewables (75%) and SeaEnergy Renewables (25%).

In February 2009 we were awarded exclusivity by The Crown Estate (which owns the seabed) to develop the Beatrice Offshore Wind Farm in Scottish Territorial Waters.

SSE Renewables is responsible for the development and construction of Scottish and Southern Energy's (SSE) renewable energy projects across the UK, Ireland and Continental Europe. SSE is the UK’s leading generator of renewable energy with over 2,300 Megawatts (MW) of renewable electricity generation capacity.

SeaEnergy Renewables Limited (SERL) is made up of members of the team which conceived, developed and delivered the world’s first deep water wind farm development - the Beatrice demonstrator project (10 MW) - which is owned by Talisman Energy and SSE and located in the Outer Moray Firth.

**The wind farm proposals**

**Where is it?**

The Beatrice Offshore Wind Farm site is located as follows:
- On the north western most point of the Smith Bank in the Outer Moray Firth.
- Approximately 13.5 km from the Caithness coastline.
- This site is approximately 19 km long and 9 km wide.

There are a number of features located nearby:
- The existing Beatrice demonstrator turbines 11 km to the south west.
- The existing Jacky oil platform is located just outside the site to the south west.
- The proposed Moray Firth Round 3 offshore wind farm zone is located directly to the east.

**What are the key wind farm components?**

The wind farm will comprise the following:
- Up to 277 turbines (tower, nacelle, rotors and hub).
- Turbine substructures and foundations.
- Up to 3 offshore electricity substations.
- Electricity cables at the site connecting turbines to the substations.
- Up to 3 meteorological masts.
- Cable connection to the mainland and onwards to Blackhillock.
- Maintenance and operational facilities on the mainland.

**Design Details?**

A number of scenarios are being assessed. The wind farm will have a generating capacity of c. 1000MW and in order to reach this capacity a number of turbines are being considered, ranging from 277 turbines of 3.6MW capacity to 142 turbines of 7MW capacity.

The 3.6 MW turbine would have a tip height of approximately 140 m, the 6 MW 183 m and the 7 MW would have a 198 m tip height.

Foundations could be pin piles, suction piles or gravity base.

Substructures could be lattice, tripod or quadrapod.

**Foundation options for fixing turbines to the seabed**

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**Site location and surrounding features**
Construction and Operation Overview

Construction

The construction of the offshore and onshore cable and a dedicated substation nearby the existing substation at Blackhilllock will take approximately two years.

Offshore cable route

Offshore cable laying will require a number of specialist vessels including a large construction vessel and a number of support vessels.

Offshore construction will be carried out 24 hours seven days a week and will take approximately two months.

There are a number of methods that could be used to install the offshore cable, depending on seabed type, these may include the following.

- Dredging a trench where the cable is laid first then backfilled with sediment.
- Ploughing the cable into the sediment where the cable is backfilled as it is laid.
- Jetting the sediment to allow the cable to be buried deeper e.g. to 2 m in soft sediments.

Onshore cable route

Onshore cable will be underground and installation will involve the following.

- Ground preparation work if required.
- Trenches dug with spoil stored for backfilling.
- Directional drilling as required for shore sections and crossing points such as roads, rivers and railways to avoid impacts to sensitive areas.
- Underground jointing pits approximately every 0.5-1 km.

Substation

Construction of a dedicated substation is likely to take two years and will include the following.

- Foundations will be designed and created to accommodate the weight and scale of the electrical equipment.
- Some of the equipment may be housed in buildings whilst others will be uncovered.
- Landscaping will be required to reduce impacts on sensitive receptors.

Operation

The Beatrice onshore substation would operate 24 hours a day, 365 days a year. It will not be manned other than for maintenance visits.
The Onshore Substation

A dedicated substation will be built nearby the existing substation at Blackhillock. Detailed design of the substation is yet to be undertaken. There are two main options for the transmission works to connect the wind farm.

- Either Alternating Current (AC) or Direct Current (DC) will be used depending on the final power output of the wind farm.

If AC

The onshore substation will be.
- Approximately 140 m (wide) by 150 m (long).

There is potential for additional land to be required for screening and landscaping around the substation of.
- Approximately 8000 m².

If DC

The onshore substation will be.
- Approximately 200 m (wide) by 200 m (long) and 25 m (high).

There is potential for additional land to be required for screening and landscaping around the substation of.
- Approximately 16,800 m².

Who are we consulting?

We are committed to consulting with all interested parties. We have already consulted with many statutory and non-statutory groups and organisations and the public is also a key consultee.

We are keen to listen to the views of all these groups and individuals and welcome any feedback. Keeping these groups and individuals informed of our plans as they develop is a key aim and we will hold many more meetings to ensure this happened. We plan a further series of public exhibitions in the Autumn of 2011 prior to submitting our application for consent, which we expect to do in Winter 2011.