Beatrice Offshore Windfarm Limited (BOWL) is a joint venture partnership between SSE Renewables (40%), Copenhagen Infrastructure Partners (35%) and Red Rock Power (25%).

SSE is one of the UK’s leading energy companies, involved in the generation, distribution and supply of electricity and the extraction, storage, distribution and supply of gas. Its core purpose is to provide the energy people need in a reliable and sustainable way. It supplies energy to around 8.2 million customers throughout Great Britain and Ireland and is one of the UK’s leading generators of electricity from renewable sources. SSE became a Living Wage employer in September 2013 and was accredited with the Fair Tax Mark in October 2014. Every year it contributes around £9 billion to the UK economy.

Copenhagen Infrastructure Partners (CIP) is a fund management company founded in 2012. Copenhagen Infrastructure Partners focuses on long term investments in energy and infrastructure assets, primarily in Northern and Western Europe and North America.

Red Rock Power is the UK subsidiary of SDIC Power Holdings Co., a power generation company listed on the Shanghai Stock Exchange. SDIC Power is primarily engaged in the investment, development, construction, operation and management of power projects. The company owns a total installed capacity of 27GW, and more than 60% of the portfolio is renewable energy capacities, including hydro power stations and wind farms.

Beatrice will be located around 13.5km (at its closest point) from the Caithness Coast in the Outer Moray Firth, with its centre located approximately 25km (13.4Nm) south south-east of Wick. It will have 84 7MW Siemens wind turbines which together will be capable of generating up to 588 MW of wind powered renewable energy.

In 2009 BOWL was awarded exclusivity by The Crown Estate to develop Beatrice in Scottish Territorial Waters. The project was consented by Marine Scotland and granted an Investment Contract by the UK government in 2014. The project achieved financial close in May 2016, signalling the start of the construction phase.

Work is underway in Moray on the Beatrice substation near Keith and work has begun on the cable route from landfall near Portgordon to the substation. We hope to begin work on the operations and maintenance (O&M) facility in Wick by January 2017, subject to planning permission. Construction at the offshore wind farm site will begin in 2017 and the project is expected to be fully operational in 2019.
Project overview

At £2.6bn, the 588MW Beatrice offshore wind farm project will be one of the largest ever private investments in Scottish infrastructure. The project will consist of:

1. 84 x Siemens 7MW wind turbines, each installed on ‘jacket’ substructures on pile foundations
2. 2 x 220kV Offshore Transformer Modules (OTMs) which collect the electricity from the turbines for transmission to shore
3. 160km of buried subsea inter-array cables, connecting strings of wind turbines to the OTMs
4. 140km of buried subsea export cables (in two lengths of 70km) connecting the OTMs to the landfall point near Portgordon
5. 20km of underground cable to transmit the electricity from landfall to the substation at Blackhillock
6. 1 x substation at Blackhillock for onward transmission of the electricity to the National Grid

Ports and harbours

Beatrice will require the use of ports and harbours during both the construction and operational phases:

**Wick Harbour:** With its proximity to Beatrice and with the availability of suitable quayside facilities, Wick Harbour has been chosen as the location for the Beatrice operations and maintenance (O&M) base. The base will be required for the 25 year lifespan of the Beatrice wind farm to facilitate the commissioning, operation and maintenance of the turbines in a safe and efficient manner. Subject to planning consent, we will renovate and utilise two historic Thomas Telford buildings on the harbour front and utilise a currently unused area of adjacent harbour to facilitate mooring up to six Crew Transfer Vessels (CTVs).

**Buckie Harbour:** We will utilise Buckie Harbour as the Beatrice contingency port which will predominantly be utilised when the CTVs are unable to return to Wick Harbour. We may also utilise Buckie Harbour where additional capacity is required during the construction and operational phases.

**Nigg Energy Park:** Nigg has been contracted as the construction and marshalling port and will store, pre-assemble and prepare the wind turbines ahead of installation offshore.
Manufacturing and construction is now underway with Beatrice expected to be fully operational in late 2019. Between now and then the construction activity both onshore and offshore will continue with key activities as shown below. One of the biggest challenges facing the Beatrice team is the weather, particularly around the offshore construction phase and so the timelines below are subject to some flexibility.

Onshore

The key onshore construction activities are focused around Wick, the home of our operations and maintenance base and Moray which is where the power from Beatrice will come ashore and join the Grid. In Wick, we expect to begin work on restoring the two Harbour Quay properties in January 2017 with work taking around 18 months to complete. In Moray, work on the substation at Blackhillock has been underway since May 2016 and work has begun on the cable route from landfall near Portgordon to the substation.

Offshore

The offshore construction activity will focus on the site area itself (for installation of the piles, jackets, Offshore Transformer Modules, turbines and inter-array cables) and along the route of the export cable which runs due south from the wind farm, making landfall at a point to the west of Portgordon. Construction will involve the use of a number of significant vessels (including jack-up vessels) as well as smaller vessels guarding the construction zones to ensure everyone remains safe.
Onshore construction progress - overview

There are a number of key onshore construction activities required as part of the Beatrice project. Work is underway in Moray at Blackhillock and near Portgordon and in Caithness we hope to begin work on the operations and maintenance (O&M) base in Wick at the start of 2017. The information below provides a brief overview of our activities to date:

Construction began in May 2016 soon after the project achieved Financial Close.

Good progress has been made including the completion of the substation platform, numerous concrete foundation pours and the perimeter fence. Work continues on site with preparations underway for the arrival of the main substation equipment.

Once complete, the substation will transform the electricity generated by Beatrice up to 400kV where it will pass through the adjacent Scottish and Southern Electricity Networks substation and on to the Grid.

Enabling works at the main construction compound near Portgordon began in October 2016 ahead of main construction getting underway. The compound is established and serves as the main base for the onshore cabling works.

Our contractors, Murphys, will be laying around 20km of underground cable between the landfall point and the Blackhillock substation utilising the latest Horizontal Directional Drilling (HDD) techniques in certain areas to ensure we protect the roads, rivers and railway lines.

Wick was chosen as the location for the O&M base due to being near Beatrice and the availability of suitable harbour facilities.

In September 2016 we held a well received public engagement event where we showcased our plans for the renovation and return to use of two harbour front buildings which form part of the original Thomas Telford Lower Pulteneytown development from 1807.

We submitted our plans to the Highland Council seeking consent to sensitively renovate the buildings and await their decision. In the event that consent is granted we expect to begin work in January 2017.
The proposed development refers to two partial blocks of Lower Pulteneytown buildings fronting east onto Harbour Quay and bounded on their north and south elevations by Saltoun Street, Telford Street and Burn Street. They form part of Thomas Telford's 1807 plan for the Pulteney Village and Harbour area.

With its proximity to the Beatrice offshore wind turbines and with the availability of suitable quayside facilities, Wick Harbour has been chosen as the location for the projects operations and maintenance (O&M) base. The base will be required for the 25 year lifespan of the Beatrice wind farm to facilitate the commissioning, operation and maintenance of the turbines in a safe and efficient manner.

A number of design options for the base have been assessed including a new build on the Telford Jetty which was presented at a public engagement event in March 2016. However, on 24 August 2016, the BOWL Board approved the option to renovate and utilise two dis-used industrial buildings, located in the historic conservation area of Lower Pulteneytown as the basis for the O&M base.

Operations and maintenance base

The proposed development refers to two partial blocks of Lower Pulteneytown buildings fronting east onto Harbour Quay and bounded on their north and south elevations by Saltoun Street, Telford Street and Burn Street. They form part of Thomas Telford’s 1807 plan for the Pulteney Village and Harbour area.

Our proposals for the re-use of these historic buildings is considered highly appropriate in as much as Lower Pulteneytown was conceived, planned and built as an industrial marine economy related development. After many years of relative decline as the original use was superceded, our development proposals will regenerate and bring back a significant proportion of Wick’s Harbour Quay into appropriate long term use.

Subject to meeting legislative requirements, the proposed O&M facilities are expected to go into construction in 2017 to be ready for commissioning activities in 2018. BOWL will also require facilities at Wick John O’Groats Airport to support helicopter operations, providing a holistic access and logistic solution for the Project.
Proposed Inner Harbour pontoons

For 150 years Wick Harbour has provided a safe haven for fishing, commercial, and leisure vessels. Since the formation of Wick Harbour Authority in 2005 (and partially in response to the decline in the fishing industry) the Harbour has been the subject of diversification. The Harbour Authority successfully developed a marina in the Inner Harbour in 2009 which has made a significant impact on the harbour at Wick and it is now an important port of call for recreational vessels passing up or down the east coast of Scotland.

Continuing the Harbour’s diversification, it is proposed that six additional berths for Crew Transfer Vessels (CTVs) will be installed within the Inner Harbour. An indicative pontoon arrangement for up to six CTVs is shown below. The pontoons are expected to be retained by tubular steel piles, similar to those used on the marina pontoons.

At this stage the final layout is yet to be confirmed. The final pontoon arrangement will be designed with input and local knowledge from the Harbour Authority.

As part of the planned development, BOWL are intending to remove the disused slipway in the north west corner of the Inner Harbour (shown to the left). The proposed removal of the slipway will enable the number of marina berths to be maintained and enable available space within the Inner Harbour to be used effectively.
Appropriate renovation and utilisation

Wick’s Lower Pulteneytown has a particular and strong visual identity and, as an example of a very early planned industrial/residential settlement, has national and international conservation and historic importance. To ensure that the Listed Building Conservation requirements for the area are fully met, the development of the scheme has progressed with close liaison with the Local Authority Conservation and Planning departments.

Onshore works

The key construction activities on the buildings will begin with demolition works. These will primarily be focused on building B with the removal of the steel and asbestos industrial roof and columns, slated roofs, and all doors & windows and internal timberwork. Parts of the walls will be demolished to allow the formation of new doors and window openings where required. Whilst thorough refurbishment is required throughout, the renovation will retain as many original features that are salvageable across both building A and B. Principally these are the masonry walls.

Marine works

The key marine construction activities will begin with the removal of the disused slipway structure located within the north west corner of the Inner Harbour. Once removed, the height of the existing quay wall will be increased to the height of the adjoining quay walls and infilling and re-levelling of the quayside will be carried out. The pontoons for the Crew Transfer Vessels will be installed and connected to the refurbished quayside by a linkspan.

Working hours

Construction work associated with the development should not normally take place outwith the hours of 08:00 and 19:00 Monday to Friday, 08:00 and 13:00 on Saturdays or at any time on a Sunday or Bank Holiday.
Appropriate renovation and utilisation

For the purpose of the application, the northernmost building group, bounded by Burn Street and Telford Street is designated as building ‘A’.

The southernmost building, bounded by Telford Street and Saltoun Street (also known as the Grey Coast Buildings) is designated as building ‘B’.

The south east portion of building ‘A’ is in separate ownership as a takeaway, so is not included in our proposals.

The settlement as a whole has a particular and strong visual identity and, as an example of a very early planned industrial/residential settlement, has national and international conservation and historic importance.
The nature and scope of the required operations and maintenance facility can be accommodated over 2-3 floors within the buildings, within the existing footprints and without the need for significant elevations changes. Such changes are limited to formation of a new vehicle point on Telford Street, reducing and replacing the extent of render from that existing and specific signage, public access and glazing work.

Internal accommodation is formed within the footprint of the existing buildings and utilises/reinstates existing and previously infilled window and door openings, but will be completely re-planned and reconstructed internally.

While building ‘A’ and ‘B’ have different basic functions, they are both integral to providing all necessary facilities to enable the safe and efficient operation of Beatrice.

During all project phases, a number of key duties will be managed from the buildings including but not limited to:

- Storage of consumables, spares, tools and other equipment
- Provision of safety training and site inductions for offshore personnel
- Coordination of permits and licenses required to conduct activities offshore
- Provision of meeting rooms and welfare facilities
- Operation of communication facilities
- Marine planning and coordination
- Provision of network management and nominated Control Point for the National Grid

There will be ‘goods in’ deliveries of supplies and equipment arriving to and despatched from, a goods entrance at the frontage of building ‘B’ to Harbour Quay (previously used for road haulage purposes).

This vehicle access will not be used for any other purpose. Goods in will comprise limited deliveries which are anticipated as up to four daily loads – by transit van sized vehicles.

Goods out will be weight limited (max 1 tonne) loads transferred by forklift or similar across Harbour Quay to proposed berths in the Inner Harbour adjoining Harbour Quay and Commercial Quay.
Developing an offshore wind farm is a complex and challenging task, requiring a significant amount of work before construction begins. Throughout the development phase and since the Financial Close in May, we have been undertaking a significant number of environmental and engineering surveys and monitoring programmes including:

- Marine mammal preconstruction monitoring
- Boat and aerial ornithological surveys
- Benthic grab and seabed photography survey
- Cod spawning survey
- Herring spawning surveys
- Sandeel survey
- Geophysical surveys (non-intrusive seabed surveys)
- Geotechnical surveys (bore hole surveys)
- Metocean surveys (sea condition surveys)
- Unexploded ordinance survey and clearance

We will continue to carry out additional surveys and monitoring and marine mammal monitoring during construction.

Construction marine mammal monitoring

These studies will use the baseline data gathered during our pre-construction monitoring to underpin further detailed studies of the responses of harbour seals to the construction of Beatrice.

This work will inform annual estimates of the abundance and reproduction of both priority species. This will be compared to the impacts predicted in the Environmental Statement (ES) and the pre-construction monitoring baseline. We have been working with the University of Aberdeen (based at Cromarty) to undertake significant monitoring over the past five years.

Additional monitoring will also be conducted to monitor responses to Acoustic Deterrent Devices (ADDs). Studies will focus upon harbour porpoise due to their likely occurrence within the development area and will monitor their responses to ADDs and the soft start procedures that will be deployed prior to piling operations.
Offshore construction

Piling and installation of the jacket substructures

The wind turbines will be supported on ‘jacket’ substructures with piled foundations. We will begin by installing the piled foundations in the seabed followed by installing the jackets. This process will take approximately 45hrs at each location. Pile drilling may also be used if the seabed structure requires it.

Turbine installation

Once the jackets are installed we will install the turbine towers, nacelles and blades. The turbines then undergo stringent testing before being commissioned, following which they will be exporting electricity to the National Grid via the Blackhillock substation.

It will take around two days to install each of the Offshore Transformer Module (OTM) topsides.

The jackets supporting the OTMs will be installed as described above.
Offshore construction - vessels

The Beatrice project is significant both in terms of investment and in terms of the engineering challenges when working with large components and in deep waters. We will be utilising some very large vessels to facilitate the construction work offshore.

<table>
<thead>
<tr>
<th>Vessel</th>
<th>Installing</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stanislav Yudin</td>
<td>Foundation piles and Offshore Transformer Module (OTM) topsides</td>
<td>Pile installation is planned from April 2017 to January 2018. OTM installation is planned from November to December 2017</td>
</tr>
<tr>
<td>Oleg Strashnov</td>
<td>Jacket substructures</td>
<td>Jacket installation is planned from August 2017 to December 2017 and from May 2018 to August 2018</td>
</tr>
<tr>
<td>Pacific Orca</td>
<td>Wind turbines</td>
<td>Turbine installation is planned from July 2018 to March 2019.</td>
</tr>
<tr>
<td>Siem Moxie and/or Siem Amery</td>
<td>Laying and burying the inter-array cables</td>
<td>Inter-array cable installation is planned from November 2017 to September 2018</td>
</tr>
<tr>
<td>Nexans Skaggerak</td>
<td>Laying and burying the export cable</td>
<td>Export cable installation is planned from September 2017 to May 2018</td>
</tr>
</tbody>
</table>
Inter-array cables

In much the same way that a number of homes and businesses are connected to substations to receive energy, the Beatrice wind turbines are connected to the two Offshore Transformer Modules (OTMs) in order to export the energy they produce. The connection network (the ‘inter-array’) will require around 160km of interconnecting cables which will be manufactured in the UK.

The inter-array cables will be laid on the seabed and then buried, usually within a few weeks of laying.

The target burial depth for the inter-array cables is 0.6m to 0.8m (top of cable).

As the seabed sediments are mainly sands and gravels the preferred method for burying the cable will be by water jetting.

Guard vessels will be employed if required to protect any exposed cables on the seabed prior to burial.

Inter-array cable installation will take place in three stages:

1. Oct 2017 to Apr 2018  
2. Feb 2018 to Apr 2018  
3. Jun 2018 to Sep 2018

The OTMs are centrally located in the wind farm. The inter-array cable layout connects the wind turbine strings to the OTMs.

At the OTMs, the generated electricity is transformed to 220kV and exported via the 69km subsea cable route to landfall at the Moray coastline and then the 20km underground cable route to the onshore substation at Blackhillock.

The electricity is then stepped up again to 400kV for onward transmission on the National Grid.

The Siem Moxie and Siem Amery vessels will be used to lay and bury the inter-array cables.
Supply chain

With construction required both onshore and offshore, the Beatrice project has three EPCI (Engineering, Procurement, Construction and Installation) contracts in place, covering the various elements of the project.

The companies responsible for these contracts are:

Subsea 7 (with Seaway Heavy Lifting as their 1st tier contractor) is the marine EPCI Contractor responsible for the design, manufacture and installation of the substructures and array cables and the installation of the Offshore Transmission Modules (OTM).

Siemens Wind Power are responsible for the design, manufacture and installation of the wind turbine generators.

Siemens Energy Management (STDL) and Nexans Norway are responsible for the design and manufacture of the OTMs and the design, manufacture and installation of the onshore electrical system. They are also responsible for the manufacture and installation of the onshore and offshore export cables.

In addition to the works described above we are tendering for a contractor who will be responsible for the redevelopment of the buildings on Wick Harbour which will become home to the Operations and Maintenance base.

The project also provides other supply chain opportunities during both the construction phase and the 25 year operational phase. These opportunities may include the provision of:

- Logistics / transport
- Safety equipment
- Spare parts
- Consumables
- Crew transfer vessels (CTV)
- Helicopter service operation
- Accommodation for staff
- Construction support services including
  - Site cabins
  - Generators
  - Fuel
- Service tools

If you wish to offer your services to the project please, in the first instance, email: offshoreprocurement@sse.com
Socio-economic benefits

The Beatrice offshore wind farm, at around £2.6bn, is one of the largest private investments ever made in Scottish infrastructure. A project of this scale is important to local, regional, Scottish and UK economies and we are committed to maximising benefits wherever possible. Opportunities include job creation, skills training, investment in Scottish ports and harbours, supply chain opportunities and community benefit funding.

Beatrice has a tier 1 supply chain comprising Seaway Heavy Lifting, Subsea 7, Nexans and Siemens and expect to deliver c. £680m into the UK and Scottish economy via employment and supply chain opportunities during the construction phase and c. £400 - £525m during the 25 year operational phase.

Job creation

The operations & maintenance base in Wick is expected to support a peak of around 65 jobs during the construction and around 90 long term jobs are anticipated during the operational phase.

Opportunities at Wick are expected to include onshore operational staff, offshore turbine technicians and skippers for the Crew Transfer Vessels which will transport the offshore teams to and from Beatrice.

Supply chain

On 23 May 2016, the green light was given for construction to proceed. Since then many significant contracts have been awarded and construction and fabrication has begun in readiness for delivering an operational wind farm in 2019.

As construction ramps up, many local businesses including restaurants, accommodation providers, shops and service providers will see increased business.

Community benefits

As well as significant employment and supply chain opportunities, Beatrice brings with it a £6m Community Benefit fund, for distribution in the Highland and Moray regions. We will announce further details of the fund in the coming months, including the areas eligible to benefit and how eligible groups and organisations can apply for funding to support their aspirations.

Be the Difference

As well as the opportunity to apply for funding, SSE operates a volunteering scheme called ‘Be the Difference’. This affords every member of staff the chance to take a day away from their day job to support local good causes that are close to their hearts.
Keeping in touch

We would like to keep you informed as we progress and there are a number of ways in which we can keep you up to date:

Email updates: If you would like to receive email updates, please complete a comments form before you leave today so that we can add you to our mailing list. You can unsubscribe at any time.

Updates are generally sent to mark key developments or project milestones or when there are specific construction activities that we would like to tell you about.

Project website: For more general information, you can visit the Beatrice website which can be found at sse.com/beatrice.

As construction progresses, we will update the website with the latest news as well as links to some interesting short videos explaining some of the processes required to bring a project like Beatrice to life.

@Beatricewind Twitter feed: Our Twitter feed has interesting bite sized pieces of news, views and project information and more. You do not have to have a Twitter account to see what we are posting. Simply go to www.twitter.com/beatricewind to read our latest posts. Alternatively, visit the project website and you will see the latest Tweets to the right of the page.

Contacting us: Of course, you may want to contact the project team to talk about some concerns or simply to get more information about an aspect of the project. In the first instance, please contact our Liaison Manager:

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