

Keeping in touch

Noel Cummins
Corporate Affairs
Inveralmond House
200 Dunkeld Road
Perth
PH1 3AQ

Email: noel.cummins@sse.com

www.beatricewind.com
www.twitter.com/beatricewind



Project update
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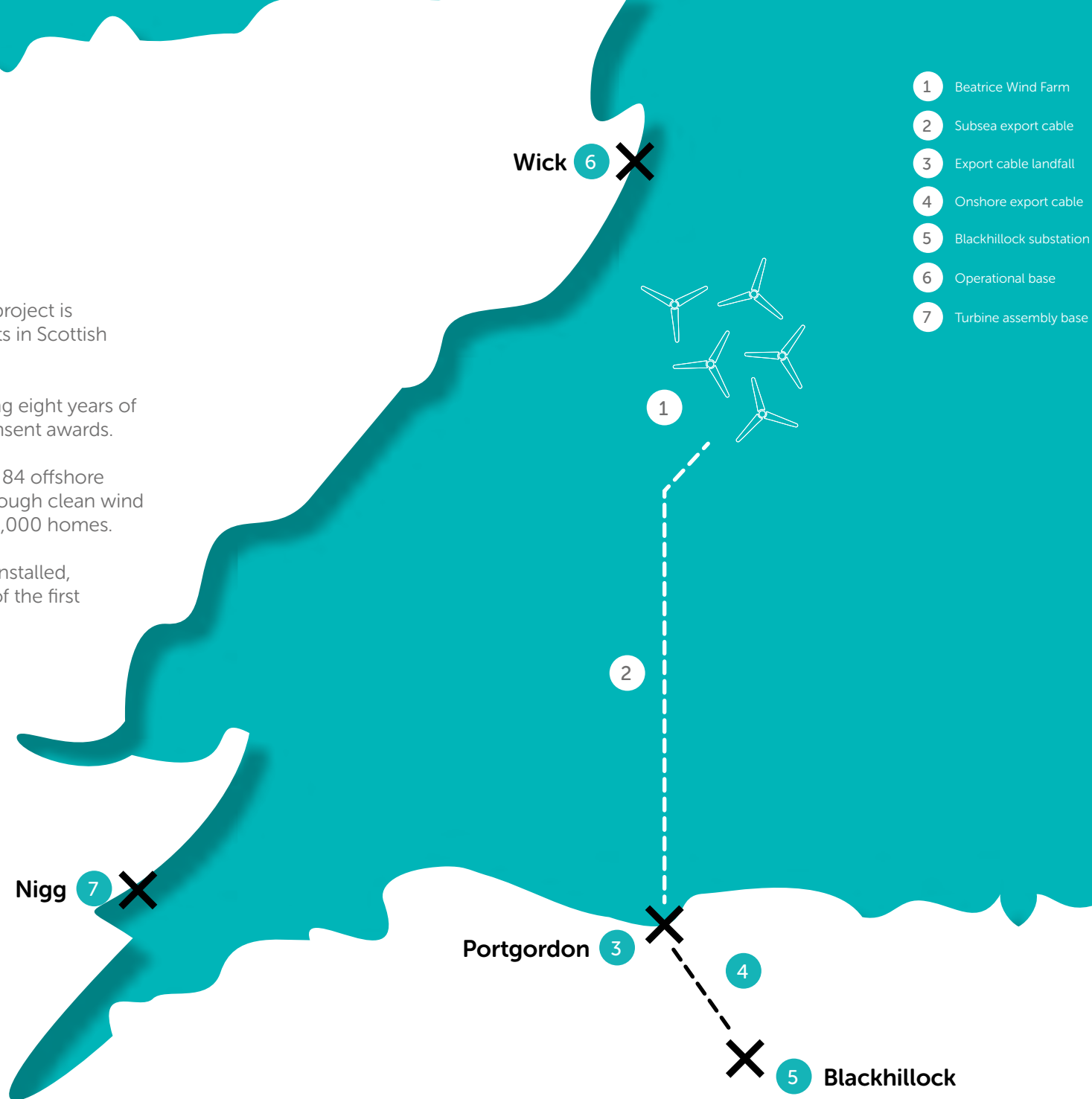
Beatrice explained

The £2.6bn Beatrice offshore wind farm project is one of the largest ever private investments in Scottish infrastructure.

Construction began in May 2016 following eight years of careful development, refinement and consent awards.

Once fully operational in 2019, Beatrice's 84 offshore wind turbines will be able to generate enough clean wind powered electricity to power around 450,000 homes.

July 2018 will see the first wind turbines installed, followed shortly after by the generation of the first electricity to the GB transmission system.



Partners

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



SSE plc is one of the UK's leading energy companies, involved in the generation, distribution and supply of electricity and in 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 million energy and home services customers throughout Great Britain and Ireland, is frequently ranked number one for customer service and is the UK's leading generator of electricity from renewable sources.



Copenhagen Infrastructure Partners (CIP) is a fund management company founded in 2012 by 5 partners with extensive experience from energy projects, including offshore wind projects. Copenhagen Infrastructure Partners currently manages three funds of approx. 3.5 billion Euros in total. 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 Limited 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 32.5GW, more than 60% of which is generated from renewable energy installations, including hydro power stations and wind farms.

Generation

Beatrice will be capable of generating enough electricity to power around 450,000 homes. That's around three times the number of homes in the Moray and Highland regions.



Picture shows: Jackets installed ready for turbine delivery and installation.

Project milestones



Blackhillock Substation

Work at the substation is progressing well and it is anticipated that we will connect on to the GB transmission system in the spring of 2018.

The electricity generated by Beatrice will be transmitted by subsea and underground cables (a total distance of around 90km) to the substation at 220kV. The electricity is then transformed at the substation to 400kV for onward transmission to the GB transmission system.

Work at the substation is expected to be completed by autumn 2018.



Above & right: The Blackhillock substation near Keith, Moray.





Onshore export cable

The electricity generated by Beatrice will come ashore near Portgordon on the Moray coast. Two large pipes have been installed under the beach through which the electricity cables pass. These are connected to the onshore underground cables for onward transmission of the electricity to the Blackhillock substation.

The installation of the 20km of underground cables between Portgordon and the Blackhillock substation is complete. Horizontal directional drilling techniques have been successfully deployed under obstacles avoiding disruption to roads, water courses and sensitive habitats.

The cable route is being reinstated to its original condition during summer 2018. This includes reseeding, replanting of hedgerows and temporary roads and access points will be removed.



Above: Direct Pipe Thruster at the Portgordon export cable landfall site

Left: The first export cable is winched ashore near Portgordon.

Offshore export cable

Two subsea export cables (140km in total) connect the wind farm to the shore. The cables are laid and then buried within the seabed, using a remote operated vehicle with a water jet trenching tool, for protection.

In September 2017, the first 36km section of export cable was laid successfully on the seabed from the Portgordon land fall. Later in October 2017 the cable laying vessel 'Skaggerak' returned and connected the second section using a subsea joint, giving a total cable length (circuit one) of 69km to the wind farm.

In February 2018 this first cable was connected to one of the two Offshore Transformer Modules, which take the electricity from the turbines and prepares it for transmission to shore via the export cables.

Where seabed conditions prevented cable protection by burial, rock has been strategically placed to protect the cable.

The installation of the second export cable was completed in early 2018.

The export cable protection work will be completed in summer 2018.

Image: Export cable in the carousel on the 'Skaggerak' cable lay vessel.





Pile installation

One of the first offshore construction activities was the installation of steel tubular structures (piles) in the seabed onto which the turbine substructure (jackets) are attached..

In April 2017, the Seaway Heavy Lifting vessel Stanislav Yudin arrived on site and began installing the piles using a piling hammer. In December 2017, the last of the 344 piles was safely installed.

The piles are up to 40m in length, 2.2m in diameter and each weighed around 170 tonnes.

A bespoke Pile Installation Frame (PIF) was manufactured specifically for these works. The PIF was 34m wide and weighed approximately 700 tonnes.

The PIF was lowered to the seabed at each turbine location and hydraulically leveled providing an accurate location guide for the piles. The piles were lowered one at a time into the frame and then hammered to the required depth.



Above: PIF being lowered in to the water.

Left: Foundation pile installation underway at a turbine location.

Safeguarding marine mammals

One of our key challenges during offshore construction is ensuring that our work does not impact on the important wildlife populations present in the Moray Firth including harbour seals, harbour porpoise and bottlenose dolphins.

We have partnered with world renowned experts and other developers to design a protocol to safeguard marine mammals and mitigate the risk of injury. This was successfully implemented for the duration of the foundation pile installation works.

In addition we are undertaking detailed monitoring throughout the construction phase, led by scientists from the University of Aberdeen to understand how marine mammals behave in and around a wind farm construction site.

This monitoring includes the use of seabed mounted recording devices, telemetry tracking and surface monitoring from small research vessels.

To find out more about this work, please visit beatricewind.com/safeguardingmarinemammals



Image: Survey team in the Moray Firth

Jacket installation

Installation of the jacket substructures, which support the wind turbines, began in August 2017 undertaken by the Seaway Heavy Lifting vessels 'Oleg Strashnov' and 'Stanislav Yudin'.

The jackets, each weighing around 1,000 tonnes, are lifted in to place on top of the installed piles from barges. The production of the jackets is undertaken by Bladt in Denmark, BiFab at their facilities in Fife and Smulders in Newcastle and Denmark.

There will be 86 jackets in total with 84 for wind turbines and two for the Offshore Transformer Modules. The jackets are up to 82m tall due to water depths of up to 55m.

Completion of jacket installation is anticipated in autumn 2018.



Above: Crew transfer vessel approaching an installed jacket.

Left: The Oleg Strashnov lifting a jacket off a barge ahead of installation.

Inter-array cable installation

We are installing a network of subsea cables which connect the wind turbines to the Offshore Transformer Modules. This will enable the electricity generated to be distributed and eventually exported.

Installation of the inter-array cables began in November 2017 utilising the Seaway Heavy Lifting (SHL) chartered Siem Aimery, Stingray, Barracuda and Moxie vessels.

Each of the Siem vessels performs specialist roles including laying cables, trenching, and cable termination and testing.

To maximise safety and efficiency an Ampelmann Walk to Work system is utilised which is a hydraulically operated gangway system that allows operatives to walk safely from the vessel to the jacket substructure.

This element of work is expected to be complete by autumn 2018.



Right: The inter-array cable ready for delivery and installation from the manufacturers in Hull.



Wind turbine installation

Perhaps the most significant milestone of the year will be the installation of the first wind turbines which will be closely followed by the first generation of wind powered electricity.

Wind turbine installation will be carried out by the Pacific Orca vessel, commencing in July 2018.

The vessel 'jacks up' ahead of installation, which means that it extends legs to the seabed and lifts itself clear of the water. This provides a stable platform for the lifting and installation work.

Siemens Gamesa Renewable Energy manufacture and install the 7MW wind turbines.

Each turbine consists of three tower sections, the rotor (three blades and the central hub) and the nacelle.

The turbine components are being delivered to our laydown and marshalling port at Nigg for pre-assembly ahead of being shipped to the wind farm site for installation.

More information about wind turbine technology is available at: beatricewind.com/technology

Image: Beatrice jacket ready for turbine installation.

Offshore Transformer Modules (OTMs)

The two OTMs, the first of this type deployed by Siemens Transmission and Distribution Limited (STDL), were assembled at Rosyth and shipped by barge to the wind farm site.

They are used to 'step up' the voltage of the electrical power generated by the wind turbines (from 33kV to 220kV) to enable it to be transmitted to shore via the export cables.

Both OTMs are now installed.



Above: OTM1 following installation.

Right: The two OTMs installed and undergoing commissioning supported by the Seajacks Hydra and Kraken jack-up vessels.





Operations and Maintenance base

Wick has been chosen as the long term operational home for the Beatrice. Up to 90 members of staff will operate and maintain Beatrice from the 200 year old Thomas Telford designed harbour front buildings which are currently being renovated.

As well as the renovation of the buildings, our £15m investment in the harbour area includes the re-purposing of the disused corner of the inner harbour.

The old slipway has been removed and pontoons installed which will be used to berth up to six crew transfer vessels.

Work is expected to be fully complete by early 2019.



Above & left: Ongoing works at Wick Harbour

Community Funds

The Beatrice project brings with it a Community Fund package worth a total of £6m to benefit community projects and organisations in Moray and Caithness.

To date, around £900,000 has been granted to projects, helping them realise their ambitions and providing a positive impact to the local communities.

To find out more about the Beatrice Community Funds, please visit www.beatricewind.com/funds.



Above: The Scottish Dolphin Centre has received grant funding from the Beatrice Community Fund.

Right: The Covesea Lighthouse also received grant funding from the Beatrice Community Fund.

