BURBO BANK EXTENSION OFFSHORE WIND FARM

OFFSHORE CONSTRUCTION BRIEFING DOCUMENT

April 2016

DONG energy

Welcome

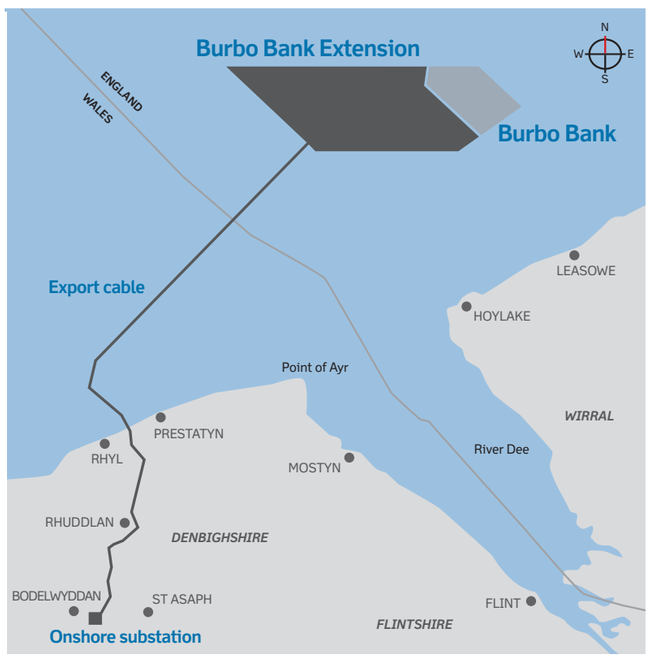
Welcome to our briefing document for Burbo Bank Extension Offshore Wind Farm. This document provides an overview of our plans for the upcoming offshore construction works for Burbo Bank Extension and sets out DONG Energy's vision for affordable, secure and renewable energy in the UK.

Leading the way in offshore wind

The UK is leading the way in the deployment of offshore wind with over half of the total installed offshore wind capacity located in Europe. With high winds, the UK coastline has ideal conditions to utilise offshore wind. To find out more about offshore wind and its role in helping the UK meet its renewable energy targets and reduce CO_2 emissions, please visit:
www.offshorewind.works

DONG Energy is the global market leader in offshore wind and is responsible for over a third of installed offshore wind capacity in the world. Our long-term vision is to lead the transformation to a lower carbon energy mix, while reducing the cost of electricity. To find out more please visit: **www.dongenergy.co.uk**

DONG Energy wind power under construction
DONG Energy wind power in operation



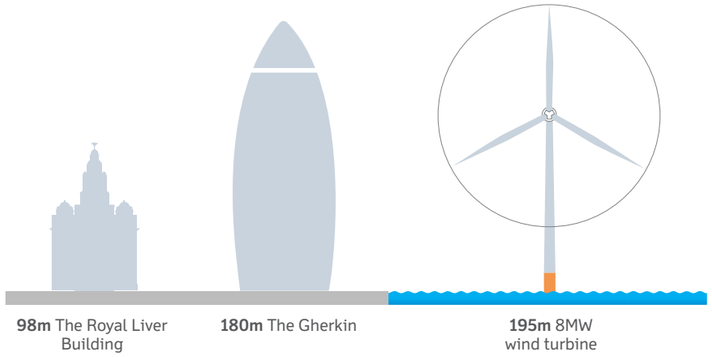
Burbo Bank Extension

In May 2010 the Crown Estate awarded DONG Energy an agreement for lease to extend the existing Burbo Bank Offshore Wind Farm. The extension is to be located in Liverpool Bay west of the existing Burbo Bank Offshore Wind Farm approximately 8.5km from Crosby beach, 7km north of Hoylake, Wirral and 12.2km from the Point of Ayr in Wales. The Project marks the first commercial deployment of the MHI Vestas 8MW turbine worldwide.

Onshore works

Since DONG Energy acquired the lease for Burbo Bank Extension Offshore Wind Farm in 2010, we have undertaken a number of geophysical, geotechnical and environmental surveys before commencing onshore construction works in early 2015. The onshore elements of the wind farm are located in Denbighshire, North Wales and consist of a project specific onshore substation, an onshore cable and a landfall site where the onshore cable meets the offshore cable. These works have progressed smoothly and are now nearing completion, with site reinstatement due to be carried out this summer.

Turbine size



Project facts

The Project will have a capacity of
258MW

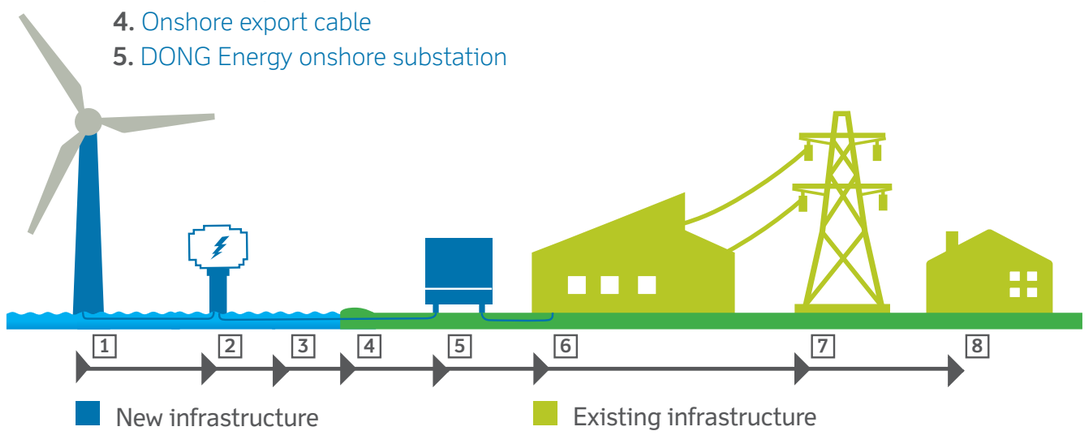
Number of turbines
32

Providing electricity for up to
230,000
UK homes.

Components of an offshore wind farm

There are several components that make up an offshore wind farm. For Burbo Bank Extension the onshore components of the wind farm are located in Denbighshire, North Wales and the offshore components will be built in Liverpool Bay.

1. Offshore wind turbine and inter array cables
2. Offshore substation
3. Offshore export cable and landfall
4. Onshore export cable
5. DONG Energy onshore substation
6. Existing National Grid substation
7. Existing National Grid power lines
8. Homes



Planning for offshore works

The offshore construction for Burbo Bank Extension commenced in April 2016 and will continue until early 2017 when the wind farm will be commissioned.

The offshore construction works will be serviced from a facilities base at the Cammell Laird site in Birkenhead, Wirral. Throughout the planning stage for offshore works DONG Energy has liaised closely with local planning authorities, stakeholders and councils along with regulatory bodies such as the Marine Management Organisation (MMO) and Natural Resources Wales (NRW).

As a major construction project you may well be able to see, or even hear, certain aspects of offshore construction in the Liverpool Bay area. With this in mind, DONG Energy aims to keep local communities informed of upcoming construction activities and have provided a freephone information line should you have any further enquiries about the Project.

The key milestones for offshore construction are listed below along with the expected start dates. Please note that the following dates are indicative and may be subject to change.

Programme timeline

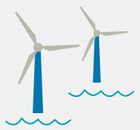
Scour protection installation April 2016
Scour protection is installed on the seabed to enhance the structural stability of the foundations and to protect the marine environment.

Foundation installation (monopile and transition pieces) June 2016
The monopile foundations for each turbine are installed into the seabed by a specialist hydraulic hammer, using a process called piling. The yellow transition pieces are then lifted into place and grouted to the monopile.

Export cable installation June 2016
The export cable transmits the electricity generated by the wind farm from the offshore substation to the shore, where it is then carried to the onshore substation. For Burbo Bank Extension the export cable reaches land at Rhyl and the onshore substation is in St. Asaph.

Offshore substation installation June 2016
The offshore substation will receive the electricity generated by the wind turbines and then step up the voltage before transmitting it to shore via the export cable.

Array cable installation July 2016
Once the foundations are in place, the inter array cables are laid along the seabed between them to collect the electricity generated from each turbine and send it to the offshore substation.



Turbine installation September 2016
Burbo Bank Extension is the first commercial use of the MHI Vestas 8MW turbine in a wind project worldwide. Each of these turbines will reach a height of up to 195m, almost twice as tall as the Royal Liver Building which measures at a height of 98m.

Testing and commissioning Early 2017
After each turbine is installed it undergoes a rigorous testing process before it is fully commissioned and then able to generate electricity. Once all the turbines have been commissioned, the wind farm will be fully operational.

About the MHI Vestas 8MW wind turbine

Burbo Bank Extension is a groundbreaking project and marks the first commercial use of the MHI Vestas 8MW wind turbine anywhere in the world.

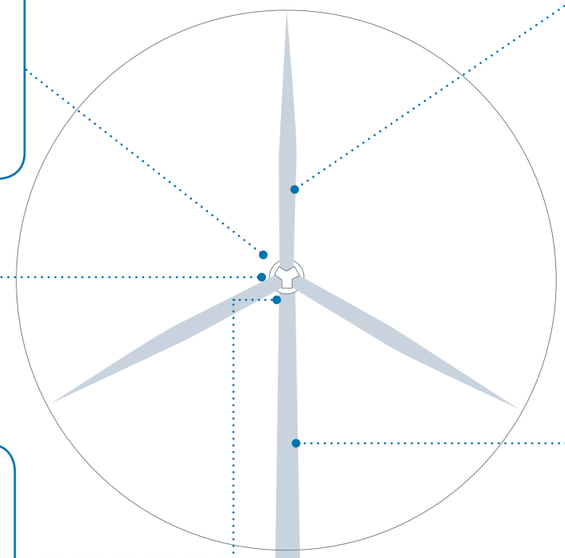
These turbines have more than twice the generating capacity than those used in today's operational offshore wind farms. Using larger turbines enables us to increase energy output whilst reducing the total number of turbines we install and maintain, helping us to achieve our key objective of driving down the cost of electricity from offshore wind. It also minimises the direct impact on the environment such as less disruption to the seabed during construction.

Installation
The turbines will be installed using the vessel Sea Installer which will be provided by A2SEA. The vessel will be loaded in Belfast with four wind turbines at any one time before sailing to the offshore wind farm site and moving into position, ready for installation. Each wind turbine is then installed with the tower being placed first, then the nacelle and finally each of the blades are lifted, mounted and secured into place.

Monitoring and safety mechanisms
Once operational, the offshore wind farm will be continuously monitored from our Operations and Maintenance (O&M) base to ensure everything is running smoothly. Each turbine will be controlled remotely from a control room which will be operated by skilled technicians. A safety management system will also be in place that will allow the safe shut down of any individual turbine or the full wind farm if required.

Rotor
The rotor has three blades mounted upwind of the tower. The rotor speed will operate automatically, changing in speed to maximise the aerodynamic efficiency of the wind turbine. It will also be self-starting when the wind speeds reach an average of approximately 3-5m/s.

Blades
The blades are 80m long and are made of fibreglass, epoxy and reinforced with carbon fibre. Each blade will have its own independent pitching mechanism capable of feathering the blade. This means that each blade can be angled to catch more or less wind depending on conditions.



Nacelle
The nacelle houses all of the generating components converting wind energy to electricity including the generator and gearbox.

Tower
The tower will have an internal ascent from the transition piece to give our operations and maintenance crews direct access to the nacelle and yaw system. It will be equipped with platforms and internal electrical lighting.

Yaw system
The yaw system is the component responsible for turning the wind turbine rotor towards the wind, and is located between the nacelle and the tower.

Community Benefit Fund

One of the ways that DONG Energy engages with the local community is through our Community Benefit Fund (CBF). For Burbo Bank Extension we have committed to a CBF worth up to £225,000 per year of the Project lifetime, with two rounds of applications each year.

Independent charity, GrantScape, are responsible for administering the fund and a local advisory group has been set up to help decide which local groups will benefit from the fund. This group has been selected to ensure that all areas within the funding boundaries are well represented by people with good local knowledge of the community and environment. The first round of funding allocations have now been made, with 14 projects receiving funding during this round.

Musical Memories
One of the projects to receive funding is Musical Memories, where a total of 15 live music concerts will be held at residential and care homes across North Wales, Wirral and Sefton. Robert Aitken CBE, Director of Music in Hospitals Cymru/Wales who run the project said: "For older people, and particularly for those with dementia, music is a powerful tool in aiding reminiscence, relieving stress and just making people feel better. We are so grateful to DONG Energy for making this project possible."

Music in Hospitals
creating joy through live music

Rice Lane City Farm
Another initiative to receive funding during the first round of allocations is Rice Lane City Farm, a project based in inner-city Liverpool that aims to empower the socially and economically disadvantaged through a range of activities including conservation work, food growing schemes and youth work. As the site is open to visitors every day of the year, there is need for some improvement works including repairs to the farm buildings and a new farmyard gate. Funding from the Burbo Bank Extension Community Benefit Fund will go towards these works along with the planting of fruit trees at the farm that will be used as an educational tool for visitors.

"This grant is great news for the city farm. It will really help us with much needed improvements to the site, helping us secure the future of our unique community asset, and continuing the work we do." Maria Hornsby, Manager, Rice Lane City Farm.

To find out more about the CBF and whether you are eligible to apply for future rounds of funding, please visit:
www.grantscape.org.uk/fund/bbecf/

Alternatively you can contact GrantScape directly at:
T: 01908 247634
E: bbecf@grantscape.org.uk

Engaging with local communities

For all our projects DONG Energy aims to proactively engage with the communities in which we work. There are a number of channels through which we do this:

Briefing Document
Briefing Documents like this one will be sent to key stakeholders in the region at Project milestones providing updates about Project developments.

Community Newsletter
Newsletters containing information about the latest Project developments will be sent directly to local residents, with additional copies being distributed at Community Access Points across the region.

Community Access Points (CAP sites)
CAP sites are sites local to the Project such as shops, libraries and community buildings where the public can obtain information about the work taking place in their region. To find out where your nearest CAP site is please contact us via the freephone information line.

Freephone Information Line – 0800 111 4478
The freephone information line allows members of the local community to ask questions about the Project or about specific work taking place in their region.

Email – burbobankextension@dongenergy.co.uk
The Project email account is regularly monitored and is for members of the community to direct any general enquiries about the Project.

Website – www.burbobankextension.co.uk
The website is a resource for people to find out more about Burbo Bank Extension, DONG Energy and our activities in the region.

Should you require this document in large print, audio or Braille then please call **0800 111 4478**.

All graphics and maps in this document are for illustrative purpose only.
Dates are based on available information and are subject to change.

Cover image: New Brighton marine lake.