Dudgeon construction completed on time

Rix Leopard-Byron Price / Equinor

Sea Challenger from A2Sea installed Dudgeon's 67 wind turbine generators

DUDGEON

Offshore Wind Farm

Operated by Equinor

Summer 2018

Just 16 months after marine installations commenced, and only 9 months after the installation of the first 6 MW wind turbine generator, the last of Dudgeon Offshore Wind Farm's 67 wind turbine generators was commissioned during September 2017 marking the completion of the construction of this important UK renewable energy power plant.

"The marine construction work has involved a total of over 4,000 vessel days, which gives an indication of the scale of the project", said Dudgeon's Operations Manager Emil Orderud.

He continued: "*The Dudgeon Offshore Wind Farm, which is currently the UK's furthest offshore operational wind farm, was completed on time, under budget and enjoyed an excellent safety record.*"

The project has created local jobs and helped stimulate further economic growth and investment in East Anglia, and it is hoped that the resulting enhanced supply chain will be of benefit to the next phase of offshore wind farm developments which are now starting along the UK's eastern seaboard

China Resources becomes new Dudgeon shareholder

It was recently announced that China Resources has acquired Statkraft's shareholding in the Dudgeon Offshore Wind Farm.

China Resources directors

Statkraft became a shareholder in Dudgeon Offshore Wind Limited when the company was acquired from Warwick Energy Limited in 2012, and the sale of its shares to China Resources was made in line with its strategy to exit the global offshore wind marketplace due to its limited financial capacity.

China Resources is a diversified holding company registered in Hong Kong. It consists of seven key strategic business units covering consumer products, power, real estate, cement, gas, pharmaceuticals and finance, and clean energy is a growing element of its power business unit.

On 16th March 2018, Directors of China Resources visited the Dudgeon Operations and Maintenance base in Great Yarmouth, Norfolk.

The shareholdings of Equinor and Masdar in Dudgeon Offshore Wind Limited remain unchanged, and Equinor continues as the operator of the 402MW wind farm located 32 kms off the coast of North Norfolk

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Great Yarmouth Town Hall hosts Dudgeon opening

With Great Yarmouth in Norfolk being home to its Operations and Maintenance Base, it was highly fitting that Great Yarmouth Town Hall was chosen as the venue for the Official Opening of the Dudgeon Offshore Wind Farm on Wednesday 22nd November 2017.

The Chief Executive Officers of the wind farm's three owners Equinor, Masdar and Statkraft were supported by senior representatives from the Norwegian Ministry of Petroleum and Energy, the UAE Ministry of Foreign Affairs and International Cooperation for Economic and Trade Affairs, the UK Department of International Trade and the UK Department for Business, Energy and Industrial Strategy (BEIS).

They were joined by over 100 guests from a wide range of business and community organisations, all of whom were welcomed to Great Yarmouth by Mayor Kerry Robinson-Payne.

Equinor will remain the operator of the Dudgeon Offshore Wind Farm for its 25 year lifetime, and in declaring the wind farm 'officially open', CEO Eldar Sætre said:

"As part of our strategy to develop from an oil and gas company to a broad energy major, Equinor will grow significantly in renewable energy, with an ambition to invest around £9.5 billion over the next few years. Dudgeon is a key part of this strategy to complement our oil and gas portfolio with profitable renewable energy solutions, as well as building upon Equinor's already strong UK presence."

▶ Top left: Great Yarmouth Town Hall
▶ Bottom left: The CEOs opening the wind farm

▶ Equinor's Hannah Mary Goodlad playing on the newly installed table tennis table.

Table tennis goes outside at Great Yarmouth Primary Academy

By participating in a short film about the importance of renewable energy to the Norfolk community, pupils at the Great Yarmouth Primary Academy played a memorable part in the Official Opening of the Dudgeon Offshore Wind Farm.

In recognition of the support of both staff and pupils for this milestone occasion, Equinor provided Great Yarmouth Primary Academy with an external table tennis table, which will enable the pupils to exercise and work off their excess energy for many years to come

Statoil becomes Equinor

On 16th May 2018 Statoil, the operator of the Dudgeon Offshore Wind Farm, changed its name to Equinor, a name which is formed by combining 'equi', the starting point for words like equal, equality and equilibrium, and 'nor', signalling a company proud of its Norwegian origin.

The name change supports corporate strategy and evolution from an oil company to a broader energy company, which includes offshore wind power generation.

Equinor is meeting the future with optimism, and will provide the energy the world needs whilst effectively fighting climate change. It is a company with innovation at its heart; an organisation that thrives on change, cheering for diversity, attracting the best talents and embodying equality and equilibrium.

The new North Star logo is the company's compass, reminding the world that the company is on a journey, never settling for 'good enough', constantly searching for better

▶ The Equinor logo

Esvagt Njord – an SOV success

When the 'Esvagt Njord' SOV (Service Operations Vessel) entered service at the Dudgeon Offshore Wind Farm in September 2016, it became the first SOV to be used to transfer service technicians to a UK offshore wind farm using the Uptime 'walk-to-work' gangway.

▶ Michael Martins

Since then it has been continuously working in the wind farm site. Initially it was supporting the construction phase, but since the wind farm's first wind turbine generators started generating electricity in February 2017, it has been providing a base and a means of transport for the turbine technicians responsible for wind farm service and maintenance activities.

▶ Esvagt Njord

To date, the 'Esvagt Njord' has made1,821 connections to the 67 wind turbines which make up the 402MW Dudgeon Offshore Wind Farm, performing 6,728 Uptime gangway passenger transfers to the turbines and completing 4,058 cargo lifts, all without incident.

Michael Martins joined the Dudgeon O&M team in July 2017. As the Marine and Logistics Manager, he is responsible for the management of the 'Esvagt Njord', and he said:

"Logistics play an important part in any operation, and the 'Esvagt Njord' spends two weeks at a time in the wind farm site before returning to port in Great Yarmouth. After a little over 8 hours in port, the time it takes to replenish stocks and complete turbine technician and vessel crew change-overs, she is once again ready to sail back to her place of work 32kms off the coast of North Norfolk."

Dudgeon Operations and Maintenance:

Inside the Control Room

The Dudgeon Control Room

Operated on a 24 hour/7 day per week basis, the Control Room in Great Yarmouth is at the heart of all O&M (Operations and Maintenance) at the Dudgeon Offshore Wind Farm.

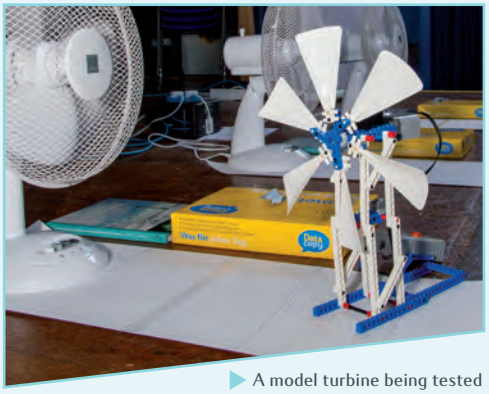
A sophisticated SCADA (supervisory control and data acquisition) system enables the Control Room Engineers to monitor both the Dudgeon, and Hywind, Offshore Wind Farms in real time. This provides information on the output of the wind turbine generators and all the related system parameters including current, voltage, temperature and functionality status. It also enables the majority of the equipment controlling the wind farm to be remotely operated from Great Yarmouth.

All maintenance and repair work on the Dudgeon network is controlled through the Work Release System, and the issue of Safety Documents acts as the official sanction for work to be undertaken. The Work Release System is operated by the Control Room engineers, who are responsible for responding to faults on the electrical network so that maximum generation can be restored as soon as is practically possible.

All the electricity produced by the Dudgeon Offshore Wind Farm is transmitted to National Grid for distribution, and the Control Room is the wind farm's point of contact with National Grid. As well as ensuring full compliance with all codes of practice, the Control Room is responsible for providing National Grid with advance notice of the anticipated level of electricity output from the wind farm, and for updating that generation output data when necessary

Dudgeon in the Community

In October 2017 Dudgeon Offshore Wind launched the Dudgeon STEM Programme, an exciting new education initiative for secondary school pupils across Great Yarmouth, North Norfolk and Breckland to be delivered through the Dudgeon Community Fund.



A model turbine being tested during a Mason Trust interactive renewable energy day

The Dudgeon *STEM* Programme is targeted at inspiring pupils to get actively involved with the subjects of science, technology engineering and maths, and it will inject additional funding of over £2.5million over the next 25 years.

Funding applications for 12 projects were received by the Norfolk Community Foundation, which is administering the Dudgeon Community Fund, in November and December 2017; these were screened by the Dudgeon Evaluation Committee and in January 2018 interviews took place with the short listed applicants and grant offers totalling in excess of £90,000 in 2018 were made to support the following projects:

Neatherd High School: an out of hours, school-based Community Design School formed on the 'Maker Shed' principle, with 6 STEM design school projects running weekly.

The Mason Trust: the delivery of 6 interactive renewable energy days to 6 schools in the Great Yarmouth and Breckland regions of Norfolk.

Greenpower: to design, build and race a single seat electric car which will compete in an inter-school challenge.

Sheringham High School: to support a programme of robotics development moving towards a large robotics competition.

In forthcoming issues of this newsletter, it is intended to publish case studies charting the outcomes from these innovative projects

About the Owners

Dudgeon Offshore Wind Farm is owned By Equinor, Masdar and China Resources.

Equinor is an international energy company headquartered in Norway, with 21,000 employees and operations in 36 countries. Building on 40 years of experience from oil and gas production, the company is committed to accommodating the world's energy needs responsibly, applying technology and creating innovative business solutions.

Masdar is Abu Dhabi's renewable energy company advancing the development, commercialisation and deployment of clean energy technologies and solutions. The company serves as a link between today's fossil fuel economy and the energy economy of the future.

China Resources is a diversified holding company registered in Hong Kong made up of seven strategic business units covering consumer products, power, real estate, cement, gas, pharmaceuticals and finance. All its investments through those business units are self-operating businesses, which have more than 450,000 employees

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