

WIND POWER FOR A CLIMATE SMARTER FUTURE

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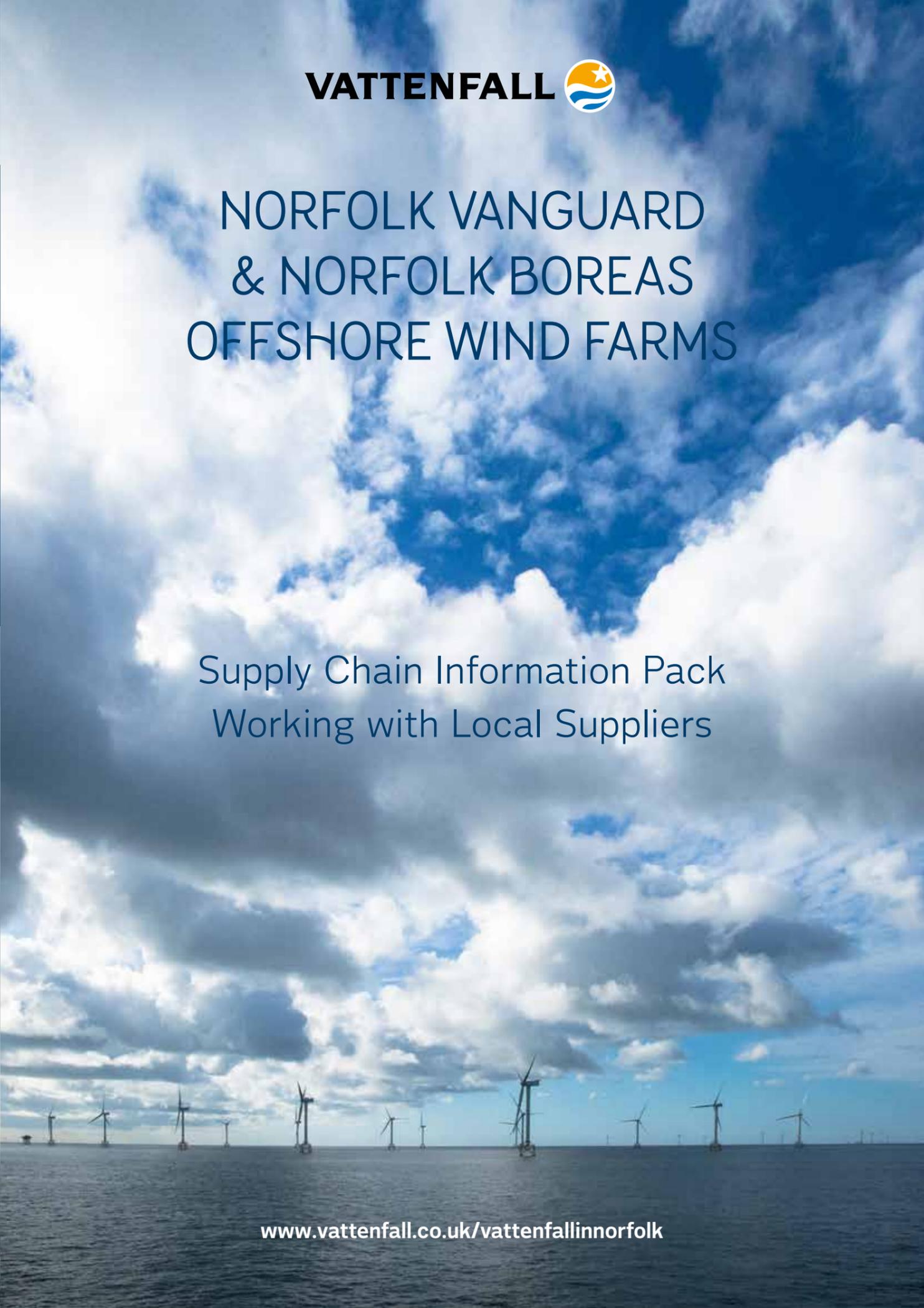
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NORFOLK VANGUARD & NORFOLK BOREAS OFFSHORE WIND FARMS

Supply Chain Information Pack
Working with Local Suppliers



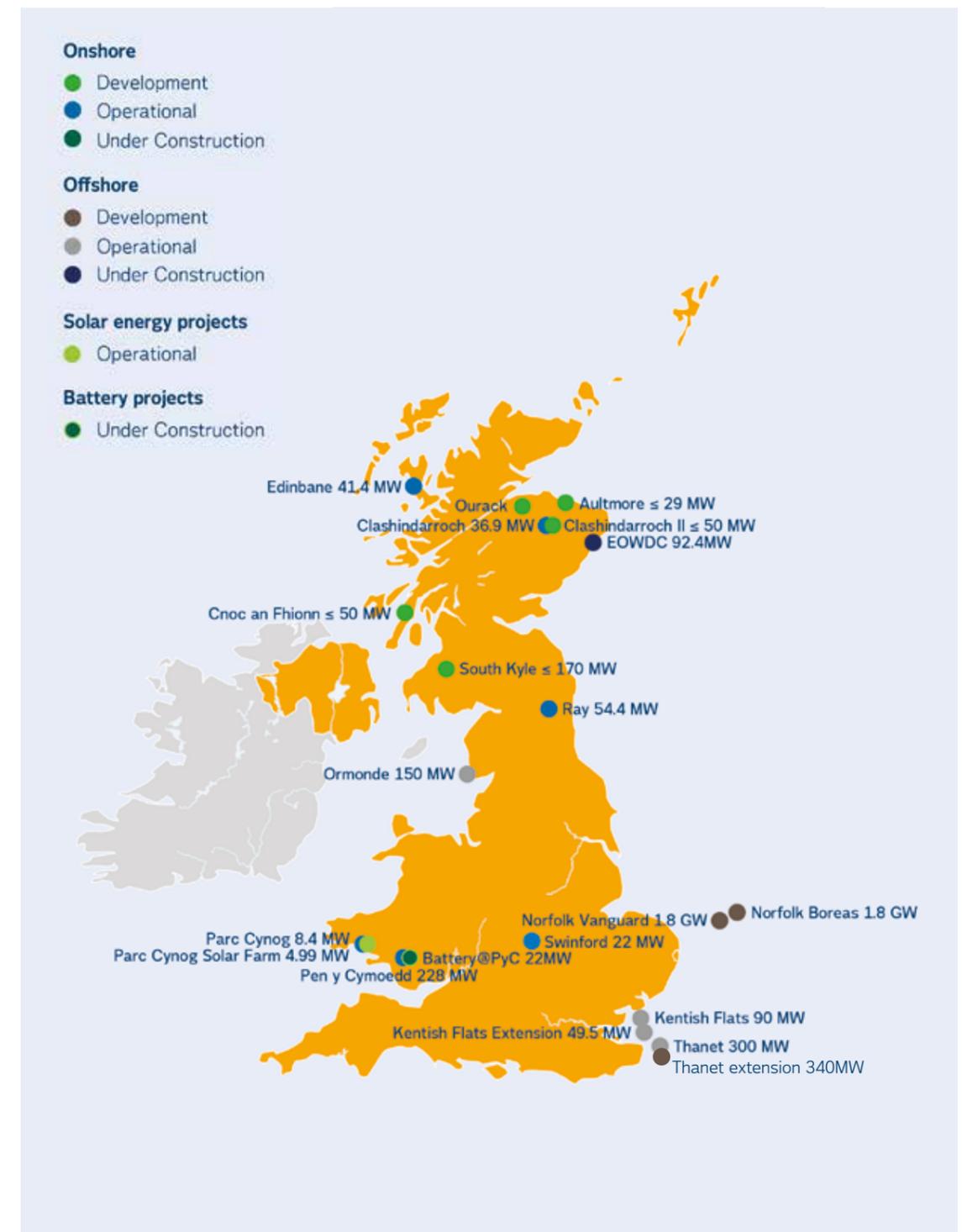
ABOUT VATTENFALL

Vattenfall is a Swedish state-owned utility and one of Europe's largest energy providers, operating in Sweden, Denmark, Finland, Germany, the Netherlands, Poland, France and the United Kingdom.

The world is in urgent need of finding alternative, cleaner ways of powering and heating homes, industry and cities, so our purpose is to Power Climate Smarter Living. To achieve this, Vattenfall plans to invest €5bn in Northern European renewables, mainly offshore wind, by the year 2020, with an overall ambition to complete 4GW of operational capacity by 2020 and 7GW by 2025. Our goal is to be climate neutral by 2050, and by 2030 in the Nordic countries. Norfolk Vanguard and Norfolk Boreas represent a significant part of these aims and of this planned investment.



OUR UK WIND PORTFOLIO



Vattenfall has invested over £3bn in UK energy infrastructure

10 UK Wind Farms

Over 200 UK employees

ABOUT NORFOLK VANGUARD & NORFOLK BOREAS

Norfolk Vanguard Offshore Wind Farm comprises two distinct development areas: Norfolk Vanguard East (NV East) and Norfolk Vanguard West (NV West).

The offshore wind farm comprises the following:

- Wind Turbine Generators
- Offshore Platforms (incl. electrical)
- Subsea Cables (including Inter Array Cables connecting the wind turbines and platforms, and export cables taking the energy to shore)

The Project will also require onshore infrastructure in order to transmit and connect the offshore wind farm to the National Grid, comprising:

- Landfall at Happisburgh South, where the offshore cables are brought ashore and jointed to the onshore cables
- Underground cables in ducts
- An onshore Project Substation near the existing Necton National Grid substation
- Works at the Necton National Grid Substation (including extension of the existing substation and modification of the overhead power lines) build scenario.

Construction of the project is anticipated to commence between 2020 and 2021 for the onshore works, and around 2023 for the offshore works. Onshore construction would likely be completed by 2026 under the longest, three phase build scenario. Construction at any one location within the onshore project area would be completed in a much shorter timescale. Offshore, a 3 to 7 year construction window is anticipated.

Norfolk Boreas is Norfolk Vanguard's sister project and is being developed approximately 1 year later. Proposals continue to be refined through Norfolk Boreas' Environmental Impact Assessment (EIA) process. We are applying to install some shared infrastructure (such as cable ducts) for Norfolk Boreas within the Norfolk Vanguard DCO application in order to minimise local & environmental impacts. Norfolk Boreas will be submitting its DCO application in Q2 2019.

Find out more at www.vattenfall.co.uk/norfolkboreas

Vanguard and Boreas will produce enough electricity to power approximately 2.6 million homes, the equivalent of 10% of the UK's households.

1.8GW per project – 3.6GW in total



Vattenfall is committed to accelerating the development of wind energy and cost reduction through innovation and collaboration. This includes opening up wider opportunities presented by Vanguard & Boreas to maximise project supply chain content in Norfolk, South East England and the wider UK.



PROPOSED ONSHORE CABLE ROUTE



- Extent of Norfolk Vanguard onshore works
- Provisional offshore cable corridor
- Former extent of Norfolk Vanguard onshore works
- National Park and other protected areas
- Permanent above-ground infrastructure**
- National Grid overhead line tower
- National Grid substation extension
- Onshore project substation
- Rainwater attenuation pond
- Mitigation planting
- A47 junction and access road
- Permanent below-ground infrastructure**
- Underground cables
- Temporary works**
- National Grid overhead line works area
- National Grid construction, laydown and parking
- Area of search for construction/mobilisation area
- Indicative footprint for construction/mobilisation area

SUPPLY CHAIN OPPORTUNITIES FOR ONSHORE WORKS INCLUDE:

Onshore Cable

- Ground thermal resistivity surveys
- Ground investigation surveys (bore holes)
- Topographical survey
- Design and engineering for highway and access improvements
- Consulting & engineering services for production of final documentation for DCO conditions discharge (transport & highways, access improvements, preparation of traffic related plans).
- Cable haul road and site drainage designs
- HDD and 3rd party support
- Hydrology and UXO surveys and reports
- Cable Route – Duct Installation
 - Pre and post construction drainage
 - Fencing
 - Archaeological and ecological surveys
 - Procurement of cement bound sand, ducts, marker tiles and installation
 - Removal of displaced excavated material
 - Trenchless crossing design, procurement and install
 - Vehicle marshalling
 - Portable welfare facilities
- Cable Route – Cable Install
 - Jointing gangs (specialist skill)
 - Fibre optic splicing
 - Cable pulling (equipment and labour)
 - Reinstatement of temporary access routes to joint bays (fencing, topsoil stripping, grading, surface laying, etc.)

Onshore Substation

- | | |
|---|---|
| <ul style="list-style-type: none"> Topographical and geotechnical surveys Onshore Engineering Support NG Design Verification & Commissioning Compliance Primary Plant Design Secondary Design Civil Design Civil Enabling Works Civil Contractors Balance of Plant (Electrical & mechanical) – Supply & assembly | <p>Substation</p> <ul style="list-style-type: none"> • 400 kV OHL works (temporary towers, new towers, piling, construction, stringing, etc). • A47 new right lane filter and new permanent access road (asphalt) construction • Drainage works (attenuation ponds – ongoing maintenance) • Planting (ongoing maintenance required) |
|---|---|

Accommodation & Buildings

- Cabins, messrooms, canteens, offices, stores, security
- Establishment, maintenance, removal, provision of services

Services

- Electricity, water, drinking water
- Establishment, supply (fixed or temporary), removal

Mobilisation areas

- | | |
|---|---|
| <ul style="list-style-type: none"> Labour and materials required to establish the site (fencing, topsoil strip, grading, surface laying) | <ul style="list-style-type: none"> Labour and materials required to reinstate the site (as above) Vehicle marshalling, cleaning and servicing |
|---|---|

Civil Works

- | | |
|---|---|
| <ul style="list-style-type: none"> Removal & legal disposal of cable drums and/or redundant equipment/ materials resulting from works Supply & install Substation Labelling Substation Signage Realignment of fibre ducts | <ul style="list-style-type: none"> Supply & install Fibre Optic Joint Boxes Excavation & Reinstatement of HV Joint Bays Grouting of apparatus bases Craneage of cable drums |
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SUPPLY CHAIN OPPORTUNITIES FOR ONSHORE WORKS INCLUDE:

General & Miscellaneous

- Onshore cable route landscaping studies
- Contaminated land studies and surveys
- RAMS support activities
- Consultancy services for OFTO transfer
- Grid code compliance consulting
- Transient studies
- Archaeological mitigation works
- Ecology monitoring & mitigation works (incl. support & survey work)
- Substation design support
- Environmental Clerk of Works
- Ecological Clerk of Works
- Agricultural Liaison Officer
- Arboricultural Liaison Officer
- Community Liaison Officer
- COCP Special Support
- Environmental construction support
- COMSOL Calculation Software
- Power Factory RMS Software

General & Miscellaneous

- Temporary Warehousing
- Fencing & lighting
- Fuel & Lubes
- Data management
- Office Cleaning
- Waste collection
- Vehicle Leasing
- Vending machines
- Catering services
- Temporary Power Supplies
- Safe Permit to Work Software
- Cable Burial Assessments support
- Lifting equipment
- Plant hire
- Crane hire
- Fork lifts & telehandlers
- Storage containers
- Project photography/videography
- Misc. Mechanical services
- Misc. Electrical services
- Transport



WORKING WITH VATTENFALL

Next steps....

- Please visit www.vattenfall.co.uk/norfolkvanguard and register your interest using the form on the 'Contact Us' page
- Register your business details and competences in the Vattenfall Suppliers Bank: <http://www.vattenfall.co.uk/supply-chain>.
- Check that you comply with Vattenfall's Supplier standards by checking our Supplier Code of Conduct. This can be downloaded from the Suppliers Bank page.
- Register at TED website. All of our European tenders are published on this website: ted.Europa.eu

Green:field – let's do business. Together.

Green:field is an open innovation platform that brings together people with promising business ideas both within and outside Vattenfall, and helps you put your ideas into practice and integrate them at Vattenfall. Find out more by visiting our website:

<https://corporate.vattenfall.com/sustainability/greenfield>

Startup scouting

Our startup scouting has begun - we are looking for new strategic partners. Allow us to find out more about you or register yourself and your startup



Who we are looking for

Startups for strategic partnerships in the following areas:

- Renewable energies and energy storage
- Big Data in the energy sector
- Digital Customer Journey



What we offer

Business on a level playing field and individual cooperation:

- More than 100 years of experience
- Industry contacts
- Individual coaching & training



About us

We are the single point of contact for linking startups with the right people in the company and providing the "large, anonymous corporation" with a contact for new business ideas



Here's how it works

To build sustainable partnerships:

- We carry out a feasibility study
- We create a prototype together, and after this
- We create a potential partnership

WHERE CAN I FIND LOCAL SUPPORT?

There are a number of initiatives and organisations that can support companies to identify, develop and exploit opportunities within offshore wind and other sectors. We will be working closely with the following organisations to maximise support for local businesses in accessing supply chain opportunities presented by Norfolk Vanguard and Norfolk Boreas. Please contact them directly for more information.



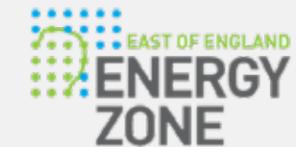
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