UK Trade
& Investment

UK Offshore Wind:

Opportunities for trade and investment

THE CROWN ESTATE

renewableUK
The voice of wind & marine energy

Offshore Wind
Programme Board

Green
Investment
Bank

Executive Summary

The United Kingdom is…

The global market leader in offshore wind:

The UK has 5.7GW installed or under construction, and is on track to deliver 10GW by 2020, representing the largest expansion in any class of renewable energy technology.

The most attractive location for offshore wind investment in the world:

The UK consistently tops international rankings as the best place to invest in offshore wind, and has been successful in attracting investment from across the globe. The offshore wind pipeline presents an investment opportunity of between £10bn to £21bn from 2014 to 2020. Innovative funding models are being created to attract new sources of capital into the sector.

A stable and predictable policy regime:

The UK enjoys a reputation for operating stable and predictable policy regimes to support investment in renewable electricity infrastructure. The UK's Electricity Market Reforms provide long term stable revenues for low carbon energy projects and reduce investor risk.

Home to a growing supply chain capability:

Industry and Government are working together to build a competitive and innovative UK supply chain that delivers and sustains jobs, exports and economic benefits for the UK. UK companies lead the world in services for the design, development, financing, construction and operation of offshore wind plant. Suppliers like Siemens have already chosen the UK as the site for future world class manufacturing facilities, and there are great opportunities for further investment in the supply chain.

Introduction

This guide is an introduction to UK offshore wind, aimed at investors who are considering entering the sector and suppliers looking to export from the UK. It provides core information that will help build understanding and evaluate opportunities in this dynamic area of technological, manufacturing and infrastructure development.

The guide is supported by five organisations with a strategic role in the long-term, sustainable growth of the sector:

UK Trade & Investment is the Government Department that helps UK-based companies succeed in the global economy and encourages overseas companies to invest in or expand within the UK. UKTI's Offshore Wind Team offers dedicated support to potential investors in the UK supply chain, supports UK based suppliers to grow and export, and works with developers of UK offshore wind farms to deliver on their local supply chain strategies. The team works closely with the Department of Energy and Climate Change and the Department for Business Innovation and Skills.

The Offshore Wind Programme Board steers a collaborative, long-term programme of work that aims to deliver cost reduction and enable growth of a competitive UK-based supply chain as the offshore wind industry grows and matures. The Board was established by the Secretary of State for Energy and Climate Change in November 2012 and has a membership drawn from across the industry and government.

The Green Investment Bank's purpose is to accelerate the UK's transition to a greener economy. GIB was created by the UK Government, its sole shareholder, and capitalised with an initial £3.8bn of public funds. GIB uses this finance to back green projects, on commercial terms, across the UK and to mobilise other private sector capital into the UK's green economy.

The Crown Estate is an independent commercial business created by Act of Parliament. The Crown Estate manages the UK seabed effectively and sustainably, balancing differing interests and delivering best value over the long-term. 100% of its annual revenue profits are returned to HM Treasury for the benefit of public finances.

RenewableUK is the UK's leading renewable energy trade association, with over 580 corporate members active in the wind, wave and tidal energy sectors. A not- for- profit organisation, RenewableUK is the sector's central point of information and a united representative voice for our members. Expertise ranges from delivering research projects, conferences and exhibitions, one-day networking and business development opportunities, to promoting the benefits of wind and marine renewables to governments, related industries, the media and the public.

Offshore Wind Programme Board

renewableUK The voice of wind & marine energy

UK Trade & Investment

THE CROWN ESTATE

Green Investment Bank

Contents

Notes for the reader:
Figures and policy information used in this publication date to June 2015 and readers should account for industry developments since then.

Figures on UK offshore wind capacity are sourced from The Crown Estate, May 2015.

Figures on estimated investment for the sector are sourced from: DECC, *Delivering UK Energy Investment* July 2014.

Section one

The existing landscape

Stable and supportive conditions have seen offshore wind expand dramatically in the UK, attracting a growing pool of international investors and delivering the largest installed capacity anywhere in the world.

Why offshore wind?

The United Kingdom is home to the world's largest offshore wind portfolio in a stable regulatory environment.

The UK has committed to the renewal of its electricity system, aiming to maintain secure and affordable supplies whilst delivering on our ambitious 2050 carbon reduction commitments.

The UK Government has establishing a robust new market framework designed to deliver investment in new low carbon power capacity.

Offshore wind will be at the forefront of this expansion

The UK is already the world leader in offshore wind, and the sector is on track to deliver 10GW by 2020, representing the largest expansion in any class of renewable energy technology.

Offshore wind is a proven technology which has developed in the UK through 16 years of government support. Active programmes of technological development are driving improvements in yields, reduction in costs and an acceleration in deployment.

The local supply chain is already expanding to meet demand, with leading equipment manufacturers choosing UK sites as the centre for growing operations.

Investment is needed today, across the value chain

A growing, dynamic sector presents a diverse range of opportunities for investment in:

- Technology and IP
- Manufacturing facilities and supply chain
- Wind farm projects in development and construction
- Construction management and contracting
- Installation plant and vessels
- Operating wind farms
- Plant operation and maintenance

United Kingdom offshore wind offers favourable returns in a stable, regulated environment

Offshore wind farms present an attractive investment profile:

- Long-dated assets with 25 year asset lives and up to 20 years of contracted revenues
- Inflation-linked revenue streams backed by UK Government legislation
- The Crown Estate offering 50 years lease terms

UK Offshore Wind Programme

Installed capacity*	4 GW
Under construction	1.7 GW
2020 potential	10GW
Potential investment 2014-2020	£16bn – £21bn

Further potential for investment growth beyond 2020

*Capacity of wind farms that have been fully commissioned.
Figures supplied by The Crown Estate

Global investment

The UK offshore wind market has received investment from across the world and has been at the forefront of attracting new investors into the sector.

Existing investors in the UK offshore wind pipeline – May 2015

Operational, under construction, government support in place or in planning

Canada
- La Caisse de dépôt et placement du Québec

Denmark
- Copenhagen Infrastructure Partners (CIP)
- DONG Energy

France
- EDF Energy Renewables

Germany
- E.ON
- RWE
- Siemens
- Stadtwerke München

Ireland
- Mainstream Renewable Power

Japan
- Development Bank of Japan
- Marubeni Corporation

Netherlands
- Eneco
- PGGM and Ampère Equity Fund

Norway
- Statkraft
- Statoil

South Korea
- Samsung Heavy Industries

Spain
- EDP Renováveis
- Iberdrola (ScottishPower)
- Repsol

Sweden
- Vattenfall

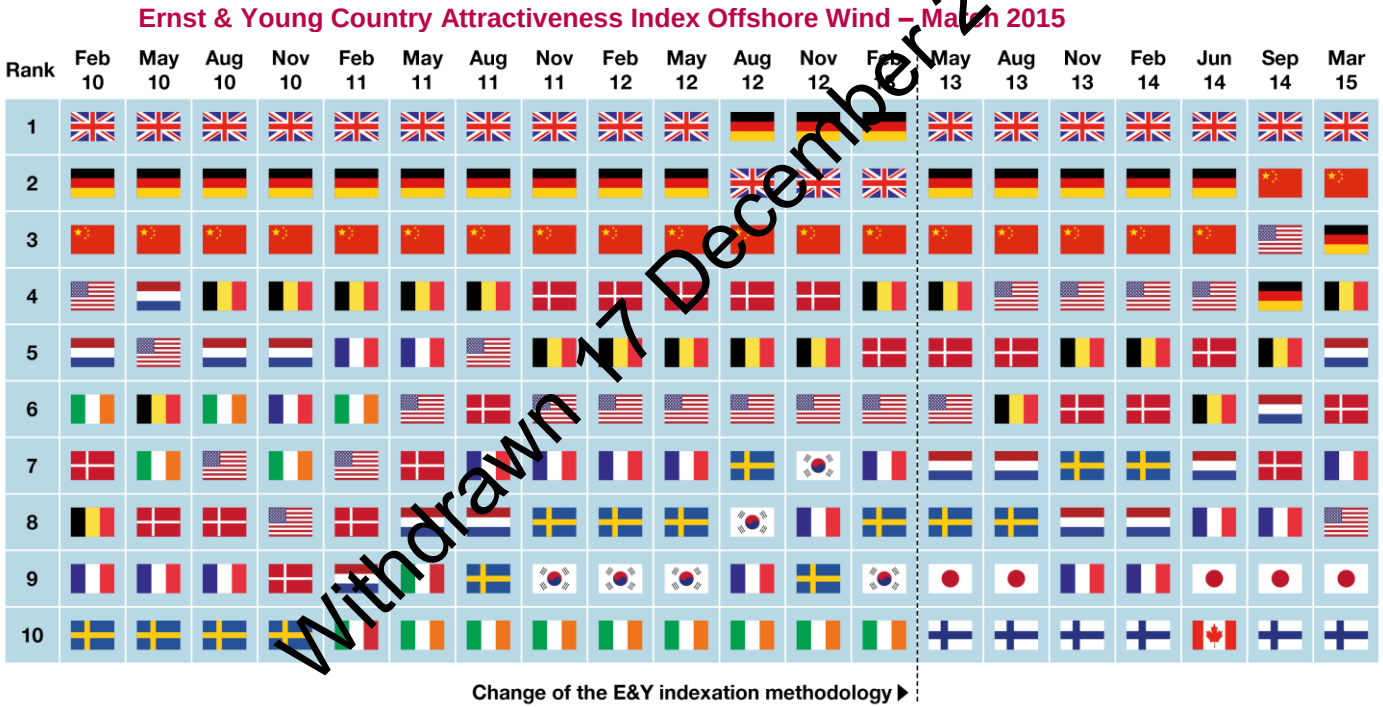
United Arab Emirates
- Masdar

United Kingdom
- Aberdeen Renewable Energy Group (AREG)
- Centrica
- Greencoat UK Wind
- JP Morgan Asset Management
- M&G Investments
- SSE
- UK Green Investment Bank
- UK Green Investment Bank Offshore Wind Fund

United States of America
- Fluor
- TCW

Global investment ranking

The UK is consistently ranked as the best place in the world to invest in offshore wind.

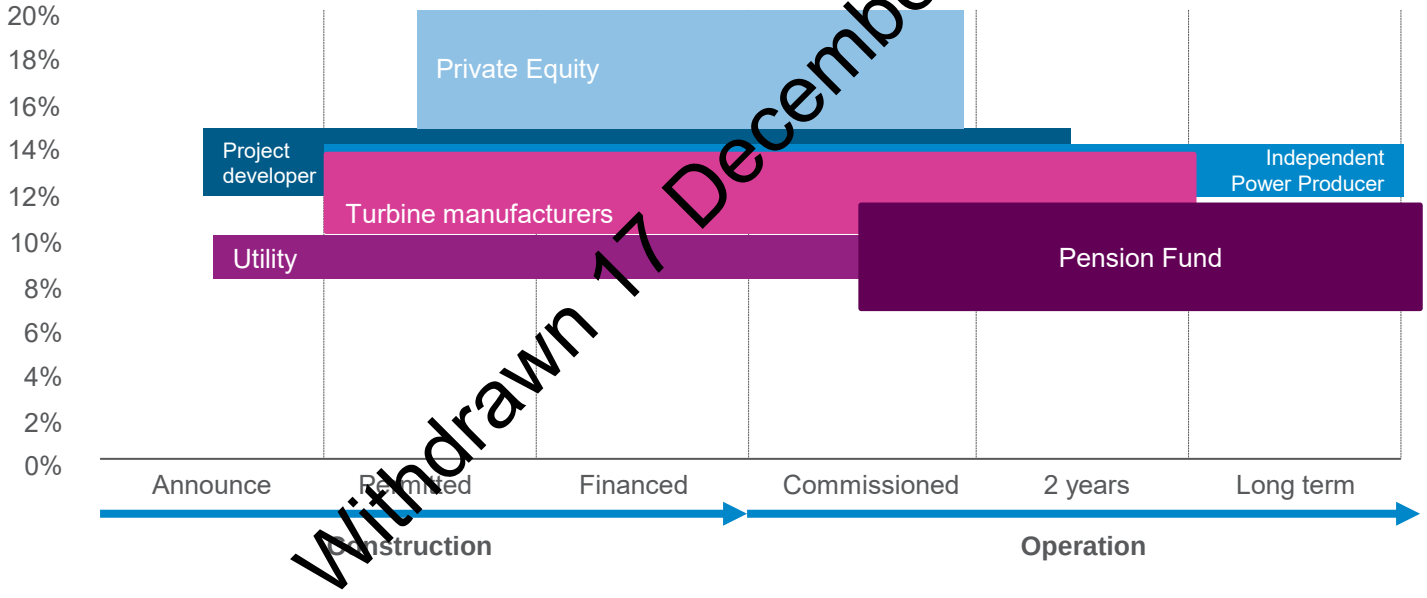


Source information from Ernst & Young for offshore wind only.
http://www.ey.com/UK/en/Industries/Cleantech/Renewable-Energy-Country-Attractiveness-Index

Indicative returns

The sector offers a diverse range of investment profiles to suit the requirements of different classes of investor.

Entry and exit timings for equity investors with target risk-adjusted returns:



Methodology: The positioning of the different players along the risk-return and entry timing spectrum is based on interviews with market players. Due to commercial considerations, these are not exact numbers, but a range, where the average of all the groups lies.
Source: Bloomberg New Energy Finance

Section two

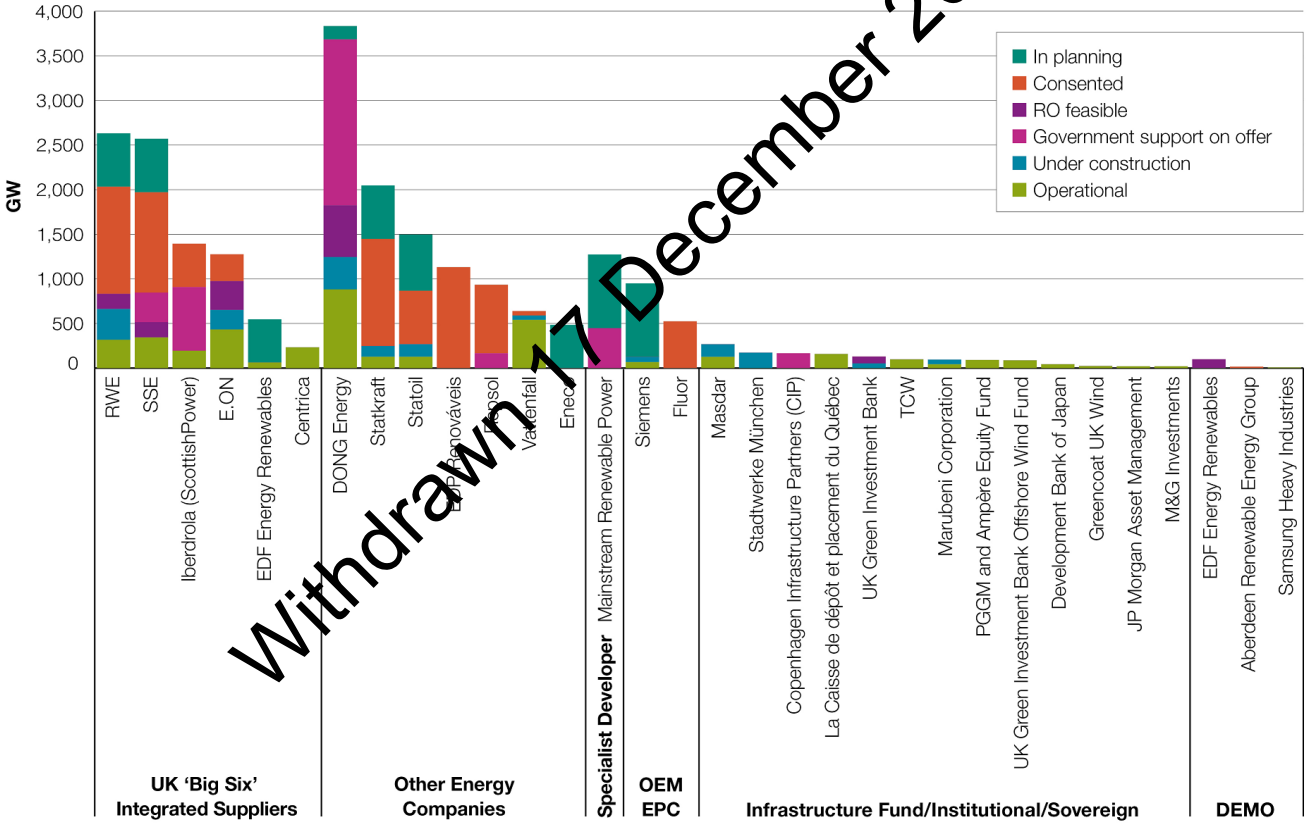
Project pipeline

A continuing programme of development and construction will present further investment opportunities as the UK's offshore wind capacity doubles to 2020.

Project pipeline

UK projects have attracted a broad range of integrated suppliers, independent power producers, and sovereign wealth funds.

Developer shares in each phase – May 2015



Project pipeline

Opportunities exist to invest across operating assets, wind farms in construction and projects in development.

UK offshore wind project pipeline – May 2015

Operational: Total capacity of wind farms that have been fully commissioned.

No.	Project name	Capacity MW
01	Barrow	90
02	Blyth	4
03	Burbo Bank	90
04	Greater Gabbard	504
05	Gunfleet Sands Demonstration	12
06	Gunfleet Sands I	108
07	Gunfleet Sands II	65
08	Inner Dowsing	97
09	Kentish Flats	90
10	Lincs	270
11	London Array 1	630
12	Lynn	97
13	Methil Demonstration – Samsung	7
14	North Hoyle	60
15	Ormonde	150
16	Rhyl Flats	90
17	Robin Rigg East	90
18	Robin Rigg West	90
19	Scroby Sands	60
20	Sheringham Shoal	3[illegible]
21	Teesside	[illegible]
22	Thanet	[illegible]00
23	Walney (Phase 1)	184
24	Walney (Phase 2)	184
25	West of Duddon Sands	389
Total		4,039

Under construction: Total capacity of wind farms that are under construction or where the developer has confirmed a final investment decision, but are not yet fully operational.

No.	Project name	Capacity MW
26	Burbo Bank Extension	[illegible]
27	Dudgeon	400
28	Gwynt y Môr	576
29	Humber Gateway	219
30	Kentish Flats Extension	50
31	Westermost Rough	210
Total		1,715

Government support on offer: Total capacity of wind farms that have secured a Contract for Difference or whose publicly stated timescales are consistent with accessing the Renewables Obligation (RO).

No.	Project name	Up to capacity MW
32	Beatrice	664
33	[illegible] Demonstration	99
[illegible]	East Anglia ONE	714
[illegible]	Galloper[1]	340
36	Heron Wind (Hornsea)	600
37	Neart na Gaoithe (NNG)	448
38	Njord (Hornsea)	600
39	Race Bank[1]	580
40	Rampion[1] (Southern Array)	400
41	Walney Extension	660
Total		5,105

Consented: Total capacity of wind farms that have planning consent and for which government support is not yet in place.

No.	Project name	Up to capacity MW
42	Aberdeen Demonstration	66
43	Creyke Beck A (Dogger Bank)	1,200
44	Creyke Beck B (Dogger Bank)	1,200
45	East Anglia ONE	486
46	Inch Cape	784
47	MacColl (Moray Firth)	372
48	Rampion (Southern Array)	300
49	Seagreen Alpha (Firth of Forth)	525
50	Seagreen Bravo (Firth of Forth)	525
51	Stevenson (Moray Firth)	372
52	Telford (Moray Firth)	372
53	Triton Knoll	1,200
Total		7,402

In planning: Total capacity of wind farms for which a consent application has been submitted.

No.	Project name	Up to capacity MW
54	Breesea (Hornsea)	900
55	Hywind 2 Demonstration (Buchan Deep)	30
56	Navitus Bay (West Isle of Wright)	970
57	Optimus (Hornsea)	900
58	Teesside A (Dogger Bank)	1,200
59	Teesside B (Dogger Bank)	1,200
Total		5,200

Grand total	23.46GW

1 RO feasible based on published grid connection dates as per TEC register – May 2015

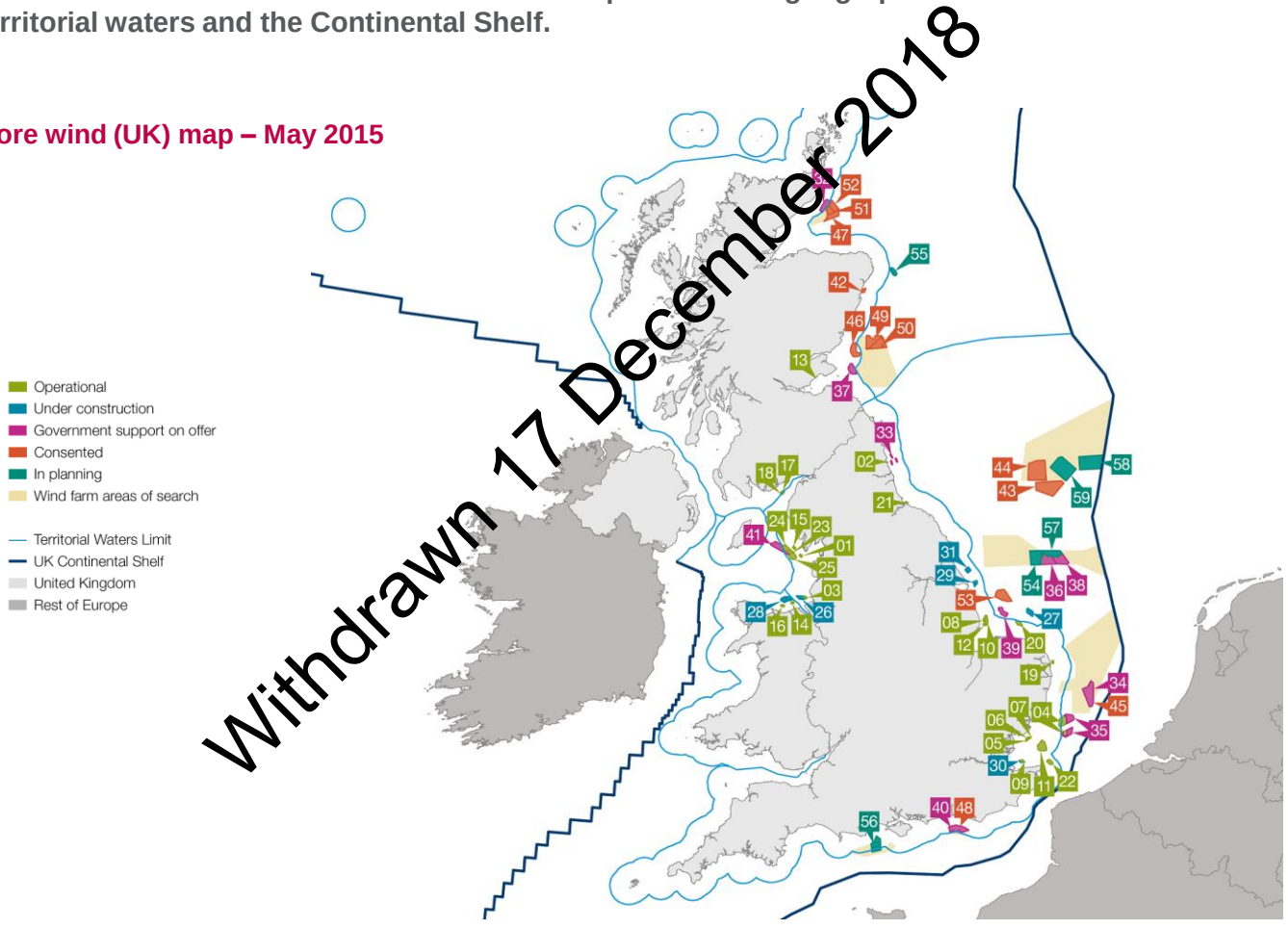
NOTE: Quoted capacity refers to the property rights held with The Crown Estate and does not necessarily reflect the build out capacity permissible under current or future statutory planning permissions.

Withdrawn 17 December 2018

Project pipeline

The location of the UK's offshore wind resource provides for geographical diversification across UK territorial waters and the Continental Shelf.

Offshore wind (UK) map – May 2015



Withdrawn 17 December 2018

Project pipeline

Over 20 international equity investors have already invested into UK operational or construction projects. An increasing number of assets will present important refinancing opportunities in the future.

Offshore wind farms in construction or operation – May 2015

Operating assets

Project name	Equity investors	No. of turbines	Capacity MW
Barrow	DONG	30	90
Blyth	E.ON	2	4
Burbo Bank	DONG	25	90
Greater Gabbard	RWE, SSE	140	504
Gunfleet Sands Demonstration	DONG	2	12
Gunfleet Sands I	DONG, Marubeni Corporation, Development Bank of Ja	30	108
Gunfleet Sands II	DONG, Marubeni Corporation, Development Bank of Ja	18	65
Inner Dowsing	Centrica, EIG Partners	27	97
Kentish Flats	Vattenfall	30	90
Lincs	Centrica, DONG, Siemens	75	270
London Array 1	DONG, E.ON, La Caisse de dépôt et placement du Québec, Masdar	175	630
Lynn	Centrica, EIG Partners	27	97
Methil Demonstration – Samsung	Samsung Heavy Industries	1	7
North Hoyle	RWE, JP Morgan Asset Management, M&G Investments	30	60
Ormonde	Vattenfall	30	150
Rhyl Flats	RWE, Greencoat, UK Green Investment Bank Offshore Wind Fund	25	90
Robin Rigg East	E.ON	30	90
Robin Rigg West	E.ON	30	90
Scroby Sands	E.ON	30	60
Sheringham Shoal	Statkraft, Statoil, UK Green Investment Bank Offshore Wind Fund	88	317
Teesside	EDF	27	62
Thanet	Vattenfall	100	300
Walney (Phase 1)	DONG, SSE, PGGM and Dutch Ampère Equity Fund	51	184
Walney (Phase 2)	DONG, SSE, PGGM and Dutch Ampère Equity Fund	51	184
West of Duddon Sands	DONG, Iberdrola (ScottishPower)	108	389

Partially operational sites

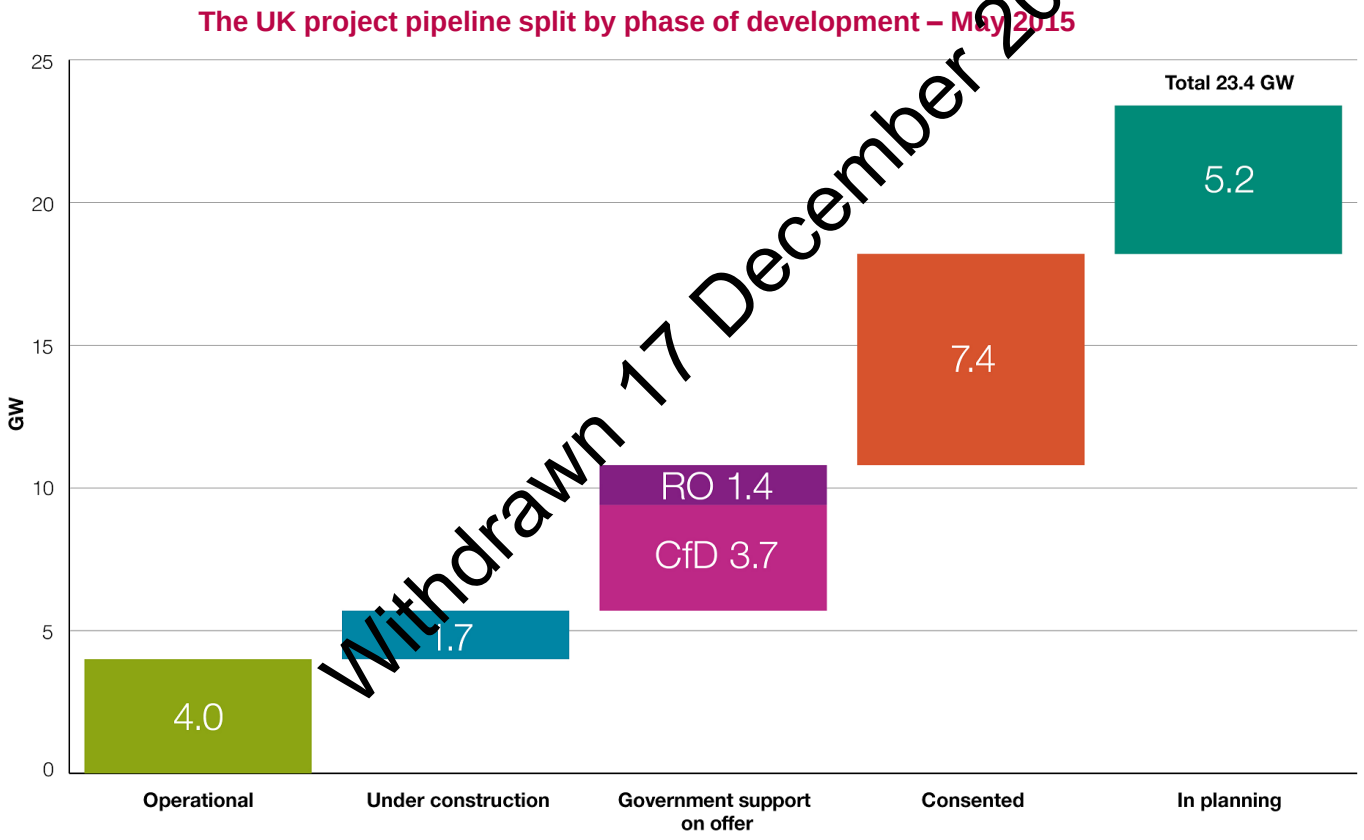
Project name	Equity investors	No. of turbines	Capacity MW
Gwynt y Môr	RWE, Siemens, Stadtwerke München	160	576
Humber Gateway	E.ON	73	219
Westermost Rough	DONG, Marubeni Corporation, UK Green Investment plc	35	210

Assets under construction

Project name	Equity investors	No. of turbines	Capacity MW
Burbo Bank extension	DONG	32	258
Dudgeon	Statkraft, Statoil, Masdar	67	402
Kentish Flats extension	Vattenfall	15	49.5

Project pipeline

Government support is available to facilitate a trajectory to deliver 10GW capacity by 2020.



Offshore transmission

Electricity transmission assets for offshore wind are attractive to investors seeking relatively low-risk regulated returns.

Market Background

Offshore transmission assets transport electricity from offshore generation sites (such as wind farms) back to the onshore grid. Ofgem is responsible for running tenders to appoint offshore transmission owners (OFTOs) for individual transmission assets.

- *Over £1.4bn has been invested so far in the OFTO asset class from a wide variety of equity and debt investors, with a further £1.5bn in the tender process.
- The strong future offshore wind pipeline will deliver billions of pounds of further investment in the OFTO market.
- Licenses give successful bidders the responsibility to operate and manage the asset for a 20 year period, in return for a regulated, stable revenue stream.

Why Invest?

The asset class has quickly attracted significant interest from the investor community, offering solid returns on a relatively low risk profile underwritten by a stable regulatory framework overseen by Ofgem. This provides the opportunity to receive a long-term index linked revenue stream.

Tender Round 3 was launched in early 2014, with bids invited to own and operate already constructed assets worth approximately £400m in total. In future, there may be opportunities for OFTOs to design, procure and construct offshore transmission assets as well, depending on developer's risk appetite.

*updated November 2014

Offshore transmission

Electricity transmission assets for offshore wind are attractive to investors seeking relatively low-risk regulated returns.

OFTO status – May 2015

OFTO Round: Transition 1

Project name	Consortium	Capacity MW
Barrow	Transmission Investment, International Public Partnerships (IPP) & Amber Infrastructure Group	90
Greater Gabbard	Balfour Beatty Capital, Equitix & AMP Capital	504
Gunfleet Sands I & II	Transmission Investment, International Public Partnerships (IPP) & Amber Infrastructure Group	173
Ormonde	Transmission Investment, International Public Partnerships (IPP) & Amber Infrastructure Group	150
Robin Rigg East & West	Transmission Investment, International Public Partnerships (IPP) & Amber Infrastructure Group	180
Sheringham Shoal	Macquarie Capital Group Limited & Barclays Infrastructure Funds Management Limited	317
Thanet	Balfour Beatty Plc & Equitix Ltd	300
Walney (Phase 1)	Macquarie Capital, Barclays Infrastructure Funds	184
Walney (Phase 2)	Macquarie Capital, Barclays Infrastructure Funds Management Limited & Mitsubishi Corporation	184

OFTO Round: Transition 2

Project name	Consortium	Capacity MW
Gwynt y Môr	Balfour Beatty Investments Ltd & Equitix Ltd	576
Lincs	Transmission Investments, International Public Partnerships (IPP) Ltd	270
London Array 1	Macquarie Capital, Barclays Integrated Infrastructure Fund, Mitsubishi & Frontier Power	630
West of Duddon Sands	Macquarie Capital, DIFL Investments & Frontier Power	389

OFTO Round: Tender Round 3

Project name	Consortium	Capacity MW
Burbo Bank Extension	To be determined	258
Dudgeon	To be determined	402
Humber Gateway	To be determined	219
Westermost Rough	To be determined	210

Withdrawn 17 December 2018

Section three

Building a stable environment for investment

Electricity Market Reform strengthens further the UK's stable policy framework for investment. Contracts for difference provide long term stable revenues for offshore wind projects, giving certain, low returns for investors.

Future direction of UK energy markets

Government has introduced Electricity Market Reforms to bring forward the necessary investment to build a low carbon, secure and affordable electricity system.

The UK energy sector will require up to £100bn investment to 2020. To support delivery, the Government has introduced a comprehensive Electricity Market Reform (EMR) programme, underpinned by the Energy Act 2013.

Through EMR, the UK aims to secure this investment and achieve a sustainable balance between its three policy objectives:

Decarbonisation

The UK has a target to source 15% of primary energy supply from renewables by 2020, in line with the EU Renewable Energy Directive. To achieve this, around 30% of the UK's electricity will be supplied from renewable sources.

In the 2013 Energy Act the UK committed to a CO2 emissions reduction of 80% on 1990 levels by 2050. The UK is the first country in the world to set itself legally binding carbon budgets to define the trajectory to meet this goal. The latest budget commits the UK to emissions reductions of 50% on 1990 levels by 2027.

Reform introduced: A new support mechanism – Contracts for Difference (CfD) – has been introduced to secure the investment needed to meet this goal.

Security of supply

Around a fifth of the UK's existing electricity capacity is due to come offline in the next decade as aging coal and nuclear plants are decommissioned.

Reform introduced: A Capacity Market provides a regular availability payment to dispatchable forms of power generation (and demand reduction) capacity, ensuring that this plant is available during periods of high demand or shortfall in output from renewable generators.

Affordability

The Government is committed to minimising costs for the consumer.

Reform introduced: To ensure affordability for consumers, subsidies for low-carbon generation must fall within a Levy Control Framework. This framework provides a planning horizon for industry and transparency over liabilities facing consumers.

Financial support for low-carbon energy

The United Kingdom enjoys a longstanding reputation for operating stable and predictable regimes to support investment in renewable electricity infrastructure.

The recently-introduced **Contracts for Difference (CfD)** and the established **Renewables Obligation (RO)** offer long-term predictable index-linked yields from proven infrastructure assets. The RO support scheme will close to new offshore wind projects in 2017. Both these support schemes are:

- established in UK primary legislation
- funded by consumers through the electricity market and not through general taxation

A Levy Control Framework (LCF) provides long-term visibility of liabilities under these regimes, assisting investment planning and providing transparency and stability in public policy. The LCF budget for supporting low carbon energy has been confirmed out to 2020/21.

In addition to the RO and CfD, revenues for renewable generators are supported through:

- exemption from the UK's Climate Change Levy – realised through the sale of Levy Exemption Certificates (LECs)
- avoided costs of carbon emissions – through the EU Emissions Trading Scheme and the UK's Carbon Price Floor

Levy Control Framework: Upper limit on total revenue budget available to low-carbon projects (£m 2011/12 prices)

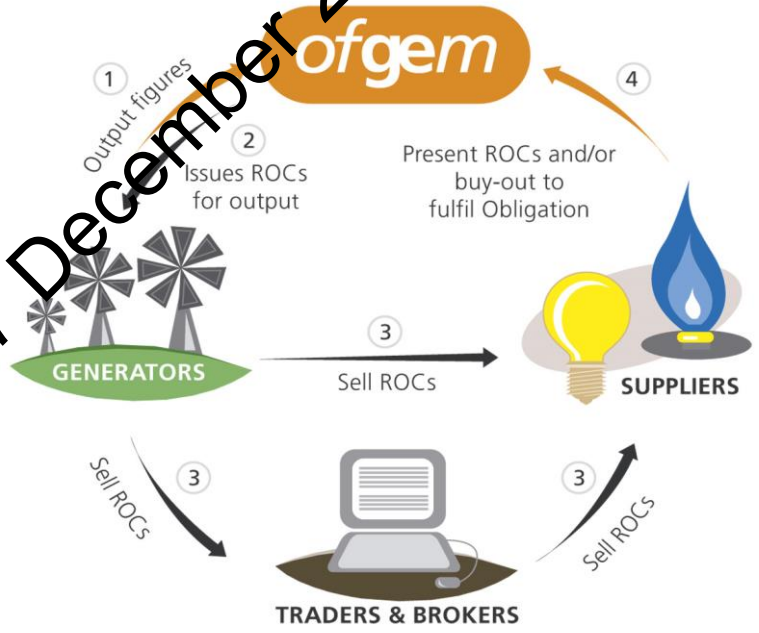
14/15	15/16	16/17	17/18	18/19	19/20	20/21
3,300	4,300	4,900	5,600	6,450	7,000	7,600

Renewables Obligation

Many assets are underpinned by a well-established incentive that is already supporting offshore wind investment.

Key points about the Renewables Obligation (RO):

- Legislated for in the UK's Utilities Act 2000
- The RO has brought forward 4 GW of operating offshore wind capacity, with a further 1.1 GW in construction under the scheme
- Open to new investments until 31 March 2017, or 31 March 2018 subject to an investment grace period
- Provides an income to offshore wind generators, which supplements revenues from the wholesale electricity market



Renewables Obligation

Revenue realisation under the Renewables Obligation.

Features of the Renewables Obligation

Tenure	20 year support period
Inflation indexation	None. Renewables Obligation Certificate (ROC) value subject to market forces
Mechanism	Underpinned by an obligation on licenced electricity suppliers to source an increasing proportion of electricity from renewable sources, a form of renewable portfolio standard. Accredited renewable generators issued with ROCs, a form of green certificate, in proportion to the renewable electricity they generate. ROC level applicable at time of accreditation. ROCs used by licenced suppliers to demonstrate that they have met their obligation. Suppliers which fail to present sufficient ROCs to meet their obligation pay an equivalent amount into a buy-out fund. Fund recycled to suppliers which surrender ROCs.
Payment	Typically through a Power Purchase Agreement – a contractual arrangement between generators and licenced suppliers or traders.

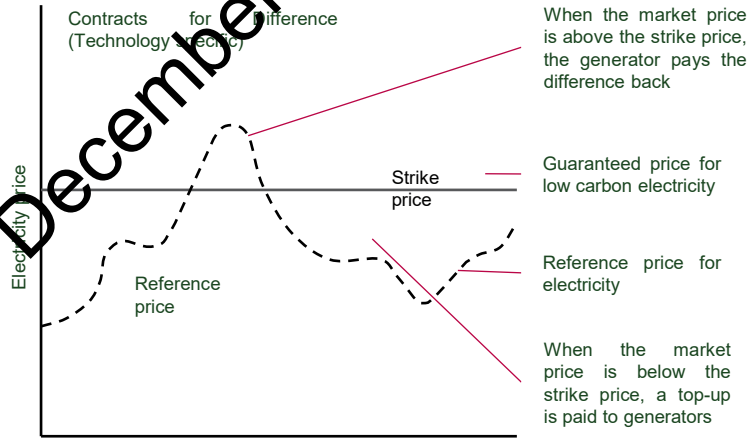
Contracts for Difference

Future wind farms can benefit from a newly-adopted mechanism providing a stable framework for financial investors.

Key points about Contracts for Difference (CfDs)

- Legislated for in the UK's Energy Act 2013
- In the first allocation round, Neart na Gaoithe (NNG) and East Anglia ONE were awarded Renewable CfDs, both with a strike price under £120
- Subsequent allocations intended to be on an annual basis
- Provides an indexed, regulated revenue for generators with insulation from wholesale price risk

Administrative strike prices for offshore wind are set out below. However when allocation rounds are over-subscribed generators will receive the clearing price from a competitive auction



Offshore Wind Strike price (£/MWh) (2012 prices)

14/15	15/16	16/17	17/18	18/19
155	155	150	140	140

Contracts for Difference

Practical operation of CfDs.

Features of the Feed-in Tariff with Contracts for Difference

Tenure	15 year contract term for plant commissioned by longstop date.
Inflation indexation	Strike price fully indexed 100% to Consumer Price Index throughout entire term.
Mechanism	Generators agree strike price for electricity generated. Strike price may be an administered price set by the Government or, in circumstances of high demand for contracts, the clearing price from a competitive auction. Generator sells electricity produced under a contract or Power Purchase Agreement to a licenced supplier or trader. Payments from the CfD counterparty (the Low Carbon Contracts Company), make up any shortfall in revenues from the differential between the strike price and an agreed reference price. Reference price is the GB day - ahead hourly price.
Payment	Payment is made by the Low Carbon Contracts Company from revenues received from licenced suppliers. Supplier Obligation creates a legal requirement for licenced suppliers to meet CfD costs. Credit waterfall arrangements protect generator revenues in the event of supplier default.
Contractual arrangements	Generator is protected against unforeseeable changes in law that target a project, technology or the CfD. Protection also provided for political decisions to shut down a generator and for Force Majeure and construction events affecting economic completion of the project.

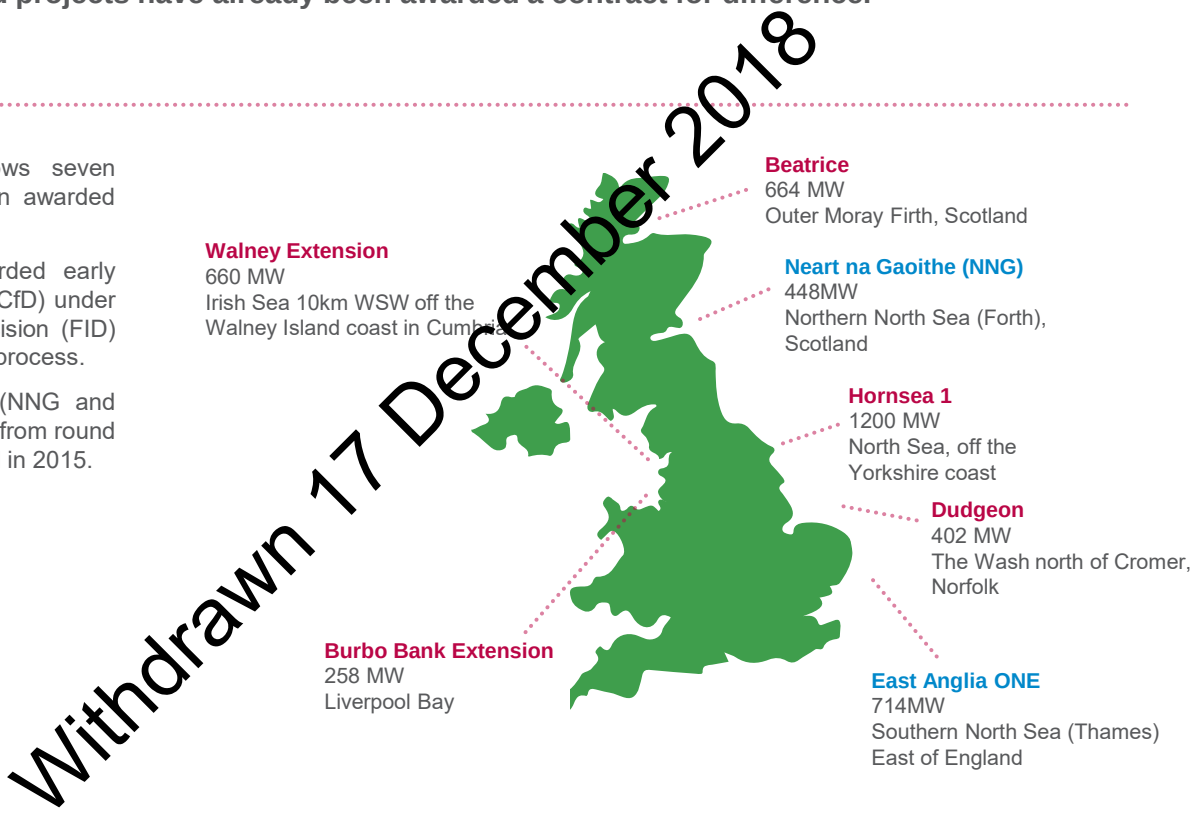
Projects awarded Contracts for Difference

Seven offshore wind projects have already been awarded a contract for difference.

The map opposite shows seven projects which have been awarded Investment Contracts.

Five projects were awarded early Contracts for Difference (CfD) under the Final Investment Decision (FID) Enabling for Renewables process.

The other two projects (NNG and EA1) were awarded CfDs from round one allocation, announced in 2015.



Awarded FIDeR CfD
Awarded CfD

Site award process and consenting

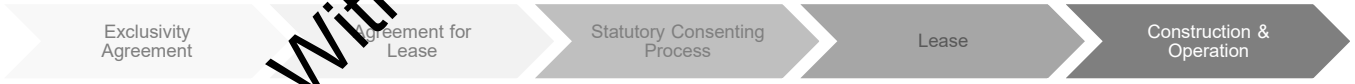
Offshore wind concessions are offered on a clear and consistent basis with robust planning procedures.

The leasing process has at least two stages, an Agreement for Lease (AfL, giving the developer the right to exercise an option on the site subject to obtaining statutory consents) and a Lease. Applications for offshore wind development consent are prepared by developers and submitted to the relevant regulator:

	Consent decisions are made by:	Application and examination process is administered by:
England	**Over 100MW** - Secretary of State for Energy and Climate Change **Under 100MW** - Marine Management Organisation	**Over 100MW** - Planning Inspectorate **Under 100MW** - Marine Management Organisation
Wales	**Over 100MW** - Secretary of State for Energy and Climate Change and Natural Resources Wales **Under 100MW** - Marine Management Organisation and Natural Resources Wales	**Over 100MW** - Planning Inspectorate **Under 100MW** - Marine Management Organisation and Natural Resources Wales
Northern Ireland	Department of the Environment Northern Ireland and Department for Enterprise, Trade and Investment	Northern Ireland Environment Agency
Scotland	Scottish Ministers	Marine Scotland

Consent applications include details on project design, an "Environmental Impact Assessment" (EIA) and evidence that the developer has undertaken detailed consultation with stakeholders on the project as it progresses.

The relevant regulator will carry out consultations on the application in order to establish – by weighing up its benefits, adverse effects and consultation responses – whether a project should be granted consent. The final decision rests with the above named organisations.



Section four

Supply chain: opportunities for investment and trade

The UK is committed to delivering a capable, competitive, and innovative local supply chain. Investors like Siemens have already committed to new manufacturing facilities in the UK, and many more opportunities exist for investment to boost existing manufacturing capability. The UK is a strong platform for exports to Europe and beyond and companies are already seizing this opportunity.

Vision for the industry

Industry and Government are working together to build a competitive and innovative UK supply chain that delivers and sustains jobs, exports and economic benefits for the UK.

Government's work to support this vision:

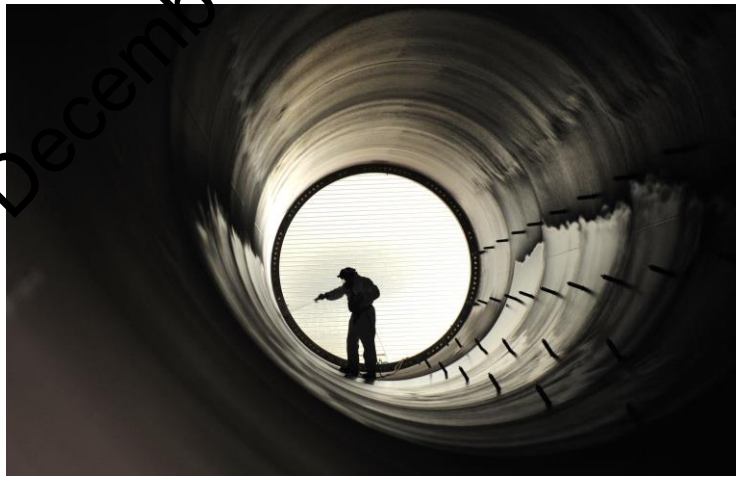
Providing market confidence and demand visibility – critical for investment by developers and the supply chain

Building a competitive supply chain – to support UK based companies to develop the capability and capacity to bid for, and win, contracts in open and fair competition

Supporting innovation – vital to achieve cost reduction and enable new players to enter the market with new product designs

Finance – support to access finance for developers and the supply chain

Building a highly skilled workforce – to deliver the right skills at the right time



Offshore wind cost reduction

The supply chain is innovating to reduce costs and deliver a competitive product for UK and international markets.

Aim for cost reduction:

The UK set up the Offshore Wind Cost Reduction Task Force as a joint collaboration between Government and industry to delivery on the point of cost reduction. The Crown Estate in support of the Offshore Wind Reduction Task Force concluded a detailed review of offshore wind costs in 2012. This concluded that costs can be reduced to around £100/MWh for a project financed in 2020.

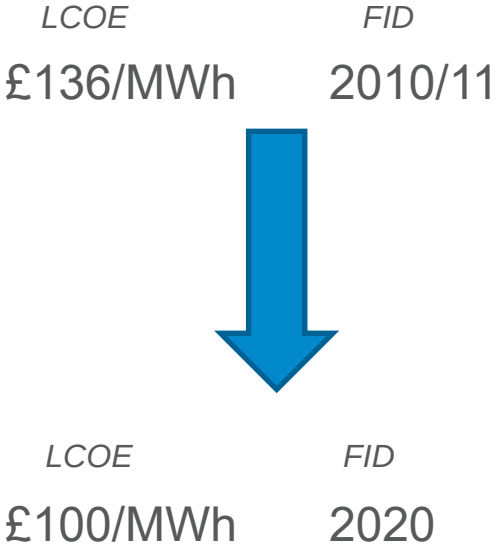
Progress:

The Cost Reduction Monitoring Framework* was established in order to provide a consistent way to measure the cost of offshore wind projects in the UK. The report shows that levelised costs have fallen faster than anticipated, from £136/MWh for built projects in 2010/11 to £121/MWh for projects taking FID in 2012-2014 with the main driver being the move to larger, more efficient turbines.

Future:

The results of the first CfD auction on 20 February 2015 also confirm that costs are falling, with the clearing prices over 14% lower than the administrative strike price of £140/MWh. Contracts have been offered to Neart na Gaoithe, a 448 MW site in the outer Forth estuary which cleared at £114.39/MWh and the 714 MW East Anglia One project which cleared at £119.89/MWh.

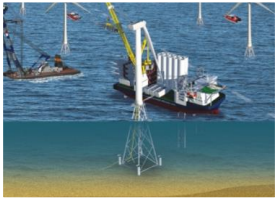
Reducing the levelized cost of energy (LCOE)



*https://ore.catapult.org.uk/our-projects/-/asset_publisher/fXyYgbhgACxk/content/cost-reduction-monitoring-framework

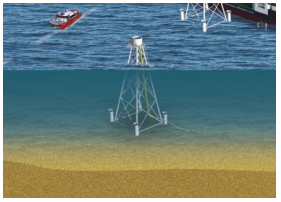
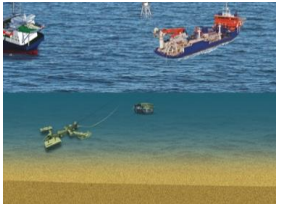
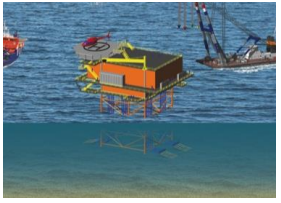
UK Supply Chain: Investment Opportunities

UK based manufacturers are in a strong position to access the largest global market for offshore wind.

Component	Investment opportunity	
Offshore turbine manufacturing	Siemens have committed to manufacture blades and assemble nacelles on the Humber. Market demand is sufficient to support further UK based turbine manufacturing facilities. The UK pipeline to 2020 alone will demand an estimated 800 wind turbines – around 50% of the European market.	
Offshore turbine towers	Existing European facilities do not have the capacity to deliver the volume of offshore towers required by the market – new investment is required. The UK offers significant logistical advantages due to challenges and costs of tower transportation.	

UK Supply Chain: Investment Opportunities

UK based manufacturers are in a strong position to access the largest global market for offshore wind.

Component	Investment opportunity	
Foundations	The market continues to generate high demand for extra large monopiles and transition pieces. Offshore Structures (Britain), a JV between EEW and Bladt, have now committed to delivering transition pieces from their recently acquired Teesside factory. The UK has the capability to deliver jackets and secondary steel, with opportunities for partnership and investment to deliver serial jackets production.	
Cables	The UK market presents a strong investment opportunity for cable manufacturing with high volume contract opportunities for export cables and interconnectors. The UK already has a strong track record in inter-array cables, supplying the UK and EU markets.	
Substations	The UK project pipeline requires an estimated 8 substations by 2020. UK fabricators bring experience from the offshore oil and gas sector, and have a track record in supplying projects in the UK and wider EU market. Partnership opportunities exist to build on this existing capability for future orders.	

Investment Case Study: Siemens and ABP, Humber Region

Siemens investment in turbine manufacturing is a strong vote of confidence in the UK's industry.

Overview

In March 2014, Siemens Wind Power selected Green Port Hull as the location for blade manufacturing for their next generation offshore wind turbines.

This £310m investment (£160m from Siemens and a further £150m from their port partner Associated British Ports) will bring 1,000 jobs to the Humber.

Since March 2014, Siemens has received continued on-going support from the UK to encourage regional investment from companies that can both supply their new plant and increase its competitiveness.

Investment Rationale

With its stable offshore wind policy environment, secure project pipeline and robust infrastructure, Siemens Wind Power clearly believes the UK to be the best location in Europe for their first dedicated offshore wind manufacturing facility.

The Humber is also particularly well placed to serve both large Round 3 projects in the UK and continental Europe, with further potential opportunities available for investment in the region.

"This investment demonstrates our ongoing commitment to UK manufacturing and confidence in the industry. The development of local manufacturing will provide a huge boost to the UK renewables industry and will help unlock other major projects and investments."

Matthew Chinn, Managing Director, Siemens UK & Ireland

"This deal shows our strategy for offshore wind is working; bringing investment, green jobs and growth, and helping keep Britain the number one country in the world for offshore wind"

Ed Davey, Secretary of State for Energy and Climate Change

Investment Case Study: EEW SPC and Bladt Industries take over TAG Energy facility

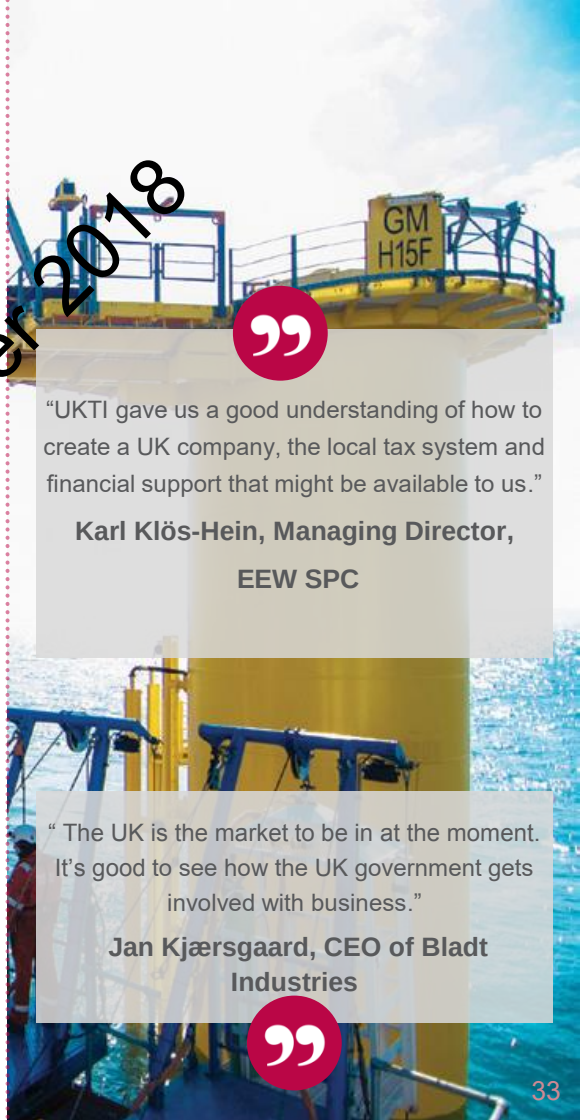
JV investment in transition piece manufacturing is a strong vote of confidence in the UK's industry.

Overview

Two leading international suppliers of offshore wind foundations, EEW SPC of Germany and Bladt Industries of Denmark, have acquired the former TAG Energy facility in Teesside in the north east of England. Following an investment of up to £30 million for the acquisition, development and upgrade of the facilities, this will become a key part of the European manufacturing base for the firms, generating up to 350 direct jobs in the local area, as well as a significant additional number of jobs in the local supply chain.

Investment Rationale

Renewable energy is a vital part of plans to reduce emissions and create thousands of green jobs and investment in the UK. Since 2010, £45 billion has been invested in the UK's energy infrastructure. Between 2010 and 2013, £6.9 billion was invested in offshore wind alone, and it is estimated that a further £16 to £21 billion will be invested in this sector by 2020. Offshore wind already powers over 2 million UK homes. This is why EEW SPC of Germany and Bladt Industries of Denmark have decided to invest in the UK.



"UKTI gave us a good understanding of how to create a UK company, the local tax system and financial support that might be available to us."

Karl Klös-Hein, Managing Director, EEW SPC

" The UK is the market to be in at the moment. It's good to see how the UK government gets involved with business."

Jan Kjærsgaard, CEO of Bladt Industries

Trade opportunities: the northern European market

The UK is a solid platform to access trade opportunities in Northern Europe

Overview

The UK is a prime location from which to access the wider European offshore wind market, which holds huge potential non-UK contracts to 2020.

The opportunity

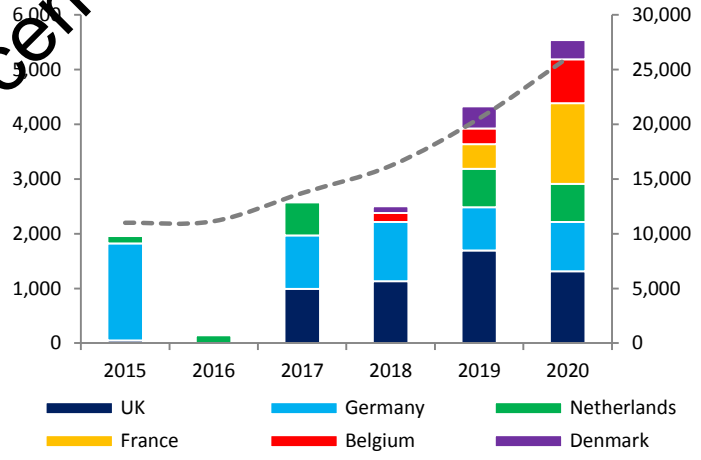
GROW:Offshore Wind forecast that by 2020 fully commissioned capacity across Europe, including the UK, will be approaching 25GW, with over 16GW of projects commissioned between June 2015 and 2020.

Within this project pipeline the UK is likely to remain Europe's largest single market, followed by Germany, the Netherlands, France, Belgium and Denmark.

Over the next five years these five markets (excluding the UK) therefore represent a significant commercial opportunity:

- Around 6GW of projects are likely to require development and early design services, particularly in Denmark, France and The Netherlands
- At least £40bn in component supply and construction contracts could be awarded, including for projects delivered beyond 2020
- Over 15GW of projects are likely to be fully operational by 2020, requiring companies experienced in managing and delivering offshore operations and maintenance activities

Forecast of European Cumulative and Annual Commissioning Activity by Country, from June 2015 to end 2020 (MW)



Source: GROW: Offshore Wind, 2015

Trade case study: JDR success in Germany

JDR cables is a strong example of the UK's existing manufacturing capability.

Overview

JDR, with UK facilities in Hartlepool and Littleport, is one of the world's leading suppliers of offshore wind inter-array cables. The company also designs and manufactures subsea production umbilicals, subsea power cables and Intervention Workover Control Systems (IWOCS) for the offshore oil and gas industry.

Alongside significant domestic achievements, JDR is one of the most successful UK exporters into the European offshore wind sector. In 2017 this included contract wins on RWE Innogy's Nordsee One project and Vattenfall's Sandbank project, both in German waters. These wins follow the successful completion in 2012 of JDR's first German contract; Meerwind for Wind MW.

Creating the Opportunity

JDR has built a reputation for quality and successful delivery in the domestic UK market, with projects that have included London Array and Greater Gabbard. This has ensured that they have become the supplier of choice for developers and cable installers seeking a knowledgeable partner for challenging projects.

JDR has made use of UK Export Finance support to enhance its competitive position in the European market. UKTI has also ensured JDR is well positioned with key customers and receives all necessary support from Government to increase competitiveness and promote success.

"The backing of Government through UKTI and UKEF has provided support for JDR to compete for offshore array cable projects with new customers both within Europe and further afield. This has given us the confidence to invest in product development and export capacity in order to compete effectively in the global renewable energy marketplace"

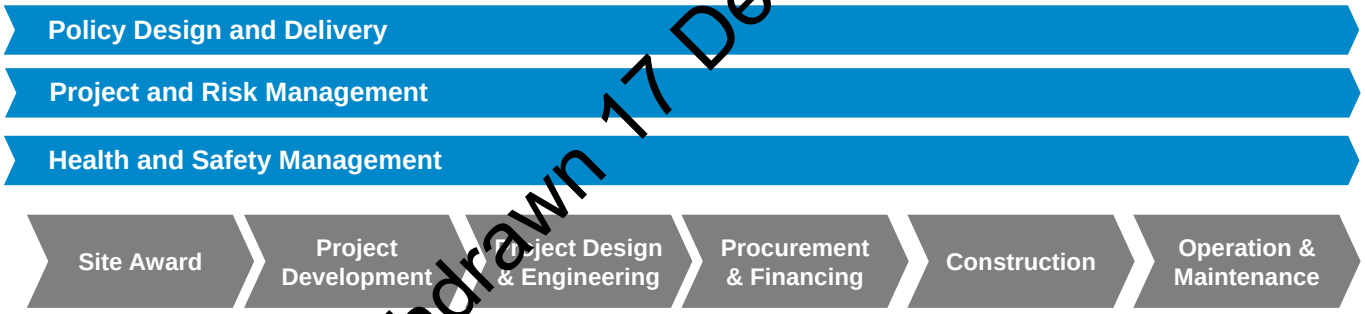
Martin Boden, Chief Financial Officer, JDR Cable Systems

Global market opportunities

UK companies lead the world in services for the design, development, financing, construction and operation of offshore wind plant. This UK expertise is a strong export opportunity.

With well over a decade of commercial deployment and the largest installed capacity of offshore wind in the world, the UK has developed a leading position that many countries are now seeking to learn from. UK companies are uniquely well placed to bring this learning to emerging markets and support the delivery of key environmental, social and economic objectives.

A selection of UK expertise in offshore wind services.



Global market opportunities

UK companies lead the world in services for the design, development, financing, construction and operation of offshore wind plant. This UK expertise is a strong export opportunity.

Below is a brief summary of three emerging markets that present trade opportunities for UK companies. Other opportunities emerging outside of Europe include Taiwan, South Korea, India and Canada.

China

- China has recently announced its support mechanism for offshore wind
- Developers and design institutes are seeking support from UK companies to design and certify both projects and technologies
- Opportunities exist for both environmental and engineering consultancies, particularly in the design of electrical infrastructure, the development of O&M strategies and risk-based project integration

Japan

- Owing to depth constraints Japan is progressing with floating projects and assessing deep water fixed options
- Japan presents a unique opportunity for experienced offshore wind companies to develop and deploy innovative technologies.
- Opportunities are emerging for design consultancies experienced in deep water and floating oil and gas infrastructure, and advisors experienced in dealing with marine life and fisheries

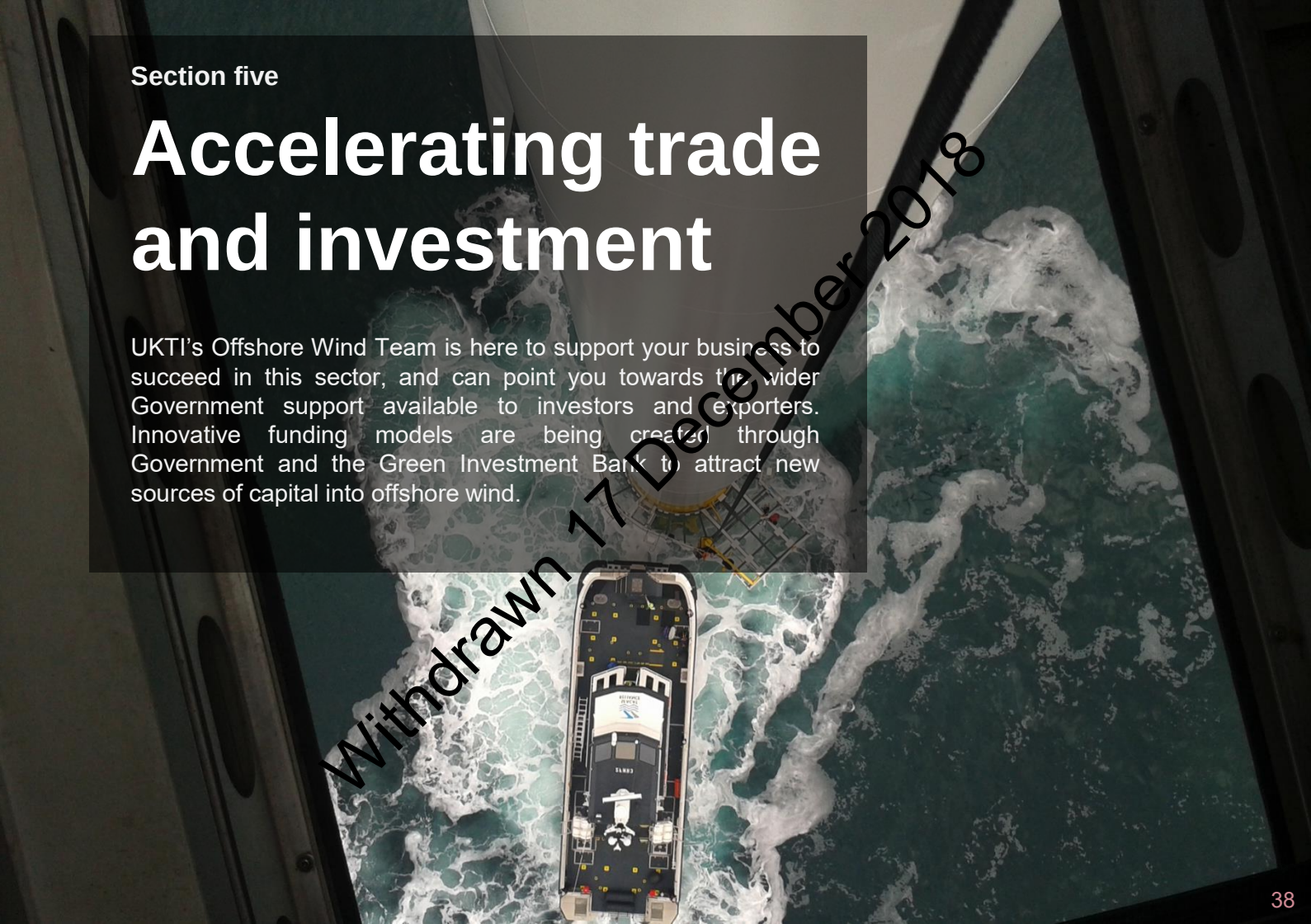
United States

- States in the north east have begun to develop offshore wind policies
- UK companies that have supported the development of a domestic industrial base are highly sought after, as are those that can deliver safe, timely and cost effective projects
- Opportunities are emerging not only for environmental and engineering consultancy service companies but also for equity partners, EPC contractors and pure play investors

Section five

Accelerating trade and investment

UKTI's Offshore Wind Team is here to support your business to succeed in this sector, and can point you towards the wider Government support available to investors and exporters. Innovative funding models are being created through Government and the Green Investment Bank to attract new sources of capital into offshore wind.



UKTI's Offshore Wind Team

The Offshore Wind Team offers dedicated support to potential UK investors, and can support your company to export from a UK base to markets in Northern Europe and globally.

UKTI's offshore wind team is working with industry to support delivery of a strengthened UK offshore wind supply chain.

UKTI's aim is to deliver:

- **Growth** of existing UK players in the supply chain
- **New investment** in UK facilities by foreign owned companies
- **Export opportunities** for new or existing UK operations

UKTI's support for companies includes:

- Work with developers to support delivery of UK supply chain strategies
- Support investors by sharing market insight, linking companies to Government financial support and local partners
- Facilitate partnerships between new investors and existing UK companies where appropriate
- Support UK businesses in developing and implementing strategies to win contracts in the largest trade markets
- Build relationships with opportunity providers, collect information on forthcoming and current export opportunities
- Build strong relationships with key UK businesses able to deliver against these opportunities

UKTI helps companies to navigate Government and access the best possible support.

UKTI works together with the Department of Energy and Climate Change, the Department for Business Innovation and Skills, UK Export Finance, and local partners in the Devolved Administrations and English Regions.

Support for business

UK Government offers a range of support products – please ask UKTI's Offshore Wind Team for guidance.

Examples of financial support for investors:

Enterprise zone funding

Various measures to assist companies that invest in specific "enterprise zones" including:

- up to 100% business rates relief (worth up to £275,000) over a 5-year period
- enhanced capital allowances in certain areas – allowing companies to write off plant, machinery etc. more quickly for tax purposes
- simplified planning processes

Support for innovation

Offshore Renewable Energy Catapult

Offshore Renewable Energy Catapult is the UK's flagship technology innovation and research centre for offshore wind, wave and tidal energy. It delivers prioritised research underpinned by world-class test and demonstration facilities, collaborating with industry, academia and Government to reduce the cost of offshore renewable energy and create UK economic benefit.

These funding support packages are complemented by Business Support and Advice that is delivered across the Devolved Administrations and through local Government across the UK

Examples of financial support for UK companies:

The British Business Bank

The British Business Bank brings expertise and Government money to smaller business finance markets.

Using research to understand these markets and smaller businesses' finance needs enables the bank to design its programmes. It maximises its impact by investing alongside the private sector and working through a range of over 80 established or newly-emerging finance market providers such as banks, leasing companies, venture capital funds and web-based platforms.

In addition to finance, British Business Bank uses guarantees to share risk with the private sector and so create stronger incentives for lenders to extend credit to smaller or growing companies. Its programmes bring benefits to smaller businesses that are start-ups, high growth, or simply viable but underfunded. Find out more at www.British-Business-Bank.co.uk

UK Export Finance (UKEF)

The UK's export credit agency provides trade finance and insurance solutions to support UK exporters. They help make exports happen.

Who they are:

UKEF are the UK's export credit agency. If you are planning to export goods or services from the UK then it is likely you'll need some form of guarantee or insurance to protect you against payment risks. If you can't get what you need from the private market, UKEF may be able to help

UKEF work closely with exporters, banks and overseas buyers to support financing of UK exports and investments across the world

What they do:

- Provide guarantees, insurance and advice to support UK-based exporters large and small
- Work across all sectors from engineering and IT to infrastructure projects, consulting and service industries. The energy sector is a key sector for UKEF, and companies they have supported include JDR Cables for work on an offshore wind project in German waters
- Work hard to understand the needs of each sector and tailor their support to provide the most appropriate solution to our customers
- Can support exports to more than 200 countries
- Work closely with UK Trade & Investment and the trade support organisations in Scotland, Northern Ireland and Wales, to ensure exporters receive the full range of government support available

Get in touch:

To find out more about their products and services, see their website for online guides and video case studies. You can also book a free appointment with a member of our network of Export Finance Advisers (EFAs), based throughout the UK.

As regional representatives of UK Export Finance, their EFAs can also act as points of contact to introduce exporters – or potential exporters – to other finance providers, credit insurers, insurance brokers, trade support bodies and other sources of government support.

To find out more and book an appointment online, visit:

www.gov.uk/uk-export-finance

UK Export Finance

The UK Green Investment Bank (GIB)

GIB's purpose is to accelerate the UK's transition to a greener economy. GIB was created by the UK Government, its sole shareholder, and capitalised with an initial £3.8bn of public funds.

GIB primarily invests in the offshore wind, waste and bioenergy and energy efficiency markets. Since its launch in November 2012, GIB has committed £2bn of capital to over 45 projects, mobilising more than £8bn*.

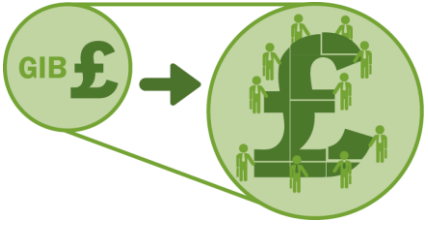
GIB has invested in seven offshore wind projects, Rampion, Sheringham Shoal, Westermost Rough, Gwynt y Môr, Rhyl Flats, Walney and the world's largest, London Array.

In total, the bank has invested over £1.1bn in the UK's offshore wind sector, with a total capacity of over 2.6 GW of renewable power.

GIB invests directly in operational offshore wind farms and projects in the construction phase, allowing developers to recycle their capital.

Our vision: green and profitable

Our task: crowding-in capital



* As at June 2015. Find out more at www.greeninvestmentbank.com


Withdrawn 17 December 2018

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