Offshore Wind

UK Capabilities & Case Studies

GREAT
BRITAIN & NORTHERN IRELAND

Meet the experts

British companies play a vital role in enabling the development and deployment of renewable energy across the globe.

This brochure is designed to help you benefit from that expertise.

It contains a selection of some of the leading UK companies and service-providers bringing world-class ingenuity, skill and experience to the offshore wind industry.

These companies make the complex and challenging business of creating energy safer, greener and more cost-effective.

They represent just a selection of UK's rich and varied supply chain.

So if you are looking for support for your renewable energy projects, whether as a buyer or investor, then please get in touch. You can reach out to UK Government representatives at your local British Embassy, or contact us online.

We can connect you with best-fit, high quality UK companies that will help you deliver your energy transition goals.

> **We are here to help connect you with the UK's world-leading offshore ecosystem.**

Chris Barton CMG
His Majesty's Trade Commissioner Europe

UK Offshore Wind

With a world-leading offshore wind sector, $1tn tech economy, four of the world's top ten universities, plus dedicated clusters and catapults, the UK boasts world-class expertise in offshore wind.

Particular strengths are farm development, cutting-edge service technologies and a highly-skilled workforce. Supported by robust regulatory support and an ongoing commitment to sustainable energy, the UK has all the partners you need to help your projects succeed. From project planning and consultancy, to maintenance and repurposing, you'll find it in the UK.

Specific strengths in fixed-bottom offshore wind

- Developers
- Finance, insurance and legal
- Consultancy services and project management for all stages of a windfarm
- Design, engineering consultancy
- Power cable design, manufacture, install, monitor and support
- Fabrication and installation e.g. blade, foundations
- Specialist design and specialist equipment
- Marine vessel operators including marine management
- Port / marine support
- Operations and maintenance, including asset management / condition monitoring

Strengths in floating offshore wind:

- Specialist engineering
- Mooring and anchor designs and installation
- Mooring lines
- Mooring equipment (anchors, connectors, bend stiffeners and more)
- Dynamic power cabling

The UK's hub of innovation: The Offshore Renewable Energy (ORE) Catapult

Innovating to make offshore renewable energy more reliable, effective and efficient

The Offshore Renewable Energy (ORE) Catapult was established in 2013 by the UK Government as one of a network of technology innovation centres in high growth industries to drive development in those sectors.

Since then it has grown to be one of the world's leading innovation centres for offshore renewable energy, and uses its key capabilities of testing linked to technology development and late stage R&D, analysis and insights, supply chain acceleration, and applied research, to de-risk and supercharge innovation in the UK offshore renewable energy sector.

The ORE Catapult has been at the heart of over £677m in innovation projects, and helped to bring about 150 new products to market, as well as supporting over 1300 companies in their journeys to bring their products and services to market.

With a presence right across the UK, from Cornwall to Aberdeen, ORE Catapult's unique facilities offer state of the art testing and research environments for everything from huge turbine blades to robotics, cables, and much more.

Through its various supply chain acceleration programmes, ORE Catapult has also been integral to the growth and development of companies, a few examples of which are in these pages: (See BladeBUG, Acuity Robotics, JET Connectivity).

Coming soon:
The Floating Offshore Wind Innovation Centre

The ORE Catapult is constantly looking to grow and evolve its offering, and in 2024 will open a new facility dedicated entirely to the advancement of technological innovation in the floating wind sector, through its Floating Offshore Wind Innovation Centre in Aberdeen.

This facility will be key to helping to fast track the transition of skills and technology from the oil and gas sector.

It will perfectly complement the validation and research work carried out at its largest facility in Blyth, outside Newcastle, where some of the most important pieces of offshore wind technology have been developed, most recently for use at the new Dogger Bank project, the world's largest offshore wind farm.

Case study: BladeBUG

Advanced robotics that make blade inspection safer and more cost effective.

UK-founded BladeBUG is a deep tech company providing advanced robotic and integrated inspection, maintenance and repair solutions to its customers across the renewable energy sector.

BladeBUG's robots deliver value by improving wind turbine performance and revenue generation through proactive and predictive maintenance whilst reducing asset downtime, unplanned events and catastrophic failures which all have a significant impact on the cost of energy.

Designed from inception to offer a cost-effective solution that is safer and faster than conventional methods, these compact, agile and multifunctional robots are being developed to work offshore to de-risk operations and make good use of narrowing weather windows.

Case study: BladeBUG

Increased demand is creating a shortage of skilled workers across the global renewable industry, but BladeBUG's revolutionary technology supports an inclusive and diverse workforce, enabling individuals and teams to work with greater productivity and cross functionality to maximise asset uptime, revenue generation and energy security.

One of the unique features of this agnostic robot is a modular payload bay that enables the integration of industry standard and customised tools to bolster capability whether collecting high quality data sets or performing highly repeatable processes with greater accuracy.

Industry demands have led to BladeBUG undertaking further research and development work to perform early-stage repairs on main components such as blades in addition to existing comprehensive inspection applications that include non destructive testing techniques using highly sophisticated matrix, phased array and conventional ultrasound.

BladeBUG is currently building its case study portfolio through early stage commercial projects which are being delivered throughout the UK and across Europe.

Award-winning BladeBUG has:

- Achieved the world's first robotic blade walk on a 7MW near offshore turbine off the coast of Scotland
- Winners of the Offshore Innovation Category of the Robotics and Automation Awards 2023
- Finalists of the Free Electrons 2023 global innovation programme that saw this ambitious company win a contract with one of the largest utility companies in the world.

Case study: Flotation Energy

Complex floating windfarms in harsh offshore environments.

Since inception in 2018, Flotation Energy has contributed significantly to the growth of the offshore wind industry in the UK and beyond. Its founders and leadership team pioneered the world's largest grid-connected floating offshore wind farms, Kincardine, off the Aberdeenshire coast, Scotland. Globally, Flotation Energy has a 13GW project pipeline in countries including Australia, Japan, Ireland, Taiwan and the UK.

Success comes from collaborating closely with local supply chains, communities and groups to determine the most suitable technical, economical and environmental outcomes for all parties.

Whilst Flotation Energy has developed its own projects independently, it also values collaboration and partnerships in delivering assured and cost-effective solutions. The company is a great example of how an established UK offshore wind developer is sharing deep technical knowledge and project management expertise to help other countries reach their Net Zero and energy security targets.

Flotation Energy's record of developing and executing successful projects includes:

- Kincardine, Scotland: the world's largest grid-connected floating wind farm.
- Toki, Japan: a two-stage 1GW floating wind project 40km off the Prefecture of Niigata.
- Chu Tin, Taiwan: a 100MW test and demonstration floating project, followed by 2x 600MW commercial floating projects.
- Perth Array, Australia: a 500MW + 500MW scalable bottom fixed offshore wind farm, connected to the Southwest Inter-connected system (SWIS).

Case study: Anakata

World-leading F1 aerodynamic expertise improving turbine performance.

With engineering expertise based on F1 motor-racing, Anakata are leaders in aerodynamic innovation, providing some of the most innovative approaches to improving wind turbine performance available to the global wind industry.

One of the key areas of focus is on improving blade performance by installing uniquely-designed blade furniture that can be retrofitted onto operational turbines to help improve their energy capture by >5% per annum. Tailored to each turbine type, Anakata have had their parts installed on all key manufacturers turbines including Siemens, Vestas, Gamesa and Nordex, with wind farm owners independently verifying improvements of >5%.

Another key product is Anakata's unique Infra-Red Aerodynamic Audit that enables analysis of the aerodynamic performance of blades in operation, quantification of how much energy is being lost through leading edge erosion, and how much can be regained through remedial actions. This enables a proper cost benefit analysis of any planned repairs, which is particularly important offshore.

Anakata works with leading wind farm owners, asset managers and wind turbine manufacturers to improve operational performance. This commercial success includes projects across Europe and Asia.

Projects include:

- Upgrade packs on a range of turbines, the oldest of which has been operating since 2016 and the biggest of which to date is on a 76m blade.
- Offshore installations, including the launch of Anakata's new SuperAero Tip Booster that is specifically tailored to meet the additional demands of offshore blade, capturing additional energy, better leading edge erosion and reducing fatigue loads.
- Infrared aerodynamic audits which measure the aerodynamic performance of operational turbines and identify how much energy performance can be regained. Unlike other inspection techniques, there is no turbine downtime during inspections.

Case study: JET Connectivity & The 5G Portal

Developing the latest 5G connectivity essential to the expansion of offshore wind.

JET Connectivity's solar-powered 5G buoy works in conjunction with fifteen 5G radio transmitters across five sites including four wind turbines and a radio mast in the port, to provide an extended private 5G network over a 45km2 area. It is a crucial part of the new '5G PORTAL'.

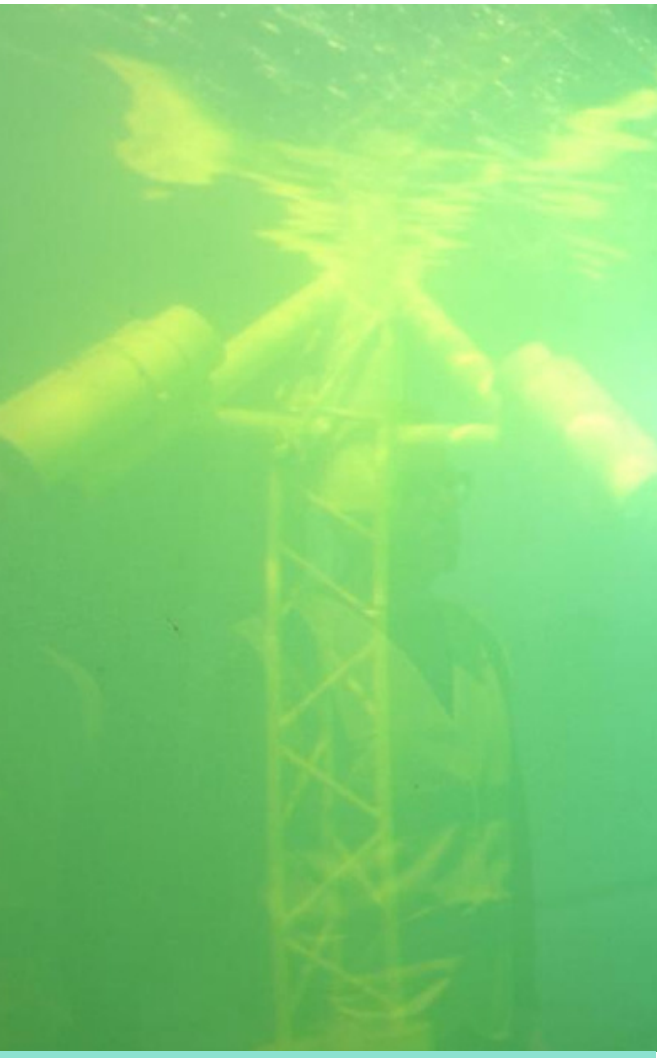
The 5G PORTAL (Ports and Offshore Renewable Technology Accelerator Lincolnshire) is a new, advanced 5G equipped 'living lab' at the Offshore Renewable Energy (ORE) Catapult's Operations and Maintenance Centre of Excellence.

The £2.8m project, funded by Innovate UK and the Greater Lincolnshire LEP, will accelerate development of a new generation of digital technologies essential to the vast global expansion of offshore wind farms.

The 5G 'living lab' will allow technology providers to develop, test and demonstrate in real world conditions with access to reliable, high-speed communications.

It is open to users from across the global offshore wind sector and will provide a real-world test and demonstration zone for robotics, AI, remote sensors, wearable technology, zero emission vessels, smart ports – driving forward the digital evolution of next generation wind farms.

The 5G PORTAL is delivered by a consortium led by ORE Catapult, bringing together the expertise of Microsoft, XceCo, Associated British Ports (ABP), Accelleran, JET Connectivity, Boldyn Networks and Satellite Applications Catapult.



Case study: HR Wallingford

Solving the engineering challenges of bigger & more powerful floating offshore wind deployment

The UK is home to one of the world's largest deployments of offshore wind. As the UK looks to expand wind energy capacity further, the industry is focusing on floating offshore wind turbines that can be deployed in deeper waters, are less congested and have higher windspeeds. Floating offshore wind is the the new frontier in large-scale renewables but the ensuing challenges require innovative solutions and technologies.

Drawing on one of Europe's largest physical modelling laboratories, and extensive research capabilities, HR Wallingford is a British engineering consultancy that's exploring how to build and deploy large numbers of bigger, more powerful wind turbines situated in much deeper waters on floating sub-structures.

With 30 years of offshore wind experience, HR Wallingford has been involved in over 90% of the UK offshore wind farms as well as projects in the European Sector, the Baltic, the US and APAC region. It uses advanced modelling of the ocean's waves, currents and sediments to test foundations for floating offshore wind farms.

As part of a one-year project funded by Innovate UK, HR Wallingford has been testing a new floating offshore wind platform, the Stinger Keel, developed by Floating Energy Systems. The team developed numerical modelling techniques including CFD and Openfast to calculate the hydrodynamic loads on the structure under severe sea states. These models were then calibrated using physical modelling and the results fed into the final structural design.

A great example of UK R&D helping to innovate the energy transition.

Case study: Tekmar

Protecting subsea cables, umbilicals and flexible pipes

Tekmar Group, is a market-leading provider of subsea protection systems for cables, umbilicals and flexible pipes with subsea cable engineering services. The company has a legacy of over 35 years of operation in the global offshore wind, energy, interconnector and telecommunications markets.

As floating offshore wind becomes an increasingly-large part of the offshore renewable energy mix, much of the technology required for floating wind is being adapted from the traditional offshore energy sector.

Companies like Tekmar Group, at the forefront of integrating and realizing floating projects, are well positioned to help with this industry transition.

With five group companies and 21 locations worldwide, Tekmar Group is a very active player in the global supply chain. Of their global projects, Tekmar has:

- Supplied 100 cable protection mechanisms to multiple offshore wind farms in the Shangdong and Guangdong provinces of China
- Provided integrated engineering solutions for an offshore wind farm project in the US
- Provided pipeline support and protection materials for a major subsea construction project in the Middle East.

Tekmar Group is a great example of how UK experts are meeting global energy demand, by constantly looking for ways to develop their services to make today's impossible tomorrow's deliverable.

Case study: Rovco

Using state of the art robotics and 3D vision technology for subsea surveying

Rovco is a provider of subsea robotic and integrated survey solutions, with a wealth of experience in delivering complex projects across the offshore wind and oil field decommissioning sectors.

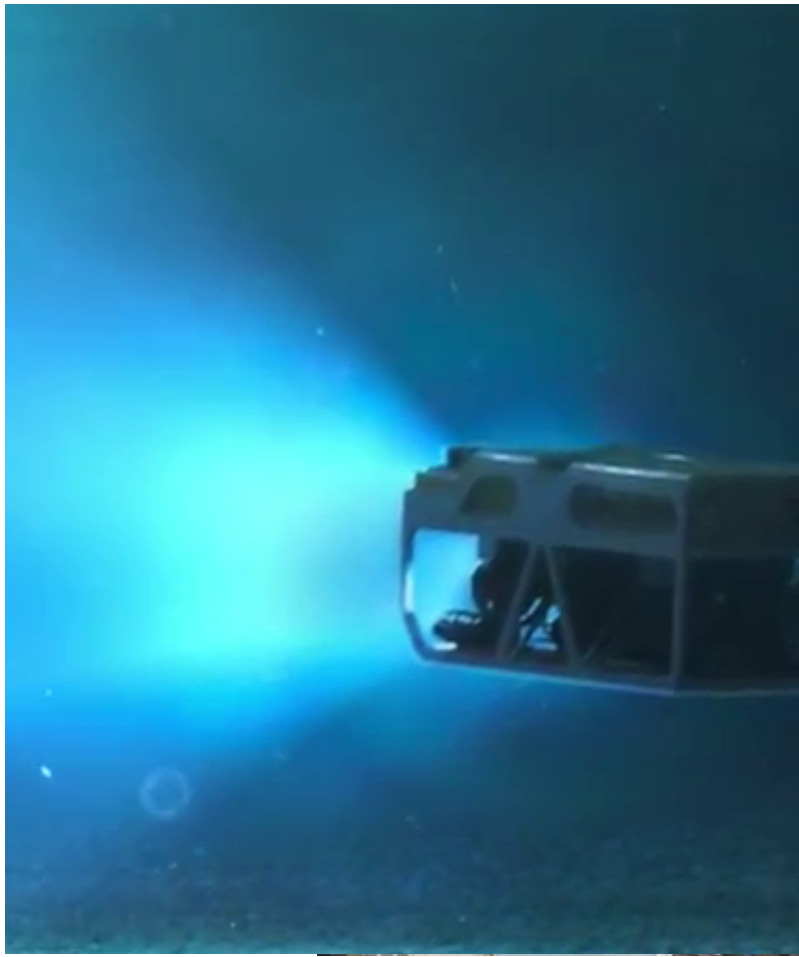
Leveraging state-of-the-art 3D vision technology to deliver superior quality data sets, they provide vital insights that support the full lifecyle of offshore wind farm developments, from guiding the initial layout and design, to informing the long-term planning of potential preventative maintenance and remedial works on assets.

Combining a highly experienced team with technology from award-winning sister company, Vaarst, Rovco are revolutionising how customers manage their subsea infrastructure and asset integrity.

Versatile offshore survey solutions enable significant time and cost savings, as well as lower emissions across projects, changing the face of the industry.

Rovco's solutions help clients make informed decisions and de-risk their projects by harnessing cutting-edge innovations, enabling a truly autonomous, intelligence-driven and cloud-connected future.

UK-founded and with an operational base in the North East of Scotland, Rovco has enjoyed continued growth since inception in 2016, and is now unfolding its potential internationally, as the business looks to support the global energy transition.



Case study: CASC

Project management, and highly-skilled labour services to the offshore industry

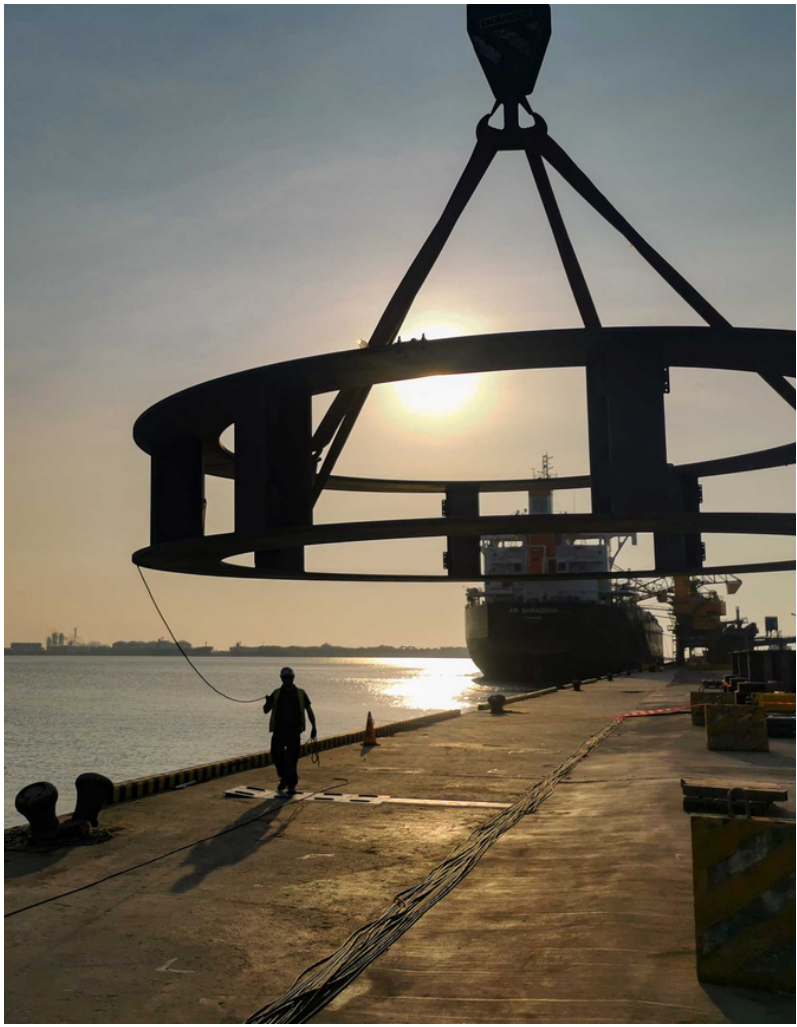
CASC are an innovative, solutions-focused framework contractor working with the world's largest wind turbine manufacturers on offshore wind projects across the globe. Responsible for mobilising some of the world's largest offshore wind farms, and providing ancillary components to these projects including bespoke platforms, sea fastenings, transport equipment, fabricated quayside equipment for tower mobilization, power distribution solutions and turnkey electrical installations.

CASC is highly skilled in portside activities and has significant recent experience in successfully delivering projects including Hornsea 1 & 2, Yunlin, Greater Changhua, Fecamp and Hope See.

Managing Director, Karl Crockard:

"I am incredibly proud of what we have achieved to date; and of the ambition that exists within the team to continue on this trajectory within the offshore renewables sector. We are committed to maintaining our ethos of being proactive and responsive on projects, and to minimise the potential issues at key stages of the critical path and contribute to an efficient delivery on projects for our clients.

We offer a high quality and effective package to our customers, and with a strong in-house team which includes design, engineering and technicians, we have both the ability and drive to expand our scope of work and our client base within the European market."



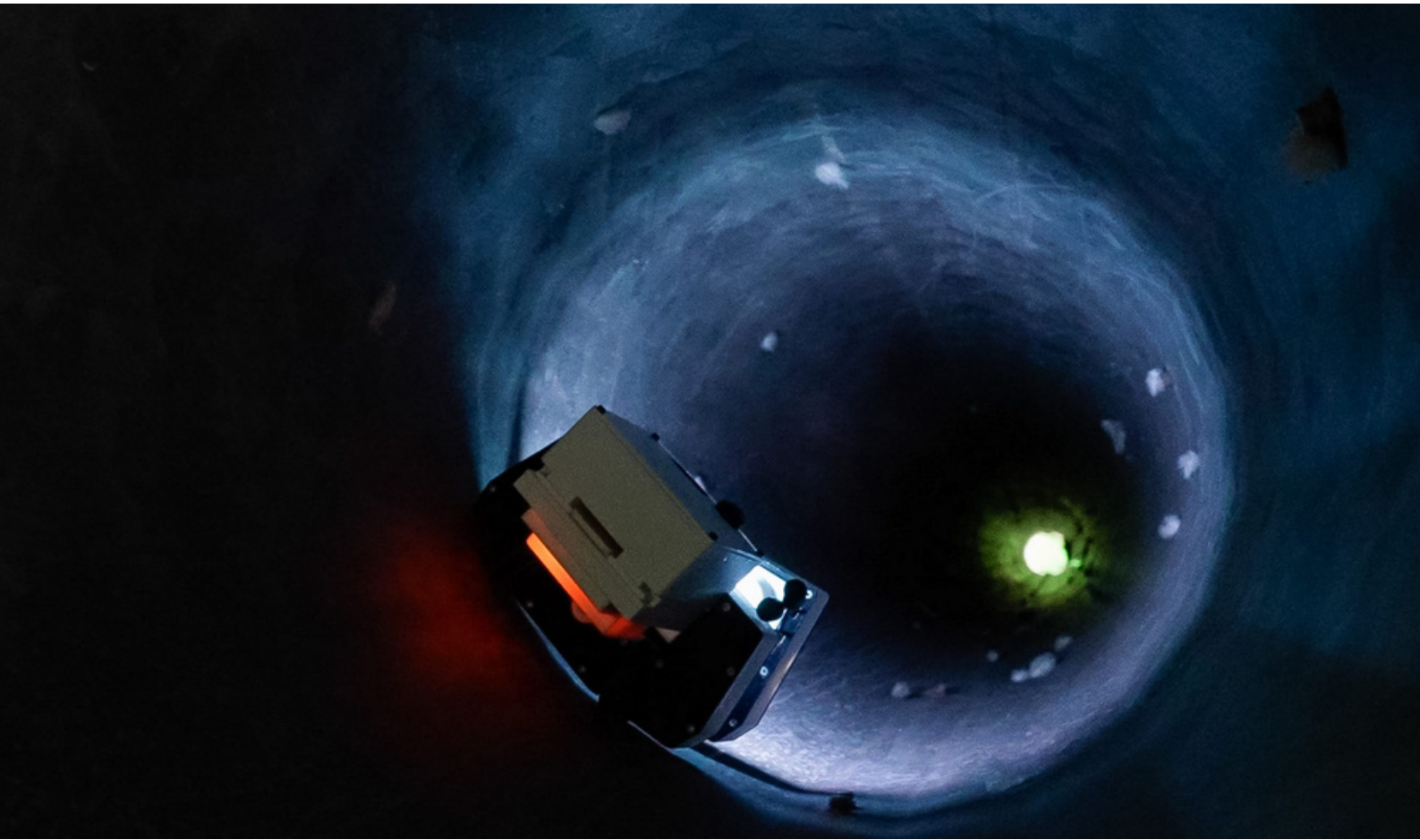
One to watch: Acuity Robotics

Capturing data & imagery to provide critical intelligence on metallic infrastructure.

A spin-out from the University of Leeds' Real Robotics laboratory, at the National Facility for Innovative Robotic Systems, Acuity Robotics provides world-class expertise in remote data capture and analysis on metallic structures.

Real time data and imagery is related to a proprietary dashboard which delivers asset monitoring, analysis and reporting.

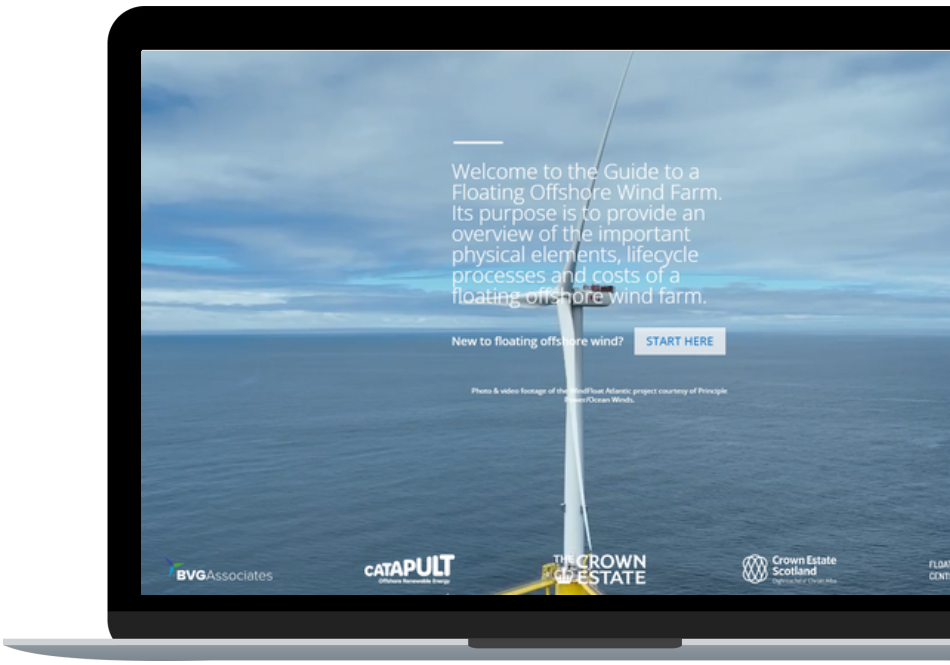
The company is currently testing their unique 'Squirrel' and 'Stoat' robots - testing the inside and outside of turnbines - on onshore wind farms before an expected move to more the complex offshore environment.

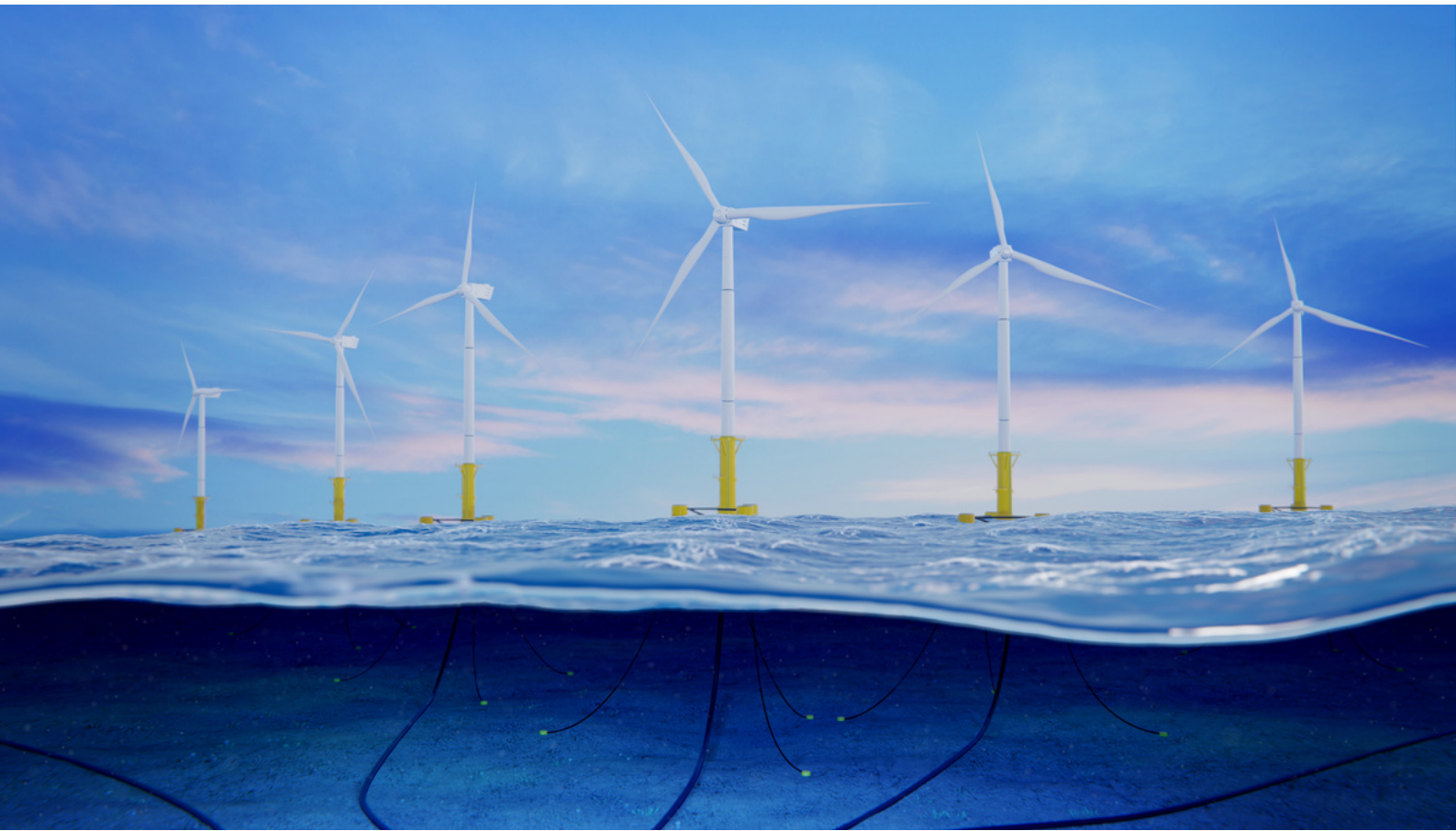


The complete floating offshore wind farm supply chain

A new highly-interactive digital guide has recently been created by BVG Associates that details every stage in the life of an offshore wind farm and the UK companies operating in the sector.

Scan the QR code to view or click the link here.





Meet the Swedish company harnessing the unrelenting power of the tides in Wales and Northern Ireland

Minesto's unique underwater "kites" generate electricity as they rotate beneath the waves.

Holyhead Deep was chosen as the starting point of the industrialisation of Minesto's amazing marine energy technology. It is not only Minesto's first utility-scale project – but also the first low-velocity tidal energy project in the world. Holyhead Deep was identified as an optimal location for a utility-scale installation.

After in-depth analysis of sites around the world, the UK was identified as the most suitable location on the basis that its territorial waters contain approximately half of the European tidal resource and around 10–15 percent of the known global resource. Numerous locations around the UK were considered, but Holyhead Deep in Wales was selected as the preferred option due to the highly suitable environmental conditions and government commitment to marine renewable energy, offering significant opportunities to attract support and investment into the project.

> Minesto: an energy innovator growing in the UK.

Find out more about investing in the UK, for R&D, commercialisation, access to capital and more. Click here.

Featured UK Companies

BladeBUG
https://bladebug.co.uk

Flotation Energy
https://flotationenergy.com

Anakata
https://anakatawindpower.com

JET Connectivity
https://jet-eng.co.uk

ORE Catapult
https://ore.catapult.org.uk

HR Wallingford
https://www.hrwallingford.com

Tekmar
https://tekmar.co.uk

Rovco
https://www.rovco.com

CASC
https://www.casconline.co.uk

Acuity Robotics
https://acuityrobotics.co.uk

With 13.9 GW installed capacity, the UK is the second largest offshore wind market in the world.

The ambition is to achieve up to 50 gigawatts (GW) of offshore wind by 2030, including 5 GW from innovative floating technology.

This is underpinned by a project pipeline of around 77 GW across 80 projects that are either in construction, consented, in development and planned in future seabed leasing auctions.

Department for Business and Trade
We are the UK's department for economic growth. We support businesses to invest, grow and export, creating jobs and opportunities across the country.

We are responsible for:

- Redrawing our rules to ensure businesses thrive, markets are competitive and consumers are protected.
- Securing investment from UK and international businesses.
- Advising, supporting, and promoting British businesses to grow and export.
- Opening up new markets for businesses by removing barriers and striking trade deals.
- Promoting free trade, economic security and resilient supply chains.

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Cover image: BladeBUG

Published by
Department for Business and Trade
November 2023