

INNOVATION HIGHLIGHTS 2018/19



Innovation Highlights
2018/19

CATAPULT
Offshore Renewable Energy

We work with
Innovate UK

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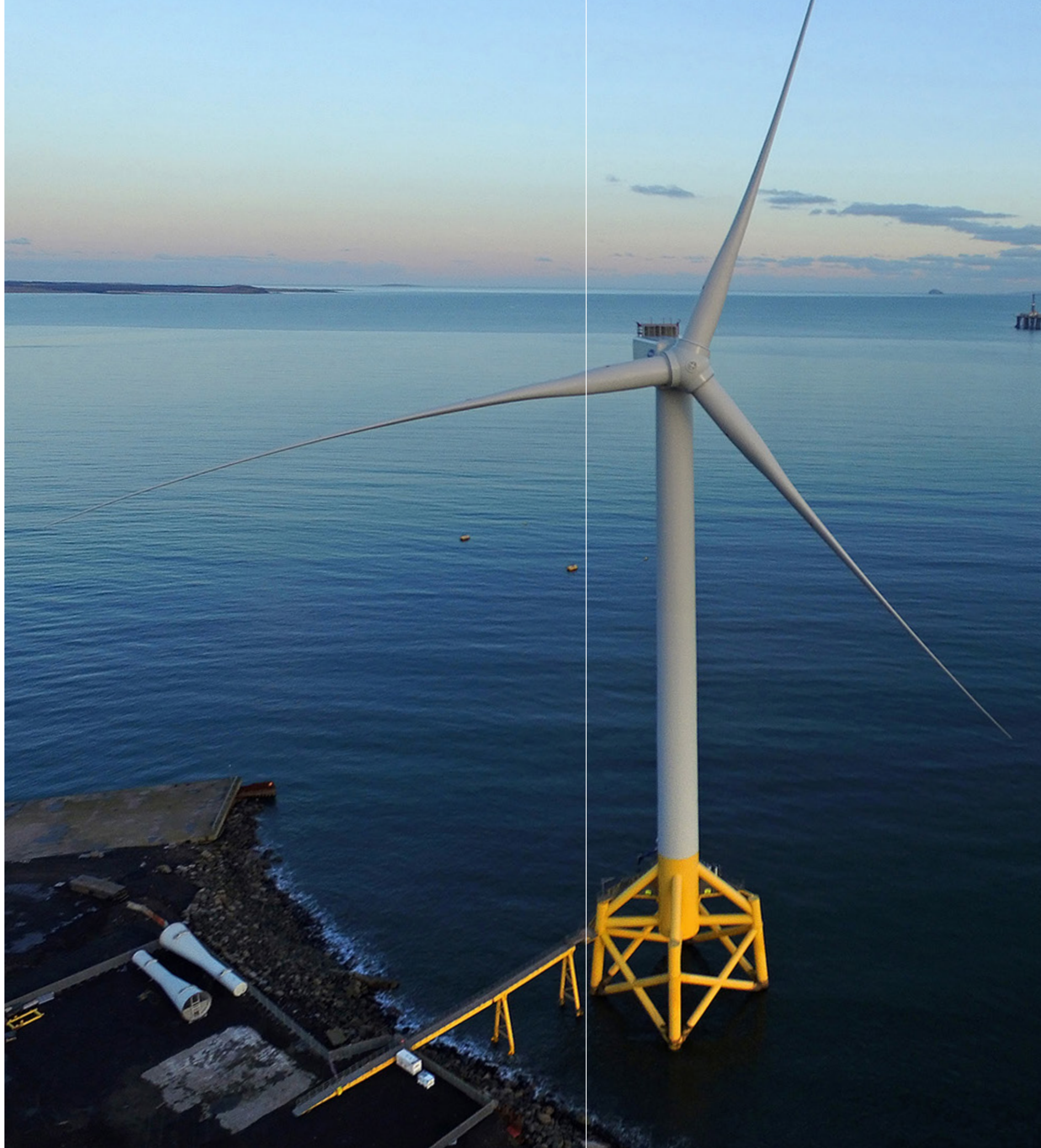
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We work with
Innovate UK



Andrew Jamieson,
Chief Executive,
Offshore Renewable
Energy Catapult



As we celebrate another successful year for our business, I can't help but reflect back on how different our industry landscape looked just six years ago, when ORE Catapult was first established, and the role our organisation is playing in making offshore renewables, and offshore wind in particular, the backbone of the UK's future energy mix. The UK has more than doubled its offshore wind installed capacity and slashed costs by more than fifty percent. In March of this year, an ambitious Offshore Wind Sector Deal was agreed with the UK Government that will see installed nearly quadruple again by 2030. The Deal is leading the way in developing a strong, indigenous UK supply chain, creating thousands of jobs, boosting UK exports and setting stretching industry diversity targets.

Significant progress has also been made in our marine industries. Atlantis, Nova Innovation and Orbital Marine are proving that tidal technology works and are successfully exploiting the growing global export market. Wave is further behind the commercialisation curve than tidal and needs greater support in co-ordinating technology developments. However, there is now real momentum in the sector, and the formation of the Marine Energy Council in the last year has been very successful in providing more of a combined industry voice in the push for policy support.

At the heart of this industry transformation has been collaboration, applied R&D and technological innovations. Bigger turbines, new foundation designs and the adoption of novel operations and maintenance activities are exciting new frontiers we are exploring. Embracing robotics, autonomous systems, big data and AI, and innovations in balance of plant, will be vital to achieve 30GW by 2030, or to meet the even more stretching target of 75GW by 2050 outlined in the Committee on Climate Change's latest report.

In this document, I am pleased to be able to profile some of the leading UK companies and the innovative projects we are working with to drive forward this industry transformation. They are excellent examples of innovation progress in the sector and are testament to the success of the Catapult's core mission to deliver economic benefit and growth for the UK.

OUR IMPACT

113



Active R&D Projects

252 since 2013

158



SMEs Supported

597 since 2013

49



Academic Collaborations

469 since 2013

55



International Projects

80 since 2013

120



Industry Collaborations

648 since 2013

8%



Year-on-Year Uplift in Competitive R&D

49%



Year-On-Year Uplift in Total Revenue

1.4bn



Value of Test Facilities

36



Companies Supported with Product Development

144 since 2013

Helping innovative UK companies succeed and grow is at the heart of the Catapult Network's mission.

By developing support platforms from local to international level, we help link the firms with the highest potential to opportunities from Shetland to Shanghai. Increasing productivity and competitiveness, and creating valuable export opportunities, is the aim.

Here are just a few examples of ORE Catapult's work delivering economic impact for UK firms by helping them win more business at home and abroad.

Right:
The Catapult's new £2m research centre in Yantai City, China.



TUS-ORE CATAPULT RESEARCH CENTRE

The offshore wind opportunity is truly global, and with China predicted to become the world's largest market by 2030, it's one that must be seized by UK businesses.

China's unprecedented growth presents huge opportunities for exporting UK products and services, and for the market there to adopt novel technologies that can not only speed up the rate of deployment, but also keep costs down.

The Catapult has partnered with China's Tsinghua University Science Park in the £2million TUS-ORE Catapult Research Centre (TORC) in Yantai City, which, with unique links into both the UK and China, will support the growth of their respective offshore wind industries.

The Centre will develop collaborative research programmes, support market entry and incubation for UK businesses in China, provide commercial support for Chinese offshore wind developers and support the demonstration of new technologies on a 300MW windfarm in Shandong Province.

The result will be a burgeoning Chinese offshore wind market – underpinned by the best new products and services the UK supply chain has to offer.

FIT FOR OFFSHORE RENEWABLES

Inspired by the High Value Manufacturing Catapult's successful Fit For Nuclear programme, in 2018 we launched Fit For Offshore Renewables, a business improvement journey designed to help the UK supply chain grasp the growing offshore wind opportunity.

With its key focus on business excellence, the programme allows companies to measure their operations against the standards required to supply the industry and take steps to close any gaps.

The pilot programme visited and assessed 30 Scottish firms before creating action plans for improvement. Fourteen are now progressing to the next stage, which will actively work to increase competitiveness and productivity in preparation for the growth catalysed by the Offshore Wind Sector Deal.

The early success of the programme has spawned follow-on initiatives in supply chain hotspots East Anglia and the north-east, and in future will align with the Sector Deal's Offshore Wind Growth Partnership business competitiveness strand, providing a nationwide economic boost.

To meet the offshore wind industry's ambitious 2030 vision, turbines must become bigger and more powerful than ever before.

With the next generation of 10MW+ machines on the horizon, we're upscaling our Testing & Validation facilities to accommodate the world's largest, most technically-advanced blades, bearings and drivetrains. These examples illustrate how we are accelerating the deployment of new technologies in UK waters, attracting infrastructure investment, and ultimately helping to reduce the cost of energy even further.

GE RENEWABLE ENERGY HALIADE-X TESTING

As the offshore wind industry prepares for the next generation of "double-digit" 10MW-plus turbines, the Catapult is playing a significant role in accelerating tomorrow's technology to market.

Our transformative test agreement with GE Renewable Energy, signed in April 2018, will see the 12MW Haliade-X – the world's largest offshore wind turbine – begin testing and validation at the Catapult's 15MW drivetrain test facility in Blyth from late 2019. The Catapult will also put the LM Wind Power Haliade-X blade – the world's longest at 107m – through a programme of representative testing later in 2019.

The Catapult is also working closely with GE Renewable Energy to develop its Haliade-X 12MW supply chain plan for the UK. All of this follows successful trials of the US giant's Haliade 150-6MW nacelle for validation, which commenced in summer 2018.

Our collaborative agreement to advance offshore wind technologies in the UK was strengthened later that year with the announcement of the four-year Stay Ashore! research and development programme. The £9m plan will aim to improve reliability, reduce unplanned maintenance and lower operating costs for next-generation turbines, while minimising human intervention.

We also continued to develop our capability for the representative testing of 10MW-plus platforms with the installation of the world's most powerful grid emulation system, at 18MVA, and hardware in the loop system testing, giving the Catapult one of the most sophisticated powertrain testing platforms in the world: the perfect platform for bringing future energy systems to commercialisation.





DUAL AXIS & LONG BLADE

In 2019, ORE Catapult successfully demonstrated bi-axial fatigue testing on LM Wind Power's 88.4m offshore wind turbine blade, one of the largest in the world. The test was conducted as part of the recently completed XL-Blade project (of the European-funded Demowind), meaning ORE Catapult became the first research organisation in the world to perform bi-axial fatigue testing on a blade of this scale.

Following a decade of research and development, bi-axial fatigue testing provides a far more representative test method, replicating the loads imparted by both the wind and gravity as the blades rotate. This revolutionary technique was performed in ORE Catapult's 100m blade test facility in Blyth, and is a significant progression of the traditional, less representative single axis test loads being applied to blades whilst under test.

The project also demonstrated next generation blade logistics and handling, as turbine components become larger and increasingly challenging to deploy.

eGRID

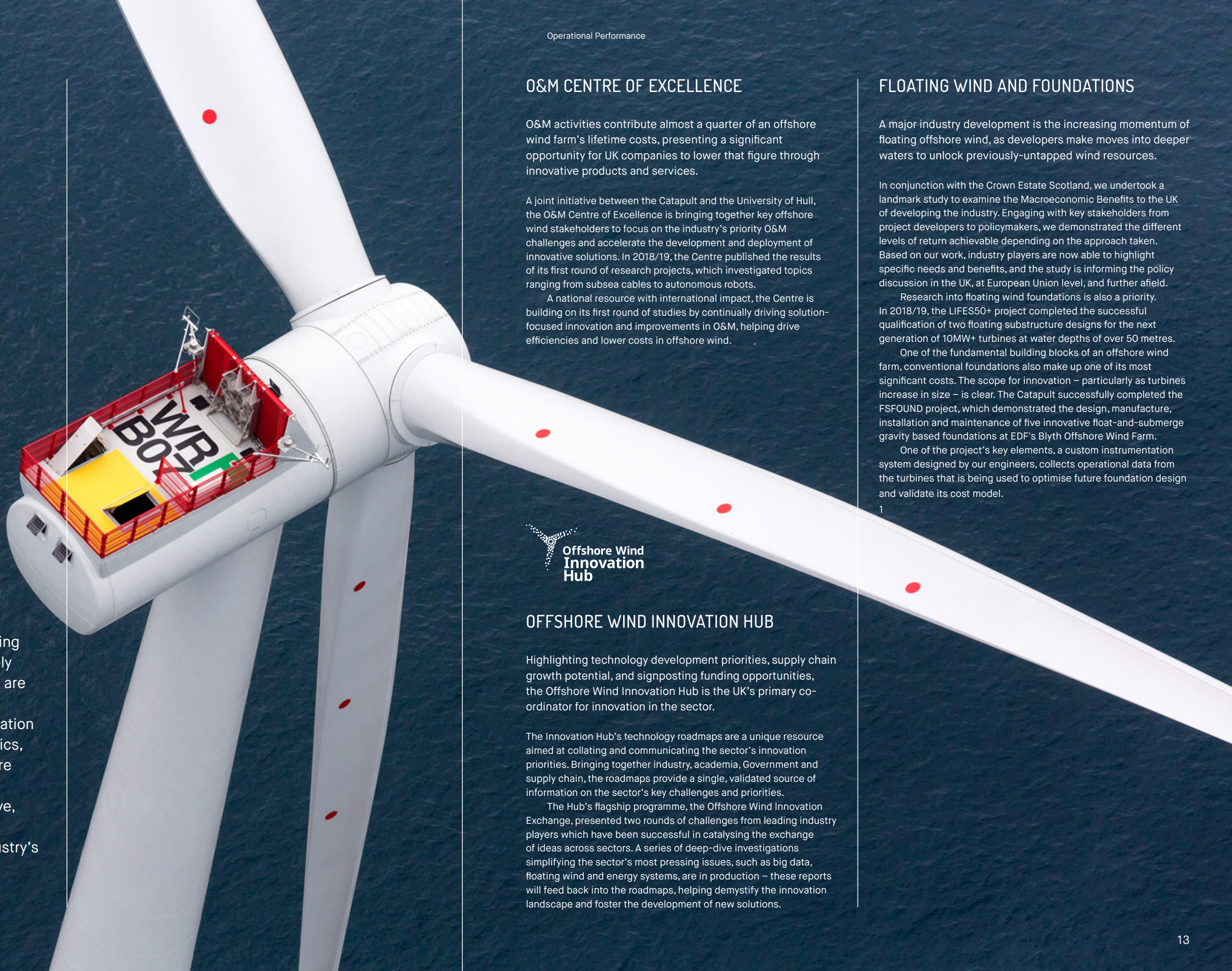
In 2019, our Blyth site installed one of the most advanced grid emulation systems in the world – 'eGrid' – at its Blyth site. eGrid can emulate any grid in the world under various conditions for devices rated up to 18 MVA. The system can control voltage and frequency at the connection point to emulate a wide variety of fault conditions that wind and tidal turbine powertrains may experience during operation.

eGrid enables testing of rare grid conditions that powertrains are required to cope with in order to pass certification tests.

eGrid allows manufacturers to get a more complete overview of their technology, increasing turbine reliability and performance that results in the reduction of unscheduled maintenance, in turn lowering the cost of energy from wind and tidal systems. In addition, eGrid supports the test, development and research of grid services, grid integration and energy storage.

Another aspect of eGrid is a UK SME engagement programme, the Grid Connection Support Series (GCSS), providing one-to-one support for businesses operating in grid connection products and services. The GCSS provides business masterclasses, innovation challenge and one to one support, and has already engaged with 64 SMEs and academic institutions.

Left:
The Catapult's Blade Test 2 facility in Blyth.



The UK's position as the world leader in offshore wind is underpinned by a thriving local operations and maintenance supply chain, and improvements in this sphere are key to continued cost reduction.

Our team is spearheading the application of cutting-edge technologies like robotics, data and artificial intelligence to offshore wind O&M – driving efficiencies while creating the foundations for a productive, export-ready UK supply chain – and our Centre of Excellence is solving the industry's current operational challenges.

O&M CENTRE OF EXCELLENCE

O&M activities contribute almost a quarter of an offshore wind farm's lifetime costs, presenting a significant opportunity for UK companies to lower that figure through innovative products and services.

A joint initiative between the Catapult and the University of Hull, the O&M Centre of Excellence is bringing together key offshore wind stakeholders to focus on the industry's priority O&M challenges and accelerate the development and deployment of innovative solutions. In 2018/19, the Centre published the results of its first round of research projects, which investigated topics ranging from subsea cables to autonomous robots.

A national resource with international impact, the Centre is building on its first round of studies by continually driving solution-focused innovation and improvements in O&M, helping drive efficiencies and lower costs in offshore wind.



OFFSHORE WIND INNOVATION HUB

Highlighting technology development priorities, supply chain growth potential, and signposting funding opportunities, the Offshore Wind Innovation Hub is the UK's primary co-ordinator for innovation in the sector.

The Innovation Hub's technology roadmaps are a unique resource aimed at collating and communicating the sector's innovation priorities. Bringing together industry, academia, Government and supply chain, the roadmaps provide a single, validated source of information on the sector's key challenges and priorities.

The Hub's flagship programme, the Offshore Wind Innovation Exchange, presented two rounds of challenges from leading industry players which have been successful in catalysing the exchange of ideas across sectors. A series of deep-dive investigations simplifying the sector's most pressing issues, such as big data, floating wind and energy systems, are in production – these reports will feed back into the roadmaps, helping demystify the innovation landscape and foster the development of new solutions.

FLOATING WIND AND FOUNDATIONS

A major industry development is the increasing momentum of floating offshore wind, as developers make moves into deeper waters to unlock previously-untapped wind resources.

In conjunction with the Crown Estate Scotland, we undertook a landmark study to examine the Macroeconomic Benefits to the UK of developing the industry. Engaging with key stakeholders from project developers to policymakers, we demonstrated the different levels of return achievable depending on the approach taken. Based on our work, industry players are now able to highlight specific needs and benefits, and the study is informing the policy discussion in the UK, at European Union level, and further afield.

Research into floating wind foundations is also a priority. In 2018/19, the LIFES50+ project completed the successful qualification of two floating substructure designs for the next generation of 10MW+ turbines at water depths of over 50 metres.

One of the fundamental building blocks of an offshore wind farm, conventional foundations also make up one of its most significant costs. The scope for innovation – particularly as turbines increase in size – is clear. The Catapult successfully completed the FSFOUND project, which demonstrated the design, manufacture, installation and maintenance of five innovative float-and-submerge gravity based foundations at EDF's Blyth Offshore Wind Farm.

One of the project's key elements, a custom instrumentation system designed by our engineers, collects operational data from the turbines that is being used to optimise future foundation design and validate its cost model.



BENCHMARKING

In offshore oil and gas, benchmarking performance against the competition is common practice. Our flagship data projects were developed to help wind farm owner/operators identify strategic issues – for example, which components fail most, or why some turbines underperform – so that they can implement optimal solutions, set targets, and make more informed investment decisions.

System Performance, Availability and Reliability Trend Analysis (SPARTA) is the world's first offshore wind benchmarking platform, and its 2017/18 Portfolio Review provided unique, anonymised insights from 77% of the UK's operational offshore wind farms.

A joint venture between the Catapult and Natural Power, Wind Energy Benchmarking Service (WEBS) Ltd is providing the onshore wind industry with secure, anonymised, web-based benchmarking across a range of KPIs, helping owner/operators strengthen their strategy, improve performance, reduce costs and manage risks.

Offshore wind farms have always generated data, but until recently the industry was never primed to take advantage of its endless potential for innovation.

From reducing turbine downtime through predictive maintenance, to improving safety through better wave height forecasting, the industry is still scratching the surface of the opportunity.

Our Data & Digitalisation team is working with owner/operators and service providers to drive the adoption of cutting-edge technologies that can add value across the whole wind farm lifecycle – helping the industry embrace a more efficient, effective, data-driven future.



Right: The Catapult's recent Data Pilots report highlighted the need for more data expertise in offshore wind.

DATA PILOTS

Offshore renewables projects generate and log data on everything from condition and performance to the heart rates of technicians. All of this presents huge opportunities for owner/operators to aid complex decision-making – but a lack of specialist expertise in the industry is a key hurdle to unlocking its value.

Through the Crown Estate-commissioned Data Pilots project, our team is engaging in short-term projects that tackle data-related challenges – for instance, delivering power predictions and identifying leading edge erosion through machine learning, or creating tools that turn turbine alarm logs into actionable insights.

POD

Despite data's increasing importance, commercialising new digital products and services for offshore wind can be difficult. Developers putting new tools through testing are often hampered by a lack of readily-available operational data, with wind farm owner/operators understandably reluctant to give up any kind of competitive advantage.

Launched in 2018 and enabled through funding from the Scottish Government, the Catapult's Platform for Operational Data is an open-access service offering comprehensive data sets from real-world offshore wind assets – benefiting the wider industry, and academic and research communities.



LIDAR VERIFICATION

Remote sensing technologies like lidar offer the industry a cheaper and more convenient alternative to the problem of erecting traditional met masts. But these still need to be tested and verified against traditional methods to ensure their accuracy.

In 2018 the Catapult launched the UK's first coastal lidar verification site, allowing developers to develop, test, demonstrate and validate new designs in a representative environment without the associated time and cost implications of carrying out tests offshore. Wood, our O&M partner at Levenmouth, successfully completed the site's first commercial test in 2019, with the abundant natural wind resource meaning the test was completed two months ahead of schedule.

Above: The Catapult's lidar verification site at Levenmouth.

From shoals of underwater robots making autonomous repairs, to sophisticated drones that can perform whole-turbine inspections in minutes, the offshore wind farm of the future will be operated and maintained by fleets of robotic and autonomous systems. The potential improvements – in safety, time and cost savings, and higher-quality data – are enormous.

Working with some of the UK's leading research universities and technology developers, the Catapult is leading the way in aerial, surface vessel, subsea and crawler robotics research for the sector – and our world-leading demonstration facilities are allowing innovators to test new devices in the field, pushing the technology further along the readiness scale towards commercialisation.



Above:
Unmanned aerial vehicles ready for testing at the Catapult's facilities in Blyth.

CYBERHAWK

Drone technology is quickly becoming the go-to method for inspection across the wind industry. The Catapult invited companies including Cyberhawk, one of the leading service providers in this emerging technology area, to perform representative commercial tests on the 7MW Levenmouth Demonstration Turbine, before analysing the results.

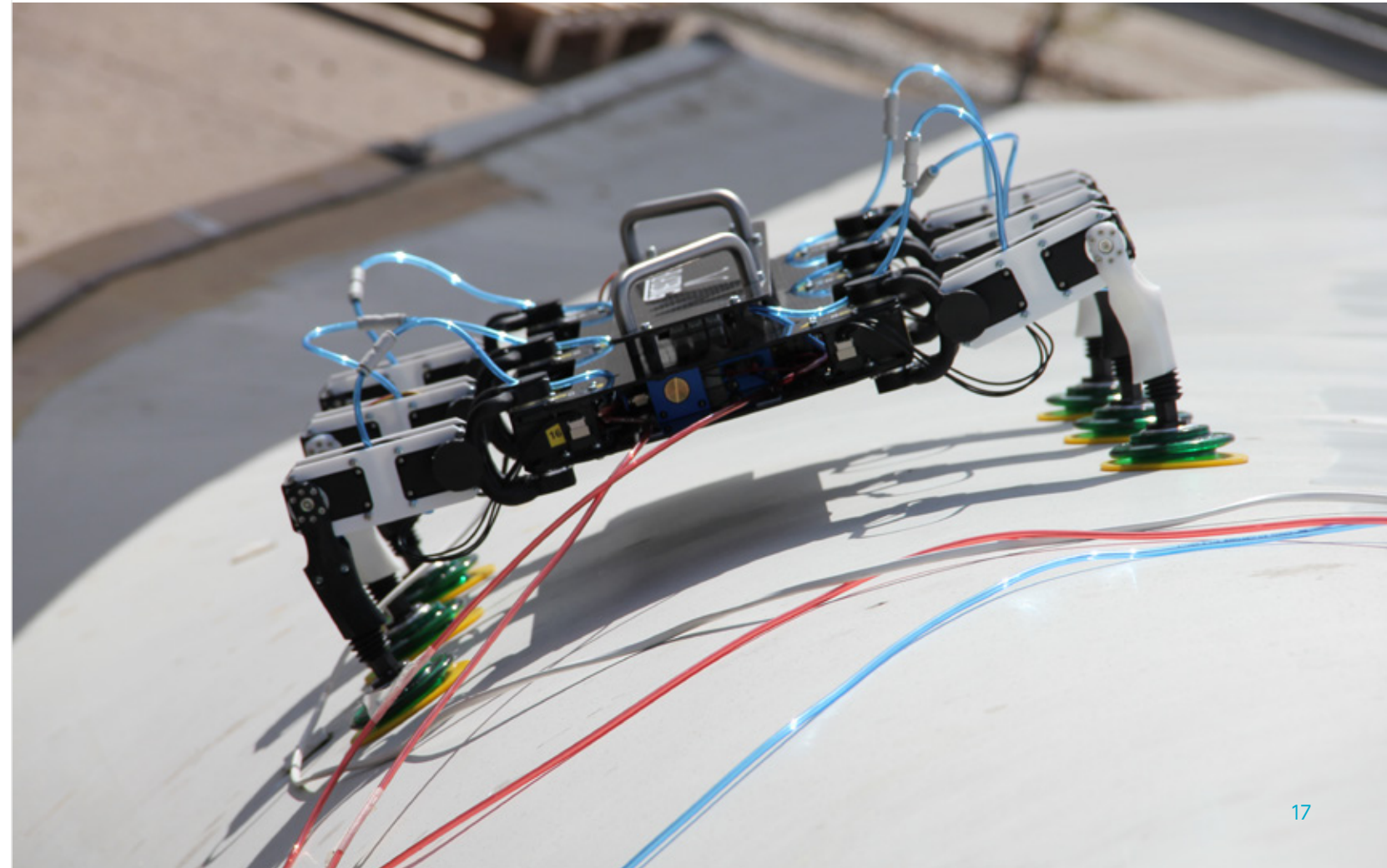
After identifying an industry baseline for a quality inspection, we brought together wind farm owner/operators and inspection providers to identify the key challenges facing the industry, opening a positive feedback loop establishing both expectations for customers and standards for service providers to aim for. With the technology's potential to cut inspection costs by almost 40%, the benefits of this collaborative industry exercise are crystal clear.

BLADEBUG

Taking technicians out of dangerous, far-flung offshore sites is a priority for offshore wind owner/operators. The robotic crawler developed by London start-up BladeBUG uses novel adhesion technology to walk along the surface of a turbine blade, collecting data on its condition – work that would normally be carried out by a rope-access technician.

Our expert engineers provided extensive technical recommendations to develop and de-risk the BladeBUG crawler, strengthening the company's business case. The second phase of the project will see the SME working in collaboration with the Catapult to further develop the robot's control systems, conduct enhanced representative testing and demonstration, and produce a commercially-ready product. The steps taken by this spider-like robot may be small, but with the Catapult's support the technology has taken giant leaps forward.

Below:
BladeBUG's robotic crawler undergoes testing on a real turbine blade in Blyth.



WASP

Alongside unmanned marine systems specialists L3 ASV and an industry advisory group, the Catapult is part of the Windfarm Autonomous Surface support vessels Project (WASP).

The project is studying the utility of autonomous surface vessels in offshore wind, exploring the technical, regulatory, and societal issues of integrating autonomous ships and existing manned shipping operations.

With vessels accounting for as much as 60% of offshore wind operating costs, which themselves make up almost a quarter of the wind farm's lifetime costs, the project has the potential to make a step-change reduction in LCoE costs over manned vessels, and significant increases in safety and performance. With an increasing number of sectors embracing autonomous systems to carry out jobs considered dangerous and monotonous, the Catapult and ASV's work will pave the way for the industry to drive down costs while simultaneously improving performance.



With the world's biggest offshore wind turbines, its first floating wind farm, and the first commercial tidal array in our waters, the UK's place as the world leader in renewables was achieved by pushing the boundaries of technology innovation.

By seeding the next generation of high-growth businesses and partnering with leading Universities to carry out cutting-edge research, we make sure that the most promising new technologies are accelerated to commercialisation, helping the UK maintain its pioneering position in the global market.

NETWORKS & STORAGE

As offshore wind increases its share of the UK's energy mix and demand for electricity increases, our grid and electrical infrastructure must evolve to meet the changing needs of distributed generation. The Catapult engaged in a number of collaborative research studies that will help the industry better understand the challenges around our future smart energy system, including WESLID, which is setting out the framework for a whole-energy system demonstration platform to trade flexibility across electricity, natural gas and hydrogen for heat and transport.

Alongside SGN, we are also studying the infrastructure that would be required to allow our 7MW Levenmouth Demonstration Turbine to become a first-of-its-kind green energy source for scalable, 100% hydrogen networks.

To tackle the intermittency of wind power, energy storage solutions will play a vital role in the UK's clean energy future. In just one example of our work in this area, our Grid Connection Support Series helped Newcastle-based Connected Energy access expert support to achieve G99 grid compliance for its innovative storage solution, which repurposes depleted electric vehicle batteries.

The company is currently embarking on an ambitious growth journey thanks to a £3m+ investment, building its presence in the UK and Europe.

WAVE & TIDAL

With the potential to support over 12,000 jobs and generate a £5.4bn cumulative benefit by 2040, the UK's tidal stream and wave energy sectors present a significant opportunity for technology developers and supply chain companies.

These figures made waves throughout the industry when they were published in our 2018 report, Tidal Stream and Wave Energy: Cost Reduction and Industrial Benefit. A comprehensive state-of-the-nation report for marine energy, it leveraged real-world data, extensive supply chain engagement and our own industry expertise to paint a comprehensive picture of the current landscape and the technology's ultimate potential.

Providing unique, independent analysis and evidence, the report has helped to shape policy both at home and in key marine energy markets like Canada and Australia. In the UK, the newly-formed Marine Energy Council is using the findings to influence Government policy on marine energy. We also initiated, together with the Scottish Government, a series of collaborative workshops to promote near- and longer-term cost reduction and industrial benefit in the UK's tidal stream industry.

Work continued on the game-changing €20.2m European project Enabling Future Arrays in Tidal (EnFAIT). Our innovative application of tidal modelling has helped project leaders Nova Innovation lower the cost of energy generated by 15% – over a third of the project's 40% reduction target.

The success of Future Proof, our collaboration with the National Research Council of Canada, led to an agreement that will see our organisations work on launching eight cross-border projects to advance marine energy technology.

Building on the success of the initial OceanERANET-funded Reliability in a Sea of Risk project, RiaSoR 2 published a suite of reports aimed at increasing the reliability of wave energy converters. The project's learnings continue to inform the development of new wave devices – technologies that will allow the UK to maintain its lead at the forefront of the global marine energy sector.

THE RESEARCH HUB INITIATIVE

Our network of Research Hubs is central to our academic engagement programme. Combining existing academic strengths with the Catapult's extensive industry knowledge, access, and world-leading facilities, the Hubs support the journey from early-stage research to the commercialisation of products and services for the sector.

A five-year, £2.3 million collaboration with the University of Bristol, the Wind Blade Research Hub was the Catapult's first major strategic collaboration with a UK university when it was established in 2017. Established to investigate innovations in the design, materials and manufacture of wind turbine blades, in 2018/19, the Hub funded five research projects on topics such as rain erosion coatings and micro-luminescence, and a number of collaborative projects involving blade manufacturers, offshore wind owner/operators and academic organisations are in delivery.

Its success provided the blueprint for a further two Hubs in Electrical Infrastructure and Powertrains. The Electrical Infrastructure Research Hub got underway in 2018/19 – a £3.1 million joint investment from the Catapult and the Universities of Strathclyde and Manchester will see the Hub tackle challenges ranging from developing the smart energy systems of the future to the improvement of reliability and availability of critical infrastructure components.

The Powertrain Research Hub was officially launched in April 2019 with the University of Sheffield as part of a joint £2.4 million investment. The Hub has secured a four-year industrial sponsorship with GE Renewable Energy that aims to tackle the most pressing issues around powertrain component reliability, health monitoring, and next-generation turbine technology. Work is underway to formulate the new Hub's first research projects for its year one programme.

Right:
The Catapult's 15MW Powertrain Test Facility



OUR CSR PROGRAMME

The Catapult's work with local schools and businesses continued its year-on-year increase in 2018/19. We logged over 6170 hours of CSR activity across our locations in Blyth, Glasgow and Levenmouth, almost all relating to science, technology, engineering and maths (STEM) education. Engaging extensively with local schools, universities and charities, we supported training for young people, and provided mentoring and internships for undergraduate engineers.

Our Blyth STEM Hub delivered ongoing engagement with schools and businesses. Over 1,000 learners and young people, 260 teachers, and a number of businesses in the region were involved in activities, events, continuing professional development work, and other initiatives run by the Hub.

At Levenmouth Academy, the STEM Ambassador role has matured into a full-time STEM Principle Teacher position responsible for co-ordinating the many STEM-related activities across the faculties. With direct support from the Catapult, these including mentoring programmes for local primary schools, and clubs and extra-curricular activities on robotics, drones, engineering and programming that could not otherwise take place. With considerable success in encouraging more young people to pursue STEM subjects, and a high take-up among otherwise disengaged pupils, the Catapult's support is having a long-lasting and beneficial impact on the community immediately around our Levenmouth Demonstration Turbine.

IMMERSIVE HYBRID REALITY OFFSHORE WIND TURBINE

Using a detailed digital replica of ORE Catapult's Levenmouth Demonstration Turbine, the Immersive Hybrid Reality (iHR) Offshore Wind Turbine, developed by Heriot Watt University, the Catapult, The Energy Skills Partnership (ESP) and Animmersion, allows students to train in a realistic and safe environment. Users can see their own hands, tools and other people while wearing VR goggles and experiencing an otherwise digital world.

First installed in a dedicated iHR Laboratory in Fife College, the system was displayed in Newcastle at the Great Exhibition of the North in 2018, giving hundreds of visitors an insight into the opportunities offered by the burgeoning offshore wind sector.

It was then installed permanently at Newcastle College's Energy Academy, allowing students to develop their skills in a world-leading virtual environment. The system went on to win Business Collaboration and Partnerships for FE/HE at the 2019 Educate the North Awards.

The iHR turbine has already been experienced by around 15,000 young people. With the offshore wind industry set to employ 27,000 people in the UK alone by 2030, over the next five years the system will be used to train more than 2500 apprentices and technicians, as well as providing an inspiration and insight into a future career for many thousands of young people.

Below:
Energy Minister Claire Perry experiences the Immersive Hybrid Reality Offshore Wind Turbine at the 2018 Great Exhibition of the North.



BLYTH TALL SHIP

ORE Catapult is a proud sponsor and active supporter of the Blyth Tall Ship. Blyth Tall Ship is a pioneering project based in workshops just along the quay from our National Renewable Energy Centre. It sets out to inspire future generations to fulfil their potential by running a traditional workshop that introduces engineering skills through the medium of traditional boat building, working alongside retired engineers and craftsmen.

Supporting 40-50 young and unemployed people a year, they are successful in getting 50% into work and 40% into further education.

Below:
View from the deck of the Blyth Tall Ship on its voyage around Great Britain.



ORE Catapult has a close relationship with the charity through our close community links, with our Test & Validation Director, Tony Quinn, serving as a Non-Executive Director.

In early summer 2019, they undertook a voyage around the coast of Great Britain on a fully restored and refitted tall ship, crewed by volunteers and young people from Blyth, the North East and around the UK, including three lucky Catapult employees.

Through our introduction, the Tall Ship will take part in Renewable UK's Global Offshore Wind exhibition and conference in London in June 2019, serving as a hospitality venue and allowing them to highlight their outstanding work and forge ever closer links with industry.

As we embark on the second year of our refreshed strategy and delivery plan, we look ahead at both the sector's future and our ambitious growth objectives.

EXPANDING OUR PRESENCE IN THE UK

The past year has seen us continue to expand our presence and activity beyond our primary centres of operation in Glasgow, Blyth and Levenmouth, ensuring that the impact of our work is felt across the UK.

We are already well established in Hull, working alongside partners Aura and the University of Hull to drive developments in Operations & Maintenance. The 21 O&M case studies from across the industry that we have published provide ample evidence of the diversity of experience and expertise that the UK has to offer in this vital field, with the strong 'cluster' around Hull and the Humber at the forefront of international developments.

The UK's rich heritage in oil & gas exploitation provides extensive opportunity for technology cross-over and diversification for companies with experience of operating in the marine environment seeking to diversify towards the low-carbon future. Aberdeen has long been at the heart of this industry, and we have now established a presence in the city, working with local companies to bring a wide variety of technologies and services to bear on the offshore renewables market.

We are also expanding our presence in the south-west, with a growing team in Hayle, Cornwall, predominantly supporting marine energy development. In Wales, we are working closely with the Welsh Government and local partners on the delivery of the Marine Energy Engineering Centre of Excellence (MEECE) in Pembroke Dock. The Centre will work with local academic partners to develop marine energy and support local companies seeking to bring new technologies and services to the renewable energy market.

FORWARD LOOK

The past five years have seen huge progress for offshore renewables in the UK but we are confident that the next five and beyond can be even greater in terms of positive impact and benefit. A platform has been established and the challenge is now to build upon it, with huge opportunity for innovation in both technology and process.

The Offshore Wind Sector Deal has delivered a pipeline of activity to 2030, and the clear path set out by the May 2019 Committee on Climate Change report has set levels of ambition far beyond the initial 30GW target.

Delivery of the vision set out in the Sector Deal can only be achieved through a significant strengthening of the UK supply chain and delivery of the £100m Offshore Wind Growth Partnership on behalf of the Offshore Wind Industry Council will be a major focus for the Catapult in the coming years, helping companies to break into the sector and more effectively meet its requirements. We will continue to create forward-thinking business support programmes that link the UK's high-growth-potential innovators with investors and end users.

Our own research has clearly set out the roadmap for marine energy to achieve commercial-scale deployment and establish a world-leading industry. We will continue to work with the sector to build reliability, scale up, and cement the UK's position as a global leader in these future energy technologies. Additionally, the Offshore Wind Innovation Hub's unique technology roadmaps will continue to play an important role in influencing Government as to the sector's innovation priorities, facilitating further cost reduction in the years ahead.

We will continue to expand our core engineering, research, test and validation capabilities and assets to optimise the UK's leading position in offshore renewables, whilst widening our footprint in line with the increasing demand for innovation support around the UK, working in close partnership with local clusters, industry, supply chain, SMEs and academia. We will throw our weight behind the development of new testing and demonstration sites so that pioneering technologies can be proven and brought to market more rapidly. With work already underway at Levenmouth to build the smarter, more agile energy networks of tomorrow, expanding our research in this area will also be crucial.

We will further strengthen our international reputation and collaborations, working with the leading research bodies and industry to drive innovation and create opportunities for UK businesses not just domestically but globally.

The demand for offshore renewables both in the UK and internationally has never been greater. Over the coming years, the Catapult will continue to strive to ensure that the UK more than delivers on its early promise, reaping the benefits not only of secure and low-cost green energy supplies but creating jobs, exports and economic growth.

OFFSHORE WIND GROWTH PARTNERSHIP



The announcement of the Sector Deal was a watershed moment for offshore wind. Wrapped up within the Deal is the Offshore Wind Growth Partnership (OWGP), a major 10-year development programme to drive increased productivity and competitiveness for UK businesses that will boost UK content both at home and in export markets.

OWGP will be delivered by ORE Catapult, with up to £100m investment by Offshore Wind Industry Council members, the supply chain, and regional collaborations.

The OWGP will engage in four key areas of activity to achieve its aims:

- Building stronger links between developers and the supply chain – leading to increased UK content in new projects.
- Business competitiveness – the Catapult's Fit For Offshore Renewables (F4OR) programme will deliver business improvement programmes to boost export capability.
- Cross-sector diversification – attracting companies with proven technology from other sectors will kickstart the development of new supply chain capacity.
- Commercialising new technologies – supporting new innovations in areas like robotics, automation, advanced manufacturing and new materials.

The Growth Partnership is a national programme, but its work with Local Enterprise Partnerships (LEPs), councils and development agencies will be key in supporting the eight regional industrial clusters defined by the Sector Deal. OWGP will help innovative, ambitious supply chain companies develop world-class products and services which will build a flourishing export market, supporting 27,000 skilled jobs, reducing electricity costs to consumers by £2.4 billion, and seeking to drive a five-fold increase in exports.

Below:
Westermost Rough Offshore Wind Farm
(Image: Siemens)



LAUNCH ACADEMY

ORE Catapult's Launch Academy is a technology accelerator that will help innovative companies to launch new technologies and services into the offshore wind market, enhancing the UK supply chain, enabling greater UK content and supporting cost reduction through innovation. Backed by leading industry partners the unique nine-month programme tackles both technology development and business growth, helping near-to-market solutions break into the sector.

Companies chosen for the Launch Academy will benefit from a unique package of support delivered by ORE Catapult and a host of specialists offering legal, technology road mapping, accountancy, IP, HR and investor readiness support. Between four and eight companies are expected to be supported in the first year. Success of the programme will be measured on companies securing contracts, demonstration opportunities and building relations with end user clients as well as the number and scale of investments secured.



Above:
The Launch Academy will provide up to eight companies with one-to-one support in its first year.



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