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For the past five years, ORE Catapult has been at the heart of a UK economic success story. As part of the Catapult Network of innovation centres, ORE Catapult has been driving UK innovation in offshore renewable energy, establishing global leadership and driving investment, growth, productivity and job creation.

We’ve seen huge strides in the development of the UK’s offshore wind and tidal sectors, driven largely by innovations in technology and operations and maintenance practices.

The commitments made in the recently announced Offshore Wind Sector Deal and the adoption of a ‘net zero’ carbon emissions target by UK Government herald ever more ambitious targets to increase installed renewable energy capacity to meet the UK’s future electricity demands, and I’m pleased that our Catapult is well positioned to contribute to this continued growth.

We’ve strengthened our industry and academic partnerships both nationally and internationally: our Catapult is delivering, on behalf of industry, the £100m Offshore Wind Growth Partnership to support UK supply chain development; we’ve opened a £2m research centre in China, and further strengthened our collaboration with GE through a £9m research partnership to develop next-generation technologies, creating supply chain opportunities for UK businesses.

The growth in offshore wind in particular has been enabled by the extraordinary cost reduction that the industry has delivered in recent years, largely driven by the speed of technology innovation. Our work is paving the way for further cost reduction and growth in installed capacity, all vital in the UK’s climate change ambitions.

On behalf of the Board, I would like to thank the whole of the ORE Catapult team, and their partners, for working to ensure that offshore renewable energy continues to enjoy global growth and success.
As we celebrate another successful year for our business, it is extremely pleasing to be part of an industry that continues to enjoy growth and success on an unparalleled scale. I’m particularly proud of the role our organisation is playing in driving innovation across industry, from the very large to the very small, enabling UK economic growth.

Andrew Jamieson,
Chief Executive,
Offshore Renewable
Energy Catapult
This year, we have supported 158 SMEs and 35 companies with product development, and enabled 120 industry collaborations, underlining our commitment to making offshore renewables, and offshore wind in particular, the backbone of the UK’s future energy mix. It’s clear that tackling global climate change and decarbonising our energy needs are ever more critical. The challenges facing all of us are large and many – but so too are the opportunities for the UK to maintain its world-leading status and for UK companies to reap the rewards domestically and in new global export markets. Bigger turbines, new foundation designs and the adoption of novel operations and maintenance activities are exciting new frontiers being explored.

I am delighted to report that this year we have commissioned our 15MW powertrain test facility. A hugely complex project involving many partners over a number of years, it is the largest and most advanced open-access facility of its kind anywhere in the world. Already proving its worth on the enhancement of current technology, it is set to enable the rapid development of the next generation of giant offshore turbines, a critical element in the delivery of both decarbonisation and lower cost clean energy. We are extremely grateful to the many stakeholders who have delivered this amazing capability, and the ETI in particular.

To fully realise the economic opportunities from the global growth of offshore renewables, we must continue to innovate. Embracing robotics, autonomous systems, big data and AI, and innovations in balance of plant, especially foundations, will all be vital, and we have developed sector-leading research programmes in all of these areas, working with some of the UK’s leading innovators such as Rovco, GreenSpur, Cyberhawk and BladeBUG and forming partnerships with our world-leading universities, including Manchester, Strathclyde and Sheffield.

We have been able to expand our footprint across the UK and beyond, establishing a collaborative research partnership in China and working with emerging markets in Korea and the US. Here in the UK, we continue to develop and strengthen our world-leading test facilities, ensuring they are serving the future needs of our industry. We have expanded our relationships with major industrial players sitting at the heart of both the offshore wind and marine energy industries, securing multi-million-pound testing and R&D projects with leading equipment manufacturers, most notably GE Renewable Energy as we support them in bringing the world’s largest offshore wind turbines and longest blades to market. Our support to the country’s leading innovators has also been strengthened by establishing new business improvement and supply chain support programmes and expanding our collaboration with the UK’s leading developers on the newest and most advanced wind farm developments, to enable new products and services to be tested in real-world conditions. One of the industry’s major successes in the past year was securing the Offshore Wind Sector Deal in partnership with UK Government. Our role in getting this landmark deal over the line was vital, championing innovation and supply chain growth and, on behalf of industry, we now administer a 10-year, £100m supply chain growth support programme, the Offshore Wind Growth Partnership.

We’ve also taken a proactive approach to supporting the development of STEM education in the communities in which we operate, not only financially but also through provision of both expertise and mentoring.

To deliver a low-carbon future and meet the UK’s ‘net zero’ target by 2050 will require at least 75 GW of installed offshore wind capacity – that’s 10 times what we have installed today. The UK is going to need new innovative solutions and approaches to challenges, such as integrating renewable energy into the grid, in order to deliver that volume of production. The Catapult will continue to be at the forefront of championing that innovation and supporting the development of next-generation technologies.
ORE Catapult is working with industry and academia to identify, develop, prove and de-risk promising new technologies and bring them to market. We help reduce the cost of offshore renewable energy, supporting the growth of the industry and creating UK benefit. Our vision for the future of the sector is that offshore renewables will be the UK economy’s largest driver of clean growth.

VISION:
To be the world’s leading offshore renewables technology centre.

MISSION:
To play a key role in delivering the UK’s largest clean growth opportunity, through accelerating the creation and growth of UK companies in the offshore renewable energy sector. We will use our unique facilities and research and engineering capabilities to bring together industry and academia, driving innovation in renewable energy.
STRATEGIC OBJECTIVES

We use our unique facilities, research and engineering capabilities to bring together industry and academia, driving innovation in renewable energy. To deliver our strategy, we have developed four core strategic objectives: Operational Performance, Accelerated Technology Development, New Frontier and UK Growth Platforms.

Operational Performance
We will enable the UK to become internationally recognised as a centre of excellence for operating offshore renewable plant, and for UK innovators and solution providers to develop products and services that will build and maintain a UK based supply chain, boosting productivity of UK businesses and creating an exportable commodity.

Accelerated Technology Development
We will be internationally recognised as the go-to testing and validation centre for the industry’s original equipment manufacturers (OEMs), and in doing so act as the access point to UK-based high-value supply chains, and help develop and validate new innovations ready for the market.

New Frontiers
We will identify and accelerate promising technologies towards commercialisation, seed the next generation of high growth businesses, and help them access the UK’s indigenous market and export opportunities.

UK Growth Platforms
We will develop cross-cutting support platforms essential for ensuring economic impact from the other three strategic objectives.

At ORE Catapult, we know that the way we deliver is just as important as what we deliver. Our four core values set out the types of behaviour we expect of our employees and set the tone for the culture of our organisation. We want our staff to embody the values of Innovation, Excellence, Integrity and Collaboration.

VALUES

Innovation: Which means we...
Seek out new ideas and ways of working and embrace positive change whilst recognising our limitations, accepting challenge and challenging assumptions.

Excellence: Which means we...
Consistently take personal responsibility for delivering successful outcomes, demonstrating resilience and determination to overcome barriers and continually looking for ways to improve.

Integrity: Which means we...
Value, recognise and reward every individual’s time, commitment, diverse and constructive contribution, treating everyone with equal dignity and respect.

Collaboration: Which means we...
Wholeheartedly commit to building enduring, positive working relationships, recognising and supporting the needs of others and working openly and honestly towards mutual success.
OUR IMPACT IN 2018/2019

- Active R&D Projects: 113
- International Projects: 55
- Year-On-Year Uplift in Total Revenue: 49%
- **SMEs Supported**: 158
- **Industry Collaborations**: 120
- **Value of Test Facilities**: £1.4bn
- **Academic Collaborations**: 49
- **Year-on-Year Uplift in Competitive R&D Funding**: 8%
- **Companies Supported with Product Development**: 36
- **Companies Supported with Product Development** since 2013: 144
- **Value since 2013**: 597
- **Academic Collaborations since 2013**: 469
The UK’s position as the world leader in offshore wind is underpinned by a thriving domestic O&M supply chain, and improvements in this sphere are key to improving performance. Our team is spearheading the application of cutting-edge technologies like robotics, data and artificial intelligence to offshore wind O&M, leveraging the UK’s world-leading Industry 4.0 sector to reduce time at sea, and expanding opportunities for the UK supply chain domestically and in the export market.
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.

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.

The Centre is working with the University of Hull and Aura to develop academic excellence around offshore wind O&M. 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.

"Our collaborative work with the Catapult has been yielding fantastic results over the last 12 months, with multiple projects underway and a strong pipeline to follow involving both SMEs and major industry players. The relationship between Aura, led by the University of Hull, and the Catapult has been continually strengthening as a result of this joint programme."

Ben George
Director of Aura, University of Hull
DATA & DIGITAL SERVICES

The emergence of big data and digitalisation as a transformer of the global economy has been one of the key industrial trends of recent years. In 2018, the Government’s Industrial Strategy identified artificial intelligence and data as one of its four Grand Challenges, providing clear evidence of the technology’s emerging importance and highlighting its transformational potential.

For the offshore wind, wave and tidal energy sectors, the technology provides endless opportunities for innovation. From reducing turbine downtime through predictive maintenance, to improving health and safety through better weather and wave height forecasting, the industry is still scratching the surface of the potential benefits.

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.

**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 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 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.

**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 Data Pilots initiative, 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**
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 – benefitting the wider industry, and academic and research communities.

The platform enables solution providers to develop new tools by using readily-available operational wind farm data.

**Lidar Verification**
In 2018 the Catapult launched the UK’s first coastal lidar verification site, allowing technology developers to test, demonstrate and validate new designs in a representative environment and saving the need for an offshore met mast.

Wood successfully completed the site’s first commercial test in 2019. The abundant natural wind resource meant the test was completed two months ahead of schedule.

**30%**
O&M can make up 25-30% of an offshore wind farm’s lifetime costs – making smarter maintenance and task planning a key focus area for our data and digitalisation team.
EOWDC TECHNOLOGY ACCELERATOR PROGRAMME

Vattenfall, the Swedish energy group, is the owner/operator of the pioneering European Offshore Wind Deployment Centre (EOWDC), off Aberdeen – one of the world’s most cutting-edge green energy projects.

In a move towards creating a stronger UK supply chain to underpin a competitive offshore wind industry, it joined forces with the Catapult to provide a test-bed for innovative new offshore wind products and services. Together, we administer a £1.5m programme seeking innovative solutions to some of the current O&M challenges facing the industry.

Successful companies will be able to demonstrate their technologies at the EOWDC, potentially securing a route to market for their innovations. One such company to benefit from the wider Catapult/Vattenfall collaboration has been Aberdeen firm Rigmar. Rigmar participated in our Fit For Offshore Renewables business improvement programme and as a result has won a major contract to provide support services to the EOWDC, securing work for 20 of its technicians.

"By collaborating with ORE Catapult, we are gaining access to some of the UK’s most talented innovators and helping to accelerate new products and services to the market by testing them in the best possible environment - the real world."

Danielle Lane
Vattenfall’s UK Country Manager
ROBOTICS AND AUTONOMOUS SYSTEMS TESTING

With our world-leading testing and validation facilities and deep industry expertise, the Catapult is leading the way in robotics research for the sector.

At the National Renewable Energy Centre in Blyth, our unique still water dock features a replica seabed and offers the potential for the deployment of scaled and representative offshore wind infrastructure. The facility has been instrumental in accelerating the deployment of technologies from firms like Bristol-based Rovco, developer of a system that could lower the cost of subsea inspections by 80%. The Catapult is also working with Modus Seabed Intervention and Osbit Ltd to trial an innovative autonomous underwater vehicle docking station, which could shave as much as £1.1bn from the operating cost of Europe’s offshore wind farms.

Our site at Levenmouth is home to the world’s most advanced, open-access offshore wind turbine dedicated to research, and also plays host to some of the industry’s most exciting new technologies for testing and validation.

In 2018, the Catapult invited autonomous inspection providers, including Livingston-based Cyberhawk, to perform representative commercial tests on the 7MW turbine so that an industry baseline for a quality inspection could be identified. We then convened industry and supply chain to identify their key challenges, establishing both expectations for clients and standards for service providers in a sector that has the potential to cut inspection costs by almost 40%.

The waters around the turbine also helped Edinburgh-based MarynSol to test SeaSmart, its automated marine survey payload, in 2018. It performed a successful survey of the seabed surrounding the turbine’s jacket foundation, while demonstrating that it can perform these crucial tasks in significantly less time than traditional methods.

The Catapult is continuing to expand its offering for developing, testing and demonstrating robotics and autonomous systems, including the development of an autonomous vehicle demonstration zone in Blyth.

"Having access to the Levenmouth Demonstration Turbine has been invaluable in helping us prove the capabilities of the SeaSmart system and de-risking the technologies."

Jonathan Evans, Director, MarynSol

40%

Using unmanned aerial vehicles for turbine inspections can cut annual costs by almost 40% over rope-access methods – even with more frequent turbine inspections.
The Catapult’s 7MW Levenmouth Demonstration Turbine.
FIT FOR OFFSHORE RENEWABLES

Inspired by the successful Fit For Nuclear programme, in 2018 the Catapult, in collaboration with the Nuclear Advanced Manufacturing Research Centre (NAMRC), launched Fit For Offshore Renewables as a pilot programme in Scotland.

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 assessed and visited 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.

Aberdeen-based Rigmar Group became one of the first firms to benefit from the programme in July 2019, when it won a major contract to supply inspection and repair services at Vattenfall’s 93.2MW European Offshore Wind Deployment Centre in Aberdeen Bay.

Following the success of the pilot programme, the Catapult and NAMRC intend to expand its reach to a national level in 2019/20.

REPORTS

• Floating Offshore Wind: A Situational Analysis

In Floating Offshore Wind: A Situational Analysis, Dr. Roberts Proskovics examines the strengths, weaknesses, opportunities and threats around this nascent technology. News outlets in the UK and Europe reported on its findings, which were also presented at the 2018 Floating Offshore Wind Turbines Conference.

• Robotics and Autonomous Systems in O&M: Removing the Barriers to BVLOS Operations

Our robotics expert Tony Fong profiles the robotic systems currently in use and being developed for use in O&M, identifies the key barriers to their full autonomy, and offers recommendations on how to address and enable their full potential.

• Climbing the Digital Maturity Ladder: Data & Digitalisation in Offshore Renewables

Peter van Heck offers an introduction to the offshore renewables digital revolution, and explores the key technologies being used and developed by the Catapult’s Data & Digitalisation team to fully exploit the industry’s opportunity.

"The enthusiasm and drive within Catapult to make Scotland a global leader in the sector is what drives the Fit For Offshore Renewables initiative. We aligned with the Programme as soon as possible and have no regrets. Why wouldn’t you?"

Brian Donaldson
Offshore Wind Supply Chain Consultant,
CORE Oil & Gas
The Catapult's 15MW powertrain test facility in Blyth.
We combine the world’s largest and most technically capable open-access test facilities in blades, powertrains, electrical and marine testing with unparalleled engineering knowledge and research expertise, and a sector-leading programme of research projects in robotics, autonomous systems, data and digitalisation, and artificial intelligence. We deliver multi-million-pound testing and research projects with leading equipment manufacturers and are at the forefront of supporting the development of the industry’s largest and most advanced technologies, including the world’s largest wind turbine and longest blade.

15MW POWERTRAIN TEST FACILITY

Commissioned in June 2018, our 15MW Powertrain Test Facility in Blyth is the largest, most sophisticated open-access facility of its kind anywhere in the world.

Designed to propel the next generation of offshore wind turbines toward commercialisation, the facility is capable of performing highly accelerated lifetime testing by recreating representative real-world conditions. The deployment of bigger, more powerful turbines will be a critical part of making offshore wind the backbone of the UK’s future clean energy system, and this world-leading new facility will pave the way for low-carbon growth, create jobs, and reduce the cost of generating electricity offshore.
By using ORE Catapult's facilities and expertise, we will be in a better position to adapt our technology in a shortened time, reduce unplanned maintenance, increase availability and power output, while introducing new features to meet customers' demands.

John Lavelle
President and CEO of GE’s Offshore Wind Business

"The move into monitoring wind turbines is an important strategic decision for GyroMetric Systems and being able to work with ORE Catapult and using their turbine test facilities has provided us with a seriously useful stepping-stone."

David Orton
Chief Executive for GyroMetric

EGRID

The 15MW Powertrain Test Facility's capabilities were further enhanced in late 2018 with the addition of the world’s most powerful grid emulation system.

The 18MVA eGRID unit enables the testing of rare grid conditions that powertrains are required to cope with in order to pass certification tests, completing the loop and allowing the Catapult to test all relevant parameters of next-generation wind turbine systems.

"By using ORE Catapult's facilities and expertise, we will be in a better position to adapt our technology in a shortened time, reduce unplanned maintenance, increase availability and power output, while introducing new features to meet customers' demands."

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David Orton
Chief Executive for GyroMetric
GE RENEWABLE ENERGY HALIADE-X

A 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 in the new 15MW facility from late 2019.

We are also working closely with GE Renewable Energy to develop its Haliade-X supply chain plan for the UK. This follows the successful trial 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 in November 2018 with the announcement of the £9 million Stay Ashore! research and development programme.

We are also currently testing LM Wind Power’s Haliade-X blade – the world’s longest at 107m. The blade arrived in Blyth in August 2019 and is undergoing an advanced testing programme to ensure it can withstand years of operation at sea.

GYROMETRIC SYSTEMS

Nottingham-based GyroMetric Systems’ innovative condition monitoring solution uses a unique algorithm to monitor drivetrain shaft health, eliminating the inaccuracies of traditional vibration sensors. Using artificial intelligence techniques, the system can also flag faults in the drivetrain, allowing for repairs before problems worsen.

The Catapult provided the expertise to help Gyrometric transfer its technology from maritime into renewables, and our drivetrain experts hooked the system up to the new 15MW Facility during its commissioning. The GyroMetric team also collected data from a 7MW nacelle’s bearings, gearbox and couplings – key mechanical failure points on an offshore wind turbine.

Testing showed that this technology has the capability to measure shaft behaviour more accurately, improving design optimisation and reducing material costs using the collected data – providing a competitive advantage for offshore wind owner/operators. And since testing started, GyroMetric attracted a significant investment, providing a boost for the company and the UK’s growing offshore wind supply chain.

12MW

GE Renewable Energy chose the Catapult’s facilities to perform advanced testing on the world’s largest, most powerful offshore wind turbine – the 12MW Haliade-X.
GE Renewable Energy Haliade-150 6MW nacelles arrive in Blyth for testing.
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. The project also demonstrated next generation blade logistics and handling, as turbine components become larger and increasingly challenging to deploy.

MODUS & OSBIT LTD.

The cost of surveying the seabed and inspecting subsea cables and foundations represents a major challenge for the offshore wind industry. Inspections and surveys using vessels, technicians and divers are expensive and potentially dangerous, creating a significant market opportunity for disruptive solutions that are cheaper and less risky.

Subsea specialist Modus Seabed Intervention, in partnership with Osbit Ltd, is developing a novel AUV docking station that will enable autonomous underwater vehicles (AUVs) to remain at offshore wind farm sites without a support vessel, in a move that could shave £1.1billion from the operating cost of Europe’s offshore wind farms.

The Catapult is working with Modus as part of the Autonomous Vehicle for the Inspection of offshore wind farm Subsea INfrastructure (AVISIoN) project, which will enable further development, testing and demonstrations of Modus’ existing Hybrid AUV capability, and docking station. Offshore wind farm developers innogy, EDF Energy and E.ON are also supporting the project, with innogy agreeing to carry out commercial trials at the Gwynt y Môr offshore wind farm.

£1.1bn

The AUV docking station being developed by Modus and Osbit could save European offshore wind farms £1.1bn in operating costs.

107m

The Catapult is testing the 107m Haliade-X blade – the world’s longest – at our blade test facilities in Blyth.
Exposed to greater forces by waves and currents than their bottom-fixed counterparts, the dynamic cables on floating turbines will have to be robust enough to survive up to 25 years of operation in the field.

To improve reliability for the next generation of floating wind farms, the Catapult contracted north-east engineering firm Osbit to design and build a 15-tonne Dynamic Cable Test Rig. As well as carrying out mechanical testing of floating wind and tidal array cables, the rig can carry out operational research. The Rig will play an important role in developing the floating offshore wind components that will help the UK achieve its ambitious clean growth and carbon reduction targets – this is a north-east success story with national impact.

Osbit and the Catapult’s Dynamic Cable Test Rig will improve the reliability of cables for floating offshore wind, which has the potential to generate up to 17,000 jobs in the UK by 2050.

**REPORTS**

**Predicting Dynamic Subsea Cable Failure for Floating Offshore Wind**
In this Analysis Paper, David Young examined the interaction between subsea cables and the dynamic environment, producing models which aid the prediction of dynamic cable failure and therefore help shape preventative maintenance strategies to lower the cost of floating offshore wind.
NEW FRONTIERS

We are constantly looking for new ideas that push the boundaries of offshore wind technology innovation. By nurturing the next generation of high-growth businesses and partnering with leading universities to carry out cutting-edge research, we take the most promising new technologies through to the market faster and help reinforce the UK’s reputation as a world-leading innovator on the global stage.
STAY ASHORE!

The Catapult’s collaboration agreement with GE Renewable Energy made strong progress in 2018/19, with the announcement of Stay Ashore!, a £9m research collaboration. The four-year programme will improve reliability, drive down operating costs, and improve safety as the next generation of 10MW-plus turbines approaches.

Stay Ashore! is built on three pillars. The first is reliability by design, which focuses on the validation of key turbine components. The second concerns enabling turbine troubleshooting and remote operability through advanced digital functionality, reducing the need for technicians to travel offshore. The use of robotics for planned maintenance events, in particular repetitive tasks and inspections, is the third.

Four collaborative projects are currently in delivery, investigating topics ranging from leading edge erosion to pitch mechanical system health monitoring. A robotics innovation challenge, launching in Q2 2019, will develop a solution for reducing involvement of technicians in labourious, time-consuming maintenance tasks.

The collaboration will increase innovation and growth opportunities for the UK supply chain, and the reduced operating costs will benefit electricity consumers.
CADEMIC RESEARCH HUBS

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.
WAVE & TIDAL THOUGHT LEADERSHIP

The UK is home to some of the world’s most advanced tidal stream and wave energy technology and project developers. There is currently no route to market for marine energy in the existing government framework for allocation generating capacity.

At the request of RenewableUK, ORE Catapult conducted an industry-leading study on the potential for marine energy to satisfy the government’s “triple test” of cost reduction, UK economic benefit and carbon reduction. Working closely with key industry stakeholders in technology and project development, supply chain and policy, ORE Catapult compiled the business case for supporting the sector. The study found that tidal stream and wave energy will reduce costs significantly with deployment, could support over 23,000 jobs by 2040 and that the cost of supporting the sector in the early days would be heavily outweighed by the GVA benefits generated in the future. The report was the first of its kind in bringing all the key arguments together in one place and quantifying the costs and benefits.

ORE Catapult has continued to work with the leading industry players and Scottish Government to identify opportunities for cross-sector collaboration which will form the basis for a series of knowledge-sharing collaborative workshops to be held in 2019, with the aims of accelerating cost reduction and maximising economic benefits to the UK supply chain.

£5.4bn

The Catapult’s work is helping the UK’s wave and tidal industries, which have the potential to support 12,000 jobs and generate a £5.4bn benefit for the economy by 2040.
As strategic initiatives designed to supercharge our outreach and impact, the Catapult’s Growth Platforms take us from the local to the international level. We help link the firms with the highest potential to the biggest opportunities in the global offshore wind marketplace. Here are just a few examples of the Catapult’s work delivering economic impact for UK firms by helping them win more business at home and abroad.
CASE STUDIES

TUS-ORE CATAPUL T 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 and TUS Wind 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 proposed 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.

"Working with ORE Catapult to access the leading developments in the biggest offshore wind market in the world places us in pole position to seize the opportunity to not only grow our company in the UK but to generate significant exports and international development”

Saul Matthews
Head of Business Development, Synaptec

£2.6bn

With global exports expected to be worth £2.6bn per year, the £2m TUS-ORE Catapult Research Centre in Yantai City is helping UK businesses take advantage of the world’s fastest-growing offshore wind market.
The Offshore Wind Innovation Competition saw Scottish Power Renewables (SPR) sponsor four innovation challenges specific to their offshore wind business, with ORE Catapult and Green Angel Syndicate on-hand to support with any technology development and investment needs. This has led directly to 11 companies pitching to SPR, three technology demonstrations at an SPR wind farm, £1.66m worth of R&D funding with ORE Catapult and SPR as partners, and a further five under development.

The Offshore Wind Innovation Exchange (OWiX) returned in collaboration with the Offshore Wind Innovation Hub and Knowledge Transfer Network (KTN) with challenges sponsored by EDPR, and another major offshore wind owner/operator.

The SME High Growth Platform saw the web-portal launched in 2018/19 – a one-stop-shop of information for SMEs looking to enter offshore wind, with hundreds of supply chain SMEs benefitting. ORE Catapult’s own Innovation Challenges, assembled through close collaboration with the industry, resulted in 15 innovative technology proposals.

March 2018 saw a landmark and transformative Sector Deal agreed between the UK Government and the offshore wind industry, the first for a renewable energy technology.

The Deal sets out ambitious plans to put offshore wind at the centre of the nation’s clean, affordable and reliable energy system and install at least 30GW of offshore wind capacity in the UK by 2030, generating one-third of the UK’s electricity, creating 27,000 jobs and boosting exports to £2.6 billion a year. The Catapult played a key role in securing the Deal, championing innovation and supply chain growth. Now, on behalf of industry, we administer the £100m Offshore Wind Growth Partnership to support productivity and increase the competitiveness of the supply chain, aiming to boost UK content in wind farms to help meet the 60% target set out in the Sector Deal.

"We believe that the Offshore Renewable Energy Catapult has been terrifically visionary in seeing the role that it can play."

Nick Lyth, CEO and Founder of Green Angel Syndicate, UKBAA 2019 Angel Syndicate of the Year

30GW

30GW: The UK’s Offshore Wind Sector Deal will more than triple installed capacity to at least 30GW by 2030, creating 27,000 jobs and boosting exports to £2.6bn per year.
REPORTS

Macroeconomic Benefits of Floating Offshore Wind
In conjunction with the Crown Estate Scotland, the Catapult’s Analysis & Insights team 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.

Tidal Stream and Wave Energy: Cost Reduction and Industrial Benefit
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. It leveraged real-world data, extensive supply chain engagement and our expertise to paint a comprehensive picture of the current landscape and 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 cost reduction and industrial benefit in the UK’s tidal industry.

“ORE Catapult has established itself as a key enabler of the growth in the UK’s offshore wind industry. It is playing a leading role across the offshore wind sector in the drive to increase home-grown innovation, has been a significant contributor to delivering the Sector Deal and will play a key role in unlocking the growth of the UK supply chain through delivery of the Offshore Wind Growth Partnership.”

Benj Sykes
Industry Chair, Offshore Wind Industry Council and UK Country Manager Offshore, Orsted
The Catapult’s work with local schools and businesses continued its year-on-year increase in 2018/19 as we logged over 6170 hours of CSR activity across our three locations, including internships. At Levenmouth Academy, the STEM Ambassador role has matured into a full-time STEM Principle Teacher position. With more young people pursuing STEM subjects, and a high take-up among otherwise disengaged pupils, the Catapult’s support is having a long-lasting beneficial impact on the community immediately around our Levenmouth Demonstration Turbine.

6170hrs

6170 hours of CSR activity undertaken

A Newcastle College student experiences the iHR Offshore Wind Turbine.
Using a detailed digital replica of that machine, the immersive Hybrid Reality (iHR) Offshore Wind Turbine, developed by Heriot Watt University, the Catapult, The Energy Skills Partnership (ESP) and Animmersion, allows apprentice technicians to learn in a realistic and safe environment. The system was displayed in Newcastle at the Great Exhibition of the North in 2018, giving hundreds of visitors an insight into the sector’s career opportunities, before being installed permanently at Newcastle College’s Energy Academy. The iHR turbine has already been experienced by around 15,000 young people, and with offshore wind set to employ 27,000 people by 2030, it will be used to train more than 2500 apprentices and technicians over the next five years.

The Catapult is also a proud sponsor and active supporter of the Blyth Tall Ship. This pioneering local project sets out to inspire future generations by introducing engineering skills through 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.

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 took part in RenewableUK’s Global Offshore Wind exhibition and conference in London in June 2019, serving as a hospitality venue and allowing the charity to highlight their outstanding work and forge ever closer links with industry.
ORE Catapult is committed to providing a safe and healthy working environment for its employees, customers and stakeholders. Our Safety, Health, Environment and Quality (SHEQ) processes are critical to the way we work.
ORE Catapult’s culture based safety programme ‘Each and Everyone’ won Best Practice Award at the Scottish Green Energy Awards. This was tremendous recognition by the renewables industry of our hard work to drive Health and Safety culture forwards.

Our safety work code, Think Safe, Talk Safe, Act Safe, enables each and every one of our employees to make a contribution to a safer workplace. A critical component of this programme is conducting regular TalkSafe discussions about the safety of the tasks we do, understand the risks involved and how could complete tasks more safely.

To have a culture where each & everyone always thinks, talks and acts safely

Each & Everyone vision

**OTHER HIGHLIGHTS IN FY18-19 INCLUDE:**

- Successfully completed the transition of our Health & Safety management system from OHSAS 18001 to ISO45001
- Implementation of Supplier Quality Assurance Programme
- Review of Environmental policies completed
- Review of SHEQ KPIs to ensure an appropriate mix of leading and lagging indicators are provided for management action

**LOOKING AHEAD TO FY19-20**

Although the Catapult has a mature and embedded process for Health and Safety, Environment and Quality, we are always striving for continuous improvement and have developed a key set of objectives for the next year. These include:

- Review and refresh of the Culture-Based Safety RoadMap
- Preparation and publication of 3-year audit schedule for all SHEQ related standards
- Complete pilot for new document control platform
- Review wellbeing arrangements and identify opportunities for improvement
- Document and issue Construction and Design Management (CDM) process guidance alongside appropriate training
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.

"ORE Catapult is an invaluable partner, acting as a focal point for industry and academic partners to deliver some game changing technology for the offshore renewables industry."

Matt Bell,
Chief Scientist, Thales UK
ORE Catapult Board
Responsible for overseeing the conduct of ORE Catapult, setting the overarching strategy to be pursued and supervising the Executive Team (ET), which is responsible for the day to day operations of ORE Catapult.

Executive Team
Responsible for making operational decisions for ORE Catapult, to properly inform the Board of material events and issues, and to seek and be guided by the advice of the Board.

Investment Committee
Responsible for approval of project related and capital expenditure.

Project Sub-Committee
Responsible for strategy and process for project prioritisation and selection and the Catapult’s objective is to ensure formal and transparent arrangements are in place.

Audit & Risk Committee
Responsible for ensuring adequate internal systems are in place to control and manage the Catapult.

Remuneration Committee
Responsible for setting remuneration policy and for setting the remuneration of individual directors and senior executives.

Nominations Committee
Responsible for appointments and reappointments to the Board and Senior Executive Office.

ODSL Board
ODSL is a trading subsidiary, responsible for overseeing the commercial activities of ORE Catapult.
Colin has over 35 years of experience in the Energy sector. At SSE, he joined the board as Power Systems Director and later became Chief Operating Officer. Prior to this, he was Director of Distribution for Southern Electric, having joined the industry with the North of Scotland Hydro Electric Board in 1977.

Jim is the Principal and Vice-Chancellor of the University of Strathclyde, Chairman of both the Scottish Research Partnership in Engineering and the Scottish Energy Technology Partnership, and co-Chair with the First Minister of the Energy Advisory Board in Scotland.
Anne has a BSc in Biochemistry from Edinburgh and a PhD in Molecular Microbiology from Cambridge. She has pursued a career in scientific research at Aberdeen University.

Anne was the first Chief Scientific Adviser to the President of the European Commission (2012-2015). Prior to that, she was the first Chief Scientific Adviser for Scotland (2006-2011).

Fred had a 30-year career with Andersen, and latterly Deloitte, providing corporate finance and corporate governance services to public and private technology companies in Scotland and Cambridge. For the last 11 years, he has worked as an Independent Non-Executive Chairman or Director. Fred is a lay member of the University of Strathclyde’s Enterprise and Investment Committee advising spinouts.
<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Date of Appointment</th>
<th>Committee Membership</th>
</tr>
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<tbody>
<tr>
<td>Julia King DBE, The Baroness Brown of Cambridge</td>
<td>Non-Executive Director</td>
<td>20-March-2015</td>
<td>R A</td>
</tr>
<tr>
<td>Alan Moore OBE</td>
<td>Non-Executive Director</td>
<td>31-March-2014</td>
<td>R P</td>
</tr>
<tr>
<td>Hugh McNeal</td>
<td>Non-Executive Director</td>
<td>01-July-2016</td>
<td>A P</td>
</tr>
</tbody>
</table>

Baroness Brown is an engineer. An academic career at Cambridge University led to senior business and engineering roles at Rolls-Royce plc. Returning to academia as Principal of Engineering at Imperial College, she became Vice-Chancellor of Aston University from 2006 – 2016.

She serves as: Vice Chair of the Committee on Climate Change and Chair of the Adaptation Sub-Committee of the Committee on Climate Change; member of the WEF Global Agenda Council on Decarbonising Energy.

She is a Fellow of the Royal Academy of Engineering and was awarded DBE for services to higher education and technology. In 2015 she was made The Baroness Brown of Cambridge.

Alan is the past Chair of the Renewables Advisory Board and of RenewableUK. He has over 40 years of experience in research and power generation across all energy sources including wind, wave and tidal, and was responsible for the investment, development, construction and operation of North Hoyle, the UK’s first major offshore wind farm.

Alan stepped down as a Non-Executive Director when his second term ended in July 2019.

Hugh became Chief Executive of RenewableUK in April 2016. Before this, he was Director of Change at the Department of Energy & Climate Change, improving the Department’s efficiency and delivering financial savings. Other roles in the Civil Service included Chief Executive, Office for Renewable Energy Deployment at DECC, and Deputy Director of Low Carbon Business at the Department for Business, Innovation & Skills.
### Andrew Mill
Non-Executive Director

**Date of Resignation**
31-January-2019

Andrew is the former CEO of the National Renewable Energy Centre (Narec), which he joined in 2005 from the European Marine Energy Centre (EMEC) where he was Managing Director. Andrew has a wide range of public-private sector experience developed over a long career in the energy industry.

### Ronnie Bonnar
Non-Executive Director

**Date of Appointment**
01-January-2019

Ronnie Bonnar started his career in the offshore oil and gas sector, working initially in the fabrication yards in the North of Scotland, followed by a number of assignments overseas.

In 2005 he took on the role as Project Manager on the Beatrice Demonstrator Project and subsequently, in 2008, became co-founder and Operations Director of SeaEnergy Renewables Ltd.

Following the acquisition of SeaEnergy Renewables in June 2011 by Repsol, he took up the role of General Manager responsible for all renewables activities in the UK, which included the development of three major offshore wind farms, Beatrice, Inch Cape and the Moray Firth projects.

### Huub Den Rooijen
Non-Executive Director

**Date of Appointment**
01-July-2018

Huub Den Rooijen is the Director of Energy, Minerals and Infrastructure at The Crown Estate. He leads the team responsible for managing the seabed around England, Wales and Northern Ireland. This includes rights to minerals and aggregates, cables, pipelines, carbon capture and storage, and offshore renewable energy.

Huub has over 30 years of experience in the energy sector, predominantly working with Shell where he was jointly responsible for creating its wind energy business in 1997 and managed its first offshore wind projects, including the first offshore turbines in the UK at Blyth in 2000.

### Ronnie Bonnar
Committee Membership
P

### Andrew Mill
Committee Membership
P
Andrew Jamieson  
Chief Executive  

Date of Appointment  
31-March-2014  

Andrew spent 24 years with ScottishPower, where he held key roles in engineering, marketing and financial planning. In 2004, he moved to ScottishPower Renewables where he was responsible for energy policy and regulation. He is a former Chairman of RenewableUK and Scottish Renewables, sits on the Scottish Government’s Energy Advisory Board and has chaired a number of UK and Scottish working groups into the development of marine and offshore wind energy.

Andrew Walls  
Finance Director / Company Secretary  

Date of Appointment  
20-March-2015  

Andrew trained with the global firm PricewaterhouseCoopers, working with both private and public sectors delivering audit, financial diligence and consultancy assignments for the firm in the UK and abroad. He then joined the London and Edinburgh-based investment bank Quayle Munro Holdings PLC, initially focusing on infrastructure projects through the private finance initiative before joining their Executive team as Finance Director and Company Secretary.

He is also a Trustee and newly appointed Audit Committee Chairman of Scotland’s largest independent charity grant funder, the Glasgow-based Robertson Trust.

Shareen Gault  
General Counsel / Company Secretary  

Date of Resignation  
11-February-2019  

Shareen Gault is the General Counsel and Company Secretary for the ORE Catapult group, overseeing all group legal and contractual activities as well being responsible for corporate governance, compliance and risk. Previously, she was Legal & Compliance Manager at the Student Loans Company following several years as an Employment and Litigation solicitor in private practice. Shareen sits as a Non-Executive Director and Trustee of Citizens Advice Scotland and the Govan Community Project. She is dual-qualified in Scots and English law.
ROLE OF THE BOARD

The Board has the primary responsibility of overseeing the conduct of ORE Catapult, setting the overarching strategy to be pursued and supervising the Executive Management Team (EMT), which is responsible for day-to-day operations.

Role of the Executive Management Team
The EMT’s primary responsibility is to make operational decisions for ORE Catapult, to properly inform the Board of material events and issues, and to seek and be guided by the advice of the Board. This year the focus has been on ensuring that a solid business case was presented for a second term of the Catapult and approval of a new 5-year strategy and delivery plan.

Board Composition, Roles and Responsibilities
Two new Non-Executive Directors were appointed in FY18-19. Huub den Rooijen, Director of Energy, Minerals and Infrastructure at The Crown Estate joined the Board on 1 July 2018, succeeding Andrew Mill who had served on the ORE Catapult Board since the merger with the National Renewable Energy Centre (NAREC) where he served as Chief Executive. Ronnie Bonnar, former General Manager at Repsol, responsible for all renewables activities in the UK joined the Board in January 2019 succeeding Alan Moore who will leave his post as Non-Executive Director at the end of June 2019. Appointments to the Board were made following a recruitment exercise in early 2018 and on the recommendation of the Nominations Committee.

ORE Catapult’s Non-Executive Directors have a broad range of skills and insight from a variety of backgrounds to ensure there is a balanced view at Board Meetings.
REPORT FROM THE BOARD

During the year, the Chairman, supported by the Finance Director and Company Secretary, maintained a rolling 12-month agenda for Board and Sub-Committee Meetings. Standing items for discussion at each meeting are: Health & Safety, Financial Reporting against budget and revenue targets, Risk Management, a CEO Report on operational activity and updates from each of the Board Sub-Committees.

During the year, the Chairman, supported by the Finance Director and Company Secretary, maintained a rolling 12-month agenda for Board and Sub-Committee Meetings. Standing items for discussion at each meeting are: Health & Safety, Financial Reporting against budget and revenue targets, Risk Management, a CEO Report on operational activity and updates from each of the Board Sub Committees.

Over the course of FY18-19, the Board considered various strands of the Catapult’s FY18-19 to 22-23 Strategy, including the Catapult’s plans to establish a Marine Energy Engineering Centre of Excellence in South West Wales and the establishment of the TUS-ORE Research Centre in Yantai, China. The Board also reviewed an independent report on the Levenmouth Demonstration Turbine in Fife and restated its commitment to maintaining this asset for collaborative R&D activity. Finally, the Board adopted the Wates principles for Corporate Governance and approved ORE Catapult’s Risk Appetite Model.

The Board has a number of sub-committees to assist in discharging its responsibilities. The principal committees are the Nominations Committee, Remuneration Committee, Audit & Risk Committee and Projects Committee. The Board may also set up issue specific Committees when the need arises. The responsibilities of these Committees are set out in individual Terms of Reference which are available on ORE Catapult website.
The Nominations Committee is responsible for appointments and re-appointments to the board and to senior executive office. The Catapult’s objective is to ensure a formal, rigorous and transparent procedure for the appointment of new directors to the board.

ORE Catapult operates retirement by rotation provisions with Directors subject to a maximum of 2 x three-year terms. The Nominations Committee annually reviews Board composition and expertise with these provisions in mind. This year, the Committee recommended a second term for both Dame Anne Glover and Hugh McNeal.

Two long-standing members of the Board, Andrew Mill and Alan Moore, came to the end of their maximum term in 2019. The Nominations Committee commenced an external recruitment process for new Non-Executive Directors at the end of FY17-18. Two appointments were made with Huub den Rooijen joining the Board in July 2018 and Ronnie Bonnar joining in January 2019.
AUDIT & RISK COMMITTEE

The Audit & Risk Committee is responsible for ensuring adequate internal systems are in place to control and manage the Catapult. The Committee receives regular reports on the Company’s finances, risk management arrangements alongside updates to key governance policies including the implementation of General Data Protection Regulation (GDPR) regime in May 2018.

In the past year the Audit & Risk Committee has overseen the annual statutory accounts and auditing process for recommendation to the Board for approval. The Committee has continued to take an interest in the risk management arrangements of the Catapult and was instrumental in the development of a new risk appetite model for approval at the Board. This has been a key area of development for ORE Catapult and the start of an increasing focus on risk-based decision making.

PROJECT SUB-COMMITTEE

The Project Sub-Committee is responsible for strategy and process for project prioritisation and selection and the Catapult’s objective is to ensure formal and transparent arrangements are in place. Accordingly, the Board has established the terms of reference, including the delegation of authority documentation, for the Project Sub-Committee.

In FY18-19, the Committee continued to review the delivery of ORE Catapult’s project portfolio and the health of its pipeline activity. It also considered projects requiring Board approval, including the Marine Energy Engineering Centre of Excellence (MEECE) as well as outputs from the independent review of Levenmouth Demonstration Turbine.
GE Renewable Energy's Haliade 150-6MW nacelle arrives in Blyth for testing
The Remuneration Committee is responsible for establishing remuneration policy and for agreeing the remuneration of individual directors and senior executives. The Executive Directors play no part in decisions on their own remuneration.

The Remuneration Committee ensures that there is a formal and transparent procedure for developing policy on executive remuneration and for fixing the remuneration packages of individual directors. The Remuneration Committee uses independent evidence of total compensation for executive and management roles, both in similar types of organisation and across the energy sector, to benchmark remuneration packages, ensuring they are appropriate and sufficient to attract, retain and motivate people of the quality required to lead the Catapult.

In FY18-19, the committee reviewed the objectives and targets of the Executive Team and approved the bonus provision for all staff, in line with current policy. The Committee also reviewed output from the Employee Opinion Survey to understand staff attitudes towards the company and the delivery of its services. The Remuneration Committee is responsible for setting remuneration policy and for setting the remuneration of individual directors and senior executives.

The Committee also reviewed ORE Catapult’s Gender Pay Report.
What is Gender Pay Reporting?
The gender pay gap shows the difference in the average pay between all men and women in a workforce expressed as a proportion of men’s earnings. Having a gender pay gap is not unlawful or discriminatory of itself. Due to the nature of the work undertaken, there may be several reasons why organisations attract more men than women into the organisation. ORE Catapult has ca. 170 employees and although we are not obliged by law to publish Gender Pay Reporting, we have chosen to do so, recognising our commitment to transparency.

Gender pay gap reporting is a different calculation to equal pay. Equal pay deals with the pay differences between men and women who carry out the same jobs, similar jobs or work of equal value. It is unlawful to pay people unequally because they are a man or a woman.

Our Results
Comparison of mean pay in Offshore Renewable Energy Catapult shows a gap in favour of men of 26%, a small improvement of 2% on FY17-18. Comparison of median pay in Offshore Renewable Energy Catapult shows a gap in favour of men of 19%, an improvement of 8% since FY17-18. The mean bonus pay gap is 42% (FY17-18: 41%) and the median is 17% in favour of men, an improvement of 10% since last year.
What our results tell us
The Catapult’s efforts to reduce the gender pay gap are bearing fruit; this reflects the shortening of the pay gap between roles through year on year calibration and benchmarking. With a median pay gap of 19%, our median pay gap is above the national average, however, the national average is across all sectors and it is widely accepted that the sector we operate in is male-dominated. To give context, at the end of March the Catapult employed 125 individuals in senior roles in the areas of research, engineering and technical competence, by gender these roles are predominately male having been historically drawn from a majority male talent pool. Our results indicate that the majority of women we employ are in lower-paid jobs within the organisation.

Our action plan to tackle the gender pay gap is therefore centred around three basic pillars: Attract, Retain and Promote.

Eradicating the gender pay gap – action we are taking
Our overall approach to decreasing the gender pay gap is to address the under-representation of women within STEM roles, which are typically in the higher grades. To address this under representation, ORE Catapult has implemented the following initiatives:

- Annually performing rigorous cross-directorate role calibration and equalisation reviews.
- Keeping gender pay during recruitment and internal promotions under review to ensure that there are no unjustifiable differences.
- Ensuring the salaried placement and intern programme has secured an equal number of males and females.

In addition to these actions we are also planning the following over the next year:

- Review of our remuneration policies to include: family friendly policies to help support working parents and those returning from leave including flexible working, job sharing, parental leave, additional paid maternity and paternity leave.
- Review of recruitment processes including the wording in advertisements, the website and media to encourage more women into senior roles, and;
- Review the support provided to women to progress to high-paid jobs through mentoring, development and network support.

ORE Catapult is also committed to working with our equivalent centres in Germany and Denmark to explore how we can better address gender balance across our industry. We also recognise the commitment of the Offshore Wind Industry Council to increase representation of women in the industry to a third by 2030, ORE Catapult stands ready to support the industry deliver this target.
ORE Catapult manages a portfolio of risks that represent both internal and external challenges to the business. Risks are proactively identified, assessed and reported to the Executive Management Team and Board. Mitigations are progressed to reduce the impact of the risk should it materialise and the likelihood of occurrence. All risks are identified and categorised against risk categories that reflect the nature and scope of the Catapult’s activities.

A review of risk appetite was undertaken in FY18-19 to understand our attitude towards risk as an organisation and for each type of risk we encounter. This exercise was conducted with the Executive Team and considered by the Audit & Risk Committee prior to approval at the Board in January 2019. Steps are now being taken to roll out risk appetite across the organisation to ensure it is embedded into our risk management processes and decision making. This work will continue into FY19-20.
KEY RISK THEMES

ORE Catapult has considered a number of strategic and operational risks, including:

**Health & Safety** - The safety of our staff is paramount in ORE Catapult. If the right controls and protections are not in place, the consequences could be catastrophic for our staff and visitors.

**Mitigation:** The Catapult has a comprehensive set of policies and controls in place to manage the safe operation of our activities. Our new cultural behaviour programme, ‘Each and Everyone’ was implemented in FY18-19 and continues to drive our commitment to Think Safe, Talk Safe, Act Safe across the organisation. Regular reporting of incidents and near misses ensures transparency in our culture and allows us to learn and implement actions to further reduce the potential of injury to our staff.

**Brexit** – Brexit may affect the Catapult’s operations, our staff and delivery of our objectives. It may also increase uncertainty across the sectors in which we work.

**Mitigation:** The Catapult has taken all appropriate steps to reduce the effects of uncertainty caused by Brexit. As the final outcome is still unknown, planning for the UK’s exit from EU has focussed on the potential for a ‘No-Deal’ scenario; a full analysis has been undertaken and, where possible, controls put in place to minimise disruption should the UK leave without a transitionary deal. We continue to keep a watching brief on the situation as it unfolds.

**Innovation and CR&D Funding** – The availability of publicly available funding for research and innovation work is vital to ensuring the Catapult can collaborate with UK businesses and deliver impact to the sector.

**Mitigation:** ORE Catapult has a strong track record of accessing and winning publicly available funds. It has developed strategic relationships with BEIS and across Europe to ensure visibility of forthcoming opportunities. The Catapult has also pursued industry investment in R&D activity to reduce reliance on uncertain public funding avenues, this includes a 4-year £9m collaboration with GE which will help boost the UK supply chain as well as the helping develop a Sector Deal for the Offshore Wind Industry.
The Catapult’s Key Performance Indicators (KPIs) are set out in ORE Catapult’s Grant Funding Agreement with Innovate UK and monitored by the Executive Management Team. In addition, Innovate UK conduct a quarterly review of ORE Catapult’s performance including progress against KPIs.

<table>
<thead>
<tr>
<th>Ref</th>
<th>KPIs</th>
<th>Target</th>
<th>Total</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Number of businesses the Catapult has partnered with or been sub-contracted by</td>
<td>55</td>
<td>85</td>
<td>+30</td>
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<tr>
<td>2</td>
<td>£s invested by UK businesses as match funding to CR&amp;D projects with the Catapult, split between UK large and SMEs (£000s)</td>
<td>Large</td>
<td>£1,100</td>
<td>+£336</td>
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<tr>
<td></td>
<td></td>
<td>SME</td>
<td>£924</td>
<td>+£324</td>
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<tr>
<td>3</td>
<td>Progression from concept to commercialisation (Number of projects completed with a TRL movement)</td>
<td>17</td>
<td>36</td>
<td>+19</td>
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<tr>
<td>4</td>
<td>% of commercial income target for year achieved, year to date</td>
<td>100%</td>
<td>108%</td>
<td>+8%</td>
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<td></td>
<td></td>
<td>(£4,435)</td>
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<tr>
<td>5</td>
<td>Number of active projects with a UK business (split between UK large and SMEs)</td>
<td>Total</td>
<td>74</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Large</td>
<td>50</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>SME</td>
<td>37</td>
<td></td>
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<tr>
<td>6</td>
<td>% of CR&amp;D income target for year achieved, year to date</td>
<td>100%</td>
<td>98%</td>
<td>-2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(£4,360)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Number of collaborative ‘R&amp;D focussed’ completed, year to date</td>
<td>&gt;20</td>
<td>64</td>
<td>+44</td>
</tr>
<tr>
<td>8</td>
<td>% of projects in current project portfolio that involve both academic and industrial partners</td>
<td>30%</td>
<td>30%</td>
<td>_</td>
</tr>
</tbody>
</table>
Offshore Renewable Energy Catapult is limited by guarantee and registered in England and Wales under company number 04659351 with registered office at Offshore House, Albert Street, Blyth, Northumberland, NE24 1LZ.
ORE Catapult’s statement of comprehensive income for FY18–19 is highlighted below.

## FINANCIAL HIGHLIGHTS

The financial information in this review is extracted from the consolidated financial statements and accounting records of the Offshore Renewable Energy Catapult.

<table>
<thead>
<tr>
<th></th>
<th>2019 £’000</th>
<th>2018 £’000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Turnover</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For the year ended 31 March 2019</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovate UK core revenue grant funding</td>
<td>11,997</td>
<td>11,770</td>
</tr>
<tr>
<td>Other income including collaborative research &amp; development revenue, other grant income and commercial revenue</td>
<td>10,819</td>
<td>7,323</td>
</tr>
<tr>
<td></td>
<td>22,816</td>
<td>19,093</td>
</tr>
<tr>
<td><strong>Capital funding</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For the year ended 31 March 2019</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovate UK capital grant funding</td>
<td>2,881</td>
<td>3,709</td>
</tr>
<tr>
<td><strong>Balance Sheet</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>As at 31 March 2019</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed assets</td>
<td>70,818</td>
<td>70,922</td>
</tr>
<tr>
<td>Investments</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Net current assets</td>
<td>5,052</td>
<td>2,371</td>
</tr>
<tr>
<td>Creditors amounts falling due greater than one year</td>
<td>62,034</td>
<td>57,037</td>
</tr>
<tr>
<td>Provisions for liabilities</td>
<td>6,014</td>
<td>9,514</td>
</tr>
<tr>
<td><strong>Net assets</strong></td>
<td>7,836</td>
<td>6,756</td>
</tr>
<tr>
<td><strong>Capital and reserves</strong></td>
<td>7,836</td>
<td>6,756</td>
</tr>
</tbody>
</table>