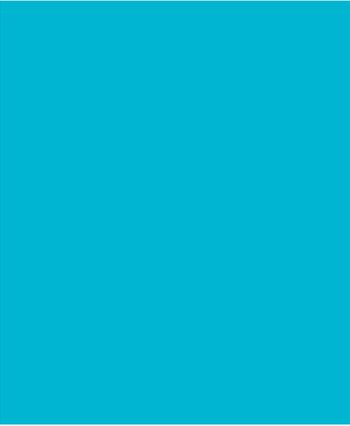
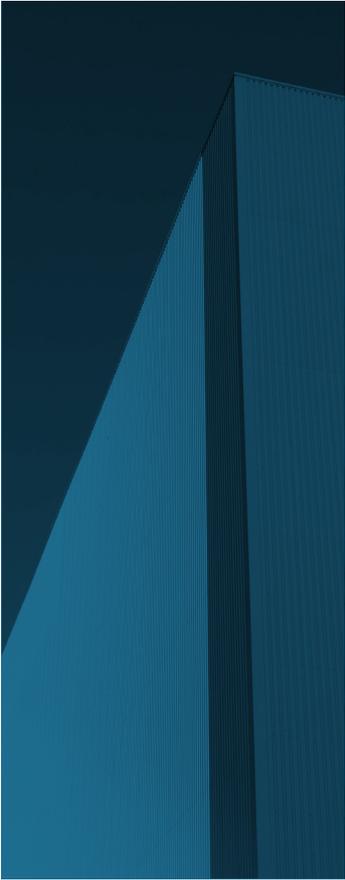


WAVE & TIDAL SERVICES

WAVE & TIDAL



The UK's flagship technology innovation and research centre for offshore wind, wave and tidal energy

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Offshore Renewable Energy Catapult

The Offshore Renewable Energy (ORE) Catapult is the UK's flagship technology innovation and research centre for offshore wind, wave and tidal energy.

We work closely with partners from across industry and academia, and use our world-leading test and demonstration facilities, to develop new ways of working and prove, de-risk and develop promising new technologies.

This helps to reduce the cost of offshore renewable energy, supporting business growth and delivering UK economic benefit.

We have over 120 staff and our multi-disciplined team of highly qualified engineers and technical specialists have in-depth experience of renewable energy technologies. As a leader in technology and sector development, ORE Catapult provides support and guidance to government departments including the Department for Business, Energy and Industrial Strategy (BEIS), and has a formal technology advisory role to The Crown Estate's Scotland Portfolio for the offshore wind and marine sectors.

We have three sites:



Inovo, Glasgow
Engineering, programme management, marine projects, bid support services



National Renewable Energy Centre, Blyth
Test facilities, research, engineering and training



Fife Renewables Innovation Centre (FRIC), Fife
Test asset, engineering, training

In addition, we have regional engagement coordinators who operate in the South West, South Coast, Wales, and East of England.



“ We are delighted to be working with ORE Catapult again. The ability to check the performance characteristics of the turbine, validate the control system, and prove the AR1500’s reliability prior to deployment is a critical element in the technology’s development lifecycle and will provide the market and investors with value-added confidence. ”

– Luke Murray
Design Director at Atlantis Resources Ltd

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Our Services

The diversity of our expertise, experience and test facilities enables us to support the marine sector through research, engineering, testing and programme management.

Blue Economy research

We participate in large-scale, collaborative, research and development, and innovative commercial and publicly funded projects, amassing vast technical knowledge and know-how. Our laboratory and testing facilities have been invaluable to the success of these projects.

We provide:

- Bespoke research projects directly to industry on a commercial basis;
- Joint research in areas of strong overlap with our own research agenda; and
- Collaborative research with multiple parties from industry and the research community, often funded through public sector grants.

Our industrial and research advisory groups as well as our industry-led board of directors provide strategic support around collaborative developments with industry as well as working with government and key industry stakeholders

to support the growth of offshore renewable energy in the UK. We focus on six Knowledge Areas (Blades, Drive Trains, Electrical Infrastructure, Operations & Maintenance, Wave & Tidal and Foundations & Substructures) and we can undertake research on a client’s behalf in these areas.

Marine engineering

Our engineering experts can provide clients with concept evaluation and technical expertise, determining the best route to deployment through a combination of market intelligence, engineering design and technical assessment.

Our capabilities and project services include:

- Technical due diligence
- Mechanical and electrical product design and development
- Power take-off support
- Instrumentation, control system development and data acquisition
- Systems integration
- Testing and verification
- Development of bespoke test rigs
- Blade design, testing and verification
- Third party data validation

Testing

Structural and mechanical

Our National Renewable Energy Centre in Blyth operates the most comprehensive open access and independent test and research facilities anywhere in the world, to enable the scale-up of offshore renewable energy technologies.

These design verification, reliability and accelerated life testing facilities have been developed to meet demand from manufacturers and technology developers looking to commercialise wave and tidal energy technologies. Testing at the facilities supports the reduction of costs and tackles technical and operational challenges.

We are experienced in designing, constructing and undertaking specialist tests that require bespoke rigs and infrastructure, to accurately simulate the real operational environment and service conditions.

Electrical systems

Our UKAS-accredited facilities are equipped with an extensive suite of specialist test and measurement facilities, helping clients to develop technologies to cater for the needs of the developing power systems and exploring life extension opportunities for ageing assets.

Specific emphasis is placed on component development, materials selection, system certification, electrical grid integration and accelerated lifetime test programme delivery, helping to improve component reliability and ensure complex multiple arrays and generation sources operate at optimum efficiency.

The facilities are the only UK accredited facilities for the testing of power cable systems, capable of providing type testing services for underground and submarine cable systems. They are ideally located next to our subsea testing environment allowing us to undertake saltwater immersion for trialling of electrical equipment and systems.

Testing services include:

- Type certification of HV cable systems, switchgear and other HV insulation systems
- Cable accessories (joints, splices, connectors) integrity and type testing
- HV and insulation breakdown testing up to 600kV AC, 1MV DC
- Dynamic testing of cables and damage tolerance
- Product development, testing and certification support
- HV bushing and transformer performance testing
- Accelerated life testing, including live environmental, mechanical and electrical stresses
- Materials and coatings selection, testing investigations, salt water corrosion and oil analysis
- Environmental assessment and testing
- Temperature and process data telemetry

Subsea systems and cables

We operate our own secure open access shallow water testing facilities, which have been used for testing subsea equipment since 2002, one with an artificial seabed and two still water test tanks (up to 8m in depth). The controlled salt water environment is used to trial and demonstrate new and innovative technologies and for practicing installation techniques at full scale. This real-life testing ground helps to reduce the risk of failure when bringing innovative technologies to the market without the need to go offshore.

Testing services include:

- Cable protection systems and cable laying equipment demonstration trials, including ploughs and trenching systems
- Prototype subsea equipment deployment and factory acceptance trials
- Scaled foundation testing, including piling techniques, noise mitigation and anchoring
- Hydrodynamic stability analysis and testing
- Power take-off design evaluation and testing, including electrical systems
- Subsea survey/inspection equipment demonstration and calibration

“ ORE Catapult’s HV Electrical Lab has played a significant role in supporting our development programme, allowing us to better predict the expected lifetime of the power cable, as well as validate and qualify its design. This capability will allow us to move to 66kV inter-array power supply which is a key driver to ensuring future offshore renewable energy development is cost-effective and reliable. ”

– Jeremy Featherstone
Product Development Director, JDR Cables

Project Management

We have a proven track record of managing high value projects and offer a project management service to deliver and support research and technology innovation projects.

We operate rigorous project management and governance procedures based on best practice drawn from across the professional project management industry, including Association for Project Management and PRINCE2 methodologies. Our procedures are regularly reviewed and updated to adapt to innovations in this sector.

We strive for excellence across all areas and operate with an Integrated Management System.

The organisation is certified to ISO 9001, 14001 and OHSAS 18001, under the scope of research, development, engineering, commercial testing, kno

Site and field services

Our specialist skills, project experience and field services equipment for conducting resource measurements, investigations and electrical testing provides project developers and equipment manufacturers with development and operational support.

We deliver bespoke test routines, carry out performance assessments and conduct data collection and analysis. We can also perform inspections, maintenance and failure investigations and carry out electrical testing of components or whole systems onshore and offshore.

Our field services, laboratory testing and specialist expertise includes:

- Oceanographic resource measurement
- Site investigations
- Electrical services

Technology Assessment Process

We offer clients a technology assessment service. The Technology Assessment Process (TAP) provides a standardised framework for the assessment of wave and tidal energy systems, allowing technology to be benchmarked in a number of key areas. We have developed this from our own internal technology assessment process recognising the urgent need for the marine energy sector to adopt a more robust development methodology to provide investors with a means to compare technology.

We characterise a technology against four stages of design maturity, providing the client with an independent, evidence-based report on the technology with recommendations to de-risk multi device integration and advise on the technology development route through to commercialisation.

Supply chain development

The development of offshore renewable energy presents significant economic opportunities for local and regional economies. Our Marine Energy Supply Chain Gateway (MESCG) supports the UK marine energy sector by providing useful information about supply chain participants and activities. Our relationships with industry players and with a number of central and local government and regional development agencies enable us to offer the client a signposting service to help develop supply chain relationships.

Modelling – Levelised Cost of Energy (LCoE)

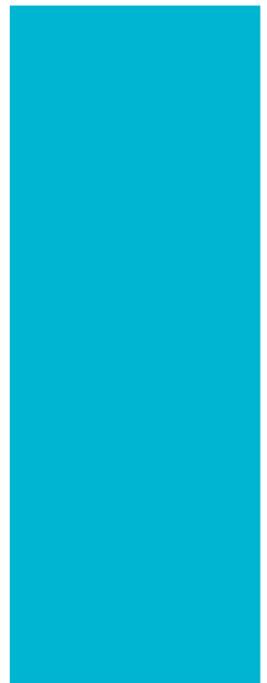
We have developed benchmark models for device families. Our energy modelling team can provide LCoE model review, or design, assumptions review and forecast verification, carry out sensitivity analysis on Mean Time Between Failure (MTBF) data to determine variations in project OPEX.

Dissemination

As a government-funded research organisation and in our remit to accelerate the wave and tidal energy sector, we have a strong commitment to dissemination. We achieve this through a robust internal knowledge management system, delivering public presentations, organising technical workshops, posting knowledge documents on our website and posting data on our Wave & Tidal Knowledge Network. Where a client has a dissemination obligation we can manage or support that activity on their behalf.

Bid writing

Our bid writing team has established an impressive track record in bids for Local Growth Fund, ERDF, FP7, H2020, Interreg and Innovate UK calls. We are experienced in both leading bids and acting as a research partner or SME partner and can offer a bid support service, either advising on content, structure and layout, or drafting a bid on their behalf.



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Innovation Challenges and support

One proven route to engage SMEs, and academics, is through our Innovation Challenges. Our Innovation Challenges aim to accelerate the path to commercialisation of well-focussed technology innovations and are structured to encourage the transfer of solutions from other sectors, in combination with experience and data from within the sector.

Our Innovation Challenges are hosted on our website, which is regularly updated with clear descriptions of the context and detail surrounding key issues, in sufficient detail to enable solutions to be developed, but without being prescriptive as to the form of any solution. As SMEs or academics respond, we then provide further advice, access to test assets and engineering skills, and options for further development.

We have specific wave and tidal technology innovation challenges across the following areas:

- Blades
- Powertrains
- Electrical Infrastructure
- Operations & Maintenance
- Foundations & Substructures
- Wind & Ocean Conditions
- Installation Systems

Visit ore.catapult.org.uk/innovation-challenges to find out more.

To discuss our services further, please contact:

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