Offshore Renewable Energy Catapult

Driving innovation and knowledge

Technology Strategy Board
Driving Innovation

CATAPULT

7
Catapults

Catapults:
A long-term vision for innovation & growth

Created by the Technology Strategy Board, Catapults are technology and innovation centres which bring together the very best of the UK's businesses, scientists and engineers working collaboratively on research and development – transforming ideas into new products and services to generate economic growth.

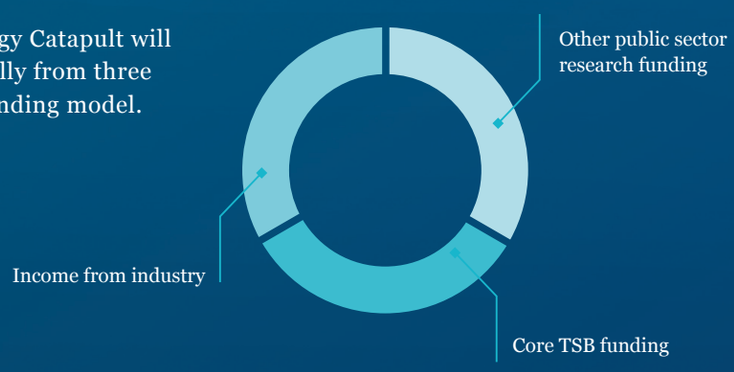
Each Catapult focuses on an area which the government has identified as strategically important in global terms and where there is genuine potential for the UK to gain competitive advantage.

The centres

> *The Catapult centres have been set up to make real changes to the way innovation happens in the UK – to make things faster, less risky and more successful.*
>
> Iain Gray, Chief Executive of the Technology Strategy Board

Our income

The Offshore Renewable Energy Catapult will generate income broadly equally from three sources, the 1:1:1 leveraged funding model.



Offshore Renewable Energy Catapult

Abundant, affordable energy from offshore wind, wave and tide.

The Offshore Renewable Energy Catapult brings together knowledge, expertise, industrial assets and resources to help businesses to develop innovative, reliable and cost effective technologies in the UK to generate electricity from offshore renewable energy.

£1.4bn
private and public sector investment

In April 2014, the Offshore Renewable Energy Catapult and the National Renewable Energy Centre (Narec) merged to form a national champion for the testing and development of innovative technology for the offshore renewable energy sector.

The merger provides the industry with a fully integrated research and testing capability, combining the world-class, development, demonstration and testing infrastructure facilities of the National Renewable Energy Centre (Narec), with the leadership, industrial relationships and engineering expertise of ORE Catapult.

This joint capability will accelerate the design, deployment and commercialisation of renewable energy technology innovation, helping to attract overseas investment and realise the enormous opportunity presented by the UK's offshore renewable energy resources.

> ***Offshore Renewable Energy Catapult and Narec will together create a world-leading innovation and asset assurance business, serving the entire offshore renewable energy sector and returning value on Government investment many times over.***
>
> Andrew Jamieson, CEO, Offshore Renewable Energy Catapult

CATAPULT
Offshore Renewable Energy

We collaborate...

The Offshore Renewable Energy Catapult is a key centre for collaboration, an industrial focal point, bringing together industry and academia and enabling cutting edge and innovative programmes, with a view to creating a positive and lasting impact on our sector.

...with industry

Our Industry Advisory Group, made up of senior representation drawn from across the offshore renewables sector, provides us with clear, consistent and representative industry advice, helping to identify critical areas where innovative approaches and technological development can accelerate industry to deliver solutions at a lower risk and cost.

Industry Advisory Group

SSE
EDF ENERGY
edp renewables powered by nature
DONG energy
RWE The energy to lead
AREVA
MITSUBISHI POWER SYSTEMS
subsea 7
SIEMENS
pelamis wave power
GLOBAL ENERGY GROUP
ALSTOM
SENVION
FAB
Technip
Hammerfest STRØM
RICARDO
Gamesa

...with partnerships and strategic alliances

We build partnerships and strategic alliances across the renewable energy industry, working in close collaboration with public and private sector, academia, representative bodies and the UK's testing and technology proving centres to identify and address industry needs and requirements.

> *ORE Catapult's focus on **standards** and **reliability** for the offshore renewable industry will directly help to improve **performance** from our existing plants and drive down the cost of energy from offshore wind.*

Jim McPhillimy, Chairman, ORE Catapult Industry Advisory Group,
Managing Director, Enterprise, SSE

...with academia

Our Research Advisory Group advises on academic views and interests for innovation in the sector, and acts as our primary vehicle to present industry's demands for innovation, providing a filter to prioritise the best academic ideas for commercialisation.

Research Advisory Group

Cranfield University
The University of Edinburgh
University of Strathclyde Glasgow
The University Of Sheffield.
University of Oxford
Queen's University Belfast
Imperial College London
Loughborough University
University of Exeter
Swansea University Prifysgol Abertawe

> *Harnessing and building upon the collaborative work of the many multi-university and multi-country consortia represented in the Catapult's Research Advisory Group is a key strategic opportunity.*

Professor Robin Wallace,
University of Edinburgh, Chairman, Research Advisory Group

...with Europe and the rest of the world

ORE Catapult is working with European partners, bringing together valuable knowledge and common aims to ensure that its ambitious agenda can influence European policy. We are working with a range of European bodies, developing our capability to access and manage EU funding.

Narec has an excellent track record in initiating and delivering over £50m of National and European collaborative R&D programmes, and has formed strong links with international research centres and academic institutions involving trans-national collaborative research programmes.

CATAPULT Offshore Renewable Energy

Our strategic focus

We have five key areas of strategic focus, which operate across the Technology Readiness Levels (TRLs) 3-8, all of which are designed to enhance UK leadership and reduce the cost of energy from offshore renewables.

Knowledge creation	Building our capability and expertise, influencing the research agenda and delivering on innovation
Testing & demonstration	Providing leading test facilities and engineering solutions to support the growth of industry
Strategic programmes	Convening industry and delivering solutions in the right areas
SME support	Helping SMEs commercialise technology faster
Bespoke services	Reacting to individual industry requirements

By identifying specific technology, knowledge and capability gaps, we are focussed on driving innovation, research and collaboration to address cost drivers in offshore wind, wave and tidal energy deployment.

Ignacio Marti, Innovation & Technology Director,
Offshore Renewable Energy Catapult

Our facilities

Over the past ten years, a total of £150 million has been invested at the National Renewable Energy Centre (Narec) in delivering integrated research and testing facilities for the offshore renewable energy and marine industries. These assets provide the most comprehensive open-access test and research facilities anywhere in the world for the scale-up of offshore renewable energy technologies.

Facilities

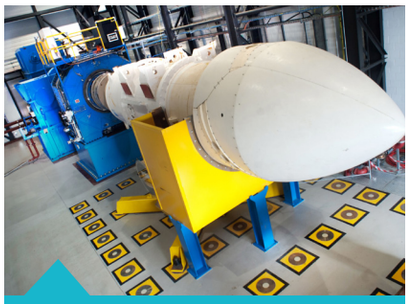
50m and 100m Wind Turbine Blade Test

Structural testing of wind turbine blades up to 100m in length for certification and reliability

15MW Wind Turbine Nacelle Test

Independent performance and reliability testing of wind turbine drive trains up to 15MW rating, identifying design and operational issues prior to installation

3MW Tidal Turbine Drive Train Test



Testing tidal power drive trains up to 3MW with the aim of improving reliability and financially derisking projects

Marine and Subsea Testing Environment

A suite of dry dock facilities equipped to undertake prototype testing, performance verification and validation of supply chain technology

Electrical and Materials Laboratory

Power system testing in a UKAS ASTA Intertek certified laboratory for component, materials, grid and electrical test and delivery

Offshore Anemometry Platform

An open access offshore anemometry platform used for validation of wind measurement techniques and sensors

Our facilities provide a supportive environment to advance new technologies for quicker deployment, providing a controlled environment to perform accelerated life testing and proof of concept trials, improving device reliability, reducing product costs and accelerating the development and deployment of offshore renewable energy technologies in the UK.

A snapshot of some of our existing industry leadership programmes

Turbine performance and reliability

SPARTA

System Performance, Availability and Reliability Trend Analysis

This major collaborative project is creating a database that takes anonymised offshore wind farm performance and maintenance data and provides participants with reliable benchmarking data.

The SPARTA database will improve wind turbine operational performance by increasing safety, reliability and availability, thereby cutting the cost of electricity generated from offshore wind.

> ***Building on previous projects within the ORE Catapult, the SPARTA project will, for the first time, produce benchmarking data that adds real value to the industry and contribute to reducing costs.***
>
> Chris Hill, Innovation Programmes Director, ORE Catapult

OPTIMUS

EU funded collaborative FP7 project with 12 partners participating from 6 countries across Europe, developing novel strategies to enable the prognosis of the remaining lifetime of key wind turbine components.

Supply chain

Regional Growth Fund (RGF) Wind Innovation Programme

The £11 million programme has delivered a total of 6 major technology projects (in partnership with Romax Technology Ltd, University of Sheffield, TWI, HVPD, David Brown Gear Systems Ltd and Siemens Transmission and Distribution Ltd) which address key technical challenges associated with the offshore wind supply chain. Examples include offshore wind turbine foundation fabrication, condition monitoring of wind turbine towers and blades and the development and automated application of protective coatings for wind turbine structures.

Cables – intra-array standardisation

We are working on projects that give a greater understanding of the influence of cables over the levelised cost of energy. This work is focusing on HVDC networks, and best practice in cable design and installation.

Wind resource measurement

Floating LiDAR

BVGassociates

This collaborative scoping exercise will consider the potential impact of LiDAR remote sensing technology on the cost of offshore wind energy, the data management requirements and identify any barriers to the use of floating LiDAR technology.

Knowledge management

Offshore Renewable Energy R&D Testing Landscape

We are currently mapping all the open access R&D testing facilities within the UK, allowing prospective customers to identify facilities which can be used to deliver commercial as well as funded R&D programmes. The online directory will also be a useful resource helping to identify any potential capability gaps in the UK.

MaRINET

(Marine Renewables Infrastructure Network for Emerging Energy Technologies)

The €9 million EU funded FP7 project allows researchers and developers access to specialist marine renewable energy testing centres across Europe to create a network of expertise in the marine renewable energy sector with experience at all scales of offshore technology research and development.

Marine technology

Marine Farm Accelerator (MFA)

Technology for first wave and tidal arrays

CARBON TRUST

The Marine Farm Accelerator (MFA) is working with a consortium of project developers and the Carbon Trust to drive accelerated innovation of the technology required to de-risk delivery of early wave and tidal farms.

It will build on the success achieved to date by the Carbon Trust's Offshore Wind Accelerator.

5 focus areas:

Electrical systems
Yield optimisation
Installation methods
Operations & maintenance
Insurance

CATAPULT Offshore Renewable Energy

SME support

A long term proposition for the UK's SME innovation community

SMEs will be the driving force behind much of the innovation in offshore renewable energy over the coming years. ORE Catapult is stimulating innovation from the UK's SMEs through identification and communication of the strategic technology priorities.

We directly support SMEs with the innovation process through:

- Proposal validation (market, technology)
- Development & commercialisation planning
- Access to expertise, facilities, partners, customers
- Lever in funding and investment from public & private sectors

Nova Innovation Ltd

INNOVATION

We are supporting Nova Innovation Ltd with the Tidal Array Model Real-World Evaluation Project (TAM), gaining a better understanding of our tidal resource in order to maximise energy generation from tidal devices. The TAM project will enable the performance of existing hydrodynamic models to be compared against each other anonymously, with the outputs being validated using the UK's first operational tidal array which will be developed, installed and operated by Nova in Bluemull Sound in Shetland.

SME technology accelerator

Renewable Energy Technology Accelerator (RETA), established by Narec, and funded by the European Regional Development Fund (ERDF), is working with manufacturing and engineering companies to progress specific technology development projects in key areas of the offshore renewables supply chain, including a cable trencher designed specifically for the offshore renewables industry as well as the design and development of smart cable technology.

> ***The ORE Catapult will help to maximise the innovation potential of SMEs by taking knowledge of the key sector challenges to the SME community and thereby stimulating increased levels of innovation.***
>
> Dr. Stephen Wyatt, Strategy & Commercialisation Director

Future focus

We work closely with leading industry and academic institutions to identify the key priority areas where there is the greatest potential to accelerate the deployment of offshore renewable energy and drive down costs.

Our priority areas for development include:

Technology Areas

Blades & Composites

Drive Trains (components & systems)

Structures & Foundations

Site Characteristics, Yield & Wake

Operations & Maintenance

Transmission & Cables

Enablers

Test & measurement

Data

Standards & Certification

Condition monitoring

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The Inovo Building,
121 George Street, Glasgow G1 1RD

Blyth

National Renewable Energy Centre, Offshore House
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