SOWEC
Scottish Offshore Wind Energy Council

SOWEC Innovation Guide

Showcasing Scotland's offshore wind research, development and commercialisation landscape and how to unlock its potential

January 2025

Delivered by Offshore Renewable Energy Catapult
on behalf of the Scottish Offshore Wind Energy Council and
commissioned by Crown Estate Scotland

QR code to a Digital Version
This QR Code links to a digital version of the of the SOWEC Innovation Guide. For further information please contact the Offshore Renewable Energy (ORE) Catapult.

Crown Estate Scotland
Oighreachd a' Chrùin Alba

CATAPULT
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This Guide was written by ORE Catapult on behalf of the Scottish Offshore Wind Energy Council (SOWEC) and commissioned by Crown Estate Scotland (CES).

The Guide was authored by Ruth Wilson-Nash, Sam Porteous, James Taylor, Lorna Bennet, Andrew Macdonald and John Walker.

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Disclaimer
Whilst every effort has been made to ensure the information contained within this Guide is accurate and true, it is possible the support landscape overview and directories are not complete, we therefore make no representations or warranties of any kind, express or implied about the completeness, accuracy, reliability, suitability or availability of services and information contained in this document. Any company or organisations who wish to be included in future revisions should contact ORE Catapult directly.

Nomenclature

AI	Artificial Intelligence
CoE	Centre of Excellence
CR&D	Collaborative Research and Development
CTV	Crew Transfer Vessel
EMEC	European Marine Energy Centre
ETZ	Energy Transition Zone
FLOWIC	Floating Offshore Wind Innovation Centre
FOW	Floating Offshore Wind
FOWT	Floating Offshore Wind Turbine
GVA	Gross Value Added
IGP	Industrial Growth Plan
INTOG	Innovation and Targeted Oil and Gas
IUK	Innovate UK
IWG	Innovation Working Group
LCoE	Levelised Cost of Energy
NMIS	National Manufacturing Institute Scotland
NZTC	Net Zero Technology Centre
O&M	Operations and Maintenance
OEM	Original Equipment Manufacturer
ORE	Offshore Renewable Energy
OWGP	Offshore Wind Growth Partnership
RAS	Robotics and Autonomous Systems
R&D	Research and Development
ROV	Remotely Operated Vehicle
SOWEC	Scottish Offshore Wind Energy Council
TRL	Technology Readiness Level

SOWEC

The Scottish Offshore Wind Energy Council (SOWEC) is a partnership between the Scottish public sector and the offshore wind industry. The vision is to grow a world-class offshore wind sector that underpins the transition to net zero by 2045 and maximises the value to Scotland. SOWEC's mission is to coordinate and grow the sector, ensuring the Scottish offshore wind industry is more sustainable, competitive, and commercially-attractive, both domestically and in the global offshore wind market.

SOWEC has four working groups tasked with dealing with different industry challenges. These include:

1. **Barriers to Deployment**
2. **Innovation**
3. **Skills**
4. **Supply Chain and Clusters**

In addition, a Developer forum is established to focus SOWEC's activity on addressing the changes required to overcome the challenges that developers face. Working closely with the other working groups, its members ensure that an industry viewpoint is applied to the initiatives delivered.

Innovation Working Group

The Innovation Working Group (IWG) aims to ensure that the offshore wind industry strives for innovative solutions towards fundamental sector challenges, especially those pertinent to the industry in Scotland, through cross-sector and supply chain collaboration. Through innovation, this group seeks to lower technology and sector risks, supporting and identifying industry and supply chain challenges, and establishing pathways from innovation development, right though to industry adoption.

The IWG works to ensure Scotland uses innovation in offshore wind power to maximise its economic growth.

Foreword from SOWEC Industry Co-Chair

Brian McFarlane
SOWEC Industry Co-Chair

Offshore wind power generation has seen immense development in the last two decades with increasing scale and reduced cost. This has been possible thanks to rapid innovation across the sector. In Scotland and the UK offshore wind is set to become the backbone of the electricity market by 2050, and in doing so deliver carbon neutral energy production, improved energy security and economic growth.

The mission of the Scottish Offshore Wind Energy Council (SOWEC) is to coordinate and grow the sector, ensuring the Scottish offshore wind industry is more sustainable, competitive, and commercially-attractive, both domestically and in the global offshore wind market. Innovation is central to the success of this mission. Further innovation, particularly in floating offshore wind, is vital to continue to reduce the costs and improve the environmental performance of offshore wind as the sector grows. This Guide produced by the SOWEC Innovation Working Group sets out the available support for innovation for Scottish companies and researchers. It also provides case studies to show some of the innovation successes that have been delivered in Scotland.

SOWEC's Innovation Working Group provides leadership for industry and government in how innovation can be implemented to support the needs of project developers as well as the wider economy by attracting inward investment and driving exports. This Guide highlights the range and depth of talent that is supporting the offshore wind sector. From an industry perspective, we are keen to support innovation at every stage from collaborative R&D through to demonstrations on our operational assets.

Innovation will help reduce costs of offshore wind projects, and will provide a bridge between the oil and gas sector and offshore wind. The ability to transfer skills, experience, and knowledge from one sector to the other is an essential part of the energy transition. Innovation places Scotland at the centre of the offshore wind sector in terms of attracting inward investment and driving exports.

The case studies in the Guide highlight the range of support mechanisms that Scottish companies can access. Accelerator programmes such as Launch Academy target start-ups and scale-ups, the Doctoral Training Centres bring through a wealth of engineering talent to the very highest level and the Offshore Wind Growth Partnership's Wind Expert Support Toolkit (WEST) helps new entrants particularly from the oil and gas sector. The Guide also provides a forward look; the importance of floating wind is clear with moorings, anchors and dynamic cables being at the centre of innovation requirements.

I am delighted to welcome this Guide and would encourage innovators across Scotland to take inspiration from what has been achieved and set their sights on the opportunities ahead.

Foreword from SOWEC Innovation Working Group Chair

Andrew Macdonald
SOWEC Innovation Working Group Chair

Scotland has developed a strong pipeline of offshore wind projects through Crown Estate Scotland's ScotWind leasing round. This will ensure that Scotland continues to play a leading role in the growth of the offshore wind sector. Whilst offshore wind is now a well-established technology it is still a relatively new sector and there are significant opportunities for innovation.

The role of innovation is set out in Scottish Government's National Innovation Strategy and in the context of offshore wind this provides three key roles. Firstly, innovation will help reduce costs of offshore wind projects. This in turn will enable projects to be deployed faster and with greater benefit to consumers. Floating Offshore Wind is a priority for Scotland but as a new technology the costs remain high. Finding the most efficient solutions for moorings, anchors and dynamic electrical cables are priority areas for R&D activity in order to make Floating Wind as low cost as possible.

Secondly, innovation provides the bridge between the oil and gas sector and offshore wind. The ability to transfer skills, experience, and knowledge from one sector to the other is an essential part of the energy transition. Innovation from the oil and gas supply chain companies (especially relating to subsea activity) will be key to solving some of challenges that remain. It also creates opportunities for existing supply chain companies to enter the market with new products and services and it enables Scotland's offshore wind supply chain to expand.

Thirdly, innovation places Scotland at the centre of the sector in terms of attracting inward investment and driving exports. International investors recognise the importance of supply chain clusters that are built around strong R&D centres. The Green Freeports along with the Energy Transition Zone (ETZ) are enabling inward investment and creating clusters of expertise that will in turn bring further investment.

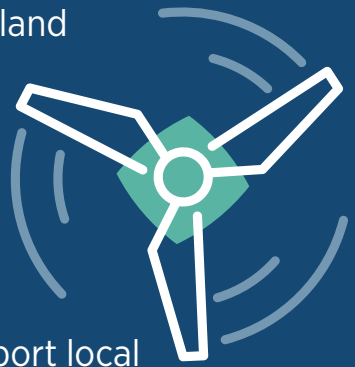
The Offshore Wind Innovation Guide showcases the fantastic work already being carried out in Scotland. The case studies show the breadth of activity and the importance of a joined up support mechanism from the visionary work of the academic sector through to the test and demonstration activities being undertaken on operational wind farms in Scotland.

I am delighted to welcome the Guide and look forward to seeing the companies take on their role in Scotland's innovation landscape.

Introduction

Purpose

Showcase impactful innovation happening in Scotland



Highlight the positive impacts innovation has in Scotland

Support local innovators in their journeys

This Guide will support key decision-makers in the Scottish offshore wind industry, both public and private sector, with specific examples of successful innovation, with highlighting crucial gaps, and with charting the way forward.

It will also provide innovators with information about support mechanisms available across Scotland.

Scene setting

Sector goals and challenges

Generate 50% of Scotland's overall energy consumption from renewable sources by 2030.

Reach net zero emissions by 2045, five years ahead of the UK's 2050 target.

Scotland is central to the UK achieving its commitments after joining eight other countries in signing the Ostend Declaration of Energy Ministers on The North Seas as Europe's Green Power Plant, with a combined target of 120 GW by 2030 and 300 GW by 2050.

Climate change effects

- Continued global trend of increasing levels of atmospheric greenhouse gases despite a reduction in the use of fossil fuels.
- 2024 was the warmest year on record.
- 2024 breached the 1.5°C temperature increase from pre-industrial levels threshold.

Opportunity

Scotland is uniquely placed to accelerate the offshore wind industry through innovation.

9 9 offshore wind projects operational.

40 40 offshore wind projects in development with up to 40 GW in the project pipeline.

6,200+ GWh Over 6,200 GWh electricity generated in 2023.

£30bn investment £1.5bn average investment projected in Scotland's supply chain by each of the 20 ScotWind projects, according to their Supply Chain Development Statements.

Largest pipeline Largest pipeline in the world of seabed agreements for commercial scale floating wind.

World leading Existing subsea engineering capabilities developed through our oil and gas heritage are world leading.

£92bn GVA £92bn GVA could be contributed to the UK economy by 2040 from the offshore wind supply chain.

Up to £500m Scottish Government commitment of up to £500 million strategic investment expected to leverage additional private investment of £1.5 billion into infrastructure and manufacturing facilities critical to growing the offshore wind sector.

What is Innovation?

> *It's about challenging the way things are done by using scientific and engineering principles in the hopes of coming up with something better than our established practices.*

Dr George Loumakis
Senior Lecturer in Energy,
Glasgow Caledonian University

> *Innovation goes hand in hand with industrialisation. It is not just the creation of new technology or ways of working but can be the application of established technology or ways of working to new companies or sectors.*

Remi Zante
Head of Strategic Planning, NMIS

> *Innovation is the expansion of our knowledge, products, and business-lines available to us which can unlock, de-risk, and maximise the value of our portfolio of projects. It also drives Ørsted's and the sector's growth, differentiates us, and hones a competitive edge.*

Alex Louden
Head of UK & Ireland Innovation Hub,
Ørsted

> *[Innovation is] The application of recent scientific discoveries or emergent technologies for social and economic benefit.*

Ryan Gordon
Business Development Manager,
National Subsea Centre

> *Innovation in Scotland isn't just about technology; it's about vision, inclusivity, and using creativity to shape a better tomorrow for everyone by blending its rich heritage with bold, forward-thinking solutions. It's also about taking the ingenuity that has defined Scotland's past—from the steam engine to penicillin—and applying it to today's challenges and opportunities.*

Ravneet Kaur
Senior Technology Acceleration Manager, Offshore Renewable Energy Catapult

Why does Innovation Matter?

Innovation is how we move from where we are to where we want to be. Whether through incremental changes to services and products that already exist, or disruptive ideas that result in revolutionary change, innovation develops Scotland's capabilities. Similarly, supply chain is grown either by doing more of the same, or doing additional new things, therefore by innovating new products, services and processes Scotland's supply chain will grow.

Scotland has a rich history of innovation because it has invested in universities and has valued industrial research. So much more can be achieved within the offshore wind industry if innovation is embraced at every scale.

John Logie Baird's demonstration of the first live working television system transformed telecommunications and started the cascade of developments leading to the televisions of today.

Professor Sir Ian Wilmut and his team at the Roslin Institute in Edinburgh cloned Dolly the sheep, the first mammal to be cloned from an adult cell, opening new opportunities for medicine and biology, and redefining what was thought to be possible.

James Clerk Maxwell displayed the first colour photograph, later developing camera and lens technologies that enabled colour photographs to be captured. Maxwell also developed many equations to understand the theory of electromagnetism which form the basis of modern-day physics and technology.

Professor James Blyth designed the world's first device to generate electricity from wind power, becoming the founding father of the wind industry.

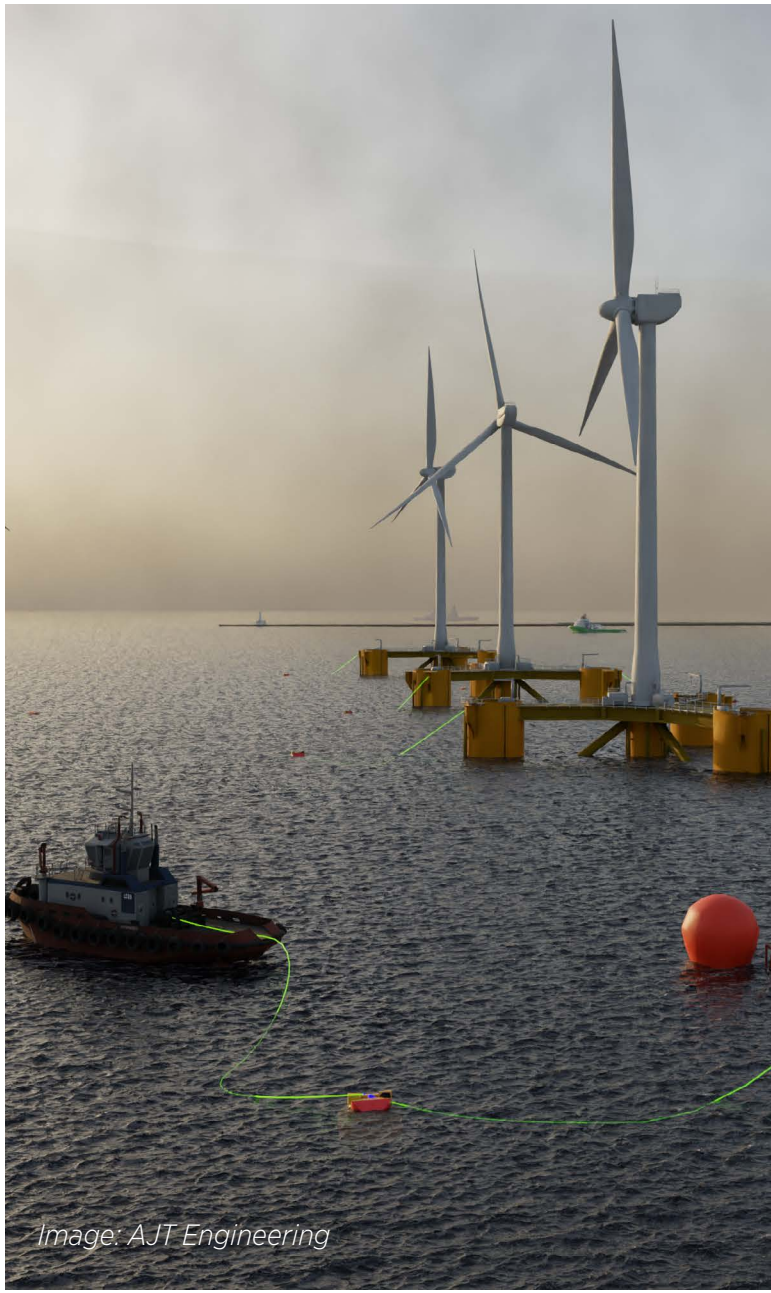
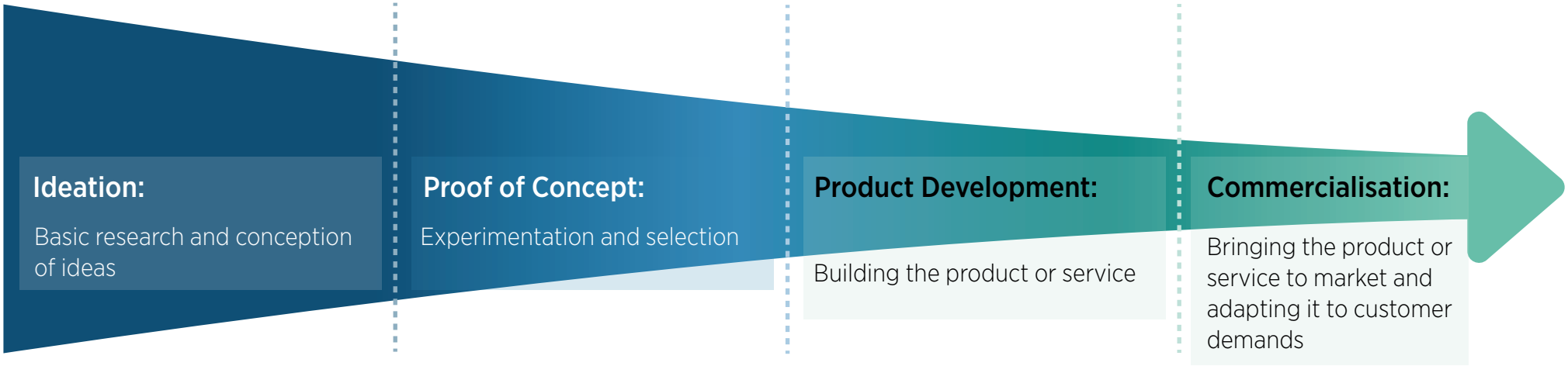


Image: AJT Engineering

Innovation Pathways

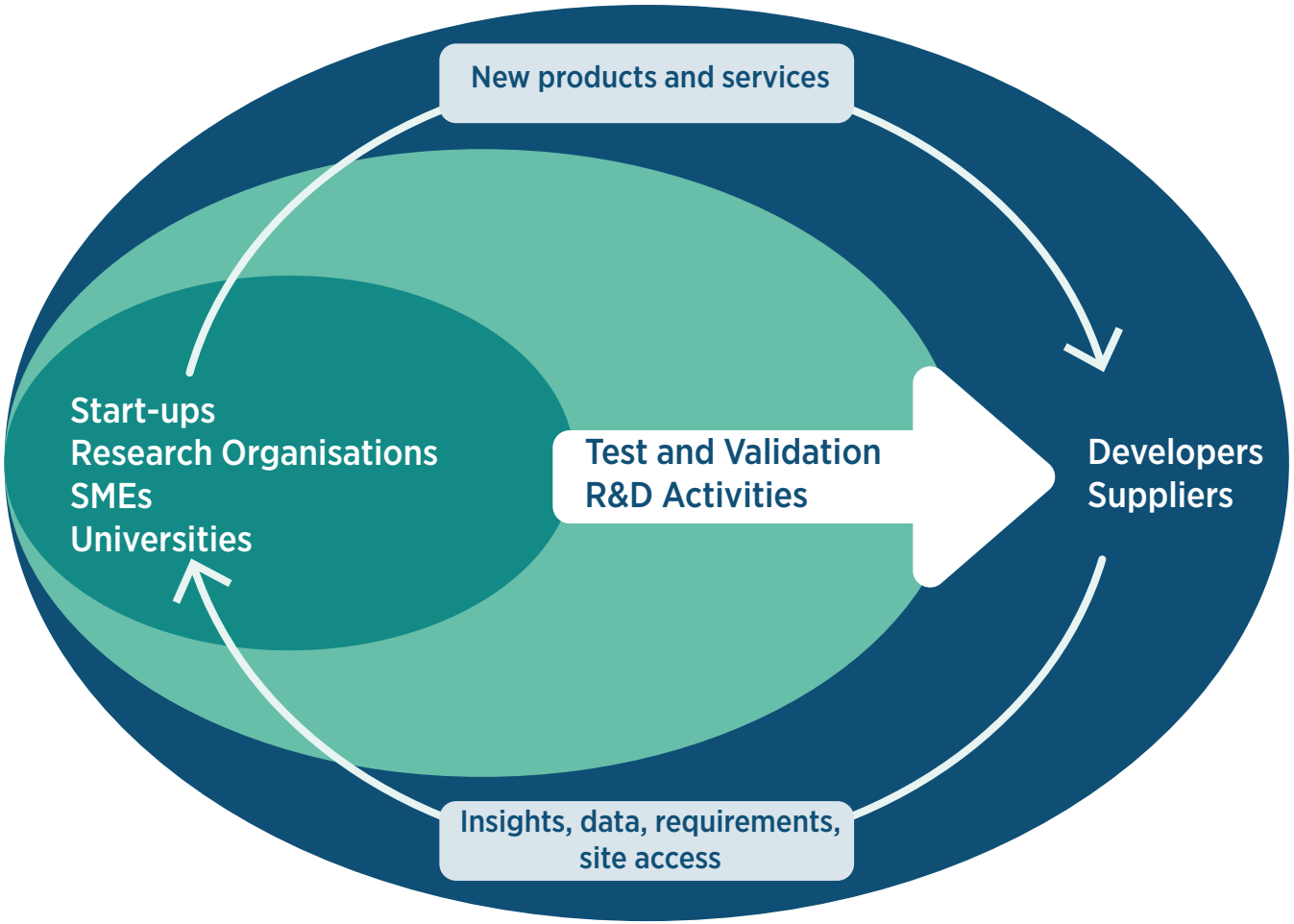
As a product or service is developed it travels along the innovation pathway through different technology readiness levels (TRLs) and phases from the very early stages of research and conception of ideas to full operation and a commercial opportunity.

Phase	TRL	Stage	Description
Operations	**TRL9**	Operations	Actual system proven in operational environment
Deployment	**TRL8**	Active Commissioning	System complete and qualified through test and demonstration
	TRL7	Inactive Commissioning	System prototype demonstration in operational environment
Development	**TRL6**	Large Scale	Technology (system/subsystem) demonstrated in relevant environment
	TRL5	Pilot Scale	Technology (component/partial system) validated in relevant environment
	TRL4	Bench Scale	Technology validated in laboratory
Research	**TRL3**	Proof of Concept	Experimental proof of concept
	TRL2	Invention and Research	Technology concept formulated
	TRL1	Basic Principles	Basic principles observed



Delivering Innovation

- During the innovation pathway, success is dependent on the interaction between those innovating and the established developers and suppliers that will use the innovation.
- This Guide is designed to showcase great examples of innovation.
- Offshore wind is poised to reap the rewards if industry and the public sector work together to put the right enablers in place.



Collaborative Innovation

Collaborative research and development (CR&D) brings together innovators and industrial end users, and catalyses multiple branches of science and engineering. Across the offshore wind industry in Scotland we can see many examples of collaborative innovation where there is a united goal to support the industry by innovating. Some examples are shown below.

Scottish Partnership in Energy and Engineering Research and Innovation (SPEERI)

SPEERI encompasses the Scottish Research Partnership in Engineering (SRPe) and the Energy Technology Partnership (ETP). SPEERI is a strategic partnership of 14 Scottish Universities working in collaboration with innovation translators, industry, public sector and government to future-proof Scotland's position as a world-class centre of excellence in energy and engineering research.

The National Robotarium

The National Robotarium is a world-leading centre in robotics and artificial intelligence (AI) at Heriot-Watt University.

Officially opened in September 2022, the National Robotarium creates innovative solutions to global challenges, working directly with industry to research, test and develop robotic, AI and automated technologies that have a positive impact on people's work, health and lives.

The National Robotarium is at the forefront of advancing the UK's robotics capabilities, developing talent, accelerating innovation and stimulating economic growth.

Scottish Enterprise (SE) are Scotland's national economic development agency, who enable businesses to innovate and scale to transform Scotland's economy.

South of Scotland Enterprise (SOSE) is the economic and community development agency for the South of Scotland, with a threefold focus on prosperity, people and planet. It offers bespoke advice, support and funding to businesses, enterprising communities, inward investors and others to innovate and grow the economy in a way that benefits our people and places and delivers a Just Transition to Net Zero and a nature-positive future.

Highlands and Islands Enterprise (HIE) are the economic and community development agency for the Highlands and Islands of Scotland, offering support including specialist advice across a range of key topics such as innovation, R&D and improving productivity, as well as access to property, and funding.

SE, HIE & SOSE are working collaboratively to support offshore wind innovators to develop, commercialise and scale their business internationally.

WINTOG / INTOG Innovation Network

From the Innovation and Targeted Oil and Gas (INTOG) leasing round, the WINTOG programme focuses purely on the oil and gas electrification aspect and the Innovation Network programme focuses purely on the innovation element. Jointly run by ORE Catapult and the Net Zero Technology Centre, both programmes facilitate research, development, and engagement scopes for project allocated exclusivity agreements.

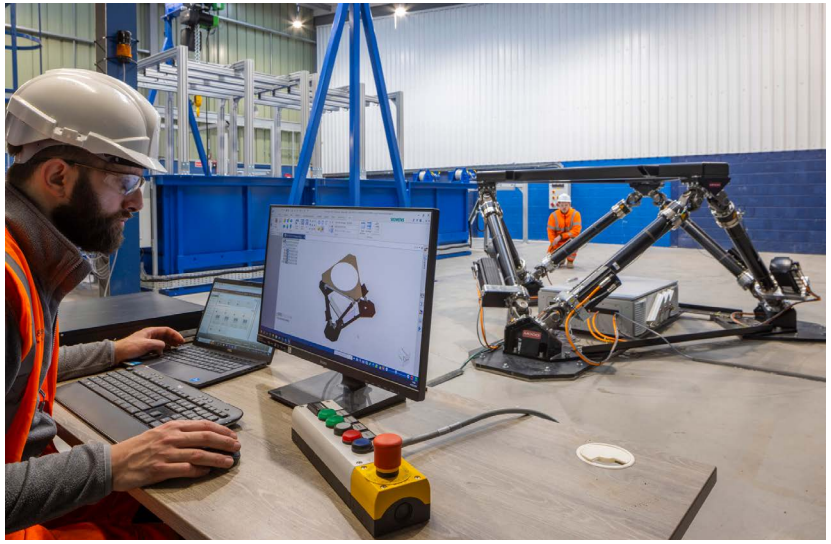
The priorities of these programmes include:

- Building collaborative relationships between projects, identifying common innovation and technology challenges and opportunities.
- Exploring new technologies to ensure a constant supply of energy to the assets (WINTOG).
- Exploring opportunities to test and demonstrate technologies to increase technology readiness levels and de-risk technologies ready for deployment (Innovation Network).

FLOATING OFFSHORE WIND CENTRE OF EXCELLENCE

Delivered by CATAPULT Offshore Renewable Energy

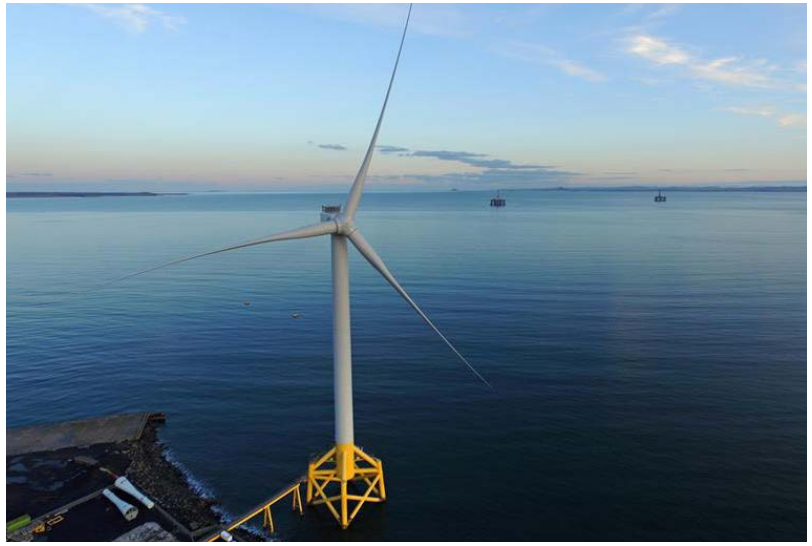
ORE Catapult's **Floating Offshore Wind Centre of Excellence (FOW CoE)** is a collaborative programme with industry, academic and other stakeholder partners to reduce the cost of energy from floating wind. FOW CoE aims to accelerate the build-out of floating wind farms, create opportunities for the UK supply chain, and drive innovations in manufacturing, installation and operations & maintenance.



OPERATIONS & MAINTENANCE CENTRE OF EXCELLENCE

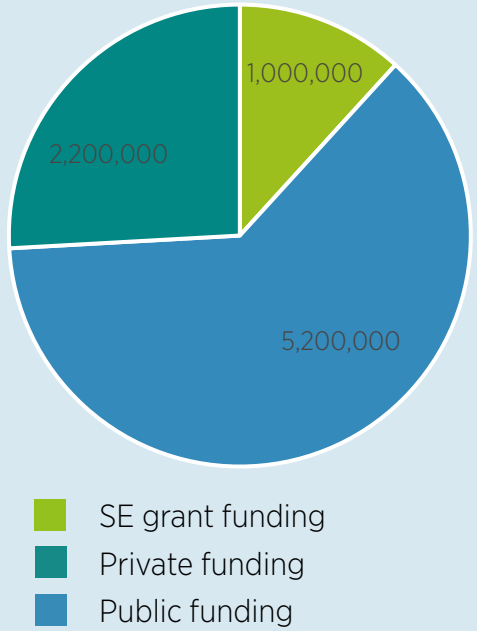
Delivered by CATAPULT Offshore Renewable Energy

The **Operations & Maintenance (O&M) Centre of Excellence** supports businesses to understand the needs, demands and opportunities in the operational years of an offshore wind farm. Collaborations enable industry to become smarter (higher performance, better reliability), safer (greater automation, best practice emergency response) and greener (clean maritime, circular economy).



What is Happening in Scotland?

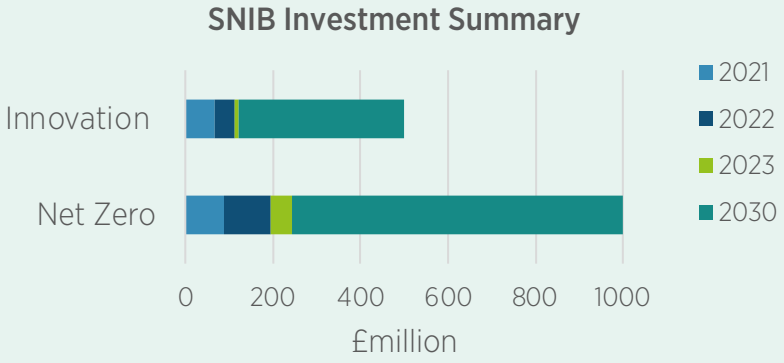
Research Funding in Scotland



Scottish Enterprise's Economic Impact Scenarios for Scotland's Energy Transition report states that between 2020 and 2023, £5.2 million of public funding, £2.2 million of private funding and £1 million of Scottish Enterprise funding was allocated to R&D in offshore wind across Scotland.[1]

The wider sector will also benefit from Scottish Government commitment of up to £500 million strategic investment which is expected to leverage additional private investment of £1.5 billion into infrastructure and manufacturing facilities critical to growing the offshore wind sector.[2]

The Scottish National Investment Bank (SNIB) has invested £120.1m towards Innovation and £244m toward Scotland's Net Zero ambitions since 2020. A total investment of £1.5bn is targeted for 2030.[3]



[1] Ref - Annex B - Scottish Capability - Research and Development (R&D)
[2] Ref - £150 million for offshore wind - gov.scot
[3] SNIB Impact report 2023 and Impact report 2024

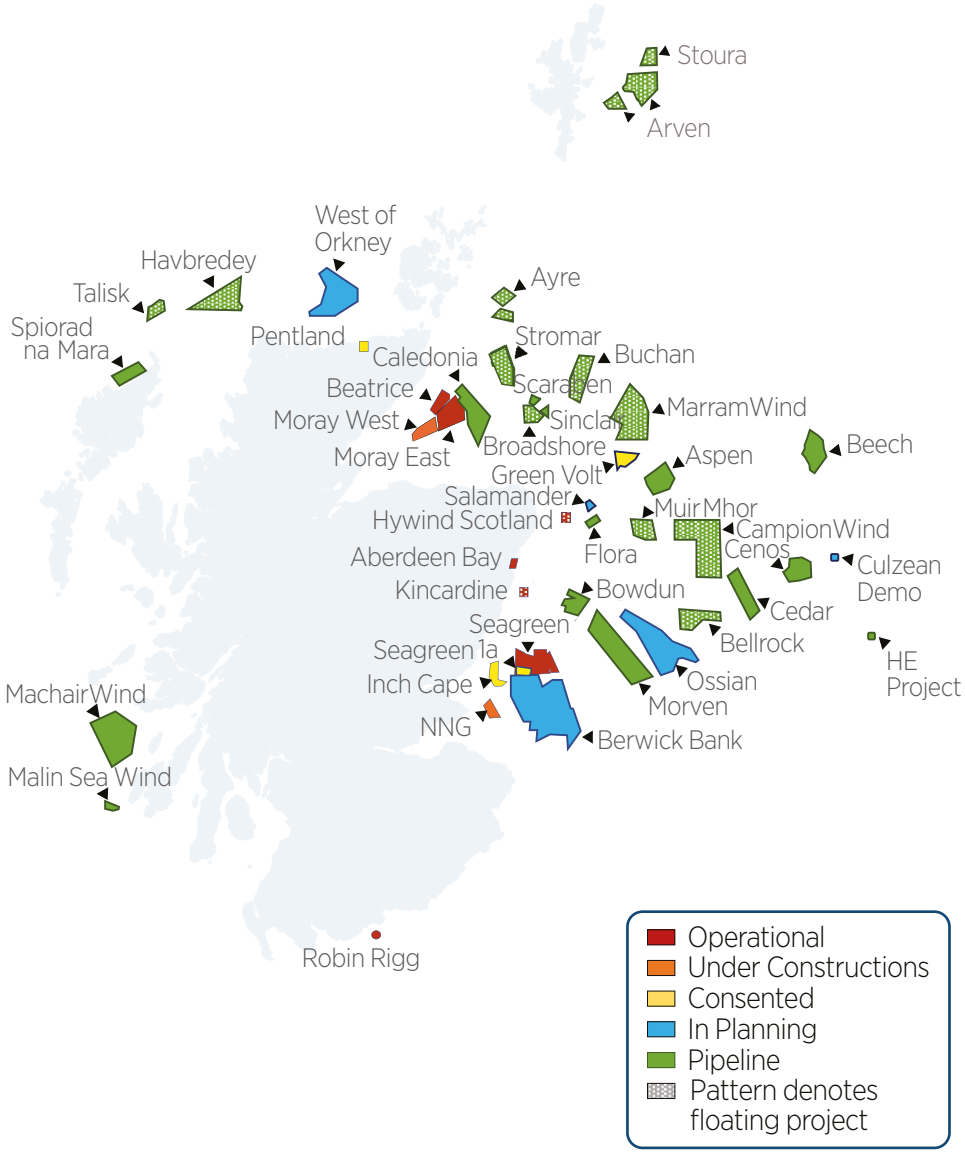
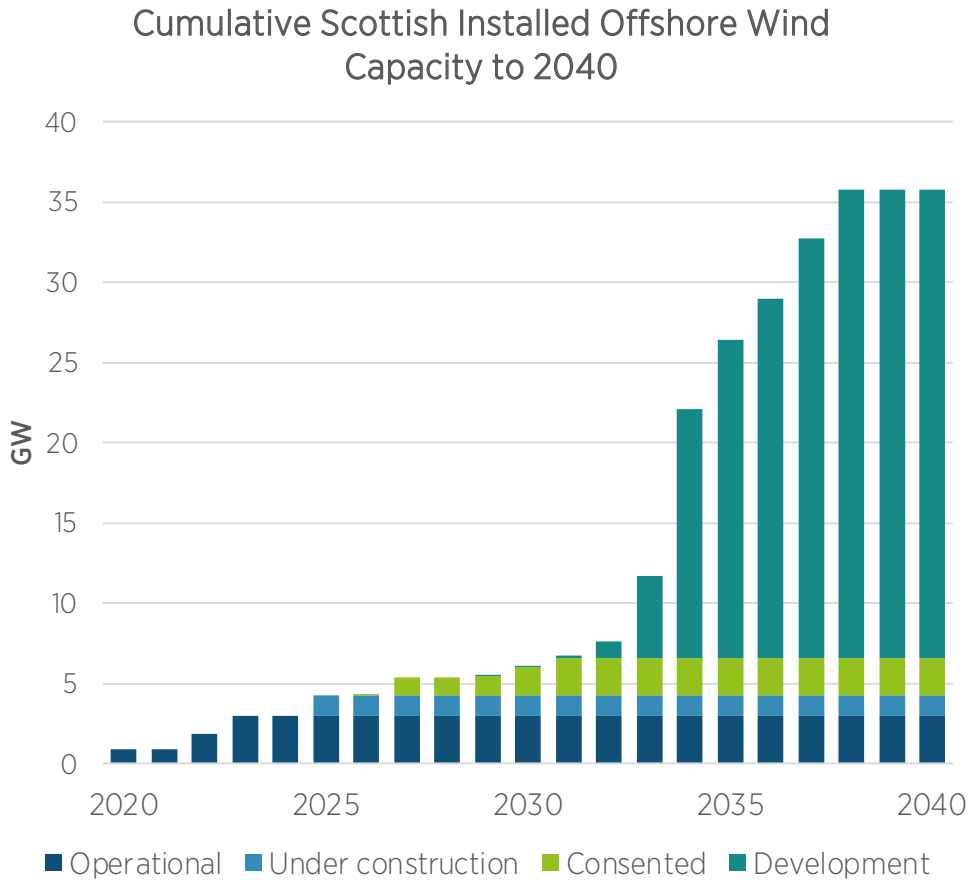


Image credit: Highlands and Islands Enterprise



With total current capacity just below 3 GW, this is expected to increase to 6 GW by 2030, 26 GW by 2035 and 35.7 GW by 2040.

Due to the increase in scale of planned growth of offshore wind in Scotland there is a great match to be made between investment funding and support on offer, to deliver the high potential opportunity within the sector.

[3] https://etzltd.com/ prospectus pg11
[4] RenewableUK's EnergyPulse platform - EnergyPulse | RenewableUK business intelligence platform

Innovation Priorities

The Offshore Wind Industrial Growth Plan (IGP), published April 2024, sets out five priority technology development areas for the UK to focus on that will benefit the UK economy. Whilst the IGP sets the bigger picture for the UK and Scotland plays a crucial role in supporting these, it is important to identify that Scotland has specific priorities. These are based on its capabilities, particularly from the Oil & Gas industry, and opportunity, with 19.2 GW of floating offshore wind awarded in the ScotWind leasing rounds.

IGP Areas of Focus	IGP Focus	Scottish Priorities
Advanced Turbine Technology 	◆ Future Turbine design and engineering ◆ Tower ◆ Blades ◆ Drive Train	The IGP identifies the need for additional blade manufacturing facilities, and sites have been identified in Scotland that are suitable. Bringing R&D activity to these sites would build Scotland's reputation in this area.
Industrial Foundations & Substructures 	◆ Floating foundation and design ◆ Deeper water and floating foundations ◆ Moorings and anchors	Scotland's pipeline in deepwater fixed and floating offshore wind unlocks opportunities to focus on technologies in this area, with a specific emphasis on anchors, mooring lines and substructures.
Future Electrical Systems & Cables 	◆ Array Cables ◆ Export Cables ◆ Cable protection systems ◆ Electrical system design	Recent investment by Sumitomo in cable manufacturing facilities strengthens Scotland's position in electrical infrastructure, particularly in dynamic cables and single mooring/cable disconnection systems. Other cable factories are being planned, including at Hunterston by XLCC.
Smart Environmental Services 	◆ Environmental surveys	A rich history in Oil & Gas positions Scotland well with its established skills in smart environmental services. This experience continues to be utilised in the development of new environmental services. In addition, the development of ports to accommodate vessel charging provides opportunities for clean maritime advancements.

Image: PALM Charger

IGP Areas of Focus	IGP Focus	Scottish Priorities
Next Generation Installation and O&M	◆ Wind turbine installation ◆ Operations and maintenance ◆ Cables installation vessels operation	With its close proximity to multiple fixed and floating current and future projects, Scotland is a hub of activity for installation and O&M activities. As turbines move further from shore new RAS systems and technologies will be needed to improve safety and cost effectiveness.
Additional Innovation Areas		Scotland's strong position in offshore wind also opens opportunities in other areas such as sustainability and the circular economy, the integration of hydrogen and port improvements. Furthermore, the decommissioning of Scotland's ageing oil and gas assets provides a catalyst to reuse and recycle materials within the offshore wind industry, strengthening the circular economy.

The following sections highlight case studies and future needs for each priority area. Case studies include a variety of technologies and projects across a range of TRLs and project types. There are examples of start-ups, university spin-outs, R&D projects, industry supported collaborations and industry led projects. Each case study had been selected for a specific reason that showcases Scottish innovation.

These include, but are not limited to:

- Unique technologies and ideas
- Collaborations between different partners
- Use of demonstration sites or test laboratories
- Types of support programmes utilised

CASE STUDY

ACT Blade

The Next Generation of Offshore Wind Turbine Blades

Advanced Turbine Technology

Technology/Project Description

The patented ACT Blade technology is developing the lightest, most controllable, most sustainable and only modular wind turbine blade ever developed. It provides two distinctive levels of innovation: a novel construction approach, with an internal modular composite structure covered by tensioned engineered textile, and a control system to reduce blade loads and optimise performance according to wind conditions.

The textile covered ACT Blade is lighter than conventional blades, enabling blades to be up to 10% longer, which means +9% energy generation. As it is an assembly of sub-systems, producing an ACT blade requires a lower CapEx and manufacturing footprint.

Timeline of Development/Deployment

ACT Blade's mission is to become Europe's largest independent turbine blade manufacturer. The market strategy is to firstly approach the Onshore wind energy market with the ACT100, a 49.2 m long blade for 2 MW capacity turbines to be sold worldwide by the end of 2025. From 2026 onward, the company will start developing a 75 m long blade, for the next generation onshore turbine market and from 2030 to approach the offshore wind energy market.

Impact

- Reduced CapEx and manufacturing footprint.
- At least 100 direct jobs and 50 indirect jobs for a single blade production line.

Funding/Support Mechanisms

- IUK Catalyst grant
- IUK Infrastructure grant
- Collaboration with ORE Catapult and High Value Manufacturing (HVM) Catapult

ACT blade

CASE STUDY

Myriad Wind Energy Systems

Developing Modular Utility Scale Wind Turbines

Advanced Turbine Technology

Technology/Project Description

The Myriad Turbine is a multi-rotor wind turbine, using numerous standardised small wind turbines supported on a modular support structure to achieve vast reductions in the levelised cost of energy. The solution uses components that are easy to manufacture and transport, and the built-in maintenance system means the turbine can be maintained without external cranes while also reducing time working at height. Unlike conventional wind turbines, the Myriad Turbine uses the same supply chain regardless of turbine size.

Timeline of Development/Deployment

Following on from the success of its 2 kW proof of concept deployment in April 2024, Myriad plans to deploy a partial scale 50 kW 10-rotor demonstrator in 2025/26. This will be followed by a full-scale prototype in 2027/28, and a commercial pilot in 2029.

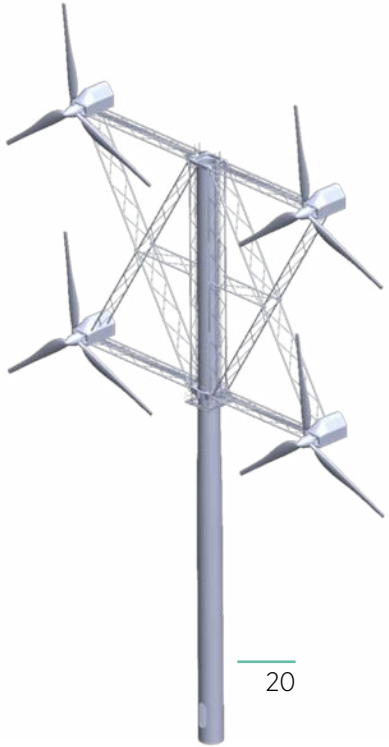
Impact

- Unlocking of GWs of remote sites across Europe.
- UK's only wind turbine OEM.
- Green jobs and improved supply chain participation for Scottish suppliers.

Funding/Support Mechanisms

- Private equity investment
- Scottish Enterprise SMART: Scotland Grant
- NZTC TechX Clean Energy Accelerator Programme
- IUK Fast Start, Innovation Voucher, Accelerate Knowledge Transfer (with University of Strathclyde)

MYRIAD Wind Energy Systems



CASE STUDY

Technology and Innovation Centre (TIC) Low Carbon Power and Energy Partnership (LCPE) Programme

Stiff-Stiff Tower Design

Advanced Turbine Technology

Technology/Project Description

Limited OEM engagement and a lack of early stage design input data typically increases uncertainty in Floating Offshore Wind Turbine (FOWT) platform design. As part of the LCPE programme, four reference stiff-stiff tower designs were defined for use with FOWT designs, provided by two offshore wind farm developers and operators. This ultimately improved the confidence of early stage FOWT platform design as it allowed the use of tower data to inform and validate FOWT designer assumptions. Furthermore, a sensitivity analysis performed as part of the project increased understanding of how stiff-stiff tower design affects the sizing and weight of a platform, and led to further enabling projects, such as the development of suitable tower-platform interfaces.

Timeline of Development/Deployment

The project began on 1st November 2023 and ended on 30th April 2024.

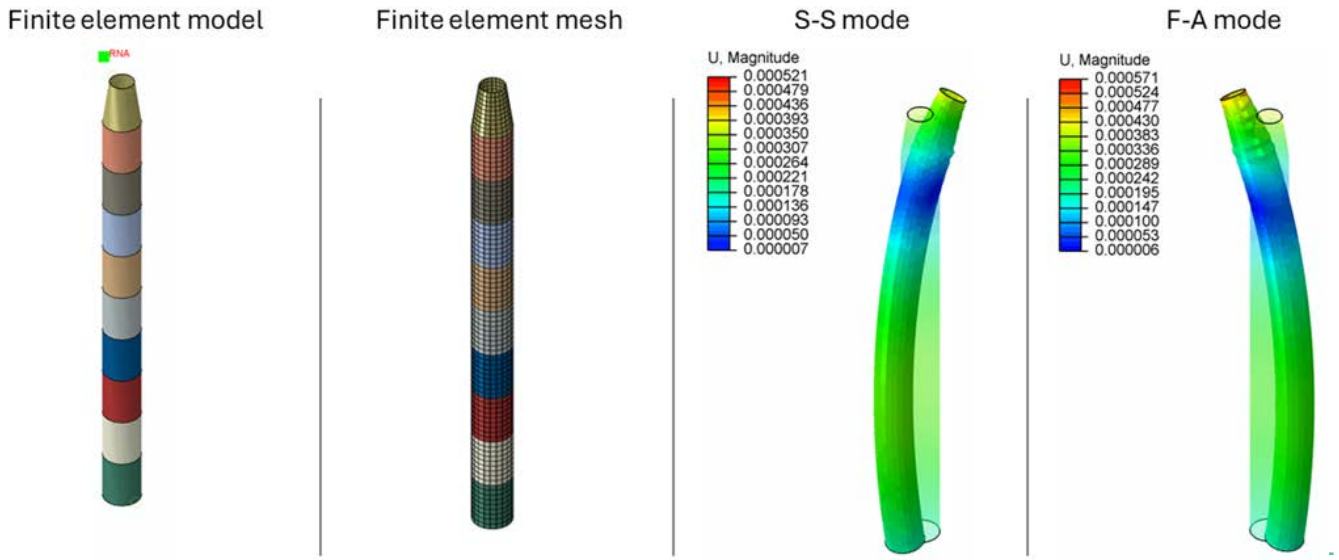
Impact

- Improvements in early stage floating platform design enabled.
- Tangible LCoE improvements unlocked.

Funding/Support Mechanisms

- TIC LCPE, funded by ScottishPower Renewables and SSE

ScottishPower | University of Strathclyde Glasgow | sse



Looking Forward

Turbine sizes have increased rapidly over the last decade and this continues to be a major factor in cost reduction. This accelerated growth must not be at the cost of reliability or performance, and innovation is required to bring advances in both blades and generators. In the short term, there is a need for condition monitoring and control systems to optimise lifetime performance. This is a high priority for floating turbines where additional loads need to be monitored and managed beyond those experienced by fixed bottom turbines. In the medium term, innovations on blades could include new materials and manufacturing processes to enable longer blades whilst reducing manufacturing costs. There will also be requirements for new approaches for bearings that face increased challenges as turbine sizes and mass increase. In the longer term, novel designs could provide alternative routes for turbine growth beyond the traditional three bladed horizontal axis turbine. The industry is also focused on improved sustainability. Innovations are needed to enable circular economy principles such as recycling of blades, refurbishment of components and manufacturing waste reduction.

Advanced Turbine Technology

CASE STUDY

Napkin Innovation

Revolutionary Non-Grouted Connector: Faster, Cheaper, Greener Foundation Installation

Industrialised Foundations and Substructures

Technology/Project Description

Grouted connections are challenging with key concerns including time, cost and risk. In conversation with engineers, it's not uncommon to hear an exasperated "the sooner we get away from grouting the better!".

Napkin is developing an alternative to grouted jacket-pile connections. The innovative solution offers an almost instant lock, reducing vessel time and grouting costs by a calculated £23m per 1 GW installed. And, by facilitating a shorter stab-in, heavier jackets can be installed by a wider range of vessels, when installation vessels are in short supply.

Timeline of Development/Deployment

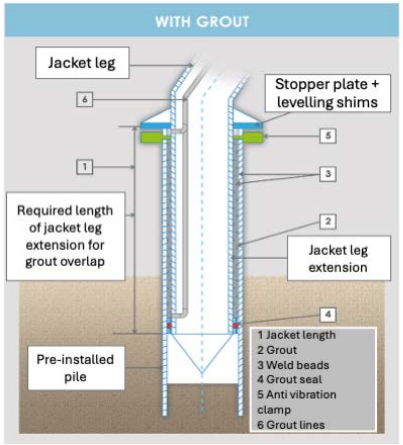
Scaled testing is ongoing at Strathclyde University's Advanced Materials Research Laboratory, with near full-scale testing planned for 2025-2026 and offshore demonstration in 2027. The product roadmap also includes a connector for split jackets.

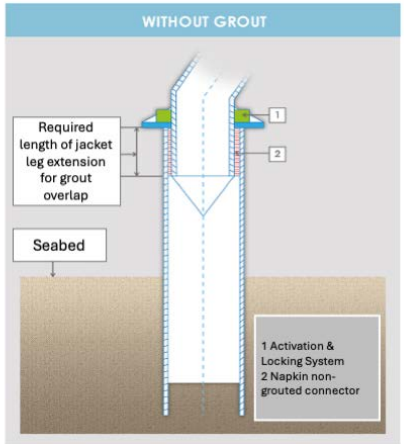
Impact

- Estimated cost saving £23m per 1 GW installed capacity.
- Reduction of up to 33% in CO_2 installation emissions.
- Potential to create 250 fabrication jobs per 1 GW farm.
- The innovation has letters of support from leading wind developers and installers.

Funding/Support Mechanisms

- IUK SMART Grant
- OWGP Pilot Call Strand B
- BEIS Energy Entrepreneur
- IUK Women in Innovation
- NZTC TechX Clean Energy Accelerator Programme
- EU's GreenOffshoreTech
- ORE Catapult Launch Academy National Programme





CASE STUDY

SCHOTTEL Marine Technologies

Swift Anchor: Revolutionising Floating Offshore Wind Mooring for Cost Efficiency

Industrialised Foundations and Substructures

Technology/Project Description

The Swift Anchor is a game-changing innovation designed to enhance the sustainability and cost-efficiency of floating offshore wind mooring systems. Originally developed for tidal energy, it is being optimised for offshore wind through cutting-edge research and industry collaboration. Its innovative design minimises seabed impact, reduces material usage, and enhances holding capacity. Crucially, the anchor's streamlined installation process significantly lowers operational costs and mitigates deployment risks, directly contributing to reducing the LCoE for floating offshore wind projects.

Timeline of Development/Deployment

The Swift Anchor has evolved over a decade, with successful deployments already completed in real life tidal applications. Collaborations with funding bodies have accelerated 3rd generation trials and certification in readiness for deployment in pilot projects, paving the way for future scalability and use in floating offshore wind.

Impact

- Industry led Steering Committee.
- Creation of skilled engineering and operational jobs across multiple disciplines.
- Contributing to local supply chain.
- Project cost reductions up to 12% LCoE on a 450 MW FOW array.
- Potential 2% reduction in carbon on a 450 MW FOW array.

Funding/Support Mechanisms

- OWGP Development Grant
- SDI market development initiatives
- Scottish Enterprise – Small and Large R&D Grants
- Innovate UK grant funding:
  - Infrastructure for Offshore Renewables (IOR)
  - Energy Catalyst – Early Stage Round 4
  - SMART – Development of Prototype Round 4
  - SMART - Development of Prototype Round 5
- OCEANERA-NET COFUND

SCHOTTEL Marine Technologies

Looking Forward

The future of turbine foundations and substructure developments in Scotland will focus on the needs of the floating offshore wind industry. Innovations are required in materials, design for manufacture and design for operation. With mooring lines being an essential element of all floating wind concepts there is a requirement for new mooring line materials that can meet the required performance characteristics and reduce costs for mass production. Innovation in substructure design is needed to optimise the use of Scottish ports; modular or rapid assembly designs could reduce the required footprint and enable more ports to contribute. Whilst floating wind is a priority for Scotland, there remain opportunities in Fixed Bottom Wind including innovations that reduce the costs of the installation of fixed and deep water fixed foundations. Scotland's oil and gas sector has overcome similar challenges for substructures and foundations, and this knowledge can be reapplied to offshore wind.

Industrialised Foundations and Substructures

CASE STUDY

Synaptec

Floating offshore wind cable health monitoring using distributed electrical sensing

Future Electrical Systems and Cables

Technology/Project Description

A pilot of Synaptec's cable monitoring techniques is currently being deployed on the world's first floating wind farm, Hywind Scotland. The deployment will demonstrate passive, remote monitoring of cables and terminations both electrically and mechanically to provide advanced warning of degradation and failure, leading to significant cost-savings for wind farm operators by reducing unplanned maintenance.

Timeline of Development/Deployment

The system is currently in deployment phase having been designed and planned in 2023-2024. The system will go live early in 2025 and begin producing new, unique health data from the floating cable networks in an industry first.

Impact

- Unique capability to provide real time data on vulnerable cable locations.
- Advanced warning of cable degradation and failure.

Funding/Support Mechanisms

- ScottishPower Renewables programme sponsor
- IUK SMART Grant

CASE STUDY

Quoceant - Q-Connect

Marine Quick Connection Systems

Future Electrical Systems and Cables

Technology/Project Description

Quoceant's Q-Connect series of marine quick connectors provide rapid installation and disconnection to floating wind, wave and tidal technology. The connectors are designed to be adaptable to a range of applications and to provide rapid and repeatable connection and disconnection of mooring lines and/or electrical cables.

Timeline of Development/Deployment

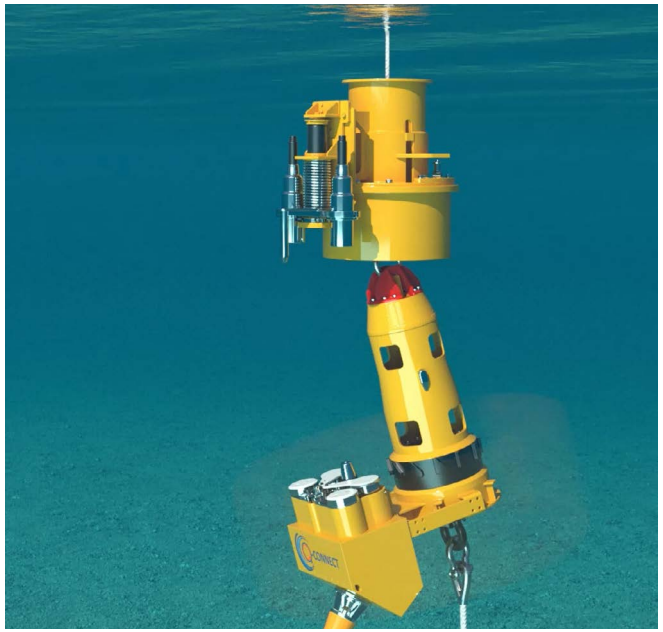
A 600 Te MBL Q-Connect integrated with 6.6 kV wet-mate connector was developed, built, and tested in factory in 2023. Designs for integrating the technology with higher rated wet-mate connectors for floating offshore wind are advancing as is the design for a separate high strength mooring quick connector. Both design scopes have been supported by funding from OWGP with additional support from, floating wind developer, Marine Power Systems. Working with MPS to develop the basis of design for offshore wind integration. Demonstration for floating offshore windis targeted in the next 2-3 years.

Impact

- Transformative benefits for installation and maintenance of floating offshore wind.

Funding/Support Mechanisms

- Wave Energy Scotland
- OWGP Development Grant
- ORE Catapult Launch Academy National programme



Future Electrical Systems and Cables

Looking Forward

The development of sites further from shore requires new solutions for cables and electrical systems. Floating wind has the additional need for cables to operate in a dynamic environment. There is good experience of cables and electrical systems from fixed bottom deployment and much of this has come from the subsea sector where Scotland has significant capability. On export cables, the longer distances to shore are leading to higher voltage cables and a shift from HVAC to HVDC with innovation being required to move to 525 kV HVDC and 275 kV HVAC. In floating wind, dynamic cables are required for array cables and potentially export cables. Cable monitoring systems will be essential areas for innovation to fully understand the behaviour of cables in a dynamic environment. There will be a requirement for the development of subsea high voltage equipment such as connection hubs and quick disconnect connectors. There is an opportunity for cable manufacturers to collaborate with Scotland's experienced subsea supply chain to find solutions to these challenges.

CASE STUDY

AJT Engineering

C-DART mooring system: Rapid, Reliable, Low-Risk

Smart Environmental Services

Technology/Project Description

The C-Dart mooring system is a collaboration between AJT Engineering and Blackfish Engineering, with an agreement in place to fast-track commercialisation. The C-Dart is a quick-connect system for floating infrastructure and assets, where mooring lines are connected using a revolutionary contact-free automated process.

Timeline of Development/Deployment

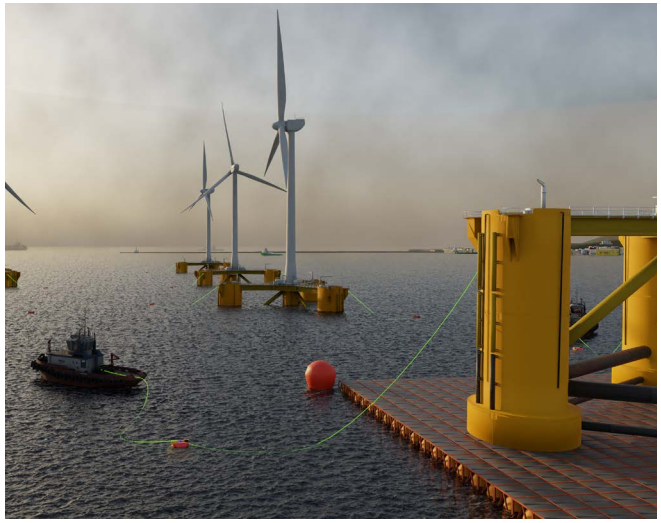
During Phase 1 of the project (2021-24) the C-Dart concept development was completed, culminating in full scale testing at The Underwater Centre in Fort William. The certification process completion and market entry into the North Sea should be achieved by 2025, with plans to expand the product line and geographical area by 2027.

Impact

- Cuts mooring installation and removal times by 50%.
- Enhances safety of mooring processes.
- Manufacturing, engineering and maintenance jobs created.
- Reduced environmental risks due to mooring failure.

Funding/Support Mechanisms

- ORE Catapult Launch Academy Scotland programme
- WES Quick Connection Systems call



CASE STUDY

Apollo / Leask Marine / EMEC

PALM Charger System

Smart Environmental Services

Technology/Project Description

The PALM Charger, a pioneering 'plug and play' charging point, is designed to enable electric service operation vessels (eSOVs) and other marine electric vehicles (EVs) to recharge while operating offshore for extended periods.

Timeline of Development/Deployment

The trials, conducted in collaboration with Orkney-based partners Leask Marine and the European Marine Energy Centre (EMEC), were carried out in Orkney waters in October 2024. EMEC's Scapa Flow test site was used, which is a leased area of seabed created for testing marine energy technologies and subsystems. This trial provides a great example of the flexibility of EMEC's test sites and how they can support other industries, in this case maritime decarbonisation, to demonstrate concepts and ideas in a real-life scenario.

Impact

- Enabling of future low-emission electric vessels in offshore wind.

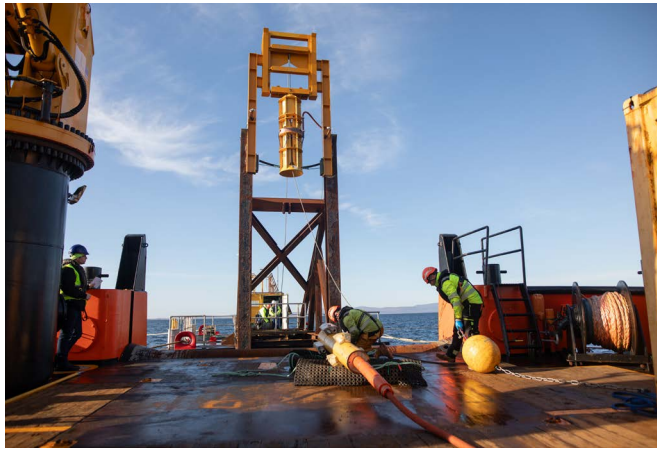
Funding/Support Mechanisms

- Clean Maritime Demonstration Competition
- Wave Energy Scotland

apollo

EMEC
THE EUROPEAN MARINE ENERGY CENTRE LTD

LEASK MARINE



CASE STUDY

Ørsted / University of Aberdeen / University of Highlands and Islands

PREDICT

Smart Environmental Services

Technology/Project Description

PREDICT is a project funded by Ørsted, in collaboration with the University of Aberdeen and the University of Highlands and Islands, aimed at improving the understanding of fish migration patterns to better predict interactions between top-level predators and offshore wind farms. The project integrates multi-disciplinary expertise in ecology, engineering, and data analysis to investigate fish migration as prey availability, assess the impact of climate change on oceanographic changes, and evaluate the knock-on effects on seabirds and marine mammals. By combining historical datasets and commercial landings data, PREDICT aims to recreate annual fish migration routes and generate seasonal maps to identify potential overlaps between wind farm locations and critical feeding grounds for seabirds and marine mammals. The project has suggested novel autonomous platforms and sensors which could be used in the future to help collect data on environmental drivers and prey availability, enhancing ecological understanding and reducing risks associated with offshore wind developments in shallow and coastal seas. Some of these sensors have been deployed at the site of the Salamander floating offshore wind farm to validate the modelling conducted in the project as part of a follow-on, dubbed PREDICT 2.0.

Timeline of Development/Deployment

PREDICT is a three-year project concluding in December 2024. PREDICT 2, which commenced in 2024, involves the collection of data at the Salamander site to validate modelling and further increase understanding of fish movements as a predictor of predator distributions

Impact

- Improved understanding of fish migration routes, allowing placement of future wind farms in areas that will minimise impact on marine life.

Funding/Support Mechanisms

- Funded by Ørsted

PREDICT

Looking Forward

With leading centres for marine research and a strong supply chain for environmental services, Scotland is well-placed to innovate in the area of Smart Environmental Services. As wind farms increase capacity, the area of seabed that must be surveyed also increases. Similarly, as wind farms move further from shore, the transit time for vessels increases resulting in higher costs and increased carbon footprint. Development of autonomous surface vessels and autonomous ROVs have the potential to address these challenges and can lead to improved consenting timescales and decarbonised vessel operations. Innovations around port infrastructure, communications and associated safety systems will be required to facilitate these new technologies. Scotland also has a strong research base in the area of autonomous vessels and robotics that can support growth in this area. As wind farms move into operations there are ongoing requirements for environmental monitoring so reducing the costs through novel data collection and analysis is another opportunity for innovation.

Smart Environmental Services

CASE STUDY

Airspection

Drone Turbine Inspection Demonstration

Next Generation Installation and O&M

Technology/Project Description

Airspection is developing Beyond Visual Line of Sight (BVLOS) drone technology to provide offshore wind turbine inspections from the safety of shore. The project aimed to validate Airspection's capability for inspecting turbine blades up close, which involved creating a Risk Assessment Method Statement (RAMS) and executing a demonstration at ORE Catapult's Blyth facility.

Timeline of Development/Deployment

The project began with planning in collaboration with ORE Catapult in November 2023, with test flights completed in March 2024, when successful inspections were completed.

Airspection is also working with the Civil Aviation Authority (CAA) to develop and demonstrate BVLOS regulation which will be trialled at an offshore wind farm in 2025 and is a key step in enabling offshore inspections with a fly from shore approach.

Impact

- Showcasing of BVLOS drone technology for offshore wind turbine inspection.
- Enhanced industry interest in BVLOS drones for commercial deployment.
- Development of CAA regulations for BVLOS drones.

Funding/Support Mechanisms

- IUK RTC grant, partnered with ORE Catapult
- ORE Catapult Launch Academy Scotland programme

AIRSPECTION

CASE STUDY

Fugro

Diving into the future of subsea surveys

Next Generation Installation and O&M

Technology/Project Description

Fugro's Blue Essence® uncrewed surface vessel (USV) completed the world's first fully remote offshore wind inspection equipped with a Blue Volta® electric remotely operated vehicle (eROV). The inspection at Vattenfall's European Offshore Wind Deployment Centre in the North Sea, off the coast of Aberdeen, involved assessing the subsea turbine infrastructure.

Timeline of Development/Deployment

In 2023, Fugro Orca became the first USV to receive approval from the Maritime and Coastguard Agency to operate fully remotely with an eROV and undertake surveys in UK waters. The USV and eROV were controlled and recovered from Fugro's remote operations centre in Aberdeen. The eROV delivered numerous inspections to assess the integrity and safety of wind turbines.

Impact

- Decreased risk to personnel by enabling them to remain onshore during inspections.
- 95% reduction in carbon emission compared to conventional survey vessel.
- Improved sustainability of O&M work scope.
- Real time data facilitated quick decision making for turbine maintenance programme.

Funding/Support Mechanisms

- Vattenfall and ORE Catapult joint funding for asset inspection at the European Offshore Wind Deployment Centre

CASE STUDY

LiftOff

(Kincardine Offshore Wind Farm) - First in-situ major component exchange on floating turbine

Next Generation Installation and O&M

Technology/Project Description

A group of industry specialist companies has achieved a world-first for the wind industry, with a Major Component Exchange (MCE) being performed on an offshore floating wind turbine while it remained on site at the Scottish Kincardine Offshore Wind Farm, located southeast of Aberdeen.

The new, more cost-effective, process was delivered through a collaboration of technologies and expertise from LiftOff, Vestas, Dragados S.A., Kincardine Offshore Wind Farm Limited (KOWL) and Cobra Wind International Limited (CWIL).

The wind energy industry has been seeking technological alternatives to improve processes when generator repairs or replacements are required. The recently completed in-situ generator exchange on a Vestas V164-9.5 MW turbine, using LiftOff up-tower crane technology and specialised teams from LiftOff and Vestas, has proven that major component exchanges can be done offshore, without the need for massive offshore cranes, or the need to tow the wind turbine to port. The full project was executed from an offshore support vessel (OSV), supported by crew transfer vessels (CTVs).

Timeline of Development/Deployment

The project was initiated in the last week of 2023 and offshore execution took place in July and August 2024.

Impact

- Elimination of the need for tow to port operations, reducing costs and carbon emissions dramatically.
- Decreased turbine down time.
- Improvement of business case for floating offshore wind.

Funding/Support Mechanisms

- Industry funding

CASE STUDY

Pict

"Get Up Safe" offshore wind personnel access system

Next Generation Installation and O&M

Technology/Project Description

The Get Up Safe (GUS) system, from Pict Offshore is an active heave compensated lifting solution, designed specifically for transferring personnel between Crew Transfer Vessels (CTVs) and the main access platform of an offshore wind turbine. The system makes access safer, improving health and safety, and allowing transfers to take place over a larger proportion of the year, improving accessibility. Each high-tech system resembles a small crane and is assembled at a bespoke facility in Inverkeithing, with fabricated parts sourced from local suppliers.

Timeline of Development/Deployment

Development of the system began in 2016 and, since the end of 2017, Pict has collaborated with Ørsted to bring the system to market. Ørsted has a 22% stake in the company.
In 2021, Pict supplied the GUS system to Ørsted's Hornsea 2 offshore wind farm in the UK, where it has replaced landing ladders as the means of access from CTV on all 165 wind turbines. In 2022/23, the GUS system was supplied to 3 new Ørsted wind farms in the USA (totalling 161 systems) starting in 2023. In 2024, Pict supplied its first non-Ørsted wind project. Pict is currently developing the next-generation GUS system, which will be launched in 2025.

Impact

- Industry supply, service and maintenance contracts entered with application across sector.
- Decreased risk to personnel accessing offshore wind turbines for inspection and maintenance.
- Growth from 4 to 30 employees and further supply chain work.

Funding/Support Mechanisms

- Scottish Enterprise SMART grant and Regional Select Assistance
- OWGP Development Grant
- OWGP Sharing in Growth Offshore Wind Programme
- Use of ORE Catapult test assets, namely Levenmouth Demonstration Turbine and the Floating Offshore Wind Innovation Centre (FLOWIC)
- Scottish Development International trade missions to foreign markets

CASE STUDY

Smarter Subsea Handling

ROVAR (ROV for Asset Recovery) – "Lifting & Shifting" Subsea Infrastructure

Next Generation Installation and O&M

Technology/Project Description

ROVAR is a game-changing, zero emissions, variable buoyancy system, powered by liquid nitrogen. ROVAR moves heavy loads (10s-100s of tonnes) underwater, as a subsea crane or forklift. It works as a standalone vehicle or as multiplexed units for heavier loads into the 1000s of tonnes, something only currently possible with heavy-lifting cranes on large ships. ROVAR can "Pick and Place", "Hunt and Gather", and "Lift and Shift" subsea, increasing the utilisation and functionality of any marine vessel, providing versatile offshore wind construction support and lower cost seabed clearance.

Timeline of Development/Deployment

With plans in place to complete engineering and certification by 2026, ROVAR will come to market through a unique collaboration with the commercial wing of the Scottish Fishermen's Federation, using their seasonally underutilised pelagic fleet for deployment and operation of ROVAR.

Impact

- Major cost savings for floating wind developers (£70m/GW) have been identified from ROVAR/Pelagic use.
- The collaboration will bring year-round social and economic benefits to Scottish fishing communities.
- Clearing of seabed subsea debris and obsolete infrastructures in congested fishing grounds.

Funding/Support Mechanisms

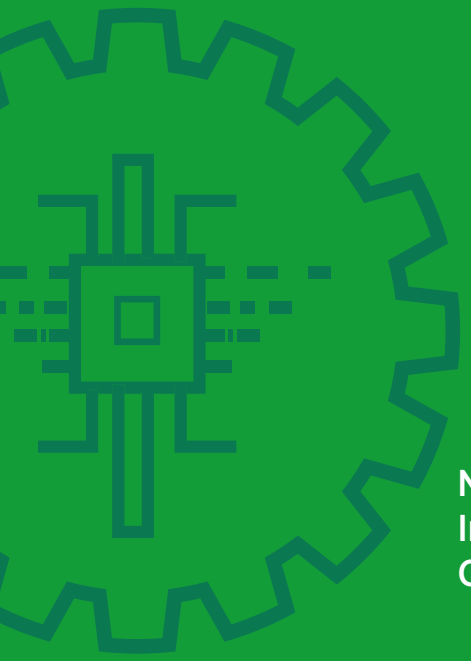
- IUK Collaborative Research and Development competition
- Industrial collaboration partners
- OWGP WEST programme
- ORE Catapult Launch Academy Scotland programme

Smarter Subsea Handling

Pioneers in controllable buoyancy

Looking Forward

Health and safety improvements from reduction in manual interventions offshore is a priority for the offshore wind sector. Development of autonomous and robotic solutions such as drones for inspection is developing well and expanding this to include more advanced interventions such as repairs is the next stage of innovation that is required. There are additional challenges relating to O&M for floating turbines in depths that are too deep for jack up vessels. Carrying out major component changes on floating platforms without towing to port is an essential innovation. Challenges also need to be addressed subsea where solutions are required to support installation and carry out ongoing monitoring of all subsea assets including cables, mooring lines and anchors.



Next Generation Installation and O&M

CASE STUDY

Clyde Hydrogen

Decoupled Electrolyser, Storage, and Offshore Wind (DESOW)

Technology/Project Description

The DESOW project (July 2023-July 2024) was a feasibility study into the technoeconomic and other practicalities of using offshore wind power to drive a Clyde Hydrogen Systems decoupled electrolyser for the production of green hydrogen. Decoupled electrolysis is a new and disruptive approach to the production of green hydrogen via electrolysis, whereby the oxygen and hydrogen products of electrolysis can be produced in different places to each other, at different times to each other, and at rates that are not linked.

Timeline of Development/Deployment

Building on small scale and batch systems, Clyde Hydrogen Systems is currently producing a prototype decoupled electrolyser which should be operational in the first half of 2025. Production of systems suitable for deployment is planned for 2026/27.

Impact

- Benefits of decoupled electrolysis for hydrogen production presented.
- A further step towards utilising green electricity for hydrogen production..

Funding/Support Mechanisms

- Scottish Government Emerging Energy Technology Fund – Hydrogen Innovation Scheme

Clyde Hydrogen

Additional Innovation Areas

CASE STUDY

EMR (ReReWind)

Recovery of Rare Earth Element Magnets from Wind turbines

Technology/Project Description

As the first generation of the UK's wind turbines come to the end of their serviceable life, the Re-Rewind project has been pioneering a sustainable, circular economy to recover and secure rare earth elements from magnets contained in direct drive offshore wind turbines. ReReWind is an innovative partnership between EMR Renewables, HyProMag, the Offshore Renewable Energy (ORE) Catapult, Magnomatics, and the University of Birmingham.

Within this, EMR has been developing techniques to safely disassemble wind turbine nacelles and extract the rare earth element containing magnets in an appropriate form for downstream processing.
These practices will be used by project partners to recover crucial rare earth element (REE) materials that can be incorporated back into the UK supply chain via short loop magnet manufacture.

Timeline of Development/Deployment

The initial project is 18 months and due for completion in March 2025.

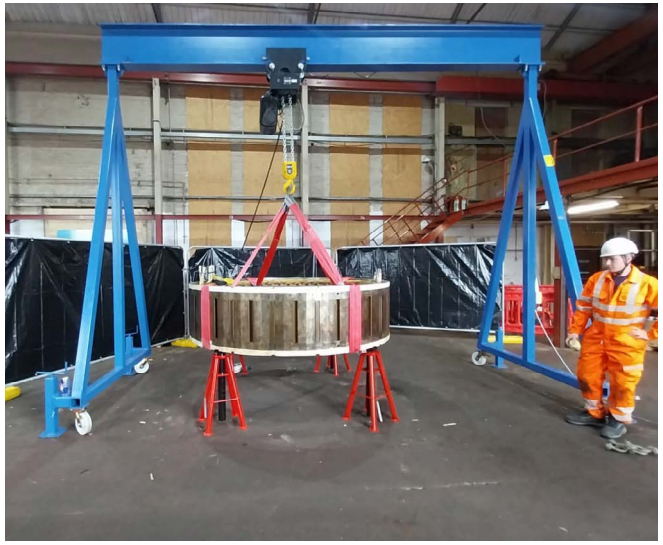
Impact

- Greater circularity of rare earth metals achievable for end of life direct drive offshore wind turbines.
- Reduction in rare earth metal mining.

Funding/Support Mechanisms

- IUK CLIMATES programme

RE-REWIND



Additional Innovation Areas

CASE STUDY

NDC Marine Simulator

The National Decommissioning Centre's Marine Simulator for Technology Trailing

Technology/Project Description

Marine operations related to the development, deployment and operation of renewable energy systems are expensive, challenging and have associated risks. The NDC's Marine Simulator provides a facility to trial and de-risk offshore operations in a safe virtual environment. The simulator provides a 300-degree walk-in visual immersive environment, with four control chairs to assign control of any object/asset in the scene, e.g. cranes, personnel, vessels. The effect of the user-controlled environment on the object is provided by real time physics calculations in the system, for example vessels are affected fully by waves, current and wind.

Timeline of Development/Deployment

The simulator build was completed in May 2021, with the official launch taking place in September 2021, with the facility now available to and being utilised by industry.

Impact

- De-risking of assembly, towing, installation and sea holding of novel floating offshore wind turbine designs.
- Supported design optimisation of floating offshore wind turbine mooring systems.
- Virtual trialling of connections and mooring line load reduction devices for offshore renewables electric marine vessel charging systems offshore.

Funding/Support Mechanisms

- Scottish Government Decommissioning Challenge Fund
- UKRI funding mechanisms (Supergen ORE Hub, IUK)
- Industry partners

The National Decommissioning Centre
Innovation through Partnership

Additional Innovation Areas

CASE STUDY

Reekie Machining

Repurposing of wind tower base foundation bolts

Technology/Project Description

Reekie Machining developed a solution to re-thread existing wind tower foundation bolts which were damaged beyond repair, allowing them to be reused. The repair method was demonstrated on a modified wind turbine base which required circa 64 bolts to have a thread reinstated to enable turbine trials to take place.

Timeline of Development/Deployment

Using two RTM CNC controlled threading machines, a bespoke mounting plate and tooling fabricated for the project, Reekie Machining successfully completed proof trials at their Inchinnan base, before carrying out in situ machining work at a turbine site.

Impact

- Allows reuse of existing infrastructure where alternative is costly.

Funding/Support Mechanisms

- Commercially funded

Additional Innovation Areas

CASE STUDY

Verlume

Intelligent subsea energy storage for the offshore wind sector

Technology/Project Description

As part of a technology scouting process in 2022, Aberdeen-based Verlume secured a contract to deliver a unique offering for system integration at RWE's OranjeWind offshore wind farm development in the Dutch North Sea.

Verlume is bringing multi-purpose intelligent energy storage solutions through Orah - a subsea lithium-ion battery with integrated intelligent energy management, which has a modular and highly scalable design that will lead to a more balanced power output by shaving the peak power production offshore.

Timeline of Development/Deployment

Scheduled for deployment in 2026.

Impact

- Minimises grid curtailment.
- Provision of multiple offshore services, such as grid response and charging of electric vessels.
- Enabling charging of resident autonomous underwater vehicles.
- Reduction of CO_2 footprint of offshore wind farm logistics.

Funding/Support Mechanisms

- Commercial contract with RWE

verlume

Additional Innovation Areas

Looking Forward

Offshore wind cannot be a standalone industry. To achieve Scotland's net zero targets, a focus on developing a variety of renewable energy technologies will be needed to ensure the security of energy supply. The integration of offshore wind with hydrogen and battery storage, whether co-located or geographically separate, is one important example. Additionally, in an industry aiming to reduce the impacts on the environment, more must be done to ensure there are suitable sustainability and circular economy strategies in place. Scotland has huge renewable resources, but currently faces the challenge of grid bottlenecks and curtailments. Combined action to both develop the transmission infrastructure between generation and demand, and system integration technologies to enable generators to make best use of grid connection points and offer additional grid services is required for the Scottish wind industry to deliver maximum value.

Additional Innovation Areas

Summary of Future Innovation Priority Areas

Advanced Turbine Technology

- Condition monitoring and control systems to optimise turbine lifetime performance.
- New materials and manufacturing processes to enable longer blades.
- Alternative designs beyond growth of three bladed horizontal axis turbine.

Industrial Foundations & Substructures

- The development of new mooring line materials.
- The modular design of substructures with reduced assembly time.
- Development of deep water fixed foundations.

Future Electrical Systems & Cables

- Export cables voltage increases to 525 kV HVDC and 275 kV HVAC.
- Dynamic cable reliability for floating offshore wind.
- Subsea high voltage connection hubs and quick disconnect connectors.

Smart Environmental Services

- Development of autonomous surface vessels and autonomous ROVs.
- Decarbonising vessel operations at an industry scale.
- Novel data collection and analysis for accelerated consenting.

Next Generation Installation and O&M

- Major component exchange strategies and solutions for FOWTs.
- Expanding robotic inspection to include repair capability.
- Circular economy, repair and refurbishment solutions.

Additional Innovation Areas

- Hydrogen and battery storage integration with offshore wind.
- End of life sustainability and circular economy strategies and mechanisms.

These developments are needed by the sector to drive cost reduction and increased deployment. Scotland's opportunity is to be the best location to conduct this innovation, research and development. Coupled with the world-leading deployment pipeline, this will enable Scotland to maximise the economic rewards of the energy transition. For this to happen, a joined-up approach between the public sector, development agencies, local authorities, developers and supply chain is required. The next section delves into the existing support landscape which offers a vast amount to innovators

Support Landscape

Scotland has an extensive and varied support landscape to meet the differing needs of innovators. This section highlights many mechanisms of commercial support, technology support and innovation programmes. An up-to-date list can be found in the Support Finder on the Offshore Wind Scotland Website. The included case studies shown highlight some support mechanisms available.

Support Finder | Offshore Wind Scotland

Launch Academy Scotland

Launch Academy: Scotland is a technology accelerator programme designed for the Offshore Wind sector and delivered by ORE Catapult. This programme is sponsored by various offshore wind developers and all three Scottish enterprise agencies. It will provide technology development, commercial and professional services support to ten innovative Scottish companies from November 2024 – May 2025.

This is a regional programme specific to Scotland, delivered by and for Scottish companies with an aim to encourage innovation and generate tangible impact within Scotland – by bringing new products & services to market, creating jobs, enabling private / CR&D investment and encouraging export to international markets.

Launch Academy: Scotland is part of the wider "Launch Academy" brand. Every year, a "national" UK-wide programme is delivered, having supported 67 innovative companies to date across the Launch Academy programme portfolio. Launch Academy is an industry-recognised, award-winning initiative. Further information associated with upcoming opportunities linked to this programme can be found at Launch Academy | Supply Chain Programmes | ORE Catapult.

Key impacts – National and Regional Launch Academy Programmes to date

- Total Investment Raised: £27,956,086
- Total Grant Funding Raised: £9,286,588
- Total Number of Grants Won: 72
- Number of Companies with D&I policies: 26
- Total Number of Patents Filed: 151
- Total Number of Products/Services Commercialised: 46
- New Operational Bases Created: 6
- Growth in Overall Headcount: 70

CATAPULT Offshore Renewable Energy | LAUNCH ACADEMY

Programme sponsors

BlueFloat Energy nadara | HIE Highlands and Islands Enterprise Iomairt na Gàidhealtachd 's nan Eilean | Inch Cape Offshore Limited | OW Ocean Winds | Scottish Enterprise | South of Scotland Enterprise

Delivery partners

Hutcheon Mearns | SCINTILLA

Salamander Supplier and Innovation Pathway

Salamander offshore wind farm (being developed by Simply Blue Group, Ørsted, and Subsea 7) is a 100 MW project, awarded a lease through the INTOG leasing round. In 2021 it ran a call – "Supplier and Innovation Pathway", which has been repeated in the run-up to the project securing its consent. The process seeks innovative technologies, as well as suppliers, and has led to many solutions being included in the project's base case which the developers would not have been aware of without the Pathway. The technologies straddle a number of packages within the wind farm, and a range of maturities – many of them will be the focus during the FEED stages of development and as the project progresses towards construction at the end of the 2020's, leading to advancement of Scottish technologies and suppliers who can impact Salamander and the wider floating wind industry.

Key impacts - Salamander

- 91 responses
- 10 taken forward to pitch review
- 3 included in the wind farm base case

EMEC Offshore Wind Research and Innovation (R&I) Programme

EMEC launched the Offshore Wind R&I Programme in 2023 alongside platinum sponsor West of Orkney Wind Farm. The programme is searching for novel solutions to help deliver offshore wind faster, cheaper and at lower risk.

A series of innovation calls will address different challenge areas pertinent to the West of Orkney Wind Farm spanning metocean, installation, logistics, and O&M as well as cross cutting challenges such as machine learning and AI. The second innovation call is due to launch in early 2025. Through these targeted innovation calls, the programme will sponsor supply chain companies to bring new solutions to market, building operational capacity and scaling up activities whilst embedding economic benefits in Scotland. EMEC is also exploring opportunities to broaden the remit of the programme, inviting project developers to sponsor the programme and/or innovation calls targeting specific technical, delivery or commercial challenges.

Expected impacts – EMEC

- Innovative solutions to key offshore wind challenges
- Reduced time, cost and risk of offshore wind roll out in high energy environments
- Enhanced R&I capacity in Scotland

Commercial Innovation Support

Commercial Innovation Support mechanisms are different forms of funding that can be applied for. These are typically in the form of grants or loans and can be for single companies or collaborative projects in a national or international setting. These may be open for application at any time or have specific call/competition periods during which applications must be submitted.

Funding	Organisation/ Company	Research / Proof of Concept	Prototype Development	Full Scale Test & Demo / Validation	Commercialisation / Market Development
Aberdeen Business Start-Up Grant Scheme	Aberdeen City Council	●	●		
Circular Economy Investment Fund	Zero Waste Scotland		●	●	●
Clean Energy Transition Partnership	Scottish Enterprise	●	●	●	
Clean Maritime Demonstration Call	Department for Transport / IUK		●	●	
Defence & Security Accelerator (DASA)	MoD, DSIT	●	●	●	●
EIC Grant Funding	Horizon 2020			●	●
Engineering and Physical Sciences Research Council (EPSRC)	ESPRC	●	●		
EPSRC Supergen ORE Hub, Flex funding projects	Various	●	●		
ETZ Challenge Call	Energy Transition Zone	●	●	●	
EUREKA EuroStars - UK SMEs	Horizon 2020		●	●	
Eurogia - IUK	Eureka Network (IUK - UK lead)	●	●	●	
Funding for development of hydrogen projects	Scottish Enterprise			●	●
General national innovation competitions 2024	UK Government	●	●	●	●

Funding	Organisation/ Company	Research / Proof of Concept	Prototype Development	Full Scale Test & Demo / Validation	Commercialisation / Market Development
Green Grant fund	Highlands and Islands Enterprise	●	●	●	●
Horizon Europe; Clean Hydrogen Partnership; Pump Prime, Scottish European Green Energy Centre (SEGEC)	European Commission		●	●	
IUK bilateral calls	IUK	●	●	●	
IUK Loans	IUK		●	●	●
Interface Innovation Vouchers	Interface	●	●		
IUK Infrastructure Systems	IUK		●	●	●
IUK Manufacturing and Materials	IUK		●	●	●
IUK Open Funding	IUK		●	●	●
IUK SMART funds	IUK	●	●	●	●
IUK Smart Shipping Acceleration Fund	IUK	●	●	●	
KTN Innovation Exchange (KTNiX)	IUK	●	●	●	●
KTP	IUK		●	●	
Low Carbon Manufacturing Challenge Fund	Scottish Enterprise	●	●	●	●
Offshore Wind Growth Partnership Innovation Grants.	OWGP		●	●	●
OFGEM call for Ideas IUK and OFGEM energy network call for ideas	OFGEM / IUK	●	●		
IUK Business Growth Innovation voucher	IUK	●	●	●	●
OWGP Development Grant £50k to £500k OWGP supply chain growth funding	OWGP			●	●
PEACEPLUS	Special EU Programmes Body (SEUPB)		●	●	

Funding	Organisation/ Company	Research / Proof of Concept	Prototype Development	Full Scale Test & Demo / Validation	Commercialisation / Market Development
Regional Selective Assistance funding (RSA)	Scottish Enterprise				
Research and Development (R&D) grant funding	Highlands and Islands Enterprise				
Research and development (R&D) grants	Scottish Enterprise				
Scotland CAN DO Offshore Wind Innovation Feasibility Challenge Call	Scottish Enterprise				
Scottish Co-Investment Fund	Scottish Enterprise				
Scottish Growth Scheme	Scottish Enterprise				
Scottish Venture Capital Fund	Scottish Enterprise				
SE Business Support Feasibility Grant	Scottish Enterprise				
SMART: Scotland Grant	Scottish Enterprise				
SME Loan Fund	Scottish Government				
Young Business Capital Grant	Highlands and Islands Enterprise				
Zero Emission Mobility Innovation Fund	Scottish Enterprise				
Zero Emissions Mobility Funding Call	ETP				

Technology Innovation Support

These are programmes aimed at supporting technology development through collaboration, and test and demonstration opportunities.

Funding	Organisation/ Company	Research / Proof of Concept	Prototype Development	Full Scale Test & Demo / Validation	Commercialisation / Market Development
ORE Catapult Floating Offshore Wind Centre of Excellence	ORE Catapult	●			
ORE Catapult Operations & Maintenance Centre of Excellence	ORE Catapult	●			
NZTC & ORE Catapult ETA Programmes	NZTC & ORE Catapult	●			
Energy Innovation Centre from Idea to full Scale Test and Demo and BAU deployment and Scale up	Energy Innovation Centre	●	●	●	●
Offshore Wind Accelerator Joint Industry Programme (JIP)	Carbon Trust	●	●	●	
Floating Wind JIP	Carbon Trust	●	●	●	
Offshore Renewables JIP	Carbon Trust	●			
Offshore Wind Sustainability JIP	Carbon Trust				●
The Integrator	Carbon Trust	●			
Low Carbon Power & Energy Partnership	University of Strathclyde, ScottishPower, SSE	●	●		

Innovation Programmes

Innovation Programmes are designed to support a business as it develops an innovation or moves into offshore wind from other sectors. This includes technology accelerator programmes, research and innovation programmes, support toolkits and growth platforms. Similar to Commercial Innovation Support, these may be open for application at any time or have specific call/competition periods during which applications must be submitted.

Funding	Organisation/ Company	Research / Proof of Concept	Prototype Development	Full Scale Test & Demo / Validation	Commercialisation / Market Development
EIC (European Innovation Council) Accelerator	Horizon 2020		●		●
Energy Catalyst Accelerator Programme	Carbon Trust			●	●
EPSRC Impact Acceleration Account (IAA) - Edinburgh, Glasgow, St Andrews, Strathclyde, Cross-institutional	EPSRC	●	●	●	●
Eureka Innowwide	Horizon			●	●
F4OR business development support	ORE Catapult	●	●	●	●
Global Business Innovation Programme (GBIP)	IUK	●	●	●	
Highlands and Islands Enterprise Innovation Programme	Highlands and Islands Enterprise		●	●	
Hydrogen Scotland	Hydrogen Scotland		●	●	●
PERSEO Start-up Programme	Iberdrola	●	●		
IUK Connect	IUK	●	●	●	●
InvestAbility; Investor Partnerships; Scottish Co-investment; GreenBackers; Clean Energy Alliance	IUK		●	●	
IUK Business Growth	IUK	●	●	●	●
IUK Scale Up Director support intense 12-month support on specific needs	IUK			●	●

Funding	Organisation/ Company	Research / Proof of Concept	Prototype Development	Full Scale Test & Demo / Validation	Commercialisation / Market Development
MSIP Accelerator	MSIP				
Net Zero Innovation Portfolio (NZIP) Programme	Carbon Trust				
NOW (Norwegian Offshore Wind) Accelerator Programme	Norwegian Offshore Wind Consortium				
NPSA (National Protective Security Authority) / NCSC (National Cyber Security Centre)	UK government				
Offshore Wind Growth Partnership Wind Expert Support Toolkit & Sharing in Growth support programme	OWGP				
Offshore Wind Innovation Hub	ORE Catapult / IUK				
Offshore Wind R&I Programme	EMEC / West Orkney Wind Farm				
ORE Catapult Launch Academy / Launch Academy Scotland	ORE Catapult				
ORE Catapult SME Growth Platform	ORE Catapult				
Ørsted Open Innovation	Ørsted				
Scottish Enterprise	Scottish Enterprise				
Scottish Manufacturing Advisory Service (SMAS)	Scottish Enterprise				
SDI; GlobalScots from test and demo to commercial	Scottish Government				
South of Scotland Enterprise	South of Scotland Enterprise				

Funding	Organisation/ Company	Research / Proof of Concept	Prototype Development	Full Scale Test & Demo / Validation	Commercialisation / Market Development
Techscaler	Codebase (via Highlands and Islands Enterprise)				
TechX Accelerator	NZTC				
UKIPO audit and follow up support - SMEs only	UK Intellectual Property Office				
UKSPA – Security and cyber	UKSPA				

Directory

Click below to view on the map. Laboratories can be selected by their individual subheadings.

Academic Institutions and Research Centres

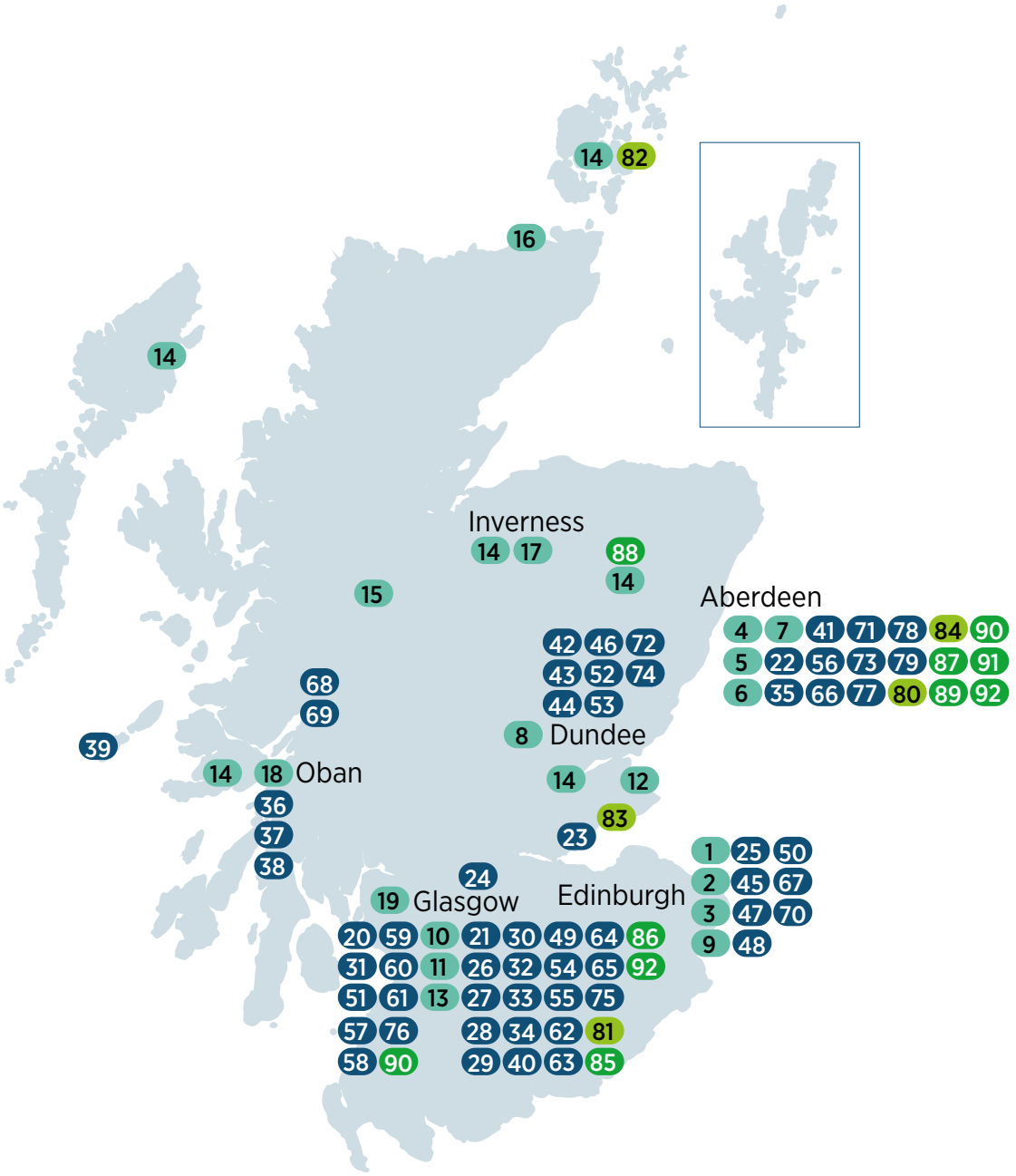
Laboratories

- Cable and Electrical Testing
- Environmental Testing and Survey
- Foundation and Anchor Testing
- Hydrodynamics
- Material Testing
- Mechanical and Structural Testing
- Robotics
- Simulation
- Subsea Testing

Demonstration Sites

Technology Centres

Show All



Academic Institutions and Research Centres

Universities and centres specialising in research, typically supporting technologies in the research and development stages of technology readiness.

Organisation	Type of facility	Location	Map Number
Edinburgh Napier University	University	Edinburgh	1
Edinburgh Napier University - Scottish Energy Centre (SEC)	Research Centre	Edinburgh	2
Heriot-Watt University	University	Edinburgh	3
National Decommissioning Centre to Academic Institutions and Research Centres	Research Centre	Newburgh, Aberdeenshire	4
National Subsea Centre	Research Centre	Aberdeen	5
Robert Gordon University	University	Aberdeen	6
University of Aberdeen	University	Aberdeen	7
University of Dundee	University	Dundee	8
University of Edinburgh	University	Edinburgh	9
University of Glasgow	University	Glasgow	10
University of Glasgow - Glasgow Centre for Sustainable Energy	Research Centre	Glasgow	11
University of St Andrews – Scottish Oceans Institute	Research Centre	Fife	12
University of Strathclyde	University	Glasgow	13
University of the Highlands and Islands	University	Inverness, Argyll, Moray, Orkney, Shetland, Perth and Stornoway	14
University of the Highlands and Islands - Energy Innovation Centre	Research Centre	Highlands	15
University of the Highlands and Islands - Environmental Research Institute (ERI)	Research Centre	Thurso	16
University of the Highlands and Islands - Institute for Biodiversity and Freshwater Conservation (IBFC)	Research Centre	Inverness	17
University of the Highlands and Islands - Scottish Association for Marine Science (SAMS)	Research Centre	Oban	18
University of the West of Scotland	University	Paisley, Lanarkshire, Ayr and Dumfries	19

Laboratories

Laboratories are facilities for undertaking testing in a controlled environment, often supporting technologies in the development phase of technology readiness.

Type of facility	Organisation	Test Facility	Location	Map Number
Cable and Electrical Testing	Altrad Babcock Limited	Cable and umbilical testing	Renfrew	20
Cable and Electrical Testing	Energy Technology Centre	Grid connection and power systems testing	Glasgow	21
Cable and Electrical Testing	Offshore Renewable Energy Catapult	Floating Offshore Wind Innovation Centre (FLOWIC) – Cable bending rig	Aberdeen	22
Cable and Electrical Testing	Parsons Peebles	Electric Motor & Generator Test Facility	Rosyth	23
Cable and Electrical Testing	Scottish and Southern Energy (SSE)	The National HVDC Test Centre	Cumbernauld	24
Cable and Electrical Testing	University of Edinburgh	Electrical Machines and Power Electronics Test Laboratory	Edinburgh	25
Cable and Electrical Testing	University of Strathclyde	Electrical Power System Protection Laboratory	Glasgow	26
Cable and Electrical Testing	University of Strathclyde	Energy Technology Test Facilities	Glasgow	27
Cable and Electrical Testing	University of Strathclyde	Distribution Network & Protection Laboratory	Glasgow	28
Cable and Electrical Testing	University of Strathclyde	High Voltage Technologies & Electrical Plant Diagnostics	Glasgow	29
Cable and Electrical Testing	University of Strathclyde	Power Networks Demonstration Centre (PNDC)	Glasgow	30
Environmental Testing and Survey	Altrad Babcock Limited	Thermal component testing	Renfrew	31
Environmental Testing and Survey	Energy Technology Centre	Whirling Arm Rain Erosion Test Rig	Glasgow	32
Environmental Testing and Survey	Energy Technology Centre	Renewable & Low Carbon Energy Test Facilities	Glasgow	33

Type of facility	Organisation	Test Facility	Location	Map Number
Environmental Testing and Survey	Energy Technology Centre	Wind Tunnel	Glasgow	34
Environmental Testing and Survey	Robert Gordon University	Wind Tunnel	Aberdeen	35
Environmental Testing and Survey	SAMS	Glider Environmental Sensors	Oban	36
Environmental Testing and Survey	SAMS	Remotely piloted aircraft - wind farm turbulence monitoring	Oban	37
Environmental Testing and Survey	SAMS	AUV seabed mapping and measurement	Oban	38
Environmental Testing and Survey	SAMS	Current meter monitoring mooring line	Tiree	39
Environmental Testing and Survey	University of Glasgow	deHavilland Low Speed Wind Tunnel	Glasgow	40
Foundation and Anchor Testing	Offshore Renewable Energy Catapult	Floating Offshore Wind Innovation Centre (FLOWIC) – Scale anchor test rig	Aberdeen	41
Foundation and Anchor Testing	University of Dundee	Simulation modelling of turbine foundations and subsea anchors (High Performance Computing Facility and Computational Modelling)	Dundee	42
Foundation and Anchor Testing	University of Dundee	Geotechnical & Soil Laboratory	Dundee	43
Foundation and Anchor Testing	University of Dundee	Anchor Pull and Cable Plough Test	Dundee	44
Hydrodynamics	Heriot-Watt University	Wave Basin	Edinburgh	45
Hydrodynamics	University of Dundee	Fluid Mechanics Laboratory	Dundee	46
Hydrodynamics	University of Edinburgh	Curved Wave Tank	Edinburgh	47
Hydrodynamics	University of Edinburgh	FloWave Ocean Energy Research Facility	Edinburgh	48

Type of facility	Organisation	Test Facility	Location	Map Number
Hydrodynamics	University of Strathclyde	Kelvin Hydrodynamics Laboratory	Glasgow	49
Material Testing	APEX Metrology Ltd	Measurement and Validation Laboratory	Loanhead	50
Material Testing	Altrad Babcock Limited	Materials, Corrosion and NDT Laboratories	Renfrew	51
Material Testing	University of Dundee	Concrete Technology Unit	Dundee	52
Material Testing	University of Dundee	Scottish Marine and Renewables Test (SMART)	Dundee	53
Material Testing	University of Strathclyde	Advanced Forming Research Centre (AFRC)	Glasgow	54
Material Testing	University of Strathclyde	Advanced Material Research Laboratory	Glasgow	55
Material testing	Element	Material Testing Laboratory	Aberdeen	56
Material testing	National Manufacturing Institute Scotland (NMIS)	Lightweight Manufacturing Centre	Renfrew	57
Mechanical and Structural Testing	Altrad Babcock Limited	Large Scale Component Testing for Wind, Marine, Oil& Gas Structures	Renfrew	58
Mechanical and Structural Testing	Altrad Babcock Limited	Fatigue testing	Renfrew	59
Mechanical and Structural Testing	Altrad Babcock Limited	High pressure testing	Renfrew	60
Mechanical and Structural Testing	Altrad Babcock Limited	Moorings, anchors and structural components load testing	Renfrew	61
Mechanical and Structural Testing	Energy Technology Centre	Motoring Dynamometer	Glasgow	62
Mechanical and Structural Testing	Energy Technology Centre	Mechanical Load Test facility	Glasgow	63
Mechanical and Structural Testing	Energy Technology Centre	Drivetrain Test Facility	Glasgow	64
Mechanical and Structural Testing	Energy Technology Centre	Structural Test Laboratory	Glasgow	65

Type of facility	Organisation	Test Facility	Location	Map Number
Mechanical and Structural Testing	Offshore Renewable Energy Catapult	Floating Offshore Wind Innovation Centre (FLOWIC) – Hexapod	Aberdeen	**66**
Mechanical and Structural Testing	University of Edinburgh	The Structures Laboratory	Edinburgh	**67**
Robotics	The Underwater Centre	Indoor Dive Tank	Fort William	**68**
Robotics	The Underwater Centre	Multiple-depth Seawater Dive Site	Fort William	**69**
Robotics	Heriot-Watt University & University of Edinburgh	The National Robotarium	Edinburgh	**70**
Robotics	Robert Gordon University	ROV Pool	Aberdeen	**71**
Robotics	University of Dundee	Robotics and Control Laboratory	Dundee	**72**
Simulation	National Decommissioning Centre	Decommissioning scenario simulator	Aberdeen	**73**
Simulation	University of Dundee	Centrifuge Geotechnical Model Simulation Testing	Dundee	**74**
Simulation	University of Strathclyde	Full Mission Bridge Simulator	Glasgow	**75**
Simulation	National Manufacturing Institute Scotland (NMIS)	Digital Factory	Renfrew	**76**
Subsea Testing	JFD	National Hyperbaric Centre (NHC)	Aberdeen	**77**
Subsea Testing	National Decommissioning Centre	Hyperbaric Pressure Test Vessels	Aberdeen	**78**
Subsea Testing	National Decommissioning Centre	Immersion Tank	Aberdeen	**79**

Demonstration Sites

Facilities enabling full scale and prototype testing, typically for technologies moving into the deployment stage of technology readiness.

Organisation	Type of facility	Location	Map Number
Energy Transition Zone (ETZ)	Green Hydrogen Testing and Demonstration Facility (ETZ GHTDF)	Aberdeen	**80**
Engineering Technology Centre (ETC)	Myres Hill National Wind Energy Test Site	Glasgow	**81**
European Marine Energy Centre (EMEC)	Offshore Wind Testing and Innovation	Orkney	**82**
Offshore Renewable Energy Catapult	Levenmouth Demonstration Turbine	Levenmouth	**83**
Vattenfall, Technip and Aberdeen Renewable Energy Group (AREG)	European Offshore Wind Deployment Centre	Aberdeen Bay	**84**

Technology Centres

Technology centres provide support across the full breadth of technology development stages. They may link with academic institutions, provide innovation programmes or have direct access to test facilities depending on their area of expertise and focus.

Organisation	Location	Map Number
Energy Technology Centre	Glasgow	**85**
Energy Technology Partnership - Wind Energy	Glasgow	**86**
Energy Transition Zone - Energy Incubator and Scale Up Hub (EISH)	Aberdeen	**87**
Manufacturing Innovation Centre Moray (MICM)	Moray	**88**
National Subsea Centre	Aberdeen	**89**
National Manufacturing Institute Scotland (NMIS)	Renfrew and Aberdeen	**90**
Net Zero Technology Centre	Aberdeen	**91**
Offshore Renewable Energy Catapult	Glasgow and Aberdeen	**92**

What Other Innovation is Happening in Scotland?

ECOWind Programme (Crown Estate, Crown Estate Scotland)
Ecological Consequences of Offshore Wind research programme

ECOWind

ECOWind's £9.45m initiative, involving top Scottish universities, advances offshore wind innovation while protecting marine life, significantly enhancing our understanding and supporting sustainable marine policy.

Honuworx
Loggerhead: Step-change reduction in subsea robotics costs and emissions

HonuWorx

By replacing legacy surface vessels used for subsea construction, inspection and maintenance work, HonuWorx unique technology solution drives cost-efficiency, safety and sustainability in the offshore energy sector.

Fathom Group Ltd
A holistic, physics-enabled Digital Twin for Offshore Wind Farms

FATHOM

Fathom subject matter experts provide advanced offshore engineering design and analysis. Our holistic, physics-based Digital Twin software reduces costs and provides effective root-cause analysis of offshore wind farm systems & components.

HPR Rov
Transforming Subsea Operations at the World's Largest Offshore Wind Farm

HPR High Performance Robotics

HPR High Performance Robotics, drives innovation with cutting-edge Micro ROV systems, leveraging advanced testing and validation to deliver efficient, sustainable solutions for subsea inspection in offshore wind industries.

Green Marine
Demonstration of a hydrogen fuel cell system on an existing CTV

GREEN MARINE

Project Verdant developed a "zero-emission mode" CTV, achieving AIP by RINA for a retrofit enabling six hours of operation without diesel redundancy. It sets the foundation for Phase 2, exploring hydrogen use for offshore wind vessels.

Ilosta
Advanced Wind Turbine Structural Health Analysis

ILOSTA Crack Map™

Ilosta provides a ground-breaking software platform using a physics-based AI algorithm to improve reliability and increase the lifespan of assets in the wind industry, delivering unparalleled accuracy and efficiency in structural health assessments.

Innovair
Advancing robotic inspection technology for the offshore wind industry

Innovair, a specialist inspection solutions service provider, is advancing existing novel robotic inspection technology. Development and deployment of the innovative upgrades to the system will take place over an eight-month period with execution to market in March 2025.

ITC
Design and fabrication of Large Combi-Reelers™ for Offshore Renewables Sector

The project is to develop ITCs' unique Combi-Reeler™ technology to be able to operate the large subsea equipment Offshore Wind required, Combi-Reeler™ are single skid HPUs, Reelers, and control panels.

NMIS
ReMake Innovation Programme

£11m ReMake Value Retention Centre (RVRC); developing the skills and processes to extend the life of products and parts through processes such as remanufacturing, refurbishing and repairs.

Oasis Marine Power
Development of the Oasis Power Buoy for Offshore Charging

Development of an offshore charging buoy (Oasis Power Buoy) for wind farm maintenance Crew Transfer Vessels (CTVs) to enable their transition from diesel to low cost green electric propulsion.

Offshore Solutions Group
FLOW-Park Safe Anchorage

The development & operational delivery of a safe, secure & compliant nearshore 'temporary parking area' for floating foundations to enable efficient port/yard and project logistics.

Renewable Parts
Keeping Wind Turbines Turning

Renewable Parts is a global supply chain leader, delivering quality new and refurbished wind turbine parts directly to our client's site. By refurbishing components, we're driving a circular economy in the wind industry.

Subworx
OceanLocker – Underwater Integrity Management

SubWorx is revolutionizing underwater asset inspection and management with its innovative OceanLocker™ technology, proudly participating in the inaugural 'ORE Catapult Launch Academy: Scotland' programme to drive forward sustainable underwater solutions.

X-Rotor Offshore Wind Turbine
Radical Offshore Wind Turbine Concept

The X-Rotor has potential to reduce the LCoE from offshore wind by up to 25%. The concept is a unique combination of a VAWT primary rotor and HAWT secondary rotors.

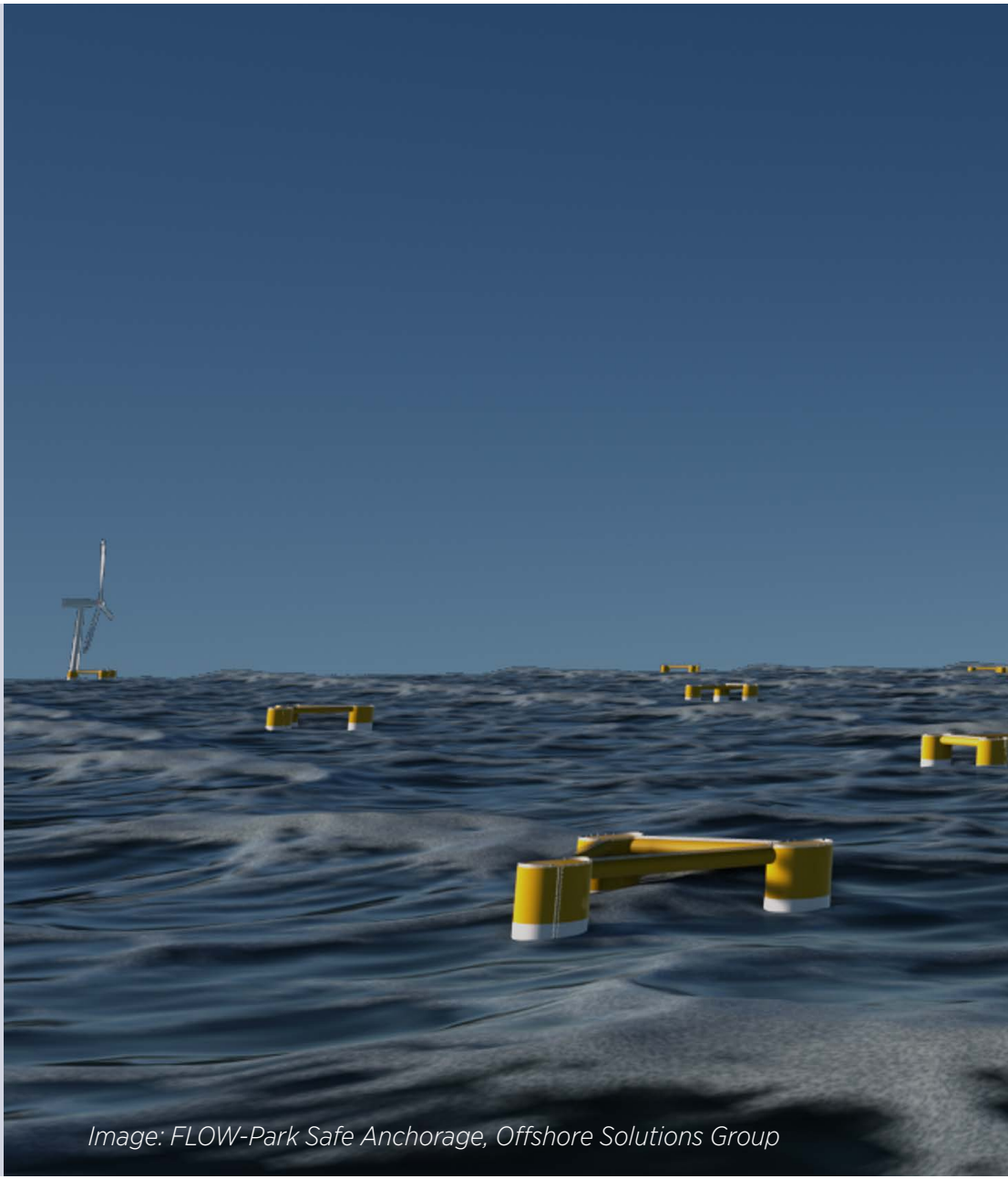


Image: FLOW-Park Safe Anchorage, Offshore Solutions Group

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SOWEC
Scottish Offshore Wind Energy Council

QR code to a Digital Version

This QR Code links to a digital version of the of the SOWEC Innovation Guide. For further information please contact the Offshore Renewable Energy (ORE) Catapult.