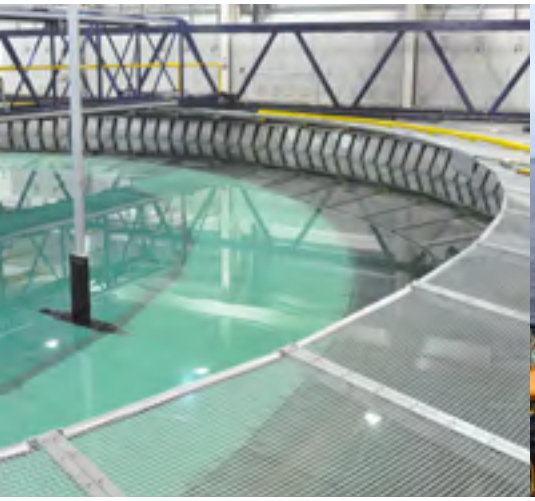
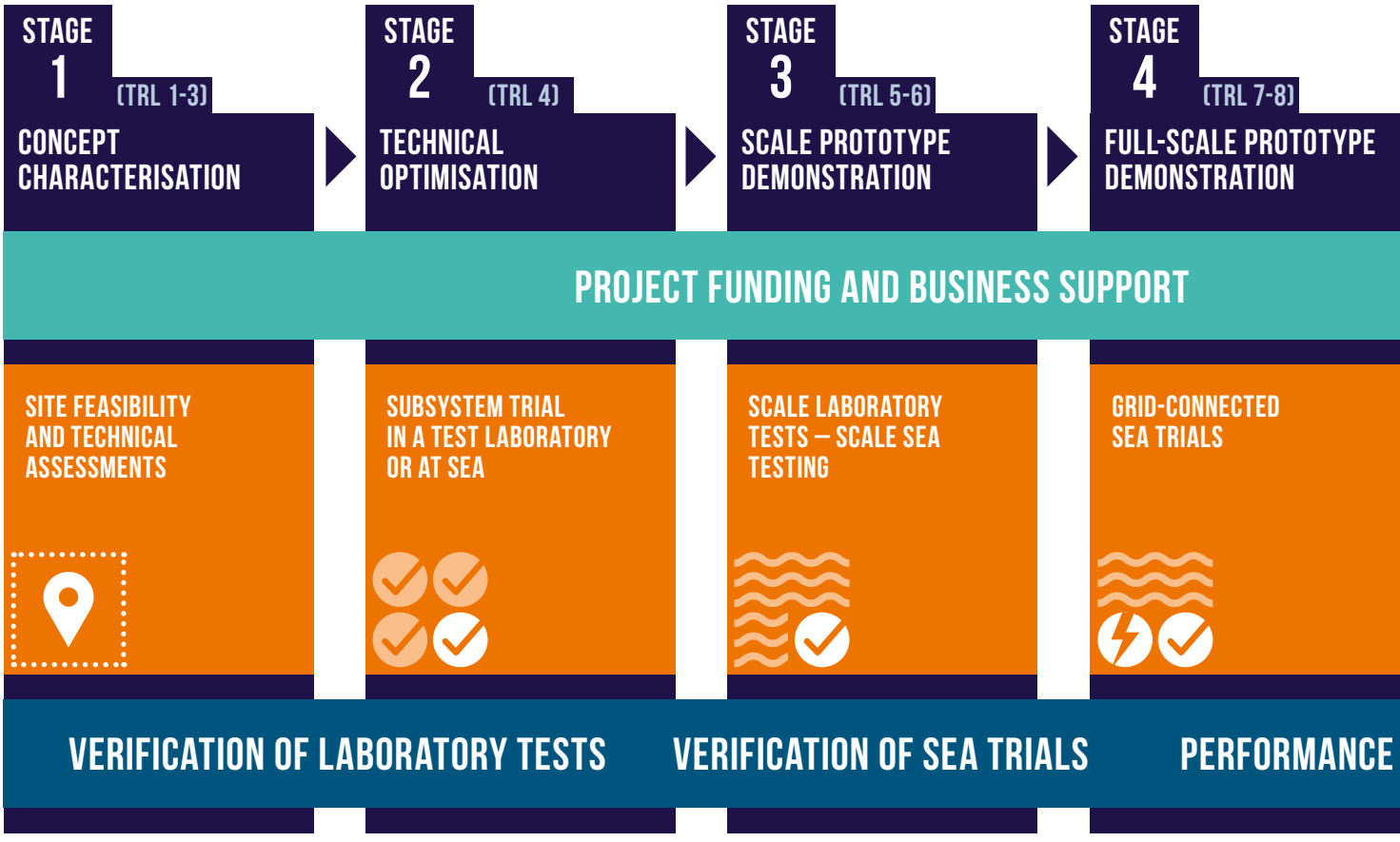
EMEC ORKNEY
THE EUROPEAN MARINE ENERGY CENTRE LTD

PATHWAY TO COMMERCIALISATION

An EMEC guide to research, development and testing of marine energy technology

PATHWAY TO COMMERCIALISATION





INNOVATE
COLLABORATE
GENERATE

HOW WE CAN HELP
DEVELOPING A BESPOKE SERVICE TO SUIT YOUR NEEDS:

CONTENTS

STAGE 5 (TRL 9)
COMMERCIAL APPLICATION

GRID-CONNECTED ARRAY TRIALS

ASSESSMENT

INNOVATE:
RESEARCH FACILITATION

EMEC is well known for providing test and demonstration facilities to technology developers, but 12 years of front-line experience in the sector has given rise to a range of wider collaborations generating cross-sectoral innovation and knowledge sharing.

USE EXPERIENCE TO SAVE TIME AND COST IN RESEARCH AND DEVELOPMENT

INNOVATE
COLLABORATE
GENERATE

OVER A DECADE OF DRIVING WORLD LEADING INNOVATION

From projects looking at EMEC's subsea cables to the generation of hydrogen at our test sites, our infrastructure and experience is being used to facilitate innovation across the industry.

OPEN TO IDEAS

We are always looking for new ideas to support innovation challenges in the industry.

Key areas include:

- **Electrical R&D:**
  Marine cables, connectors, power conversion and power conditioning
- **Component testing:**
  Monitoring, corrosion and survivability
- **Environmental monitoring/data gathering:**
  Resource, environmental impact assessments, acoustics and modelling
- **Installation:**
  Devices, support structures, moorings and foundations
- **Research projects:**
  Verification, standardisation, industry facilitation and knowledge sharing

EVIDENCE BASED RESULTS

EMEC's unique marine testing experience is backed by accredited verification capabilities meaning we can contribute our expertise to R&D projects on our test sites and further afield (see page 14 for more details).

EMEC DATA FOR INNOVATION:

ENVIRONMENTAL DATA:

- ACOUSTIC SURVEYS
- WILDLIFE OBSERVATIONS
- WAVERIDER SURVEYS
- ADCP SURVEYS
- METEOROLOGICAL DATA
- RADAR DATA
- BATHYMETRY
- SITE BASELINE DATA

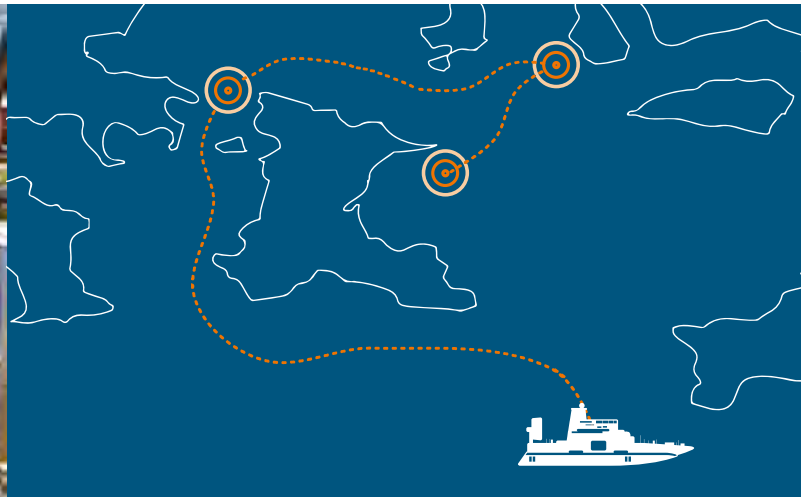
OPERATIONAL DATA:

- AIS (VESSEL TRACKING)
- ELECTRICAL SURVEYS
- SCADA
- CCTV
- MARINE OPERATIONS DATA

INNOVATE:
RESEARCH FACILITATION
CASE STUDIES

CROSS-SECTORAL INNOVATION AND KNOWLEDGE SHARING





AN INTEGRATED MONITORING SOLUTION FOR MARINE ENERGY

EMEC has successfully completed initial trials of its novel Integrated Monitoring Pod at its tidal test site at the Fall of Warness. The first of its kind pre-commercial prototype, designed by EMEC to operate in high velocity tidal flows, integrates a variety of sensors to undertake comprehensive concurrent environmental measurements, providing improved characterisation of high energy marine environments.

The system is connected to the shore via a subsea cable to facilitate 24/7 real-time data collection. Making real-time data feeds available to developers will assist in device design, enable more accurate assessment of device performance, and support operations and maintenance planning.

Development of the Pod is ongoing and EMEC is keen to collaborate with sensor developers and end users to instigate continual innovation in this area.

The project has been funded by the Scottish Government via the Marine Renewables Commercialisation Fund (MRCF), which is managed by the Carbon Trust.

"It is really exciting to see EMEC's novel Integrated Monitoring Pod solution being deployed. We strongly believe it will help to reduce the cost of early array deployments for both wave and tidal technologies."

Angus Vantoch-Wood, Carbon Trust

A NEW TOOL FOR PLANNING MARINE OPERATIONS

EMEC has joined up with environmental engineering consultants at JBA Consulting and metocean scientists at the Met Office to develop software which could revolutionise operational planning at EMEC's wave and tidal test sites in Orkney as well as other marine renewables developments.

This software will incorporate the vast amount of operations and maintenance (O&M) data and resource models from EMEC's test sites to create a bespoke system to manage marine operations in Orkney waters. A range of algorithms will analyse EMEC's data against ensemble forecast data to determine whether the forecasted metocean conditions are likely to exceed the safe operating tolerances of a mission based on a breakdown of all mission components (e.g. lifting at port, steaming to site, operations at site, and return journey).

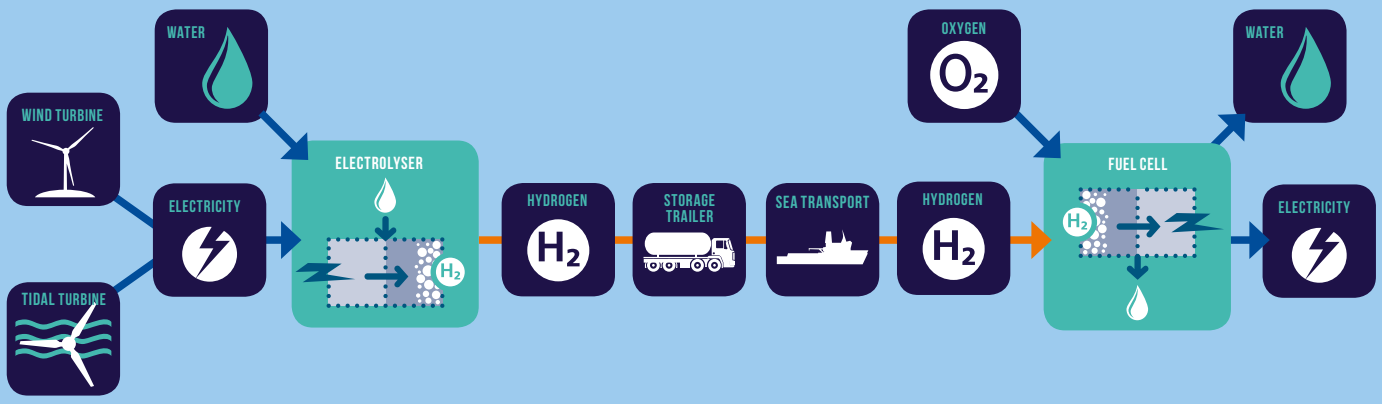
Ultimately, the system aims to reduce O&M costs for marine energy technology developers, by helping optimise O&M strategies resulting in fewer failed maintenance missions.

RELIABILITY IN A SEA OF RISK
AN INNOVATIVE NEW METHODOLOGY FOR RELIABILITY TESTING

Kicking off in 2016, the Reliability in a Sea of Risk (RiaSoR) project will establish industry best practice in reliability testing for wave and tidal energy devices through improving load measurements and verification, standardising design guidelines, and increasing safety in marine energy operations.

The industry-approved reliability testing practices developed by RiaSoR will be applied through the leading ocean energy testing houses to ensure consistency and robustness by which reliability is demonstrated across all wave and tidal technologies. RiaSoR is being funded by OCEANERA-NET.

THE SURF 'N' TURF CONCEPT



GENERATING HYDROGEN FROM TIDAL ENERGY

EMEC has procured an integrated hydrogen system to be installed at the Fall of Warness tidal test site as part of a pioneering project aiming to produce hydrogen from tidal and wind energy.

The Surf 'n' Turf project will see power generated by tidal energy devices at EMEC – and from Eday's community-owned wind turbine – sent to a 0.5MW electrolyser to generate hydrogen.

The hydrogen gas generated will be compressed and stored, with some of the gas being used in a hydrogen fuel cell to provide backup power to EMEC's extensive data gathering and control systems. The remainder of the hydrogen gas will be shipped to a fuel cell in Kirkwall which will convert it back to electricity to power Orkney's inter-island ferries while they are berthed at the pier.

The project brings together four partners: Orkney Islands Council, the European Marine Energy Centre, Community Energy Scotland and Eday Renewable Energy Ltd.

"Bringing together tidal devices and wind energy like this is a hugely inspiring way to solve one of our energy system's greatest challenges – how to store electricity which is produced when it is not immediately needed or unable to reach its demand."

Michael Rieley, Scottish Renewables

Innovative R&D ideas?
Benefit from our experience: If you have an idea you would like to discuss, please contact us:

01856 852060 // info@emec.org.uk

COLLABORATE: CONSULTANCY

EMEC has worked on over 100 projects globally to help facilitate the development of marine renewables.

We can help open the door to European R&D projects, site development and marine energy testing.

COLLABORATE

DE-RISK PROJECTS BY TAPPING INTO INDUSTRY KNOWLEDGE

INNOVATE
COLLABORATE
GENERATE

HELPING YOU SECURE FUNDING

EMEC has a strong track record in securing grant funding for marine renewable energy activities and will partner with you to deliver a successful application. We have a success rate of over 50%, and have helped to secure over £50m in R&D funding for technology developers and projects.

Our commercial team can guide you through the proposal process and rules of participation, as well as provide advice on issues that may arise before and during project implementation.

HELPING YOU UNDERSTAND THE MARKET

We can recommend suitable technology companies and research organisations to partner in your project, and can provide valuable market intelligence to help develop a robust business case behind your technology development process. We can support your business planning with global market assessments helping you find your niche within this burgeoning industry.

Our marketing, public relations and project dissemination experience can make sure your brand profile grows and your achievements are recognised.

EMEC can also support project coordination activities to help lessen your load.

DEVELOPING A GLOBAL MARKET FOR WAVE AND TIDAL DEVELOPERS

Having overseen more than 2000 marine energy activities at our test sites in Orkney covering device deployments, grid connections, cable laying operations, data collection and various monitoring activities, we are working with countries around the world, helping them develop their own marine energy test facilities to instigate the development of a global market for wave and tidal energy developers.

EMEC can advise on:

- Business planning and cost analysis;
- Design and development of a new test centre (including cabling, grid connection, berth site selection, resource assessment);
- Test site operations and maintenance (via established QHSE management procedures);
- Data collection and environmental monitoring;
- Consenting;
- Stakeholder engagement; and
- Wider infrastructure and supply chain requirements to support marine energy deployments.

DATA FOR COLLABORATION:

- GLOBAL MARKET INTELLIGENCE
- COUNTRY SPECIFIC MARKET KNOWLEDGE
- OVERVIEW OF FUNDING STREAMS

COLLABORATE: CONSULTANCY

CASE STUDIES

WORKING TOGETHER FOR A GLOBALLY SUCCESSFUL MARINE ENERGY INDUSTRY



TECHNOLOGY ASSESSMENT PROCESS (TAP): A NEW APPROACH TO TECHNOLOGY DEVELOPMENT

TAP is a new methodology designed to track progress and build evidence of performance as technological ideas move from one stage of development to another.

ORE Catapult and EMEC will work with developers to significantly de-risk technology before it reaches prototype testing stage, resulting in a less expensive, faster and more certain development pathway.

Benefits for Developers

- Improve understanding and validate the competitive prospects for innovative technology
- Capital investment is matched to strong, feasible technical ideas
- Economic justifications for capital investment will underpin each stage of the development journey

Benefits for Investors

- Greater level of confidence in innovative technologies through early and ongoing independent review
- Better informed investment decisions, improved confidence and reduced risk

An evidence-based dossier – the Technology Passport – will help to map the developer's journey through the development process, identifying milestones towards technology commercialisation and development support opportunities.

EMEC SEAS IN THE LAB AT FLOWAVE

Scotland's world-leading ocean energy test centres have joined forces for a ground-breaking project to recreate scaled versions of Scotland's oceans in the laboratory.

EMEC has partnered with FloWave Ocean Energy Research Facility to share expertise in ocean and laboratory testing and replicate Orkney's seas in the FloWave tank. Through the initiative, EMEC is providing a wealth of data to FloWave – gathered over years by 'waverider' buoys, radar and ADCPs (acoustic doppler current profilers) – which FloWave is using to develop accurate models to replicate the complex sea states encountered in Orkney as closely as possible.

"The closer you can replicate real ocean conditions in the laboratory, the better you can refine your prototype and validate how it might perform – before testing part-scale or full-scale devices at sea.

If EMEC is the lab in the ocean, FloWave is the ocean in the lab"

Stuart Brown, FloWave Ocean Energy Research Facility

"We want a wave or tidal device which is certified at EMEC to be immediately marketable in any country, without expensive and time consuming re-validation."

Neil Kermode, EMEC

INNOVATE COLLABORATE GENERATE

INTERNATIONAL WATERS (WAVE AND TIDAL ENERGY RESEARCH SITES) NETWORK

EMEC's Global Ocean Energy Symposium held in 2013, established a global network focused on collaborative opportunities for test centres in support of the developing ocean energy industry.

Each country has its own unique conditions, both physical and political, and exploring these challenges simultaneously will enable marine energy technologies to develop projects more rapidly than if tackled in isolation. Standards are vital in the development of test centres for ocean energy, and common ways need to be established for the collection and analysis of data.

"You only have to travel overseas and attempt to plug in a computer to see why global collaboration is important." explains Neil Kermode, EMEC's Managing Director.

"Every country established their own standards for plugs and sockets in isolation and the end result is pointless diversity of detail. Marine energy devices are no different. In time, wave and tidal technologies will find their markets in dozens of countries and EMEC wants this to be as easy as possible. We want a wave or tidal device which is certified at EMEC to be immediately marketable in any country, without expensive and time consuming re-validation."

For more details, visit: www.internationalwaters.info

SUPPORTING THE DEVELOPMENT OF INTERNATIONAL TEST CENTRES

EMEC is working with countries across Europe, the Americas, Asia and Oceania to support the development of similar marine energy test facilities across the world.

For example EMEC is providing advice on the development of a marine energy test facility in Nagasaki Prefecture, Japan.

EMEC will inform the prefecture on the infrastructure needed to develop a test site, covering subsea cables, grid connection and resource data instrumentation, as well as the wider infrastructure required in the region to support marine energy deployments. EMEC is also supporting business planning and advising on operational procedures and health and safety.

"We would like to learn from EMEC how to effectively manage a marine energy test centre and exchange information with supply chain companies in Orkney. Having the support from EMEC, who has accumulated valuable expertise, we trust that Nagasaki Marine Energy Centre will be successfully realized."

Makoto Takahira, Nagasaki Marine Industry Cluster Promotion Association

Interested in collaborating?
Tap into our knowledge:
01856 852060 // info@emec.org.uk

GENERATE:
TESTING AND VERIFICATION

With over a decade of experience, EMEC is attracting developers from around the globe to prove what is achievable in some of the harshest of marine environments. Across our range of facilities and services, we can support your technology development from concept through to deployment at EMEC.

To date, more wave and tidal energy devices have been grid-connected at EMEC than at any other site in the world.

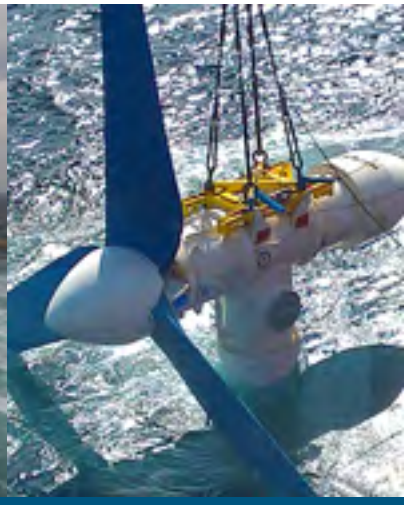
GENERATE

PROVING PERFORMANCE IN REAL SEA CONDITIONS

GENERATE: TESTING

INCREASE INVESTOR CONFIDENCE BY PROVING REAL SEA PERFORMANCE





REDUCE RISK: ESTABLISHED FACILITIES AND MANAGEMENT SYSTEMS

EMEC embeds a risk-based approach within all of our operations to support project delivery and maintain the highest levels of health and safety across our sites.

Our clients benefit from a range of ready-made test and demonstration facilities, with built in redundancy which includes spare cabling to ensure developers can concentrate on their technology, rather than the pains of site development.

There is a cluster of energy, maritime and environmental expertise around EMEC, with a uniquely experienced supply chain on our doorstep.

REDUCE COST: PRE-INSTALLED, ACCESSIBLE INFRASTRUCTURE

EMEC's test sites feature extensive investment (more than £30m) in infrastructure, removing valuable CAPEX requirements from developer budgets.

Significant infrastructure investments have also been made to Orkney's ports, harbours and vessels to make it as easy as possible for technology developers to access testing.

All income generated by the sale of electricity is returned to the developers, increasing the funds for future industry investment.

For an overview of EMEC's test sites, see pages 18-19.

REDUCE TIME: PRE-PREPARED INFRASTRUCTURE AND CONSENTS

EMEC is one of very few places with a grid-connected cable, or pre-installed anchor points ready and waiting, speeding up site selection on your critical path.

EMEC has worked closely with regulators over the years to streamline the consenting process, and has conducted extensive environmental monitoring studies to provide you with a comprehensive view of the site. We can keep you on the right track with the regulatory authorities and legislation, and can provide significant input into the necessary documents: Environmental reports, environmental monitoring programmes, navigational risk assessments, third-party verification certificates (TPV) and decommissioning programmes.

QUALITY

EMEC has been accredited by the United Kingdom Accreditation Service (UKAS) to ISO/IEC 17020 and ISO/IEC 17025. These standards form the foundation of our Integrated Management System which also uses the principles of BS EN ISO 9001, BS EN ISO 14001 and BS OHSAS 18001. This ensures that we have the systems and processes in place for us to support you through each stage of your testing programme.

"EMEC has developed an excellent test site at Billia Croo in a challenging environment backed by reliable performance assessment and an experienced supply chain."

Steven Nauwelearts, Laminaria

"Test programmes can prove installability, survivability, reliability, maintainability, operability and ultimately the all important levelised cost of energy (LCoE) which is critical to commercialisation."

Eileen Linklater, Client Relations Manager, EMEC

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CASE STUDIES

SCALE TESTING: NAUTRICITY

Nautricity used EMEC's Shapinsay Sound scale site to test the CoRMaT tidal energy converter:

"It was much more straightforward and quicker to gain the necessary permissions and consents to deploy because outline consents were already in place and we weren't exporting electrical power to the grid. At this stage of the project, we didn't have the time to invest in a potential site development program, so the Shapinsay Sound site seemed like the perfect solution to that.

"The site was certainly challenging enough, but the reduced tidal flow meant we could do it at a lesser cost than if we were to go straight into the high energy sites. We gained a good understanding of how to handle the device, both on and offshore; how the device operates when it's on the mooring system; we tested and validated our deployment and recovery techniques; and we tested our theoretical models in a real sea environment – a verification/validation process.

"We found the local supply chain in Orkney was good, and the supply chain worked together really well. A lot of the suppliers that we did use had worked in the marine renewables sector before due to all the activity around EMEC in Orkney so they already knew some of the challenges, and were happy to share their experience."

Robbie MacDonald – www.nautricity.com

GRID-CONNECTED TESTING: WELLO

Wello tested the Penguin wave energy converter at EMEC's Billia Croo site:

"We've been involved with EMEC since 2011. EMEC was a very good place to start testing our device. The guys really appreciated the rough conditions where we could test the device.

"What I've seen that is really positive is the fact there are several developers working at the same time, so you can really share the experience and learn from each other. That's a key element of this sort of site.

"Having several big companies on site for help and support has been instrumental for us coming from another country where we don't really have the resources, or the right contacts to start with. They've been really helpful in doing what we need to do on the test programme. It really has been a learning curve for us.

"There's been really good cooperation. Orkney is a remote place, but there are all the things you need. Everything is available. The attitude is right – the can-do attitude – that's really good."

Aki Luukkainen – www.wello.eu

Have you generated real-sea experience?
Come and test at our facilities

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GENERATE:
VERIFICATION

VERIFY CLAIMS TO REACH THE MARKET QUICKER

INDEPENDENT LABORATORY STATUS UNDERPINS ALL OF EMEC'S SERVICES

Developers need to test and validate technology to build credibility and bankability of projects. To progress the technology to a commercial stage a proven track record validated by an accredited party is more attractive to funders and investors in financing large commercial projects.

EMEC has been examined and accredited as a test laboratory for full-scale wave and tidal test facilities by the United Kingdom Accreditation Service (UKAS).

We are the first and only centre of our kind anywhere in the world to win this mark of quality, which enables us to provide independent, internationally recognised verification of the performance of the devices we test.

PERFORMANCE ASSESSMENT FOR YOUR WAVE OR TIDAL ENERGY CONVERTERS

EMEC is accredited to test laboratory standards (ISO 17025) and can test the performance of wave and tidal energy devices against IEC Technical Specifications. We can provide you with an independently verified performance report, whether you are testing at our sites in Orkney, or elsewhere in the world.

VERIFICATION SERVICES FOR A WIDE RANGE OF ENVIRONMENTAL TECHNOLOGIES

Technical verification:
EMEC can provide you with independent verification in accordance with ISO 17020 to confirm that your technology satisfies conceptual reliability, survivability and performance targets. Technical verification can cover marine energy convertors, sub-systems and associated processes as follows:

- Wave and tidal energy convertors
- Power take-off units (PTOs)
- Moorings or mooring components
- Corrosion protection systems
- Cable lay/pull-in/connector installation aids
- Hydraulic systems
- Transformers/switchgear/rectifiers
- Coatings
- Lubrication systems
- Marine based sensors
- Active control systems
- and similar or related devices.

Environmental Technology Verification (ETV):
EMEC is a qualified verification body for the EU ETV Pilot Programme, accredited to ISO 17020 and the EU ETV General Verification Protocol. At the end of the ETV process, you'll receive a Statement of Verification: evidence that your performance claims are both credible and scientifically sound. Under the EU ETV scheme we can verify:

- Energy technologies
- Water treatment and monitoring
- Materials, waste and resources

"Building in the validation of results can increase confidence and reduce risk in any project, making it more attractive to funders, investors and partners."

Matthew Finn, EMEC

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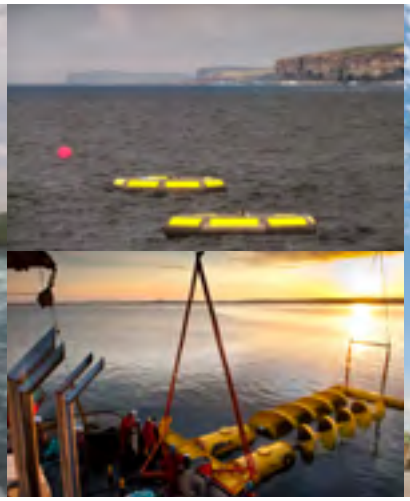
GENERATE

CASE STUDIES



STANDARDS FUNDAMENTAL TO THE DEVELOPMENT OF THE MARINE RENEWABLE SECTOR

In 2009, EMEC released a suite of 12 marine renewables standards and guidelines covering assessment of energy resources, performance of devices, guidelines for certification, grid connection, tank testing, and project development. More than 50,000 copies of these documents have been distributed worldwide, with 6 guidelines being progressed via the International Electrotechnical Commission (IEC) for global adoption as the first international standards for marine renewable energy.

As with any standards, it is important that these documents are reviewed regularly and the need for new standards identified. Therefore, in collaboration with the Offshore Renewable Energy Catapult, EMEC ran an industry-wide workshop event to review the existing suite of EMEC standards and identify areas where new standards are required. The workshop was attended by over 50 representatives from a wide range of industry groups including technology developers, industry consultants, test centres, and representatives from government agencies, academia, and trade bodies.

Several topics for potential development of new guidelines were identified by delegates during workshop discussions, with recommendations that they should be progressed further.

"Standardisation is important. To have one body that people can trust to act independently in verifying performance is a good thing."

Andrew Scott, Scotrenewables

Can you prove your claims?
Build in our accredited verification:
01856 852060 // info@emec.org.uk

DATA FOR DEVICE TESTING:

ENVIRONMENTAL DATA:

- HYDROGRAPHIC SURVEYS
- SEABED GEOLOGY SURVEYS
- ACOUSTIC SURVEYS
- WILDLIFE OBSERVATIONS
- WAVERIDER SURVEYS
- ADCP SURVEYS
- HYDRODYNAMIC MODELLING STUDY
- METEOROLOGICAL DATA
- RADAR DATA
- INTEGRATED DATA FACILITIES

OPERATIONAL DATA:

- AIS (VESSEL TRACKING)
- ELECTRICAL SURVEYS
- SCADA
- CCTV
- MARINE OPERATIONS DATA

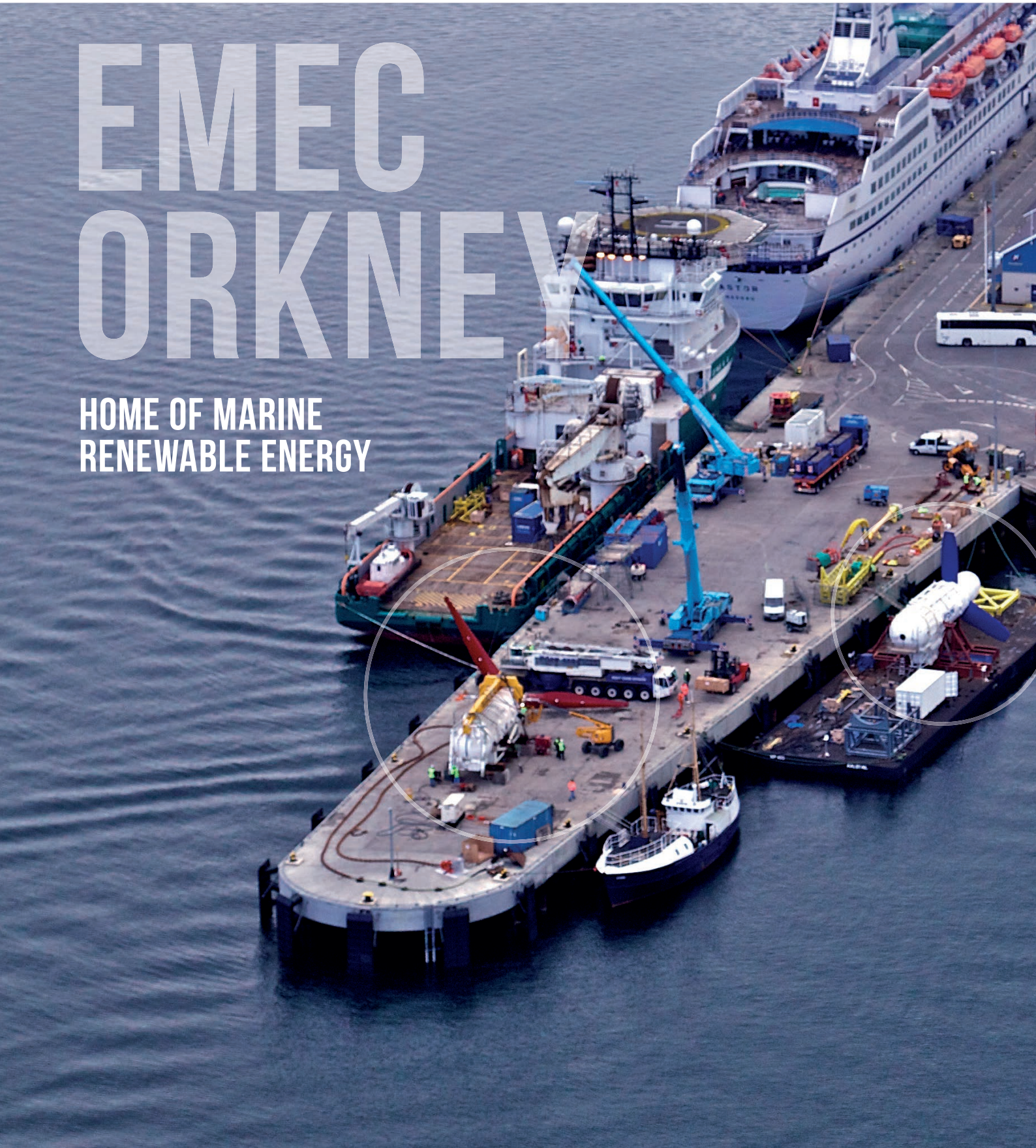
MORE MARINE ENERGY TECHNOLOGIES TESTED AT EMEC THAN AT ANY OTHER SINGLE SITE IN THE WORLD

ALSTOM

ANDRITZ Hydro Hammerfest

pelamis wave power

Proyecto Magallanes



OVERVIEW OF TEST SITES

EMEC SITES

1. **Fall of Warness**
   Grid-connected tidal test site
2. **Billia Croo**
   Grid-connected wave test site
3. **Shapinsay Sound**
   Scale tidal test site
4. **Scapa Flow**
   Scale wave test site
5. **Stronsay Firth**
   Tidal test site
   (yet to be developed)

A **Stromness EMEC offices** and data facilities

B **Kirkwall EMEC offices**

Our sites are used by marine energy developers, supply chain companies, equipment manufacturers and academics for a wide range of activities:

- Device testing
- Component testing
- New tools, techniques and supply chain solutions
- Monitoring corrosion, biofouling and acoustic instrument packages
- Anchoring, cabling, subsea hub and wet-mate connectors
- Installation tests
- Rehearsal activities
- Testing ROV's, vessel activities,
- Operation and maintenance tests
- Training
- Health and safety procedures
- Decommissioning trials
- Research projects

SCOTTISH FACILITIES

FloWave: Edinburgh – World's most advanced tank test facility, which can simulate the wave and tidal conditions at EMEC's test sites.

Wave Energy Scotland: Inverness – WES provides funding packages for the development of innovative technologies to produce low cost, efficient and reliable components and subsystems.

Offshore Renewable Energy Catapult: Glasgow – UK's flagship technology innovation and research centre for offshore wind, wave and tidal energy.

ACCREDITED, GRID-CONNECTED PERFORMANCE TESTING

EMEC is the only accredited test centre in the world, suitable for testing multiple devices simultaneously while producing electricity to the national grid.

1 FALL OF WARNESS TIDAL TEST SITE

Our grid-connected tidal test site is situated in a narrow channel between the Westray Firth and Stronsay Firth. The site has a very strong tidal current, with a typical spring flow of 4m/s (8 knots). The site is based 22km from Hatston Pier.

2 BILLIA CROO WAVE TEST SITE

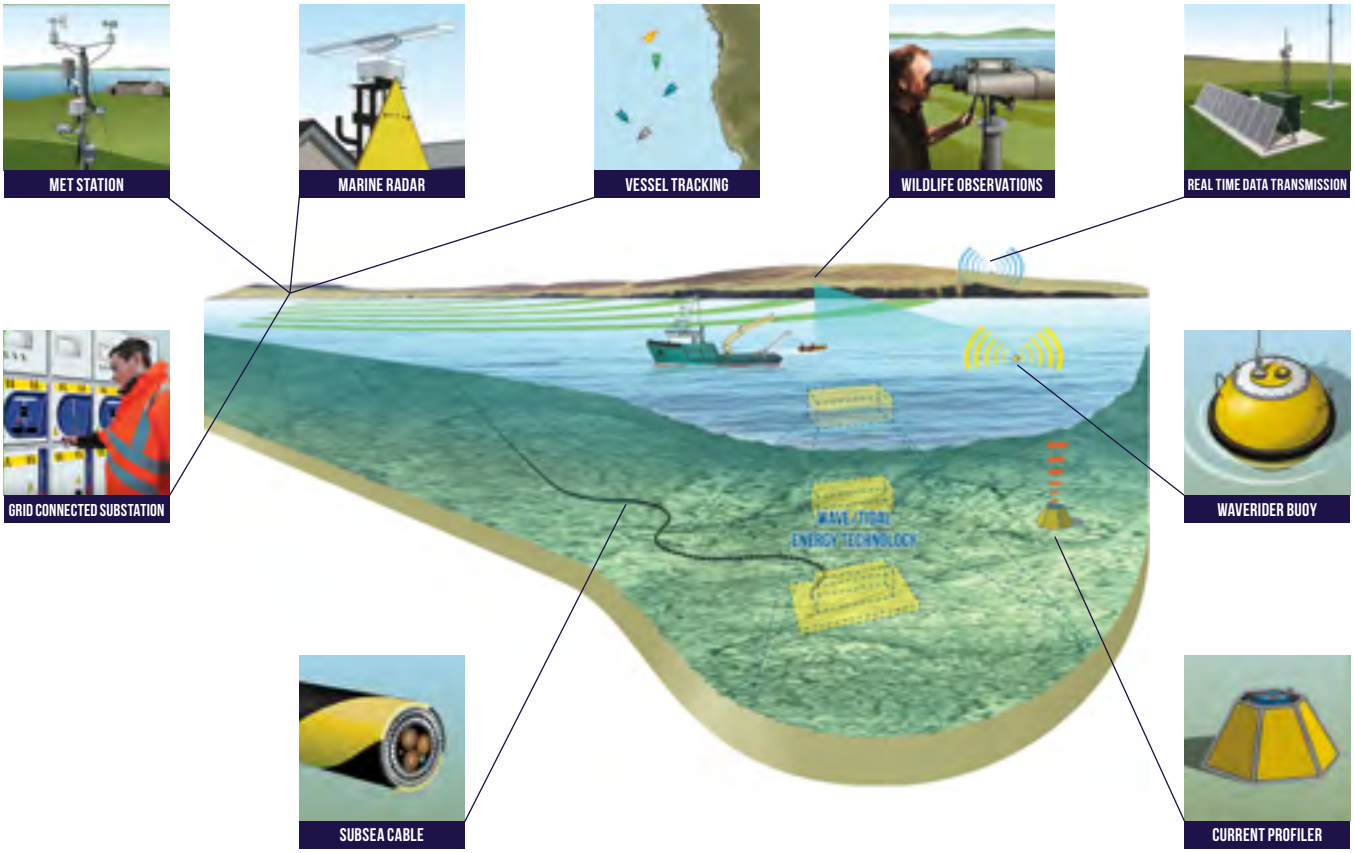
Our grid-connected wave test site is situated on Orkney's west mainland. The site is open to the large powerful waves of the Atlantic Ocean, but is also close to harbour facilities at Stromness (8km) and Lyness (21km).

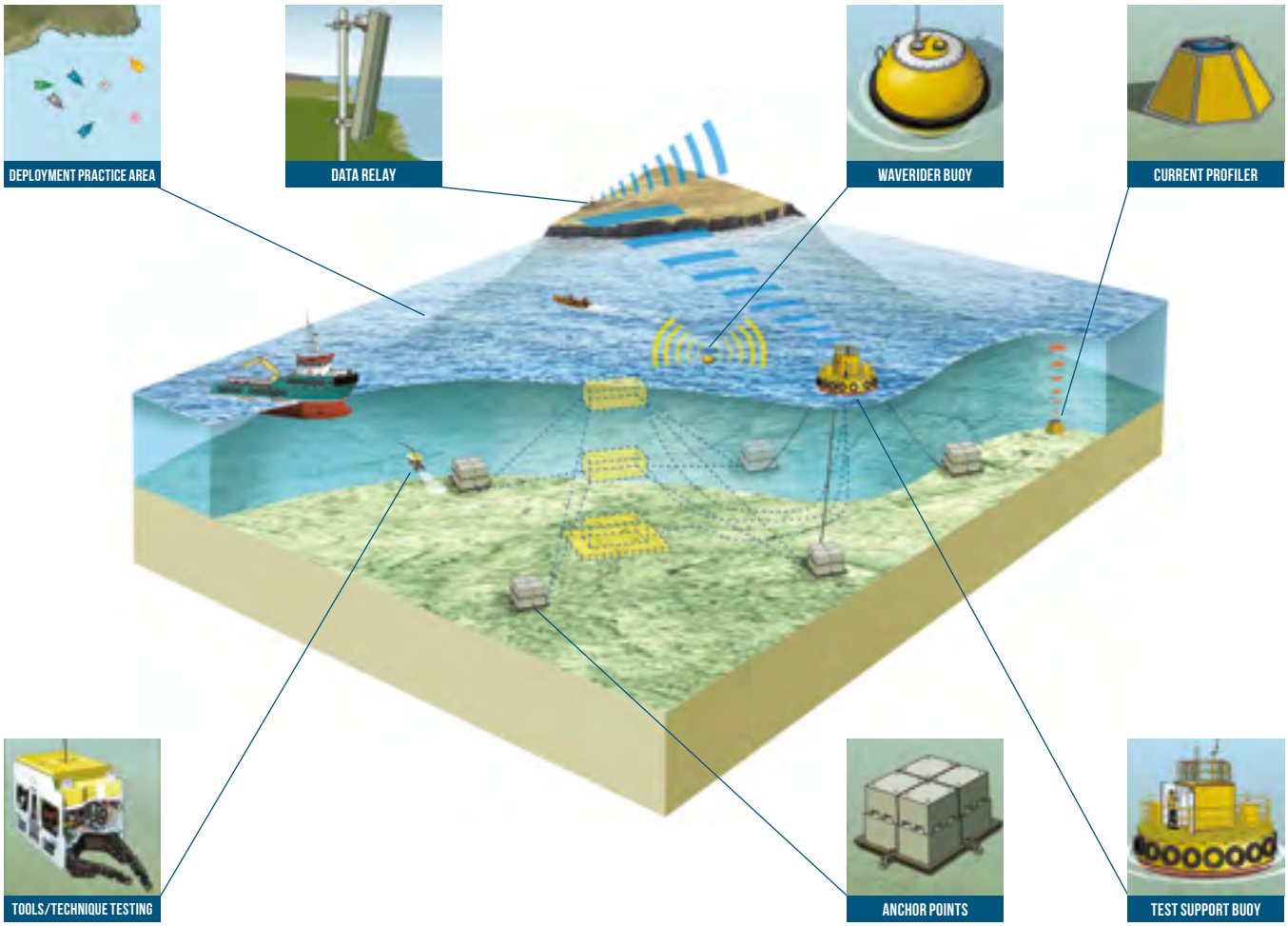
3 4 SCALE TEST SITES

Based in the less challenging conditions of Scapa Flow and Shapinsay Sound, the non-grid connected test sites provide a more flexible sea space helping to close the gap from tank testing, and acting as a stepping stone towards larger scale projects.

These test sites provide more accessible in-sea testing options to help you to learn lessons at smaller scale, thus minimising the cost of development, reducing the need for big vessels or large plant, and removing risk from future in-sea deployments.

- Bespoke test support buoys can be provided, allowing developers to dissipate electricity generated by their devices, while recording wave and tidal data.
- Pre-installed anchor points provide mooring options, and an area of seabed is available for rehearsal or deployment of other tools and techniques.
- EMEC holds an overarching site licence, simplifying the consent process within an agreed envelope of activity.


MET STATION
MARINE RADAR
VESSEL TRACKING
WILDLIFE OBSERVATIONS
REAL TIME DATA TRANSMISSION
GRID CONNECTED SUBSTATION
WAVERIDER BUOY
SUBSEA CABLE
CURRENT PROFILER


DEPLOYMENT PRACTICE AREA
DATA RELAY
WAVERIDER BUOY
CURRENT PROFILER
TOOLS/TECHNIQUE TESTING
ANCHOR POINTS
TEST SUPPORT BUOY

OUR VISION

A GLOBALLY SUCCESSFUL MARINE ENERGY INDUSTRY

OUR MISSION

TO REDUCE THE TIME, COST, AND RISK ASSOCIATED WITH THE DEVELOPMENT OF MARINE ENERGY TECHNOLOGIES, MAXIMISING THE USE OF OUR BESPOKE FACILITIES, INDUSTRY KNOWLEDGE, AND UNPRECEDENTED EXPERIENCE.

INNOVATE | COLLABORATE | GENERATE

EXPERIENCE

27 DEVICES

17 COMPANIES

100+ R&D PROJECTS

75+ UNIVERSITIES ENGAGED WITH ON R&D PROJECTS

2,000+ OPERATIONS ON SITE

KNOWLEDGE

18 COUNTRIES ENGAGED AROUND THE WORLD

ENGAGED WITH:

120 TIDAL DEVELOPERS

260 WAVE DEVELOPERS

50,000+ STANDARDS DISTRIBUTED

65,000+ UNIQUE WEBSITE HITS PER YEAR

3,000+ EMEC/ORKNEY VISITORS

FACILITIES

30 KM OF GRID-CONNECTED SUBSEA CABLES

500,000 HOURS OF DATA COLLECTED

15TB OF DATA

18,000 HOURS OF WILDLIFE OBSERVATIONS

AROUND **£34 MILLION OF PUBLIC FUNDING** HAS BEEN INVESTED TO DATE BY THE SCOTTISH GOVERNMENT, HIGHLANDS AND ISLANDS ENTERPRISE, THE CARBON TRUST, UK GOVERNMENT, SCOTTISH ENTERPRISE, THE EUROPEAN UNION AND ORKNEY ISLANDS COUNCIL.

WHAT DRIVES US

CLIMATE CHANGE

5.2
BILLION TONNES OF CO^2 SAVED BY 2030*

ECONOMIC DEVELOPMENT

160,000
DIRECT JOBS BY 2030*

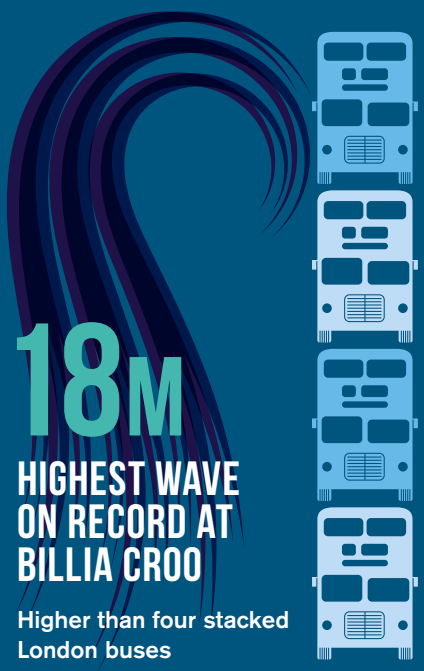
ENERGY SECURITY

748GW
POTENTIAL OCEAN ENERGY BY 2050*

* Estimates of marine renewables impact given the right market conditions. Source: The International Energy Agency's Ocean Energy Systems International Vision Report (2011).

WHY ORKNEY?

"IF IT CAN WORK HERE, IT CAN WORK ANYWHERE"



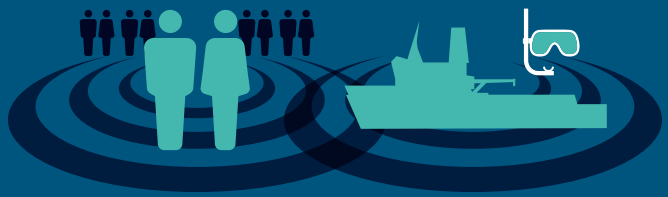
18M
HIGHEST WAVE ON RECORD AT BILLIA CROO
Higher than four stacked London buses

£23M
PUBLIC INVESTMENT IN SUPPORTING INFRASTRUCTURE FOR MARINE ENERGY SECTOR

£10.3M
EMEC TOTAL LOCAL SPEND (50% OF ALL EMEC SPEND 2005-2014)

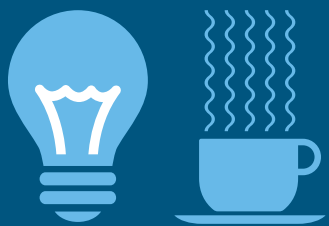
£1M
ESTIMATED SPEND PER DEVICE BY DEVELOPERS IN THE LOCAL ECONOMY

250 IN **40**
EMPLOYED — LOCAL COMPANIES



4M/S (8 KNOTS) PEAK TIDAL FLOW
at Fall of Warness

104%
OF ORKNEY'S ELECTRICAL DEMAND MET FROM RENEWABLES IN 2014



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