

SUPPLIERS DIRECTORY 2016



LEADING THE CHARGE IN THE MARINE ENERGY REVOLUTION



Energy of
ORKNEY

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INTRODUCTION

Welcome to the 2016 Orkney marine energy suppliers directory.

Within these pages you'll find details of what is now the world's most experienced marine energy supply chain. We've also included information on some of the technology developers currently testing devices in Orkney, or planning to deploy here in the near future.

These are cautiously optimistic times for the marine energy sector. The well-documented difficulties recently experienced by some of the main players in the wave sector undoubtedly acted as a wake-up call for those who might have thought marine energy was going to be straightforward.

Indeed, we're now seeing a greater degree of technical humility from within the sector, with many developers taking a more cautious and

considered approach to the task in hand. Some are downsizing their machines, some trying to do better at the scale they're already at and some are going bigger, but that's what innovation is all about – tackling challenges from multiple directions. Other developers are closer to commercialisation and everyone hopes they will provide the proof – if any was ever needed – of marine energy's enormous potential.

Beyond the changes taking place in the technology landscape, Orkney's knowledgeable and adaptable marine energy supply chain has been going through its own evolution, driven not just by external industry factors – such as the re-scaling of technologies – but also by our community's innate desire to find better ways of doing things, leading to greater cost effectiveness.

Crucially, there's an unshakeable but pragmatic optimism here in Orkney about the future of marine energy. Right from the outset, Orkney's supply chain companies have exhibited a determination to make themselves indispensable to developers, responding to their needs, devising new techniques and accelerating the pace of progress in the marine energy sector.

A key example of this mindset is the use of small, cost-effective work vessels and towable lifting barges to support marine energy operations, rather than large and expensive oil industry dynamic positioning ships. Our experienced skippers and crews have undertaken a number of trials with these smaller vessels and many operations are now being carried out at considerably less cost than in previous years.

We're also seeing innovative solutions emerge from the islands in response to local grid constraints, most notably the development of a 'surf and turf' hydrogen generation scheme that will utilise tidal energy at EMEC's Fall of Warness test site and wind energy to bypass local grid constraints. This project involves community groups, public sector bodies and businesses and reflects the can-do attitude towards renewables that's prevalent in Orkney.

The upshot is that Orkney now has an industry led support network of marine operations specialists and onshore experts – along with an engaged and supportive local population – that serves as a model for communities around the world. With around 300 jobs linked to Orkney's marine energy supply chain, the islands are living and working proof of the benefits wave and tidal can bring to peripheral regions.

Neil Kermode, Managing Director,
European Marine Energy Centre





With unrivalled experience of operating in the harshest of ocean environments, Orkney's industry-leading marine companies are dedicated to delivering safe, efficient and cost-effective project support.

MARINE COMPANIES





GREEN MARINE

Green Marine is a multi award winning company providing cost effective solutions for the safe installation, removal and maintenance of a wide range of tidal and wave energy devices and gravity bases, as well as a wide variety of marine services.

With headquarters in Orkney and an office in London, we operate worldwide and have a fleet of well-equipped specialist vessels and experts at our disposal. Our highly experienced team members have a vast knowledge of the marine sector and possess a long track record of successful operations in the UK and overseas. This expertise allows us to safely and efficiently carry out marine operations in harsh conditions and strong tidal currents.

We have undertaken works for Wello Oy, Atlantis Resources Ltd, Meygen, Aquatera, CorPower Ocean AB, Gardline, Prosafe, Seatricity, Andritz Hydro Hammerfest, Nautricity, EMEC, OIC, Land and Marine, Wave Energy Scotland, Scottish Enterprise, JGC, Marine Services, RGC Services, BAM Nuttall, Foyle and Marine Dredging and Coastworks.

OUR SERVICES:

- Naval architectural services.
- Engineering.
- Structural analysis.
- Operational planning and storyboards.
- Vessel charter.
- Barge charter.
- Specialised heavy lifts.
- Decommissioning.
- Salvage.
- Construction.
- Vessel management.
- Maintenance of subsea devices.
- Installation and removal of subsea devices.
- Mooring deployment and removal.

OUR VESSELS

- **GANTRY BARGE GM700L**
The GM700L is designed to lift and deploy all types of marine structures and anchors from the seabed or surface for maintenance, installation and removal. The GM700L can also place all devices and anchors onto the GM1100C for transportation to and from sites. The GM700L has a SWL of 700tons in air.
- **FLAT TOP BARGE GM1100L**
This barge is for the transportation of all types of marine devices and anchors for deployment at sea or maintenance at sea or onshore. The GM1100L has a load capacity of 1100tons.
- **GREEN CHIEF**
DAMEN 2609 Stantug, this vessel is equipped with a towing winch and deck crane for towing activities and light anchor handling works and offshore works in the marine renewables sector.
- **GREEN ISLE**
DAMEN 2712 Multicat, Versatile workboat with substantial cranes and winches for all construction and anchor handling works. Fitted with a four point mooring system specially designed for work in the wave and tidal sector. DAMEN Multicats are regarded as the best in the world.
- **CAPELLA**
Safe and fast crew transfer and safety vessel, capable of carrying 12 passengers with onboard facilities.
- **RIBS**
Various RIBS for transfer and safety as well as assisting in mooring operations.

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LEASK MARINE LTD

Providing vessel charter, commercial diving and international marine construction services for a number of sectors, including renewable energy, aquaculture, fisheries, ports and harbours, Leask Marine delivers a range of proven capabilities.

Working across Europe, our vessels and dive teams have delivered on time and within budget projects, meeting and exceeding our customers' expectations.

Our track record in delivering a wide range of services is second to none. Whether you need a fouled prop cleared, a renewable energy device installed, or a whole new harbour constructed, we are here to help you. Contact Leask Marine today to discuss your requirements.

Over the past 10 years Leask Marine has been at the forefront in supporting the marine renewables industry and has grown to become a world leader in wave and tidal marine technology supply chain service provision, successfully completing projects for many of the world's leading marine energy converters.

RANGE OF SERVICES

- Leask Marine provides an unprecedented range of uniquely developed processes and equipment to support the mobilisation, deployment, installation, commissioning, service and maintenance, inspection and de-commissioning of the world's foremost marine energy developers' devices.
- Leask Marine's known experience and flexibility allows each client a turnkey solution for their devices, while the company's unparalleled depth of expertise and experience offers a complete supply chain solution for marine equipment procurement and logistics.
- Leask Marine has extensive experience working on a diverse range of projects and this has given the company the flexibility to offer a wide variety of commercial diving, vessel charter and consultancy services including:
 - Installation and support of marine renewables devices.
 - Marine construction.
 - Marine consultancy.
 - Commercial diving.
 - Inspection services.
 - Inspection, survey and ADCP work.
 - Salvage work.
 - Aquaculture work.
 - Towing and other general workboat support tasks.
 - Plant hire.
 - NDT and MPI Testing.

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ORKNEY MARINE SERVICES

The range of ports and harbours within the Orkney Harbour Authority is both varied and diverse; from the Oil Port of Scapa Flow – the world’s second largest natural harbour – that hosts multiple ship-to-ship transfer operations of crude oil, LPG and LNG and vessels serving the Flotta Oil Terminal, to the harbours of Kirkwall and Stromness that receive, on average, 120 cruise ships annually making Orkney the most popular cruise ship destination in the United Kingdom.

The harbour authority has a fleet of three 55 tonne bollard pull ASD tugs and two pilot launches, while also supporting the nine inter island ferries that carry over 300,000 passengers annually to the north and south isles of Orkney.

Orkney’s geographical location, just one degree inside the new sulphur emission control area, presents both challenges and opportunities. The Harbour Authority is assessing both ends of this spectrum with a pragmatic and positive view to developing future sustainable business through innovative bunkering and future low carbon fuel delivery programmes.

The Harbour Authority provides all pilotage services and Vessel Traffic Services (VTS) for Scapa Flow and the Kirkwall Harbour areas.

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ROVING EYE ENTERPRISES

Roving Eye Enterprises provide cost effective ROV services and workboat charters in Orkney, offering clients a professional and experienced team for a variety of tasks.

The firm operates two state-of-the-art Seaeye ROVs, enabling surveys to be undertaken in a range of locations – from pipelines, cables and jetties, to piles, hulls and the seabed. Object and cable recovery, diver safety and visual surface support, expand an already extensive service capability.

Roving Eye Enterprises can arrange a complete survey package, tailored to client requirements, that utilises multi beam, bottom sub profiler, side scan sonar and ADCP systems.

With a recently expanded fleet of vessels, Roving Eye is pushing its working capability into challenging new locations, inshore and offshore, with marine renewables a particular focus.

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Naturally, the firm is dedicated to safety throughout all its operations. All craft are fully certified and coded for the task in hand, while Roving Eye’s friendly and experienced crews are happy to integrate with clients’ team members.

Roving Eye’s client list is extensive and includes a number of major energy companies and a variety of private and public sector bodies.

“Challenging working conditions require creative thinking and problem solving skills,” says Roving Eye’s Keith Bichan. “Our highly skilled and experienced work team of ROV pilots, tethermen and boat skippers guarantee your job will be successfully completed with the agreed time frame and on budget.”

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SCOTMARINE LTD MULTICAT M.V. ORCADIA II

SCOTMARINE LTD

Scotmarine Ltd, established by Orcadian entrepreneur Barry Johnston, owns and operates a new Damen 2613 MultiCat® work vessel the M.V. ORCADIA II. The M.V. ORCADIA II is one of the most powerful Multicat work vessels in the world and the largest possible in its classification at 199.8 BT. With a 50 tonne bollard pull it is the first vessel based in Orkney that's able to undertake a similar role to the OIC owned tugs, in addition to carrying out heavy anchor handling and heavy lifting operations. The highly versatile vessel's capabilities include a 100 tonne anchor handling winch, 60 tonne towing winch and twin 290 HS Marine knuckle boom hydraulic cranes each capable of lifting over 42 tonne. The vessel has a total power on-board of over 4000hp.

The crew and management team have over ten years direct experience in marine renewables. The M.V. ORCADIA II provides a range of support services, from anchor handling, towing and mooring deployment, to hydrographic survey, diving support and the installation and recovery of wave and tidal energy systems and the associated infrastructure. The experienced crew is used to operating in a variety of challenging environmental conditions. In addition to this the company offers services to other marine industries, including fish farm support and dredging. Client confidentiality is a priority and competitive day rates are offered with both short and long-term charter opportunities.

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SULA DIVING LTD

SULA Diving is located at the Old Academy, Stromness – the heart of renewable energy developments in Orkney. Its core business involves the provision of diving and marine survey services. Commercial SCUBA and surface supply dive teams carry out a variety of work across Orkney, from inspection, seabed surveys and biological sampling, to civil engineering projects associated with local oil and marine renewables sectors.

Other marine survey resources include the provision of remote sampling techniques, such as side-scan, magnetometer and remotely operated vehicle (ROV) surveys. SULA Diving Ltd's core staff are qualified marine biologists with decades of experience working in Orkney's marine environment. Work vessels are also provided in support of these services, along with full project management, permitting and risk assessment.

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Proper preparation is key to successful project delivery in renewables. Orkney's specialist consultancies have a long track record in laying the vital groundwork for wave and tidal device deployment, guiding clients through every stage of the planning process.

SURVEY WORK





AQUATERA LTD

Aquatera has been delivering a modern and innovative suite of environmental services and products to local, UK and worldwide markets since 2000, building a strong track record in marine renewables and other energy sectors.

The Stromness based company's work includes: strategic energy and marine spatial planning; a wide range of environmental surveying activities; undertaking and managing environmental impact assessments (EIAs), completing resource assessment studies and risk assessments, engaging in public consultation and public communications initiatives and providing a wide range of operations support activities for technology deployment and project development.

In addition to substantial experience in renewable energy, Aquatera and its sizeable network of associates possess a vast knowledge of wider environmental and social studies, particularly in offshore and coastal areas. The Aquatera led team of expert practitioners has completed numerous research projects, including a number funded by the UK Department of Trade and Industry (DTI) and other government bodies.

Aquatera's core focus is upon the environment, in its broadest sense. Whether considering plankton or people, habitats or homes, birds or businesses, the company ensures that any policy, plan or project meets the highest standards of stewardship and stakeholder expectations, whilst also working for the overall success of the particular scheme. Aquatera specialise in the management of interactions with, and impacts on, the environment.

Managing Director Gareth Davies commented: "Over the last 15 years we have sought to build a company that has the expertise and capacity to make a real difference in delivering new and better ways of providing global energy. Our special niche is in the marine energies of wave and tide, but many of the tools that we have developed, the approaches that we follow and the knowledge that we have, can equally be applied to offshore wind and even the offshore oil and gas sectors."

He added: "At the heart of what we do is a 360 degree perspective on environmental interactions, considering both the effects of development on the environment, but also the effects upon development from the environment."

This holistic approach helps us to find the right solutions for our clients to all of the pressures that they face."

A multi award winning company, Aquatera has a proven track record in finding solutions in the most challenging marine environments and also in a wide range of coastal and terrestrial situations. By completing over 500 commercial projects in its 15 years of activity, and building longstanding client relationships, Aquatera is a successful and well-respected company that thinks locally and acts globally.

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CLARK THOMSON INSURANCE BROKERS

Clark Thomson Insurance Brokers possess over 15 years experience in the renewables sector, providing innovative and tailored insurance solutions for wind, wave and tidal energy developers throughout the UK.

The largest independent insurance broker in Scotland, Clark Thomson has a unique and extensive branch network supporting local communities and businesses across the country.

Well established in Orkney, Clark Thomson's experienced Kirkwall based team offers access to some of the world's leading renewable energy insurers, with specific industry knowledge and proven track records in the sector.

Offering tailored, competitive insurance solutions for offshore renewables developers and their technical service providers, Clark Thomson can cover all phases of device development, from construction and transit, through to deployment, operation and decommissioning.

Employer's liability and public and products liability are also areas of expertise for the firm.

Clark Thomson's clients include a number of major marine renewables developers and several service providers offering vital support to the industry.

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INTERNATIONAL CENTRE FOR ISLAND TECHNOLOGY

The International Centre for Island Technology (ICIT) is the Orkney campus of Heriot-Watt University. ICIT is based in Stromness, Orkney, with the location providing a living laboratory for students and researchers to engage closely with industry and government.

Core activity includes teaching and research across marine science and biodiversity, marine planning, marine policy, and marine renewable energy. ICIT has 25 years of experience teaching MSc programmes in Orkney, attracting students from around the world.

The MSc programmes offered by ICIT produce highly qualified graduates who are filling the skills gap in the emerging renewable energy sector.

Scholarships are available for 2016 entry onto all four of ICIT's MSc programmes – Marine Renewable Energy, Renewable Energy Development, Marine Resource Management and Marine Planning for Sustainable Development.

Over the years, ICIT has developed a strong multi-disciplinary research and consultancy portfolio contributing towards the equitable and efficient use of marine and energy resources.

ICIT has led and partnered with several major EU Framework Programme research projects, as well as many UK Research Council and industry funded research projects – for example, the H2020 Maribe project overcoming barriers to the development of "Blue Growth", and the EPSRC funded TeraWatt project; a large scale 3D modelling programme for wave and tidal energy resource and environmental impact assessment.

ICIT is now on a trajectory for growth, capitalising on our close proximity to the marine industry, government and community stakeholders.

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ORKNEY RESEARCH CENTRE FOR ARCHAEOLOGY

ORCA is located in the University of the Highlands and Islands Archaeology Institute. We offer a comprehensive range of marine and terrestrial archaeological and historic environment services to support the energy industry across Scotland, such as impact assessments, archaeological fieldwork and post-excavation, built heritage services, environmental archaeology, marine archaeology and archaeological sciences.

OUR CAPABILITIES INCLUDE

- Historic Environment Impact Assessments, Appraisals and Environmental Statements.
- Cultural heritage consultancy as part of the planning and licensing process.
- Desk-based assessments, baseline assessments, walkover surveys, building surveys, wreck surveys, site evaluations, archaeological watching briefs and excavations.
- Auger surveys and analysis of onshore and offshore geotechnical datasets for archaeological and palaeoenvironmental potential.

- Laser scanning and geomatics.
- Marine and terrestrial geophysical survey (including collection of sub-bottom profiling, sidescan sonar, gradiometry and resistance data), data analysis and interpretation.
- Provision of marine and terrestrial historic environment management and mitigation strategies.

ORCA has been closely involved with marine and onshore energy developments in the Northern Isles, the Highlands and Islands and Scottish Waters, supporting a range of renewables, gas and grid transmission projects, providing a bespoke consultancy service for both marine and terrestrial energy-related developments. We have a track record of facilitating projects through the planning process from the initial project design, baseline data collection and impact assessment stages through to management and monitoring services post planning consent. We are a registered supplier on the Achilles Utilities Vendor Database.

CONTRACT PROJECTS INCLUDE

- An extensive programme of archaeological work in Shetland, as part of the Laggan-Tormore development in Delting. The development comprises the construction of a new gas processing plant, pipelines and infrastructure to open up the Laggan and Tormore gas fields, located offshore approximately 85-90km west of Shetland. Currently, ORCA is undertaking detailed post-excavation analysis of the material recovered from the excavations.
- MeyGen is the world's largest planned tidal stream energy project and the UK's first commercial tidal array to be developed and built. ORCA worked closely with the teams at Xodus and MeyGen to provide management and mitigation strategies to help avoid or reduce risks to the project from historic environment issues, contributing to the achievement of planning and licensing consents.

APPLIED RESEARCH PROJECTS INCLUDE

- An archaeological desk-based assessment of key marine datasets for Orkney and the Pentland Firth to support cultural heritage within new marine planning protection systems and the management of offshore resources for Historic Scotland and RCAHMS.
- Remote sensing surveys and archaeological diving evaluations within the important naval harbour of Scapa Flow, Orkney. The investigations aimed to establish or confirm the identification, extent of survival, character and condition of around 25 known, but mostly poorly recorded First and Second World War wreck sites and associated structures, and to ground-truth a limited sample of geophysical anomalies identified in previous studies.

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ORCADES MARINE MANAGEMENT CONSULTANTS LTD

OrcaDes Marine Management Consultants Ltd (OMMC) is a leading provider of marine project management and consultancy services to the offshore renewable energy sector, shipping and port industry.

Based in Kirkwall, Orkney, OMMC brings together a dynamic and experienced team of maritime professionals, marine scientists and marine engineers, all dedicated to providing the most innovative, economic and practical solutions for clients.

OMMC's consultants possess many years of hands on experience in the marine and offshore sectors and have been involved with renewable energy installations from the earliest days of the industry in Orkney.

The firm believes that a crucial element in creating a sustainable marine renewables industry is the ability to install, recover and maintain marine energy converters economically. OMMC has already demonstrated in practice that substantial savings can be made by the early involvement of its consultants when considering the design of an installation.

OMMC continues to assist several major renewables developers in Orkney and is working hard to build on its already solid reputation for getting the job done safely, efficiently and on time.

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ORKNEY COLLEGE MARITIME STUDIES DEPARTMENT

Orkney College's Maritime Studies department is ideally situated on a waterfront site in busy Stromness Harbour. It has a long and distinguished history of providing education and training for generations of seafarers from Orkney and beyond.

We are committed to providing training that is relevant to the growing needs of the renewables maritime workforce – both seafarers and land-based technicians who are required to go to sea. We are happy to discuss discounts on block bookings from the industry. Some of the courses relevant to the renewables industry are listed here, but please visit the website or preferably call to find out about our full range:

- Deck Safety Awareness: This course has been written to enable non-seafaring technicians who have to work at sea gain an understanding of the vessel environment and risks associated with it.

- Personal Survival Techniques (PST): This is the one-day mandatory sea-survival training course that all seafarers and those working on vessels require.
- Elementary First Aid and Medical First Aid.
- VHF Short Range Certificate: The mandatory licence required for using both fixed and hand-held VHF radios at sea.
- STCW Fire Fighting.
- Powerboat Level 2: This can be bundled with other courses to achieve a commercial endorsement which allows the holder to operate a powered vessel of up to 24m in a 3 mile radius. Useful for harbor and inshore work.
- We offer a wide range of courses for seafarers, from Yachtmaster to EDH, as well as the full range of Basic Safety training and even sail making.
- Master Coded Vessels <200T MCA exam preparation course.

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XODUS GROUP

Xodus Group has experienced steady growth in our Low Carbon business over recent years. This has been driven by major developments in offshore wind, wave and tidal energy and associated subsea cables and power interconnectors. The key to Xodus' success is a total commitment to our existing international client base and the repeat business this generates. Our clients are pioneers and market leaders and they expect the same of their professional consultants. Working in partnership with our clients, our environmental, engineering and commercial teams have been cooperating on truly integrated projects.

Xodus has an ever expanding portfolio of environmental impact assessment (EIA) projects for the tidal energy industry. Following on from the success of the MeyGen project where Xodus was lead consultant on the EIA for the 86MW Phase I and played a pivotal role in the delivery of consent for this project, we are now supporting a number of other clients in a similar role. Xodus was lead EIA

consultant on the Tidal Venture Limited (TVL) Torr Head Tidal Energy Array in Northern Ireland and is currently EIA coordinator for Minesto's Deep Green tidal array in Holyhead Deep offshore Wales. These two projects have been able to take advantage of the experience from MeyGen and also made wider use of Xodus' engineering capability in the completion of site development studies. This includes cable routing and landfall studies as well as a study to investigate the electrical architecture for a tidal array. Xodus has also recently been engaged by OpenHydro to undertake the scoping of the EIA for the Race Tidal Project in the Channel Islands.

In the offshore wind sector we were retained by Statoil ASA as lead EIA consultant on the Hywind Scotland floating wind pilot park project, proposed for offshore Peterhead. This project was successfully consented in 2015. We have also recently completed a multidisciplinary strategic and feasibility study for the Guernsey Government investigating the potential for an offshore wind project.

In the past three years Xodus has continued to grow in the submarine cable market. Successes include:

- A number of cable route feasibility studies for including the following HVDC interconnectors; NorthConnect, Icelink and Western Isles.
- Marine services framework agreement for submarine cable and offshore gas pipeline assets owned by Interconnector Services Limited (part of Mutual Energy Ltd), providing advice for all aspects of the ongoing operations and maintenance on these strategically critical assets.
- Employer's representative services framework agreement for Scottish and Southern Energy plc, providing technical and contractual support, client representative services and vessel build/fit-out auditing in support of all submarine assets. The Caithness Moray HVDC Interconnector being a key project; and
- A number of specialist studies for confidential clients within Europe and the USA relating to insurance, emergency response and technical due diligence.

In addition to our work on commercial projects, we have also been involved with some high profile research projects in the offshore renewable industry.

In the past two years, Xodus has completed three innovative studies for the Carbon Trust Offshore Wind Accelerator research programme and a fourth is ongoing. In the area of cables, we have completed a cable burial risk study that reviewed survey methodologies and costs; cable burial techniques; cable burial risk assessment methodologies and completed a cost benefit analysis that highlighted potential for significant savings from risk focused survey methods and cable burial assessments. This resulted in the Carbon Trust issuing a guideline on the methodology for cable burial risk assessment. The Xodus engineering team has also recently commenced a study looking at reducing weather downtime and offshore working time for cable installation operations throughout the transport and installation process.



XODUS GROUP

Other work included:

- Development of a new approach to structural integrity management, starting with the basis of design, incorporating fabrication, installation and operation. This demonstrated the potential for significant cost reductions using condition and response monitoring technology.
- Development of a new statistical tool for analysing complex time-domain scenarios associated with optimised vessel and access system design and performance. This new approach considers the latest technique to vessel motion characterisation and provides a state-of-the-art, user-friendly, assessment tool.

According to Marc Costa Ros, Senior Manager, Offshore Wind and Dimitris Kostopolous, Associate:

“Carbon Trust has been working with Xodus Group and their subcontractor partners over the past fifteen months. They have delivered work on three key Carbon Trust Offshore Wind Accelerator projects in the areas of offshore wind turbine accessibility, structural asset integrity optimisation and cable burial risk. The latter project resulted in an industry

guideline for cable burial risk assessment and burial depth specification. It is fair to say that the outcomes of all three studies have provided insights and contributed to our objective of reducing the costs of offshore wind projects. Throughout, the Xodus led teams’ approach, technical insights, industry knowledge, stakeholder engagement and good project management ensured high quality and value for the OWA partners and we would have confidence in their ability to deliver on future studies should the opportunity arise.”

In partnership with SMRU Limited, Xodus delivered a project for the Department of Energy and Climate Change (DECC) under their Offshore Renewables Joint Industry Programme (ORJIP) to review the role acoustic deterrent devices (ADDs) can play with regards to the mitigation of impacts on marine mammals from offshore wind projects.

We have also completed a project for the European Marine Energy Centre (EMEC) to conduct an engineering study into the options for export power control from its tidal test site on the island of Eday, Orkney. Xodus, in partnership with fellow energy consultancy Element Energy, investigated a range of scenarios

to identify innovative technology solutions to use the excess power that cannot be exported to the grid due to the present grid capacity constraints.

Earlier this year Xodus partnered with EMEC and a host of other marine energy specialists across Europe and America in a major R&D bid to Horizon 2020 to progress wave energy. If successful this will see a new wave energy converter being tested on Orkney.

Xodus believes this commitment to research and development is not only valuable to our clients, but also helps us attract the brightest talent to support the future growth of our business.

ABOUT XODUS GROUP

- Xodus Group is a global energy consultancy providing engineering and environmental services to the offshore energy industries.
- The company delivers technical and commercial know-how at all stages of the project lifecycle from consenting to decommissioning – including environmental impact assessment, conceptual engineering,

FEED, detailed design, safety and risk. We provide highly integrated multidisciplinary teams that focus on our clients’ goals to deliver the right solution.

- Xodus works across the sector with project developers, technology suppliers, marine contractors, finance providers, policymakers and regulators. With vast experience in offshore wind, wave and tidal developments, Xodus marries technical expertise with practical solutions.
- Clients include: Aquamarine Power Limited, Atlantis Resources Corporation, Centrica, DP Energy, EDP Renováveis, Hammerfest Strøm UK Ltd, Interconnector Services Limited, Kawasaki Heavy Industries, Mainstream Renewable Power, MeyGen Limited, Minesto AB, National Grid Electricity Transmission, OpenHydro, Pelamis Wave Power, Repsol Nuevas Energías UK, RWE npower renewables, Scottish Power Renewables, SSE Renewables, Statoil ASA and Tidal Ventures Limited.

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Orkney's diverse network of highly experienced onshore support businesses is characterised by a commitment to delivering innovative and affordable solutions to the challenges faced by renewable energy developers.

ONSHORE





BRYAN J RENDALL (ELECTRICAL) LTD – BJRE

With over 15 years experience in marine renewables and the most northerly NERS accredited Independent Grid Connection Provider in the UK Bryan J. Rendall (Electrical) Ltd (BJRE) is a multi-disciplined renewable energy service and support company based in Kirkwall, Orkney. Established in 1994, the business provides a wide range of support services to the wave and tidal renewable energy sectors worldwide.

From system design through to installation, commissioning, operations and maintenance, BJRE prides itself on the ability to carry out every aspect of major electrical work in house. This one stop shop approach has helped BJRE build up an extensive portfolio of satisfied customers.

Some of our clients include; MeyGen, Nautricity, Voith, Andritz Hydro, OpenHydro Tidal Technology Ltd, Scotrenewables Tidal Power Ltd, Tidal Generation Ltd, Sustainable Marine.

Selected as a company of growth by Highlands and Islands Enterprise, BJRE continues to expand, primarily to meet the requirements of Orkney's rapidly developing marine renewables industry.

The firm is proud to be electrical consultant and contractor to the European Marine Energy Centre and has amassed considerable experience in terminating and testing submarine cables at EMEC's Billia Croo wave site and its Fall of Warness tidal facility off the island of Eday.

Subsea cable work is extremely challenging, requiring just the kind of expertise and rigorous attention to detail that BJRE has become renowned for. The firm carries out stripping and preparation work on double wire armoured, dry and flooded subsea cables, splicing and termination of power core, auxiliary core and fibre optic cables and all associated testing work. With sea survival certified personnel on staff, these tasks are undertaken from both the offshore and onshore ends of cables.

In addition, BJRE regularly carries out design reviews for marine energy developers. The firm also uses the latest version of ETAP software to undertake everything from short circuit analysis, load flows and transient stability analysis, through to earth grid design, cold site determination and cable thermal rating studies.

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CRAIGIE ENGINEERING

A long established marine engineering business operating from modern workshops based in Kirkwall. The company is now embracing the challenges of the marine renewables industry, offering a range of services and solutions to developers.

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HAMNAVOE ENGINEERING

For over 30 years now Stromness based partnership Hamnavoe Engineering has been undertaking a wide range of engineering work throughout Orkney – everything from boat and engine repair, to steel fabrication and winch fitting.

The experienced eight-strong team at Hamnavoe Engineering is now busier than ever, supporting Orkney's developing marine renewables industry, much of which is focused in and around Stromness.

Recent projects have included work for Scotrenewables, Aquamarine Power and EMEC, with the firm also involved in the major harbour development project in Stromness as a renewables base.

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HEDDLE CONSTRUCTION LTD

Heddle Construction Ltd is Orkney's most experienced wind and marine energy civil engineering contractor. We have established an unrivalled reputation for successfully delivering complex and challenging renewable energy projects.

Our company is unequalled in the range of services on offer, from general and heavy crane hire, heavy haulage and storage facilities, to large civil engineering projects, steel fabrication and project management.

With over 40 years experience of working in Orkney, Heddle Construction Ltd fully understands the unique challenges created by the island environment.

We have assisted every one of the marine renewables developers undertaking device testing at the European Marine Energy Centre's facilities in Orkney, giving us unparalleled knowledge of the services required by the industry. Crucially, we appreciate that marine developers require

a high level of professional onshore support and are well qualified to provide this backup.

Heddle Construction Ltd is also the contractor of choice for the construction of the Balance of Plant for onshore wind farm projects having developed excellent relationships with key partners, including consultants, designers, turbine manufacturers and sub-contractors.

Our experience of managing the interfaces involved throughout all project stages allows us to offer clients competitive and sustainable solutions.

Heddle Construction Ltd's extensive client list includes Scottish and Southern Energy, Andritz, Aquamarine Power Ltd, Open Hydro, Tidal Generation Ltd and Voith Hydro.

Whatever your requirements may be, get in contact today to discuss how we can help you successfully deliver your project.

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ORKNEY MARINE SERVICES

The range of ports and harbours within the Orkney Harbour Authority is both varied and diverse; from the Oil Port of Scapa Flow – the world’s second largest natural harbour – that hosts multiple ship-to-ship transfer operations of crude oil, LPG and LNG and vessels serving the Flotta Oil Terminal, to the harbours of Kirkwall and Stromness that receive, on average, 120 cruise ships annually making Orkney the most popular cruise ship destination in the United Kingdom.

The harbour authority has a fleet of three 55 tonne bollard pull ASD tugs and two pilot launches, while also supporting the nine inter island ferries that carry over 300,000 passengers annually to the north and south isles of Orkney.

Orkney’s geographical location, just one degree inside the new sulphur emission control area, presents both challenges and opportunities. The Harbour Authority is assessing both ends of this spectrum with a pragmatic and positive view to developing future sustainable business through innovative bunkering and future low carbon fuel delivery programmes.

The Harbour Authority provides all pilotage services and Vessel Traffic Services (VTS) for Scapa Flow and the Kirkwall Harbour areas.

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Founded in Orkney in 2003, the European Marine Energy Centre (EMEC) is playing a key role in proving to the world the value of wave and tidal power as a sustainable source of renewable energy.

TEST CENTRE



THE EUROPEAN MARINE ENERGY CENTRE (EMEC) LTD

The European Marine Energy Centre (EMEC) is the world's leading real-sea test facility for wave and tidal energy converters. With over a decade of experience, EMEC is attracting developers from around the globe to prove what is achievable in the harshest of marine environments.

More marine energy devices have been tested at EMEC than at any other single site in the world: EMEC has hosted 16 wave and tidal energy clients (with 25 marine energy devices) spanning nine countries.



THE EUROPEAN MARINE ENERGY CENTRE (EMEC) LTD

REMOVE THE BURDEN OF SITE DEVELOPMENT AND INFRASTRUCTURE INVESTMENT

Real-sea testing and demonstration infrastructure

EMEC provides pre-consented and cost-minimising test and demonstration facilities in major wave and tidal resources:

- Accredited, grid-connected test sites:
 - Extremes of up to 18m waves and peak tidal flow of 4 m/s (8 knots).
 - 11kv sub-sea cables, connected to national grid via onshore substation.
 - Performance monitoring with metered electrical output for devices.
- Scale test sites: consented areas of sea space with pre-laid foundations, and bespoke test support buoys available to dissipate any generated electricity. Suitable for:
 - Component and device testing.
 - Installation and maintenance practice.
 - Marine operation and vessel demonstration.
- R&D projects.

VERIFY PERFORMANCE CLAIMS AND GET EVIDENCE BASED RESULTS, WHILE REDUCING TIME, COST AND RISK IN YOUR TECHNOLOGY DEVELOPMENT PLAN

Testing and verification services

As the world's only accredited marine energy test centre, EMEC offers:

- Testing programmes: bespoke for every stage of your technologies development.
- Independently verified performance reports (ISO 17025): Factory test and evaluation; system integration test and evaluation; technical field trials; operational field trials; in-service support evaluation.
- Environmental Technology Verification (ISO 17020): Design review; supplier test; supplier analysis; certification; independent test; independent analysis; in-service trials; in-service support evaluation.

USE RESEARCH AND DATA TO FACILITATE CROSS-SECTORAL INNOVATION AND KNOWLEDGE SHARING

With over a decade of world leading innovation on our sites, EMEC participates on a variety of projects to help facilitate the development of marine renewables. We are always looking for new ideas to support innovation challenges in the industry such as:

- 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.

SPEED UP AND SIMPLIFY YOUR INTERNATIONAL DEVELOPMENT POTENTIAL

Global industry development and consultancy

Having overseen more than 2000 marine energy activities at our test site in Orkney, covering device deployments, grid connections, cable laying operations, and data collection EMEC, is at the forefront in the development of international standards for marine energy and is forging alliances across the Americas, Asia, Australasia and Europe to create a global network of test centres, and instigate the development of a global market for wave and tidal developers.

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Technology developers represent the leading edge of the marine energy revolution, with those testing devices in Orkney waters recognising the support of a supply chain that genuinely shares their passion for the task in hand.

DEVELOPERS





CORPOWER OCEAN AB

OUR BACKGROUND

CorPower Ocean AB was founded in 2009 and has developed a compact high-efficiency wave energy converter, inspired by the pumping principles of the human heart. Our wave energy converters offer five times higher annual energy output per ton of device compared to previously known technology. The step-change improvement in performance allows a cost-of-energy that can compete with offshore wind in the near term and established energy sources as the volumes increase.

Our aim is to establish a new class of highly effective wave power for utility-scale energy generation competing with established energy resources.

OUR SOLUTION

The key challenge is to survive storms with good reliability and at the same time deliver enough annual energy in relation to the system life cycle cost making it a profitable business case. CorPower's devices are very compact and

operate in resonance with incoming waves, delivering a large amount of power with small buoys. Survivability in storms is achieved by unique de-tuning mechanism, making the devices more transparent to incoming energy. Low CAPEX and an effective O&M scheme provide step-change reduction in cost-of-energy, enabling wave power to compete with offshore wind after 50MW of installed capacity.

OUR TECHNOLOGY

The Wave Energy Converters (WECs) have a unique design with low inertia, combined with advanced control systems that make the WEC oscillate in resonance with incoming waves. Our patented phase control technology makes the converters resonant in all wave conditions, strongly amplifying the motion and power capture.

This allows for small and light devices with a high power output, and effective energy absorption over a broad range of sea states. The concept, incorporating many small units,

enables mass production to drive down device cost, and has an effective maintenance scheme. The system has an excellent survivability rate in storms, thanks to its robust construction.

An 8m-diameter buoy having a mass of 60tons can generate 250kW in a typical atlantic coast wave climate, which should be compared to previous generation WECs having dimensions of 30m+ and mass of 1000t+ for similar power output. The detuning of the PTO is a critical function for storm survivability.

OUR DEVELOPMENT

CorPower Ocean is currently in the stage three of its pilot program, which will entail taking a scale 1:2 25kW Wave Energy Converter (WEC) through the next step of structured verification by dry testing it in a rig in Stockholm in 2016, followed by wet testing in the first and second quarters of 2017 at EMECs Scapa Flow nursery site in Orkney. Stage 3 will be supported by best practice from EMEC in Orkney, alongside the

experience from offshore power generation company Iberdrola Engineering, the University of Edinburgh, and WavEC Offshore Renewables' expertise in cost and performance modelling.

Testing activities in Stage 1 and 2 have already proven that a significant improvement in the amount of annual energy per ton and annual energy per force can be offered compared to the current state of the art for Wave Energy Converters.

After verifying functionality, operations and economy of half scale system by mid-2017, CPO expects to launch its stage 4 with that testing of a full scale system before being able to launch the first units to the market.

Wave farms based on CPO technology require less capital investment, less ocean area, less materials and deliver a higher annual energy output for a given generation capacity, all enabled by system efficiency and smart control.

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LAMINARIA

Oostende based Laminaria has developed a surge-operated point absorber, consisting of a vertical surface that interacts with horizontally travelling wave energy. As the result of this horizontal movement in the water the Laminaria device is subjected to a tilting and translating motion, which is transferred through mooring ropes to the generators.

The technology has a bespoke storm protection system built in to enhance the survivability of the device, allowing it to remain operational during storm events.

When wave power exceeds the level necessary to produce nominal power, the ride height of the Laminaria is lowered to the point where the motion in the water is equivalent to the production of nominal power. This ensures nominal power production even during the heaviest of storms without undergoing excessive forces.

The Laminaria device converts waves from all wave directions, heights and lengths at the same time.

In February 2016, Laminaria joined forces with the European Marine Energy Centre (EMEC), Innosea, Ghent University, and TTI Testing to support the development of the wave energy converter. Funded under the OCEANERA-NET First Joint Call 2014, the LAMWEC project seeks to develop and test a 100kW Laminaria WEC, progressing from TRL stage 5 (technology validated in relevant environment) to 7 (system prototype demonstration in operational environment).

Scale sea trials of the device are already underway in Belgium to inform the design for the full-scale version that will undergo performance testing at EMEC in 2017.

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NAUTRICITY LIMITED

Nautricity Limited is a Glasgow-based next generation tidal energy technology developer. Its CoRMaT tidal turbine technology has been developed from first principles and evolved through Technology Readiness Levels 1 (fundamental concept appraisal) to 9 (full scale pre-commercial demonstration), the latter being completed in 2014.

The CoRMaT device uses two closely spaced dissimilar rotors, moving in opposite directions to eliminate reactive torque forces that would otherwise necessitate extensive foundation structures. The device is free to orientate itself to the direction of tidal flow and the relative rotational velocities set up by contra-rotating blades remove the need for a gearbox. The CoRMaT is scalable in capacity and is suitable for deployment in water depths greater than 8 meters.

Nautricity secured a Scottish Government Smart Scotland award in 2012 to prototype its novel tidal stream station keeping technology, the Hydro-buoy. The Hydro-buoy has undergone extensive in-sea testing at the European Marine Energy Centre, holding station a full-scale CoRMaT turbine.

The Scottish Government WATERS2 award will see Nautricity deploy and operate a commercial CoRMaT tidal energy technology in coastal waters at the Mull of Kintyre. Nautricity aims to build out its Mull of Kintyre tidal development post WATERS2 demonstration using the experiences gained from the initial project. This will inform the most cost effective development route to be adopted for all technical and commercial aspects of the project. It is envisaged that a multi-megawatt array could be realised on the site post-2016.

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OPENHYDRO

OpenHydro, a DCNS company, is a technology business that designs and manufactures marine turbines to generate renewable energy from tidal streams. In May 2008, OpenHydro began successfully generating electricity from its test turbine onto the Scottish grid, the first company in the UK to do so. OpenHydro is continuously using this platform for research and development purposes and to test its turbines. The company plans to achieve an industry first in 2016 by delivering two of the world's first grid connected tidal arrays in France and Canada.

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SCOTRENEWABLES TIDAL POWER

ScotRenewables Tidal Power (SRTP) based at Hatston, Orkney, is a world leader in the development of floating tidal turbines. It has been developing its patented technology from initial concept to commercial scale over the past 12 years.

This year the company will launch the SR2000 2 MW, the most powerful tidal turbine in the world. The turbine will be installed at the European Marine Energy Centre, Orkney where it will undergo a rigorous testing and demonstration programme ahead of supply to tidal array customers.

Rugged and robust, the SR2000 is designed to minimise installation, operation and maintenance costs through the use of inexpensive, locally available vessels for these activities.

The turbine is highly versatile and can be installed in most seabed conditions, in both shallow and deep water sites. It can also be optimised to local tidal currents to maximise energy extraction.

SRTP has established a turbine assembly facility at Hatston, where it has assembled and tested the internal equipment for the first SR2000 turbine. This facility will also become the main equipment assembly point for SR2000 turbines for large-scale deployment in tidal arrays within the UK. This will ensure that Orkney and the Highlands and Islands economy continue to reap the benefits of wider scale deployment of these turbines as the industry moves to the next level.

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SUSTAINABLE MARINE ENERGY

Sustainable Marine Energy is a marine engineering company delivering commercially viable solutions to the tidal industry. Our innovative technologies and processes deliver a step change reduction in cost and enhance through-life performance for customers. Our team and development partners have been involved in the deployment of first generation tidal energy devices. We understand the challenges faced by the sector. Ensuring that low cost installation and maintenance operations can be achieved is a fundamental design driver for all of our systems; solving one of tidal energy's key challenges and enabling the delivery of commercially viable projects. Our main product is, PLAT-O, a tidal energy

system, fitted with SCHOTTEL SIT turbines. PLAT-O is a moored, buoyant platform that is positioned mid-water column. It provides a comprehensive systems integration solution, exporting grid-compatible power from multiple tidal energy convertors. A 100kW PLAT-O prototype has undergone testing off the Isle of Wight and will be grid-connected at EMEC in Spring 2016. A 240kW commercial demonstrator will be deployed towards the end of 2016. These systems are available for purchase. In addition, SME provides anchoring and mooring solutions for energetic marine environments and bespoke system integration platforms for tidal energy convertors and other applications.

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TOCARDO

Tocado is a Dutch company focusing on the development of total tidal energy solutions. Tocado has two turbine types commercially available - the T1 and T2. Ten turbines are presently operational and grid connected in the Netherlands. Currently, Tocado's standard 1MW platform is developed for deployment at EMEC by next year.

Tocado became an independent company in 2008 and has been fully commercial since 2012, when its first turbines were sold to clients in Nepal and Japan. With Huisman Equipment as strategic shareholder, Tocado is ready to become a leader in the tidal energy market.

In 2015, Tocado installed three linked T1 turbines in the Afsluitdijk, a 37 km long primary sea defence in The Netherlands. Another Tocado turbine in the Afsluitdijk has been providing electricity for over eight years. Together with Bluewater and a group of leading offshore companies, Tocado has also deployed its first offshore floating tidal energy project at the island of Texel in The Netherlands with a T2 turbine.

Further still, together with Huisman, Tocado has installed five T2 tidal turbines in the Eastern Scheldt storm surge barrier (Oosterschelde barrier) – the world's largest tidal installation, consisting of five turbines in an array. The array has an installed capacity of 1.2MW and powers 1,000 households.

Tocado signed up to demonstrate a 20-year pre-commercial array at EMEC's Fall of Warness tidal energy test site. Tocado plans to install eight T2 turbines across two Tocado semi-submersive floating platform systems. The planned array at EMEC is the next step in Tocado's path towards commercialising its tidal turbine by proving and validating the technology in the volatile offshore environment in Orkney for an extended time period.

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Orkney's transport and logistics experts know how to keep projects moving, with unrivalled experience of getting large-scale equipment from A to B as quickly and cost-efficiently as possible.

TRANSPORT





NORTHLINK FERRIES

Serving the Northern Isles, NorthLink Ferries operates four main freight routes providing customers with a solution for all their cargo needs.

The business has seen substantial growth in the transport of commercial goods and vehicles over the years and so the range of services on offer is continually reviewed and developed.

Two dedicated freight vessels, MV Hildasay and MV Helliar, operate on three routes:

- Kirkwall to Aberdeen
- Lerwick to Aberdeen
- Lerwick to Kirkwall

The comprehensive freight offering caters for all traffic types, including project cargoes for the renewable energy, construction and oil and gas sectors.

Kris Bevan, Freight Manager at NorthLink Ferries, said: "Companies are increasingly relying upon our bespoke freight solutions

as a reliable means of transporting large-scale equipment to the Northern Isles.

"As well as our crossings being regular, our vessels can handle roll on roll off cargo in addition to containerised and heavy outsize loads.

"Our use of Orkney's Hatston pier and close proximity to Copland's Dock mean we are well equipped to accommodate industry traffic."

The freight service is fully integrated with NorthLink's passenger vessel service making the Northern Isles more accessible than ever before.

Passenger vessel MV Hamnavoe, which operates on the Scrabster to Stromness route, provides access and great views of the European Marine Energy Centre wave test site. Located on the western edge of Orkney's mainland, at Billia Croo outside Stromness, this grid-connected site is one of the highest wave energy potentials in Europe.

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NORTHWARDS LTD

Northwards is a leading haulier in the North of Scotland, providing innovative logistic solutions for its customers by transporting goods all over the United Kingdom, Europe and internationally. They pride themselves in delivering cost effective innovative solutions for any transport requirement.

The company operates a wide variety of vehicles, trailers and handling equipment to suit the diverse range of goods that move in and out of the islands. Next day/time critical consignments are a speciality, as are out of gauge project cargoes.

Company depots are situated at Aberdeen, Inverness, Stromness, Scrabster, Cumbernauld and the head office in Lerwick.

Cargo handling and storage facilities are available at all locations. Northwards are also members of the UPN Pallet Network which gives it nationwide coverage for next day pallet collections and deliveries.

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STREAMLINE SHIPPING GROUP

With over 30 years in the business, Streamline Shipping Group offers efficient, professional and competitive services around all aspects of project cargo, from planning and logistics to full project management. We are ISO9001, 14001 and 18001 accredited and, as such, offer quality and assurance throughout your supply chain.

Our in-house teams cover heavy lifting – including crane hire and contract lifts – road haulage and sea freight, offering vessel chartering, freight forwarding and agency services, quayside stevedoring services, storage and warehousing. With over 200 staff, the Group has bases in Aberdeen, Glasgow and Humberside, as well as specialist island operations in Orkney and Shetland.

Streamline operates its own container vessel on a bi-weekly service sailing between Aberdeen and the Northern Isles. This scheduled shipping service offers highly efficient grouped freight, container and project cargo movement to Orkney and Shetland from mainland Scotland.

Our container service is augmented by daily trailer/express services from Glasgow and Aberdeen to the far north. Working with partners, we also offer weekly services to and from Scandinavia and continental Europe and have an in-house international freight forwarding team for worldwide distribution.

The Group has extensive experience in servicing the oil and gas sector in the north and more recently has been involved in a wide range of renewables projects where the moving and positioning of equipment safely, on time and to budget is critical.

Our combined Project and Agency teams facilitate geared and non-geared vessel charters as part of a point to point service which can include collection, loading, carriage, discharge, transfer to site and final positioning.

If you are interested in sourcing a trusted and experienced freight partner, look no further.

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A number of other local and national organisations provide a vital role in supporting Orkney's marine renewables industry.

MARITIME AND COASTGUARD AGENCY

The Maritime and Coastguard Agency implements the government's maritime safety policy in the UK and works to prevent the loss of life on the coast and at sea.

We provide a 24-hour maritime search and rescue service around the UK coast and in the international search and rescue region through HM Coastguard and inspect and survey ships to ensure that they are meeting UK and international safety rules. We also provide certification to seafarers, register vessels and respond to pollution from shipping and offshore installations.

www.dft.gov.uk/mca

NORTHERN LIGHTHOUSE BOARD

The Northern Lighthouse Board is the General Lighthouse Authority for Scotland and the Isle of Man. The Board's mission statement is: to deliver a reliable, efficient and cost-effective network of aids to navigation for the benefit and safety of all mariners.

The Northern Lighthouse Board's principal concern is with safety: the safety of the mariner at sea; the safety of our own people employed in or around some of the world's most dangerous coastlines; and the safety of the environment in which we, and those who come after us, must live and work.

www.nlb.org.uk

NHS ORKNEY

NHS Orkney is proud to deliver a wide range of health services to the people of Orkney, supplemented by specialist services provided by mainland health boards, such as NHS Grampian and NHS Highland. Additional emergency services are provided by the Scottish Air Ambulance Service.

NHS Orkney can provide a hyperbaric chamber 24 hours a day, 7 days a week.

www.ohb.scot.nhs.uk

RNLI

The RNLI is the charity that saves lives at sea. Its volunteers provide a 24-hour search and rescue service around the United Kingdom and Republic of Ireland coasts. The RNLI operates over 230 lifeboat stations in the UK and Ireland and has more than 150 lifeguard units on beaches around the UK. The RNLI is independent of Coastguard and government and depends on voluntary donations and legacies to maintain its rescue service. Since the RNLI was founded in 1824 its lifeboat crews and lifeguards have saved over 139,000 lives.

In Orkney, the RNLI maintains lifeboat stations at Kirkwall, Stromness and Longhope, on the island of Hoy.

www.rnli.org.uk

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