

Leading the way in marine
renewable energy



With more than 300 miles of Atlantic coastline, Cornwall & the Isles of Scilly is a natural home for the burgeoning marine energy industry – with rich opportunities for trialling new technologies, a strong skills base, important funding and business support.

Harnessing the power of the waves has long been an aim for renewable energy pioneers. In Cornwall, the dream is becoming reality. Already a leader in wind energy and marine engineering, the county is now attracting companies from across the globe who are looking to develop wave and tidal energy projects

In addition to the rich natural resources of our coastline, the South West offers an unparalleled range of R&D support, resource and expertise for the emerging marine renewable sector. Most notably, this includes the Peninsula Research Institute for Marine Renewable Energy (PRIMaRE) – a dedicated team of more than 40 internationally renowned experts in the industry. PRIMaRE is a collaboration between the University of Exeter and University of Plymouth, and is based at Tremough Campus in Cornwall. The team provides a unique combination of technical and business support, and are highly involved in the Wave Hub programme. The Wave Hub is a new, world leading, £42 million offshore facility providing a live working environment in the reliable Atlantic Ocean swell, for developers to test and refine their wave energy equipment.

While these new resources and facilities build a compelling case for Cornwall as the home of the marine energy sector, the county's industrial heritage also has a part to play. A pioneering maritime tradition is continued today in a thriving marine engineering cluster round the port of Falmouth. The result is a pool of skilled marine engineers and an established supply chain of companies that are experienced in the challenges of offshore construction. Add in exciting EU funding opportunities and it's clear that Cornwall quite simply offers the best conditions for marine renewable energy pioneers in the UK.

See the light. [Invest in Cornwall](#).



Boundless marine energy expertise

With a strong marine and advanced engineering heritage, Cornwall has the R&D support, talent, skills and infrastructure marine energy pioneers need.

For centuries, Cornwall has been renowned around the world for marine engineering and associated industries. Today, traditional industries such as boat building and repair continue to thrive in our ports, while the engineering skills that underpin them have been harnessed to support new industries such as marine pipeline installation and wind farm construction.

As a result, Cornwall can offer marine renewable energy companies a rich skill set that spans skills such as geotechnical investigation, wind farm construction, diving, marine construction, marine drilling and socketing and marine pipeline installation. Surrounded by the sea, marine industries are key to the county's economy, and the skills on offer are an immense and growing asset for prospective businesses in this sector.

“The availability of expertise in the marine renewables industry is boundless in Cornwall.”

Richard Lovell, Director, Duchy Hydraulics



To ensure Cornwall continues to produce the best marine engineers, the University of Exeter in Cornwall – has developed the UK's first dedicated renewable energy degree programme. In addition, the Combined Universities in Cornwall (CUC) initiative brings together six universities and colleges in the county, including the University of Exeter, the University of Plymouth and University College Falmouth. It combines the expertise in related fields across each campus to support the marine energy and engineering industries, adding new courses year on year to reflect changing demands.

The PRIMaRE advantage

For many companies considering Cornwall, one of the greatest attractions is access to the unique knowledge and expertise provided by the Peninsula Research Institute for Marine Renewable Energy (PRIMaRE). This is made up of 40 academics based at Tremough and has the full resources of both the Universities' of Exeter and Plymouth at its disposal, it has a world-class reputation for its research and understanding of the sector. In conjunction with the Wave Hub project, the PRIMaRE team have developed wave resource characterisation methods, metocean models and perform comprehensive wave and environmental data monitoring at the Wave Hub site.

In particular, PRIMaRE is deeply involved in modelling and dynamic testing of marine energy converters and sub-systems, supporting the Wave Hub project and hosting its own Dynamic Marine Component Test Facility (DMAC) (see pages 8-9). These complementary facilities enable companies to accelerate testing and refine their renewable energy device designs at all stages of the development lifecycle.

PRIMaRE collaborates with industry to support research and development activity across a number of areas, including design, engineering, environmental impact and grid connection.

PRIMaRE Resources

- Resource characterisation – which examines the economic viability of potential offshore sites
- Marine renewable energy systems – helping developers overcome engineering challenges and assisting the development of mooring systems, umbilical connections and installation and maintenance infrastructure
- Environmental and biodiversity impacts – focused on understanding the impact of renewable energy projects on the environment and marine wildlife and gaining approval for the deployment of device arrays
- Safe operations and navigational risk – which aims to minimise the risk of equipment collisions and manage the relationship between people and wave energy devices
- Underwater and surface electrical systems – concentrating on grid compliance, power quality and system protection.

It is also involved in work to inform policy on energy and sustainability based on appropriate consulting and consenting processes.

Plymouth Marine Sciences Partnership (PMSP)

PMSP is a partnership of seven independent organisations each with their own areas of expertise, working to provide opportunities for governments, agencies and industry through technology transfer, joint ventures, collaborative research, international partnerships and multi-disciplinary conservation efforts. Its strength lies in its ability to call upon a diverse range of experts with complementary skills to provide the necessary expertise to tackle some of our most challenging marine environmental questions.

www.pmsp.org.uk

Right: Falmouth Divers are experts in offshore cable laying.

Below: PRIMaRE uses video to conduct environmental surveys of the Wave Hub site.



Wave Hub: a unique asset for marine energy pioneers

The world's largest testing facility for pioneering wave power technology is open for business – putting next-generation wave energy devices through their paces in Cornwall's oceanic swell.

Wave Hub is a grid-connected, fully consented £42m facility, funded by the UK government and EU Convergence money and located just 10 miles off the Cornish coast. With support from PRIMaRE, developers will be able to use Wave Hub to evaluate the effectiveness and reliability of their wave devices, over long periods of time.

The five square-mile site is connected to an on-shore sub-station, which is to be part of a new marine energy business park for future development at Hayle on the north coast of Cornwall. All energy generated from Wave Hub will be sold directly to the National Grid.

The Wave Hub site is divided into four testing areas, each available for lease to device developers. Initially, the site will operate at 11kV and be capable of delivering 20MW of power. In the future, it can be upgraded to 33kV delivering up to 50MW. Wave Hub is in 55m of water and is connected to an electrical sub-station on-shore via a 25km armoured cable which consists of twin 300mm², 33kV power triads and fibre optic cables. Each berth is served by a 300m cable 'tail' connected to the hub chamber.

“Wave Hub will be a key element in the development of wave energy. The combination of the resource, skills and infrastructure make Cornwall a key focus for us in future, and we look forward to being part of this exciting project.”

Mark Draper, CEO, Ocean Power Technologies

Wave Hub was deployed in the summer of 2010 and the first wave energy conversion devices are expected to begin testing in 2011/12. The first developer to deploy a device is USA owned, Ocean Power Technologies, which will be testing its PowerBuoy system. The UK government has furthered its commitment by granting the company an additional £1.5m to develop a larger version of the PowerBuoy (www.wavehub.co.uk).



Beyond Wave Hub

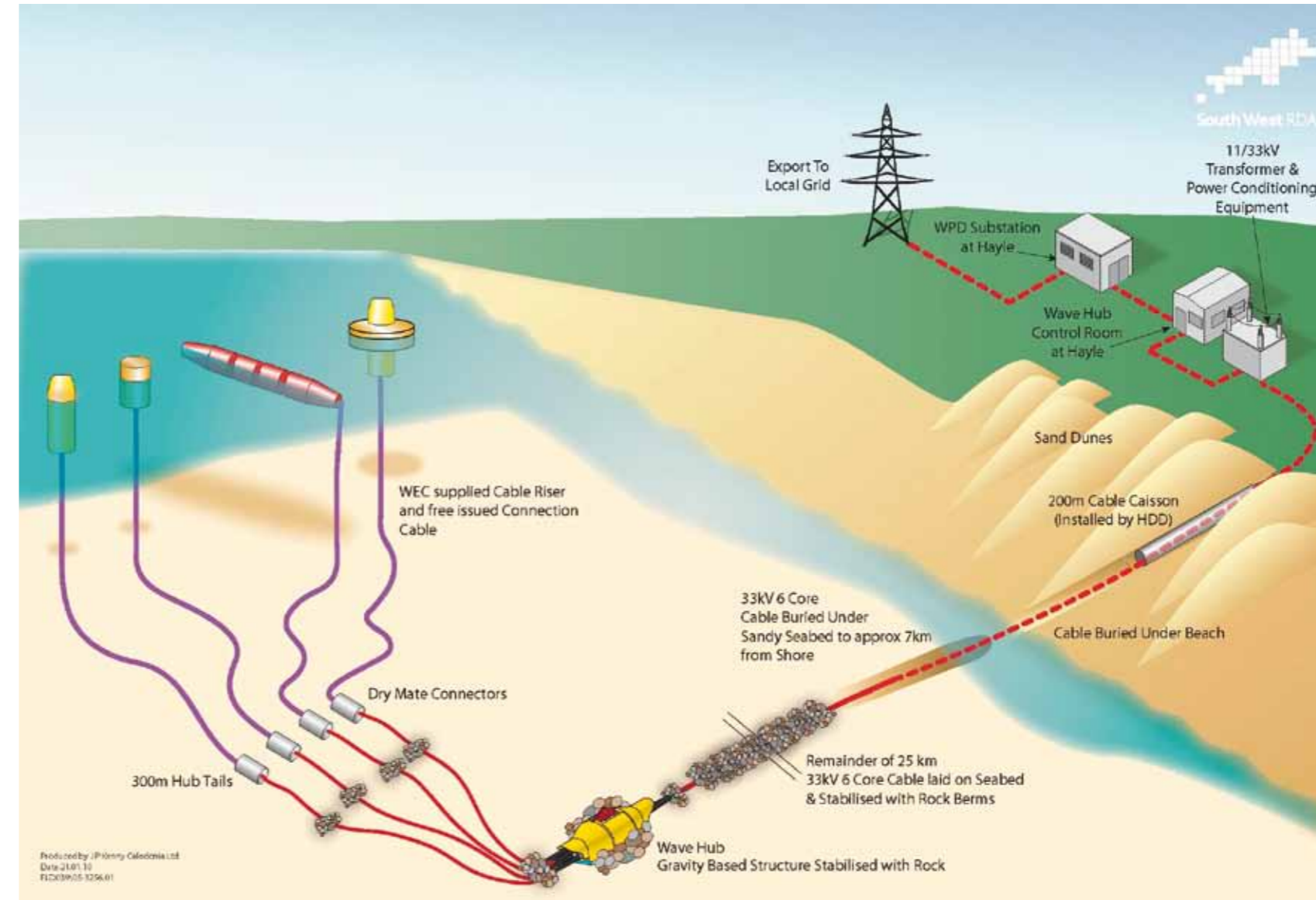
But Wave Hub isn't the only state-of-the-art test site available to the South West marine energy sector.

• Dynamic Marine Component Test Facility (DMAC)

DMAC is a twelve-tonne test facility that will be housed at Tremough Campus and is the first of its kind in the world. It provides a secure, low-risk setting to identify potential engineering problems and refine their designs more specifically and quickly than has been possible so far – before testing them fully in the live environment. DMAC will support the PRIMaRE team in conducting research into the feasibility of marine renewable energy in Cornwall.

• South West Mooring Test Facility (SWMTF)

The SWMTF buoy has been designed to test how moored structures respond to changes in wind, wave, current and tide. It can obtain very detailed data in actual sea conditions to enable developers to model and test mooring designs and components for marine energy devices.



• Plymouth Science and Innovation Partnership (PSIP) – Marine Building

As part of the PSIP – a joint initiative between the South West RDA (Regional Development Agency), University of Plymouth and Plymouth City Council – a new £18 million research facility will be developed at the University of Plymouth. This will include new wave tank testing equipment that will be unique to the UK. The main 35m by 15.5m tank could be used by renewable energy researchers and companies testing boats or underwater vehicles. Specialist equipment will create realistic sea conditions, including waves, wind and sediment.

Additional marine energy test facilities available in Cornwall for industry innovators include a new research vessel and the forthcoming Wave Testing Tank which will allow scale models of wave and tidal energy devices to be tested in different conditions, currents and arrays. For more information on these vital resources, visit www.primare.org.



Ready for renewable business

Cornwall's extensive natural resources and established infrastructure have encouraged a rapidly growing cluster of specialist marine companies, creating an established renewable energy supply chain and providing excellent opportunities for innovation and collaboration.

In addition to the strong supply chain, Cornwall is home to the world's third-deepest natural harbour at Falmouth, a busy commercial port. Located in the South West of the county, Falmouth Docks provides a secure environment for assembling off-shore platforms and equipment and is ideally positioned for transporting equipment around the Atlantic seaboard and beyond. With some of the most advanced marine engineering skills in the UK, Falmouth is home to companies which are providing environmental consultancy, project management, device installation, rigging and operations and maintenance to offshore marine projects. There is future opportunity for innovations in development of large vessels to support the future marine energy industry as it moves to deeper waters further offshore.

As an additional benefit for marine renewable energy companies, Falmouth offers abundant skills in engineering and maintenance, as well as access to graduates from the Falmouth Marine School which offers education in renewable energy and environmental technology.

Together, these factors are helping to shape Cornwall as a marine support centre for renewable energy and there are abundant opportunities for businesses to invest.



Some of the marine engineering companies already located in the county include:

- **A&P Falmouth:** one of the UK's most successful ship builders and repairers located in Falmouth Docks, the third-deepest natural harbour in the world.
- **Coastline Surveys:** specialists in providing hydrographical, seabed, geotechnical, geophysical, and environmental surveys for marine renewable energy companies.
- **Duchy Hydraulics:** an experienced hydraulic technical engineering specialist offering parts, advice and engineering services for all marine hydraulic and pneumatic applications.
- **Falmouth Divers Ltd:** one of Europe's leading multi-discipline diving, subsea and marine civil engineering contractors.
- **Fugro Seacore:** a world-leading overwater marine drilling contractor that provides geotechnical services and specialist foundation solutions for marine construction.
- **Marine Designs Ltd:** an innovative provider of marine access solutions, including commercial berthing solutions and pontoon and pier installation.
- **Mojo Maritime:** a leader in project management and consultancy for offshore marine turbines.
- **Ocean Fabrication:** experts in all aspects of offshore activities including engineering, manufacture, design, testing and development.
- **Wardell Armstrong:** an independent engineering and environmental consultancy.

Working together in marine renewable energy

One of the strengths of Cornwall's marine engineering sector is that established companies are accustomed to working together, offering complementary skills to tackle complex and large-scale projects.

Falmouth-based Mojo Maritime, for example, worked with Ocean Power Technologies to install its unique "PowerBuoy" wave energy device at Santona off the coast of northern Spain. Mojo has also helped Marine Current Turbines install and maintain its SeaGen tidal turbine in the narrows of Strangford Lough.

Also based in Falmouth, Fugro Seacore recently expanded its operations from oil and gas to the renewable marine energy sector. The company has been involved with a number of ground-breaking projects, including the installation of Aquamarine's Oyster wave energy generator at Orkney.

Keynvor Morlift (KML), which is based in Par, is collaborating with other Cornish companies to drive the marine renewable energy industry forward.

It recently became the main marine contractor for Bristol-based tidal energy company Tidal Generation Limited (TGL), and is helping TGL deploy its 500kw tidal power prototype.

Spare capacity on the Cornish grid

Cornwall is connected to a 400kV national grid with spare capacity for the wave and tidal energy sector. With this world-class infrastructure in place, companies generating wave, tidal and wind energy can sell it back to national energy providers quickly and cost effectively.

A thriving low-carbon economy

Cornwall has long been a pioneer in renewable energy and other environmental technologies. Today, the region is recognised as one of the UK's leading low-carbon economies – with the skills and incentives to develop further.



In 1991, Cornwall built the UK's first commercial wind farm. Today, Wave Hub is open for business, plans for major solar farms are underway, and the country's first commercial geothermal power station is set to open here in 2011. To ensure the continued success of these and other projects, Cornwall Council has made a commitment to invest in the low carbon economy.

But Cornwall's green economy goes far beyond renewable energy. Low carbon businesses offer expertise in solar energy, ground source heat, energy efficiency and environmental consultancy. The first solar farm in the UK was granted planning permission from Cornwall Council in September 2010. We are also home to the world-famous Eden Project, and the county is set to be the site of one of the UK's first eco-towns – a 5,000 home development near St Austell which will set new standards in green living.

The South West is the UK's first region to be designated a Low Carbon Economic Area because of its expertise in marine renewables. This has been achieved by accelerating low carbon economic activity and building on the existing geographical and industrial assets of the area. The region is backed by

government to focus on the development of marine energy demonstration, servicing and manufacture.

Cornwall Council is taking part with its own sustainable energy strategy, the Green Cornwall Programme. This features strict building regulations and ongoing investment in renewable energy and green transport as well as proactive planning commitment in respect to renewable energy development. Cornwall Development Company (CDC), in partnership with Cornwall Council, is investing in CDC's Low Carbon Delivery Team, offering a programme that aims to facilitate development of low carbon business, support research driven local energy generation, establish low carbon economic measures, promote carbon literacy and build sustainability supply chains in Cornwall.

The result is that the county is highly attractive to anyone with an interest in sustainable living – and offers clear opportunities for businesses in the sector.

Cornwall: Green living at its best

Cornwall offers far more than a booming low-carbon economy for marine energy pioneers. Beautiful beaches, green living opportunities and the mildest climate in the UK make it a great place to live as well as work.



Our famous coastline plays a central part in the Cornish lifestyle. Sailing and watersports enthusiasts are in their element; walkers and cyclists love the cliff top paths and Cornwall is the UK's surf capital.

While Cornwall offers great opportunities to relax and unwind, it is also highly connected to the rest of the UK. As well as benefitting from excellent road and rail links, the county enjoys extensive, high-speed broadband internet coverage to support high-tech business. Furthermore, business competitiveness and opportunities for flexible working will be transformed with the roll out of next generation broadband. The EU Convergence funded project will allow internet speeds of up to 100Mbps from 2013, making Cornwall one of the best connected regions in Europe.

Education is a top priority in Cornwall and all of the county's comprehensive schools have been awarded specialist school status in at least one subject. Add the growth of higher education through Combined Universities in Cornwall, and it becomes clear why the county has seen over 30 years of high inward migration.

Unique funding opportunities and business support

The funding available for renewable energy businesses in Cornwall and the Isles of Scilly is greater than anywhere else in the South West – and InvestinCornwall can help you access that funding and find the locations, staff and suppliers you need.

Over the last decade, Cornwall and the Isles of Scilly has benefited from large-scale EU investment to help transform our regional economy – and that investment is set to continue until at least 2013. Cornwall and the Isles of Scilly will receive some £500m of Convergence funding: c£347 million from the European Regional Development Fund and c£153 million from the European Social Fund. This will be matched by UK public money from local, regional and national sources giving a total value of c£712 million.

While strict eligibility criteria apply, marine energy businesses that are entitled to grant funding will receive more in Cornwall than other locations. In fact, if your business has fewer than 50 employees, you could attract up to 50 per cent of your funding in Cornwall – which is considerably more than anywhere else in the South West.

InvestinCornwall: Unparalleled business support

Whether you're starting a new marine energy business or looking to relocate, InvestinCornwall can help you find out just what Cornwall has to offer – and ensure you get all the support you need to succeed here by connecting you to the resources, people, funding and advice you need to expand into the UK.

InvestinCornwall is Cornwall and the Isles of Scilly's inward investment agency. Working in partnership with UK Trade & Investment and renewable energy agency RegenSW, we provide a range of pre-relocation services that help your business thrive, from property searches and funding advice, to recruitment support and access to local market sector specialists.

Once you've made the decision to make Cornwall your business location, we continue to give you support through extensive local knowledge, networking opportunities, advice and information. All our services are free of charge for potential investors.

www.investincornwall.com



Support from RegenSW

RegenSW aims to secure growth in the South West's sustainable energy industry by providing targeted business support. It does this by brokering new business through its supply chain service, providing specialist advice on policy and funding and promoting the sector's capability inside and outside of the region.

Support for businesses relocating to Cornwall includes advice on grants and financing, help bringing solutions to market, and support with skills training.

Support from UKTI

UK Trade & Investment (UKTI) is the Government organisation that helps businesses invest and locate in the UK and grow internationally. It offers a range of services and support to overseas companies, whatever their size and experience, at every stage of their investment. This includes:

- Impartial advice on where and how to set up a business in the UK
- Information related to funding, financing, staffing and operations (including tax, visas, property and R&D options)
- Introductions to professional advisers and key contacts such as possible business partners
- Practical help on the ground, including visits to suitable locations, finding business partners and accessing financial incentives
- An aftercare service, including advice on maximising investment in the UK, through domestic and international expansion.

To find out more, contact the InvestinCornwall team on +44 (0) 1872 322 800.



Find out more by visiting our website
www.investincornwall.com

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alternative format, please contact us.

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