

Nautricity launches marine turbines

A new generation of marine turbine that can harness energy from the sea is being developed by Nautricity, a University of Strathclyde spin-out company.

The company's objective

The tidal market is in its infancy and neither the wave nor the tidal energy market has consolidated on a single device design. There are currently a number of devices, in various stages of development, that aim to capture the energy of waves and tidal currents by different mechanisms.

Nautricity Ltd is a spin-out company formed in 2010 from the University of Strathclyde's Energy Systems Research Unit (ESRU), in the Department of Mechanical Engineering, to generate electricity from tidal flows. Based in the heart of Glasgow, Nautricity aims to become a leading player in the marine tidal energy industry through the application of game-changing technologies designed to reduce the capital and operating costs of tidal energy schemes. Nautricity's objective is to become the most cost-effective developer of tidal energy sites and establish market leadership. It plans to lead the development of large-scale tidal energy generation schemes both domestically and internationally, capturing a significant share of a market which is expected to grow rapidly – mirroring the growth of the offshore wind market.



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Not only will our business be as a tidal energy technology provider but we will also become a lead project developer.”

Dave Pratt, Director, Nautricity

Building a robust solution

Combining the expertise of Dr Andrew Grant, Professor Joe Clarke and Cameron Johnstone from ESRU, the team was able to use fluid dynamics with performance characterisation to develop the concept of this unique contra rotating tidal turbine (CoRMaT). The first fully functional prototype was built and tested in February 2007 in a tow tank in the University, and proved that the benefits of blade interaction met the theoretical predictions across a wide range of flow regimes.

Unlike conventional turbines, the CoRMaT design uses two rotors which turn in opposite directions, making it extremely stable and removing the need for expensive, fixed foundations. An economic appraisal comparing a range of tidal technologies has shown CoRMaT to potentially be the most cost effective system for all tidal sites with water depths between 10 and 500 metres. The simple, direct drive flooded generator, means a device which is considerably lighter; while the elimination of a gearbox, blade pitch control systems and generator cooling systems all equates to low maintenance requirements.

Following successful sea trials, the team were able to demonstrate that the CoRMaT produces electricity and offers significant economic and technical advantages as well as proving environmentally sound (by reducing the impact on the seabed). The sea trials also proved that the technology is scalable and versatile, making it suitable for grid connected power systems and stand-alone / distributed power systems such as those for island communities, paper mills, etc.

Making it happen

Dave Pratt was brought on board and funded by the University's Technology Talent Initiative. This important commercial funding initiative, now relaunched as the Executive Director Designate Programme, is aimed at bringing on board directors for up to six months prior to company creation to finalise the business plan and raise funding. Dave Pratt, a University of Strathclyde graduate and Strathclyde 100 member (a network of the University's successful entrepreneurs that includes a mentoring

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programme for new businesses started by staff, students and alumni), has more than 25 years experience in the offshore energy industry both in the UK and internationally.

The technology stemmed from research within ESRU whose remit is the development of low carbon and renewable energy solutions to meet the energy demands of the built environment. Following the initial research and theoretical predictions, a Scottish Enterprise Proof of Concept programme funding application for the contra rotating tidal turbine (CoRMaT) project was awarded £220,000 to develop and test two prototypes over a period of three years.

From 2007 to 2008, small awards from the Strathclyde Entrepreneurial Network and the University's Commercial Development Fund allowed critical testing to produce electricity to take place and enable funding pitches to commence engagement with the investment community. This de-risking of the technology also enabled Director Designate funding to be released to enhance the team with the appointment of Dave Pratt.

Successful outcomes

Nautricity was formed as a spin-out company from the University in 2010 following five years of intensive



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The need to develop advanced, lower- cost, renewable technologies which deliver reliable power to homes and businesses has never been more apparent.”

Cameron Johnstone, Senior Lecturer,
Faculty of Engineering, University of
Strathclyde

knowledge exchange support from Strathclyde's Research and Knowledge Exchange Services team to obtain funding, develop the intellectual property, and mentor the team. The investment funding led by First Tech Ltd (a privately owned company) enabled Nautricity to bring the CoRMaT technology to market. The University negotiated a global exclusive licence of the robust contra rotating tidal turbine patent application to Nautricity as part of the spin-out process. The patent has since been granted in the USA and is pending in Europe.

The CoRMaT technology has been awarded the prestigious Technology Award by the Energy Institute and is now widely regarded by agencies such as the Carbon Trust and the Scottish Government as being a 'disruptive' technology since it has the potential to deliver the necessary step change reduction in costs to make tidal energy commercially acceptable.

Nautricity signed a deal in May 2011 to site a tidal turbine in London, the first stage in plans to locate a tidal energy farm on the River Thames that would generate enough electricity to power 35,000 homes.

In October 2011, The Crown Estate gave the go-ahead for the initial deployment of up to six tidal turbines (3MW) off the south-west coast of Scotland with the potential to build out to a Saltire Prize array of sixty devices (30MW). Under the Argyll Tidal development, Nautricity will deploy six, 500kW turbines on the seabed off the Mull of Kintyre. Positive discussions are ongoing in the development of international projects using CoRMaT technology in North America, South America and South East Asia.

How we can help your organisation

Strathclyde's Research and Knowledge Exchange Services team supports the University's knowledge exchange activities in a variety of ways.

If you would like to take advantage of our research and knowledge, please contact:

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