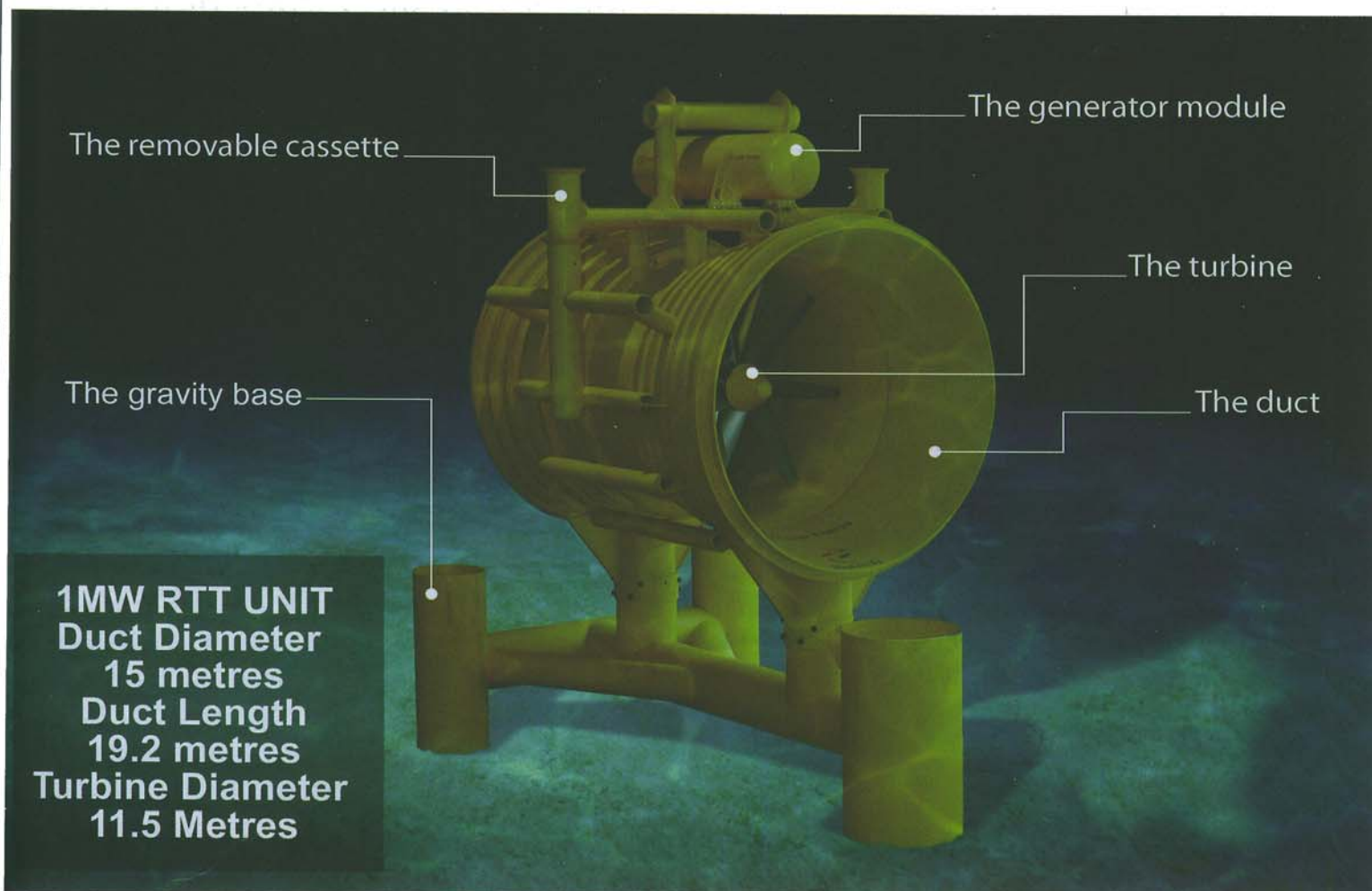


Harnessing tidal power

Katy Shields

Lunar Energy seals overseas £500m tidal power deal with Korea



With its mission to produce new technological and environmental solutions to the problem of clean, carbon free electricity provision for the 21st century, Lunar Energy is set to make real waves in the renewable energy sector by harnessing the power of tidal streams - the fast moving currents created by rising and falling tides. The recent announcement of a £500million deal to create a massive 300 turbine field - the world's largest - off the South Korean coast is testament to the vast global potential of a highly innovative technology. This follows on from the announcement late last year of the E.ON/Lunar joint development of an 8MW tidal turbine field off the coast of Wales, a development that was noted as "interesting" by Friends of the Earth Cymru.

Lunar Energy's founder and chairman William Law is highly experienced in the fields of biomass, small hydro, wind and combined cycle gas turbine power stations. Since the late '90s Mr Law has focused his attentions on the commercial potential of the marine renewables sector. Establishing Lunar Energy in 1999, his goal was to identify a tidal stream technology that addressed increasingly pressing carbon emission issues and that was simple, robust, economically viable and able to harness power from the predictable source of the earth's tidal currents.

His search brought him north of the border to Aberdeen-based Rotech Engineering, specialists in the research and development of innovative tools for the oil & gas, geothermal, subsea and

renewable energy markets. Since 2001 Lunar Energy and Rotech worked in partnership, with Rotech taking responsibility for the technical and engineering development of what is now known as the Rotech Tidal Turbine (RTT), while Lunar Energy holds a worldwide in-perpetuity licence to exploit the commercial use of the patented technology.

Three key considerations underpinned the search for the right technology and the Lunar Energy solution is:

Predictable: the endlessly repeating cycle of the tides creates a reliable and perpetually available energy source. Operational at water depths well in excess of 40 metres, Lunar Energy RTT technology has the competitive advantage of being able to harness the energy of fast-moving deep sea streams which contain over 63% of available tidal energy.

Invisible: positioned on the sea bed, Lunar Energy's gravity based power generation units are unobtrusive, environmentally friendly and invisible. They are designed to address practical and aesthetic concerns relating to the organic environment in which they are likely to be placed. They have the added advantage of being positioned at a depth which will cause no obstruction to shipping.

Economic: the system has the potential to collect energy from the ocean's currents at a market competitive rate and retain the advantage of low operations and maintenance costs - often a major contributor to the high end costs of any tidal energy project.

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As William Law confirmed: "The RTT is a gravity based venturi with a removable central cassette containing the generator, hydraulic pump and motor for operational and maintenance purposes. The design is robust and invisible in use on the sea bed, while the venturi captures the tidal flow energy very efficiently. Its performance is competitive with wind energy and considerably less controversial in environmental terms."

Since the formation of the partnership with Rotech, progress has been steady. Rotech have continued to develop and enhance a 1MW RTT unit, while Lunar Energy has focused on commercial site identification - assessing the most viable sites around the UK and abroad for tidal power sea farms - and initial design and costing of a one third scale prototype demonstration device for sea trials at the EMEC test site in Orkney. The advantage of the scaled prototype is that it can be easily transferred around the world for environmental assessing and testing purposes prior to full scale commercial developments.

During this period, the installation of a full scale commercial unit for testing in Korean waters will take place as part of the agreement with Korean Midland Power Co (KOMIPO), Hyundai Samho Heavy Industries (HSHI) and Rotech to create a giant 300-turbine field in the Wando Hoenggan waterway off the South Korean coast, an estimated project cost of £500 Million. The plant is expected to provide 300MW of renewable energy to KOMIPO, one of Korea's main power generation companies, by December 2015.

The project will move forward at pace, with fabrication and installation of the turbines to be carried out by South Korean-based HSHI while Rotech Engineering will provide design optimisation and specialist components. It is anticipated that full resource research and feasibility will be completed this summer, followed by the installation of a 1MW pilot plant as early as March 2009. This ambitious, pioneering project, which draws on the well proven abilities of both Rotech and Hyundai, provides Lunar Energy with the ideal platform to demonstrate the technical and environmental merits of the system and will generate interest on a global basis.

RTT technology will also be taking centre stage closer to home. In 2007 Lunar Energy and E.ON announced a landmark proposal to build one of the world's largest tidal stream power stations off the Welsh Pembrokeshire coast. The multi-million pound scheme would comprise a field of 8 turbines situated on the sea floor with the capability to generate enough electricity to power up to 5,000 homes. Early feasibility studies have been completed and the proposal is currently undergoing full environmental impact assessment and planning consents. If approved, it is anticipated that the plant would be deployed in 2010.

Both the Korean and UK developments stand as testament to the recognised potential of tidal stream power and specifically of RTT technology and will open doors to a vast worldwide market. For William Law, there is no question that the opportunity is there, though there are challenges to be overcome along the way. "The procedure for gaining necessary permissions is frustratingly time consuming. The planning process is notoriously inefficient and is slowing the development of a new energy industry. That industry is vital if we as a nation are serious about securing new, secure and carbon friendly energy supplies for the future. At the present time the whole regulation system is unhelpful," he commented. "However, in the UK the principle challenge is grid capacity coupled with the lack of availability of an offshore connection to the grid. The overall effect is that we are likely to develop commercially more abroad than in the UK and in fact we are already in talks with interested parties in North America, Australia, New Zealand and other parts of the world.

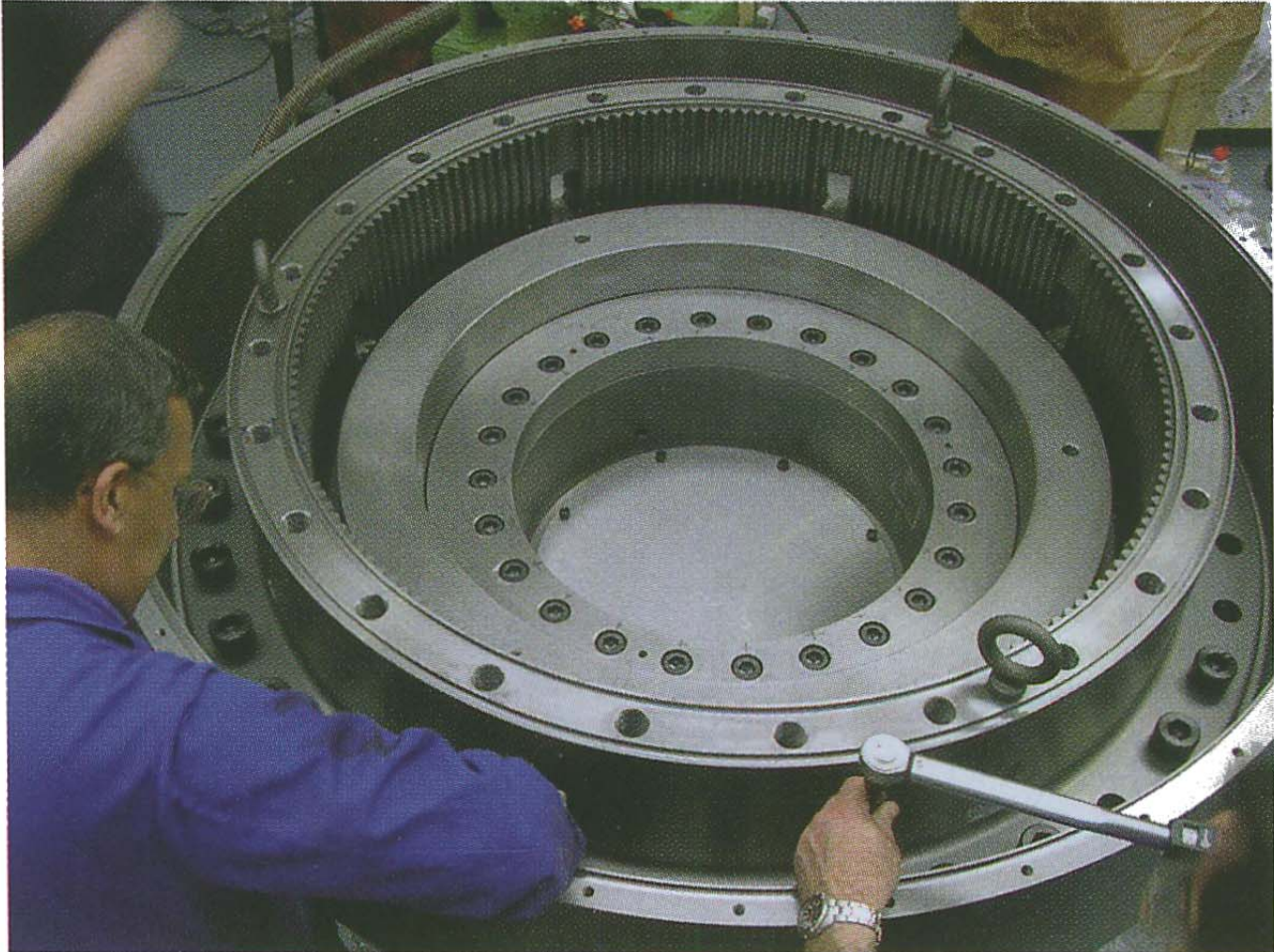
"It is disappointing that the UK presents such a challenge, but the issue of grid connection is huge. The main energy areas are in the north, the Pentland Firth for example, where there is a vast resource - some experts say as high as 25% of UK electricity needs - that we can't take advantage of until something is done about the grid system. It's frustrating for everybody, and the situation won't change unless the government makes it a priority."

Lunar Energy continues to play its part in advancing tidal stream developments, moving forward assertively with what clearly has the potential to be a very valuable technology, both in terms of meeting sustainable energy targets and in creating a successful business stream for the Rotech and Lunar Energy partnership. Tidal power is conservatively estimated to be capable of contributing up to 4500MW of the UK's annual requirement by 2020 and is worth between £1 and £6 billion annually - Lunar Energy, with its revolutionary technology, aims to secure a significant portion of this high growth market by 2016.

Said Law: "Tidal energy technology has massive potential. There is a huge available resource out there that is currently not being exploited, it's not being pushed hard enough but we are certainly working to change that. I would be disappointed, but not surprised, if our main developments were conducted outside the United Kingdom as a result of the negative planning and regulatory framework currently existing in our home market."

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A "Brake" through in Tidal Turbine Technology



Wichita is happy to support Lunar Energy with the supply of the HBS 42 Oil Immersed Brakes for arresting the undersea turbine during extreme tidal flows.

The innovative new HBS brake was designed and manufactured for the challenging operating conditions under the sea.