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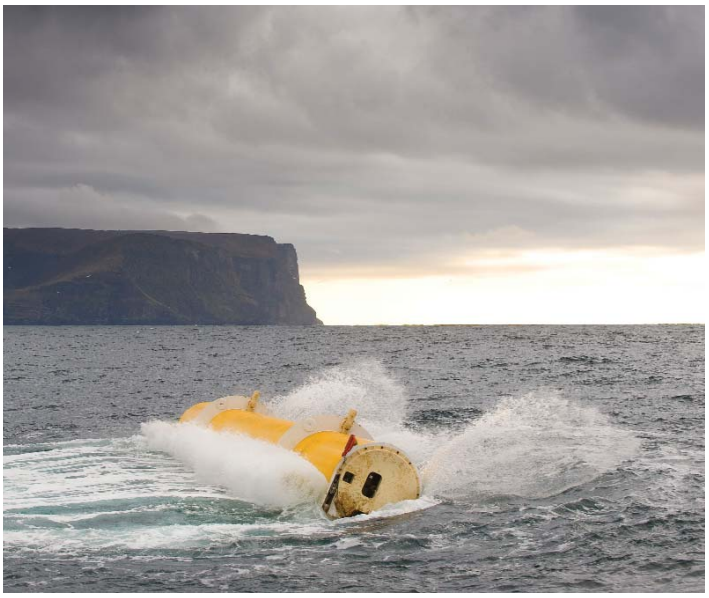
Control Techniques Inverters Chosen for Aquamarine Power's Flagship Technology – The Oyster Marine Energy Generator

The world's largest and most successful working hydro-electric wave energy device, known as 'Oyster', has, at its heart, a 315kW high-efficiency grid connected inverter system from Control Techniques.

Aquamarine Power's Oyster marine energy generator, sits just off shore, in Orkney, and comprises a large buoyant steel flap hinged to a base that sits on the sea bed. As waves roll over the device, the flap oscillates backwards and forwards, driving two hydraulic pistons attached to each side. High pressure water from these two pumping cylinders – clean, salt-free water in an enclosed system – is pumped ashore, driving a Pelton wheel with spoon-shaped buckets that harness the energy of the high pressure water. This is attached to a flywheel (to smooth out variations), powering a standard induction generator. Control Techniques inverters take the generated power and provide an interface with the grid.

Testing of the demonstration scale wave energy device commenced at NaREC in March last year and it is now installed and working offshore at Billia Croo near Stromness, in Orkney . The Oyster was officially turned on in November 2009 to generate power for the national grid and local homes in Orkney and beyond.

The more powerful the wave action, potentially the more electricity that can be generated from such devices, with the maximum output being in the winter months, coinciding



KEY BENEFITS

- CLEAN ENERGY SUPPLY TO THE GRID
- LOW HARMONIC DISTORTION
- MONITORING & COMMUNICATION FACILITIES
- EXCELLENT SERVICE & SUPPORT

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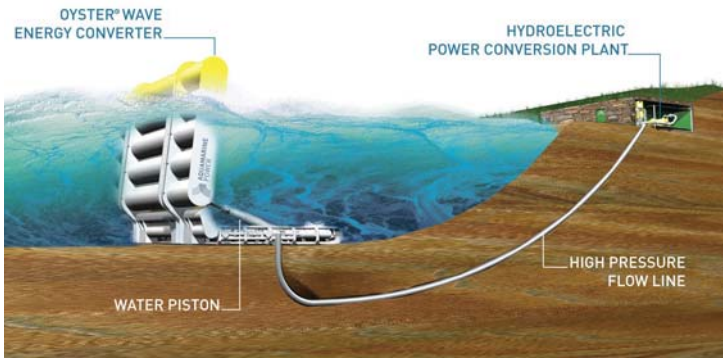
with maximum demand – it has been estimated that big waves incorporate potential energy amounting to 200kW per metre!! Long term, marine energy has the potential to meet up to 20% of the UK's energy demands. Control Techniques was involved in the development at an early stage, because of its close working relationship with the New and Renewable Energy Centre (NaREC) at Blyth, where the Oyster concept was under test in their dry dock facility.

Now, Oyster is installed at the European Marine Energy Centre's test site in Orkney, where two Control Techniques inverters provide a clean supply to the grid, with low harmonic distortion.

The AC output from the generator is normally equally split via sharing chokes, to produce a clean output to the grid.

Being a demonstration unit, Aquamarine Power has fitted many strain gauges, pressure monitoring and other feedback devices at all key points on the system to give a complete picture on the system performance and all of these signals are fed back to the PLC. The Pelton turbine's speed is monitored by encoder and this is fed back to the inverter.



"The next generation of Oyster drives, which will have three operating 'flaps', are already in development, and we are looking at an output of 2.4MW per unit," says Paul Smith, Lead Electrical Engineer at Aquamarine Power. "We have been very pleased with the support we've had from Control Techniques."

The units that make up the system are from the Unidrive SPM range which can be used to implement high efficiency grid-tie inverters for renewable energy systems including wave, tidal, photovoltaic and wind.

Aquamarine Power is a wave energy company with its head office in Edinburgh and further operations in Ireland and Northern Ireland. Its goal is to develop commercial Oyster hydro-electric wave farms around the world. In a ground-breaking development for the marine energy sector, Aquamarine Power entered into a strategic alliance with SSE Renewables (formerly Airtricity), a wholly owned subsidiary of Scottish and Southern Energy, to develop 1,000MW of Oyster sites.