

## Harvesting green power from the sea

Four companies, three based in the United Kingdom and the other from Sweden, are engaged in exploiting the Scottish seas to obtain renewable power. Their long-term plans range from generating electricity from waves to harvesting power from tides. Energy is stored in the waves until they reach the shallows and beaches. One metre of a single wave front is sufficient to power 50 electric heaters! As a general rule, coastlines with an ocean "fetch" exceeding 400 km are ideal for exploitation. But greater energy resources are available between latitudes 30° and 60° in the northern and southern hemispheres.

Wavegen is installing its 500 kW Limpet turbo generator on the Scottish island of Islay to provide power for residents of the Inner Hebrides islands. Consisting of a collector and oscillating water column, the Limpet uses wave power to force air up through the collection chamber, spinning the pneumatic turbine that is driven in the same direction, regardless of the air flow, sucking the air down and generating electricity as the waves subside. The company expects to begin feeding electricity to the island's grid within a year.

Ocean Power Delivery is planning to install two wave energy converters on Islay, under the 1999 Scottish Renewable Obligation bill, in 2001. The 375 kW units, named as Pelamis, measure 3.5 m in length and 3.5 m in diameter. Shaped like a floating sausage, 10 drums are connected by hydraulic hinges inside each system which pump the fluid back and forth as the "sausage" oscillates on the waves. The fluid pressure is used to run the generators and electricity is produced.

Another company, Engineering Business, plans to exploit the moon's pull on tidal streams to create electricity. The company's active water column generator (AWCG) resembles an upside-down coffee cup sliding up and down a vertical metal pole. Positioned in the offshore seabed, the cup remains below the surface with its large angled wings protruding from either side. The tidal current pushes the cup down, trapping air that is squeezed out through a pipe to the surface. Then the air passes through a turbine and electricity is produced. When the cup reaches the bottom of the pole, the wings flip over to be forced upwards by the tidal current sucking air in and generating a continuous power supply for the turbine. The AWCG can generate 300 kW of electricity and can be combined with a wind turbine to harness extra power.

The Shetlands are the location for Sweden's Seapower International experiment, an 80 m long unmanned barge floating 1 km offshore and which acts as a beach. Sea state data gathered by satellite brief the barge's computer to position the ballast to ensure that the waves break with full impact against it. The barge has already been proven in trials off the Swedish coast.

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