Pelamis wave energy project

Information sheet

Pelamis P1 prototype during testing in Orkney.

Harnessing energy from our oceans

The power of our oceans has long been seen as a potential source of energy. The UK has some of the best wave and tidal resources in the world, but it's only in the last decade that it has become much more than a pipe dream. And, we're at the forefront of making marine energy a reality. By 2020, the UK could produce up to 2GW of energy from wave and tidal power – enough to supply 1.4 million homes.*

Fact file

- The machine is designed to produce up to 750kW of power.
- It has been entirely designed and built in the UK.
- Over 200 people have been involved in the build programme.
- At 180m long, the Pelamis machine is as long as the Gherkin building in London is tall.
- The machine weighs approximately 1,300 tonnes.
- EMEC is about 200 nautical miles from Edinburgh.
- The Pelamis name comes from a species of sea snake.

Making marine energy a reality

E.ON began tracking marine energy technologies nearly 10 years ago. In 2005, we set up a dedicated development team to investigate the various wave and tidal technologies and build up a portfolio of projects.

We're particularly focused on developing technologies that have minimal impact on the environment. And, we're using our wealth of engineering experience to bring down the cost of producing energy from our oceans over time.

Our Pelamis project marks our first significant investment in wave power. The Pelamis P2 machine will be installed and tested at the European Marine Energy Centre (EMEC) in Orkney.

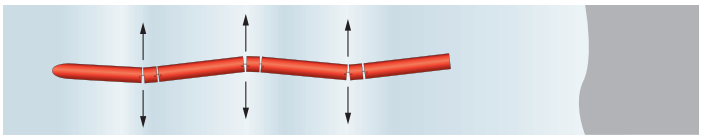
The success of this project should give us the confidence to move on to the next phase of commercialisation, which is to install larger arrays around the UK coastline.

* Source: Renewable UK – Marine Renewable Energy, State of the industry report, March 2010

How does the Pelamis machine work?

This is the first time the Pelamis P2 wave energy machine will be tested anywhere in the world. It's a semi-submerged structure, 180m in length and made up of cylindrical sections linked by hinged joints.

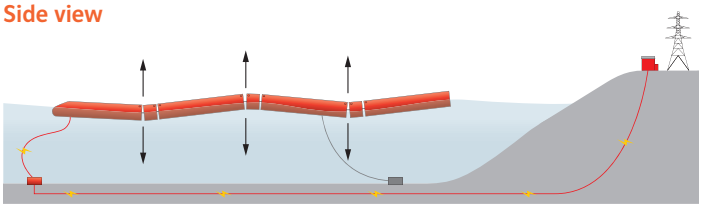
Top view



Wave direction →

The wave-induced motion of these joints is resisted by hydraulic rams, which pump high pressure fluid through hydraulic motors via smoothing accumulators.

Side view



Wave direction →

The hydraulic motors drive electrical generators to produce electricity. Power is fed to the seabed via a single dynamic umbilical, connected to a transformer in the machine's nose. The complete machine is flexibly moored so it can swing head-on to the incoming waves.

Note: Pelamis P1 machine shown

Test programme

We'll initially test the machine for three years, each year intensifying the demands and raising the success criteria.

Year one will be focused on survivability:

- installation and recovery of the machine in the marine environment
- ensuring all systems are fit for purpose and fully operational
- verification of wave climate forecasting and power prediction techniques and expectations.

Year two will look at optimisation and the environmental impact of the machine:

- focusing and extending periods of operation in representative sea states
- optimising operations and maintenance strategy
- optimising control to maximise output
- assessing environmental impact of the machine
- cost reduction strategies (CAPEX and operation).

The final year of the trial will be a review of component wear and life:

- review of component wear and machine survivability
- testing of revised components and systems
- decommissioning techniques and cost curve analysis.

About the European Marine Energy Centre (EMEC)

EMEC is a research facility backed by the Scottish Government and is based in Stromness, Orkney. It consists of an installed wave power testing system at Billia Croo on the Orkney mainland and a tidal power testing station on the nearby island of Eday.

At the official opening of the Eday test station, EMEC was described as "the first of its kind in the world, set up to provide developers of wave and tidal energy devices with a purpose-built performance testing facility".

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