

case study

DeltaStream

World's first free-standing tidal energy device

Project Summary

To design a blade for the DeltaStream energy device, to perform an audit of the structural design of the tidal stream energy device and to investigate the drag and fatigue forces on the overall structure.

Partnership

- Cranfield University, a leading international centre for engineering
- Tidal Energy Ltd (TEL), will sell, manufacture and maintain the DeltaStream units
- Eco 2 Ltd, Renewable Energy Developer and operator for 20 years and investor in TEL
- Lola Composites Ltd, will design the blade and manufacturing process for the blades

Aims

To implement the world's first Tidal Stream energy device that does not require fixing to the sea or river bed.

Inspiration

In 2002 the first UK full scale tests of blades in a Tidal Stream were completed and power curves developed. Phase 2 of the project established that the design concept was completely feasible. TEL's tidal stream 1.2MW generator concept has three turbines/generators which sit on the seabed as part of a triangular frame. The frame needs to be ballasted to prevent dragging and must allow for swift installation and retrieval. Cost of energy is highly competitive due to low capital cost and the simplicity of the device.

Innovation

The life expectancy of the DeltaStream device is 20 years and life cycle costs are returned in approximately six months of operation. The design is completely modular and easy to containerise as a system and therefore has many opportunities for export and licensing around the world, allowing others to reduce CO₂ emissions.

DeltaStream offers the cheapest capital cost/MW installed (lower than offshore wind) and has very high availability as it can be deployed and retrieved in just two days. As it is completely modular, the components can be exchanged rather than repaired in situ, again contributing to higher availability and cheaper maintenance for onshore rebuild of the components.

Development

The Tidal Stream device will significantly reduce CO₂ emissions as a renewable energy resource. Each DeltaStream of a nominal maximum 1.2MW at 6 knots produces an average 5.5 million kWh to 7.7 million kWh over 20 years when there is a Tidal Factor between 0,42 (Orkney) and 0,3 (General UK good coastal position).



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Carbon Connections is HEIF-funded investment project utilising £3 million for carbon reduction activities. Based at the UEA, Carbon Connections supports innovative projects in carbon reduction using a partnership model. The aim is to facilitate knowledge transfer between universities and research laboratories and the business community to speed commercial development of carbon-saving projects, whether technological or behavioural in focus.