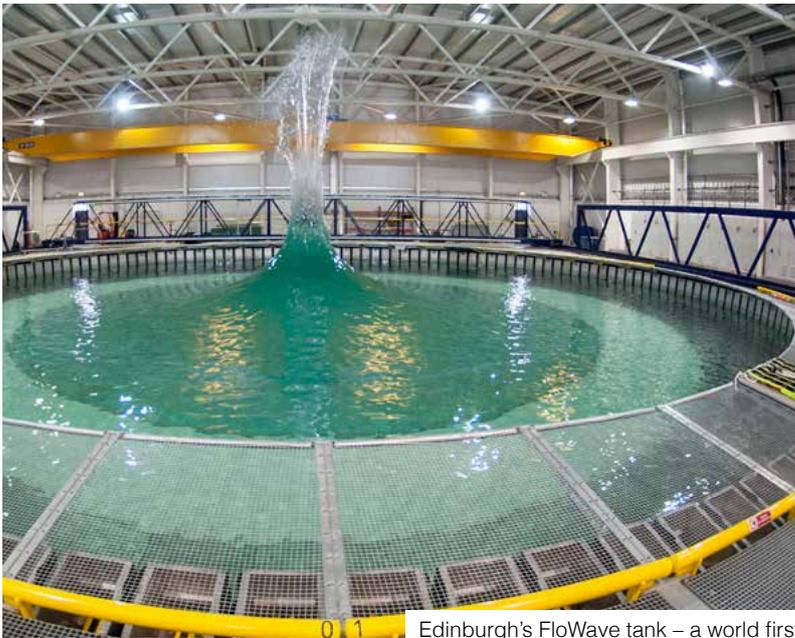


# EDINBURGH MAKES WAVES IN POWER GENERATION RESEARCH



Edinburgh's FloWave tank – a world first

Research in wave and marine engineering at the University of Edinburgh has a long history. The story started back in the 1970s, when the Edinburgh Wave Power research group invented the 'Duck' wave power generator, a means of converting into electricity some of the abundant natural power stored in ocean waves.

## CREATING WORLD FIRSTS

After its initial success, the group realised that wave-making facilities were in demand, and produced the first 'multi-paddle, absorbing wave tank' in 1976 to test wave power generation. By the late 1980s, their wave machine expertise was considerable, and this knowledge base led to the creation of Edinburgh Designs Ltd (EDL), now the world-leading supplier of wave-making technology for scientific and recreational facilities.

In 2002, the company collaborated with researchers from the Institute for Energy Systems on the construction of the Edinburgh Curved Tank. This led to the design and construction of another innovation: the world's first wave and current tank, the FloWave Ocean Energy Research Facility, based at the University's King's Buildings.

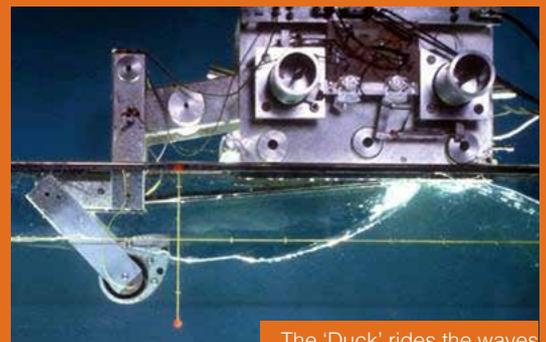


## THE 'DUCK' – TURNING WAVES INTO WATTS

Invented by Stephen Salter in 1974, the 'Duck' is a system that converts into electricity some of the natural energy contained in waves, such as those that make up the turbulent waters off the western coast of Scotland.

Shaped like a teardrop, it floats on the sea and absorbs around 90% of the energy of the oncoming waves. The resultant bobbing motion compresses hydraulic oil within the system, which is then used to power a hydraulic motor, generating electricity.

The most efficient wave-energy converter ever designed, the 'Duck' was to be the first of many world-leading innovations for its developers, bringing together the University's research teams in both Energy Systems and Wave Power. Since their first highly successful collaboration, the teams have combined to produce groundbreaking energy generation systems and wave research facilities, through three highly successful spin-out companies: Edinburgh Designs, Artemis Intelligent Power Ltd and NGenTech.



The 'Duck' rides the waves





Harnessing the energy of nature



EDL has gone from strength to strength. Now the world-leading supplier of wave-making technology for scientific and recreational facilities, it boasts designs in 19 countries.

Since 2008, EDL has:

- supplied the COAST laboratory at Plymouth University;
- installed wave-making equipment in the 260m Marin Depressurised Wave Basin at Wageningen in the Netherlands for ship-towing tests;
- created the flood scenes for the 2012 film *The Impossible* (about the 2004 Indian Ocean tsunami);
- commissioned the Manoeuvring and Sea Keeping Basin for the US Navy in Maryland – the largest computer controlled wave tank in the world for testing ship models.

### LEADING GLOBALLY FROM THE UK

The FloWave Ocean Energy Research Facility is the world's first wave and current tank, providing a vital testing environment for energy and climate change researchers. It allows testing at meaningful scale, in realistic and repeatable sea conditions, in a controlled environment – but on dry land.

**The Chief Scientific Advisor to the Department for Energy and Climate Change** has said: "This world-leading technical capability... gives the UK a global lead in simulating ocean conditions for testing tidal and wave energy devices."



EDL attributes a large part of its success to the continuing academic endeavours of the University's Wave Power Group: "Edinburgh Designs continues to have strong technical collaborations with the Wave Power Group," affirms **Matthew Rea, Managing Director at Edinburgh Designs**.

The world-class FloWave facility is the latest manifestation of this fruitful relationship. It is, according to **Professor Robin Wallace, Chair in Renewable Energy Systems** at the University, "as close as you get to real sea on dry land".



Scale model testing

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