

TRIPLE T 2 PROJECT

TANDEM TIDAL TURBINE PROJECT

PROJECT DETAILS

Cluster: Turbines

Knowledge provider: School of Planning, Architecture and Civil Engineering, Queen's University Belfast (PI Dr Bjoern Elsaesser)

Industrial Partners: Applied Renewables Research; McLaughlin and Harvey; Joules; Oceanflow; Schottel.

Total project costs: £160,904 over 12 months from Jun 2014 to May 2015.



PROJECT BACKGROUND

An increasing number of marine renewable energy (MRE) systems are reaching the stage where a working prototype must be demonstrated in operation in order to progress to the next stage of commercial projects. This stage is often referred to as the 'valley of death' where device developers face the challenge of raising capital needed to demonstrate the prototype.

Even if the prototype is funded the developer faces a further challenge in devising and validating test regimes for components such as turbines that provide insight into performance in real sea conditions. There has been a lot of activity in the research community to develop and implement component test rigs that allow the investigation and demonstration of performance under controlled, yet representative conditions. As will be apparent a key feature of the Triple T approach is that test results in the laboratory can be compared with tests of the same turbine in two other environments: a large-scale towing tank and in open sea conditions in a lough in Northern Ireland.

PROJECT ACTIVITIES

Project work consisted of testing scale tidal turbines in real sea conditions in Strangford Lough in Northern Ireland. The unique feature was the ability to test scaled tidal turbines in both a laboratory tank and in real sea conditions. A close-up of part of the test rig below shows a turbine (yellow) and supporting framework.

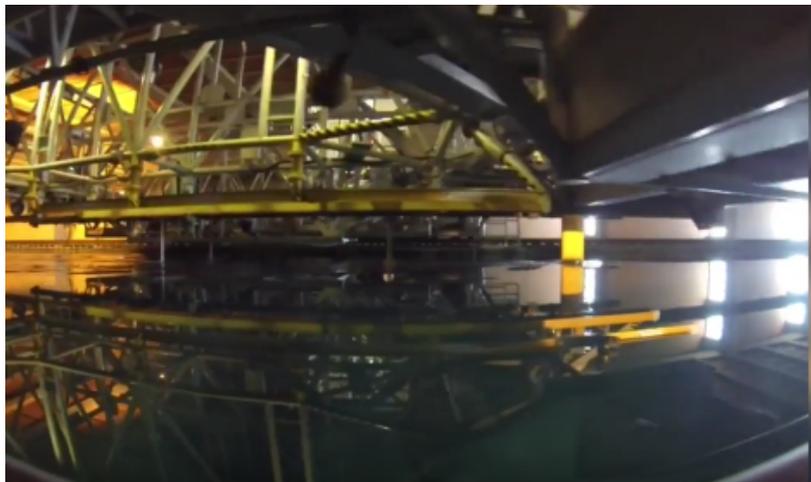


This was compared with results from a third type of test with turbines in a towing facility (Umberto Pugliese) in Rome at INSEAN. In the picture below, the whole rig assembly moves, towing the turbine in a large indoor tank.

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PROJECT ACTIVITIES CONT.



There were a large number of partners both local and multinational. The test runs generated large amounts of data and analysing them required significant computing power, so a significant proportion of project time and effort was assigned to this stage. The threefold testing approach led to new research questions that were not previously known.

Key features that made the project a success, according to one participant ARR, included: clear and realistic objectives; a committed well-qualified researcher assigned from the academic partner; and that the industrial participants are also committed to it and can allocate resources as required.

PROJECT IMPACTS

At the 12-month stage, reported impacts were:

- £400k actual and potential contracts for members;
- 6 posts created;
- 7 published papers;
- potential for \$1.2m USA prize;
- significant interest in Strangford Lough as a test site [more from Trevor Whittaker awaited].

By late 2016, the interim evaluation report stated at October 2016, CASE had achieved 13 journal articles which all emanated from the Triple T project.

BENEFITS FOR MEMBERS

Benefits for participants are exemplified by ARP which gained new contracts with project participants, and was able to use the work to enhance its reputation internationally. All the researchers that worked on the project have been permanently employed some by participants and others by external companies. A number of partners were successful in gaining funding from other sources to continue aspects of the work. There has been considerable international interest from companies wishing to use the test facility



CASE is an Invest Northern Ireland funded competence centre with grant funding of £5 million. The centre has successfully funded 18 research projects in renewable energy across biogas, marine renewables and energy systems sectors.

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