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Accelerating the Commercialisation of Marine Renewable Energy Through Parallel Deployments of Multiple Hydrokinetic Power Systems

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Introduction

ORPC specialises in developing power systems and projects that harness electricity from tidal and river currents. The company is developing a range of commercial products, covering multiple market applications. This poster outlines how the company's R&D efforts are being advanced in a coordinated manner and in parallel with ongoing field deployments.

ORPC RivGen® (left) and TidGen® (right) Power Systems

ORPC is applying a Staged Development Process to Guide R&D Priorities and Advance Technology Commercialisation

Marine energy technology developers face the dual challenge of balancing structured technology development with the imperative to accelerate cumulative deployments and achieve system cost reduction. This can be supported by applying agreed best practices, such as the approaches is outlined in the IEA-OES Evaluation and Guidance Framework for Ocean Energy Technology[1]. ORPC designs new R&D projects to ensure that they advance the technology across specific Evaluation Areas and address the requirements of the appropriate Development Stage.

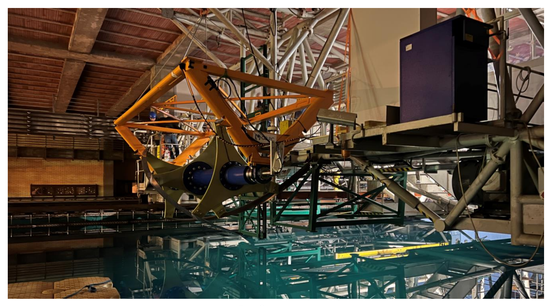
Evaluation Areas included in the IEA-OES Evaluation and Guidance Framework

Above: ORPC turbine foil undergoing structural fatigue testing using an unbalanced rotating mass (URM) system at the University of Galway. Image courtesy of the University of Galway

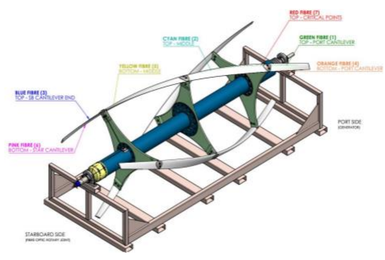
Project Case Study: CRIMSON

The CRIMSON Project demonstrates how research and development work can feed into the commercialization of technologies like RivGen® that have already been demonstrated in multiple real-world environments.

- Structural testing (University of Galway): Achieved the highest number of fatigue cycles ever reported for a full-scale marine energy component in test conditions - 1.3 million cycles[2].
- Tow tank testing (CNR-INM): Subjected a fully instrumented turbine to operational flow speeds over almost 250 test runs.
- Validation of numerical models undertaken, with additional field trials planned for Strangford Lough, Northern Ireland in late 2024.



CRIMSON turbine at CNR-INM Towing Tank (above) and sensor positions (below).



LOGIC-TIDE

Accelerating the commercialisation of Optimor, a high-potential cross-flow tidal energy turbine with a capacity of up to 2MW, with a focus on of industrial manufacture, installation, operations, and maintenance.

Evaluation Areas: Manufacturability, Installability, Affordability, Power Conversion

A-TEAM

Assessing key practical requirements for the mooring and station keeping of buoyant tidal energy devices and validating the robustness of critical mooring and monitoring components in a high-precision laboratory setting.

Evaluation Areas: Controllability, Survivability, Installability, Affordability, Maintainability

DeepCData

Generating materials data from laboratory testing to inform techno-economics models, lifecycle analysis, and overcome technical and other barriers to the market uptake of ocean energy.

Evaluation Areas: Manufacturability, Survivability, Power Conversion, Environmental Acceptability

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