

TETHYS ENGINEERING BLAST



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[Tethys Engineering](#) is an online knowledge base that facilitates the exchange and dissemination of information on the technical and engineering aspects of marine renewable energy. The bi-weekly *Tethys Engineering Blast* highlights new publications in the [Tethys Engineering Knowledge Base](#); relevant announcements, opportunities, and upcoming events; and news articles of international interest.

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Announcements

WPTO Semiannual Stakeholder Webinar

The U.S. Department of Energy's (DOE) Water Power Technologies Office (WPTO) will be hosting its [third Semiannual Stakeholder Webinar](#) on 12 May 2020 from 1:00-2:30pm ET. DOE representatives will highlight recent announcements and publications, share project updates, and discuss upcoming priorities. They will also discuss COVID-19 impacts to events and DOE funded work. The presentation will close with Q&A. Email questions ahead of the webinar to WaterPowerTechnologiesOffice@ee.doe.gov. Register [here](#).

Reddit Ask Me Anything Panel

Pacific Northwest National Laboratory (PNNL) coastal scientists and engineers will be hosting a [Reddit Ask Me Anything](#) panel on the [blue economy](#) on 20 May 2020 from 3:00-5:00pm ET. The panel will discuss how science and technology are advancing the future of the blue economy and answer questions from the online community.

Call for Abstracts

The [7th PRIMaRE \(Partnership for Research In Marine Renewable Energy\) Conference](#) is now accepting abstracts submissions until 1 May 2020. The conference will be held online from 7-8 July 2020, with no charge for attendance.

Funding Opportunities

The Blue-GIFT (Blue Growth and Innovation Fast Tracked) project has announced the [2nd call for applications](#). The project aims to help Atlantic Area companies test the next generation of MRE technology in real sea environments. Applications close 30 April 2020 at 17:00 UTC.

The [Selkie Project](#) has [extended its call](#) for tidal and wave energy developers to tender their services to validate multi-use engineering tools, templates, standards, and models, which can be used across the sectors in both Wales and Ireland. The new deadline for applications is now 30 April 2020.

The U.S. Department of Energy's Water Power Technologies Office has issued a [funding opportunity](#), entitled "Marine Energy Foundational Research and Testing Infrastructure", to build marine energy research capabilities and leverage expertise to help the developing marine energy industry tackle complex scientific and technical problems. Concept papers are due 11 May 2020 and full applications are due on 7 July 2020. A pre-recorded [informational webinar](#) is now available to provide information to potential applicants.

The U.S. Department of Energy announced up to \$38 million in funding for a new Advanced Research Projects Agency-Energy (ARPA-E) program, [Submarine Hydrokinetic And Riverine Kilo-megawatt Systems \(SHARKS\)](#). The program seeks to design economically attractive hydrokinetic turbines for tidal and riverine currents. Concept papers are due 27 May 2020 at 9:30am ET.

Employment Opportunities

Minesto is seeking a [Civil Subsea Engineer](#) to assist in the design and development of subsea systems, foundations, anchoring and mooring systems, connections, umbilical and risers. Applications close 28 April 2020.

The University of Exeter is seeking a [PhD Candidate](#) to support fundamental research in the field of reliability engineering, component testing, and performance assessment for tidal energy technologies. Applications close 30 April 2020.

Carnegie Clean Energy is seeking a [Hydrodynamic Engineer](#), [Electrical Machine Expert](#), and a [Machine Learning Expert](#) to join the technical team and work closely with engineers across a broad range of disciplines in executing the development of the CETO wave energy technology.

CorPower Ocean is seeking a [Senior Instrumentation and Automatic Engineer](#), [Mechanical Technician](#), [Electrical Technician](#), and [Chief Financial Officer](#) to support the development of its wave energy converter technology. CorPower is also seeking a [Master's Student](#) to explore and improve control algorithms to maximize power output under varying wave conditions.

Upcoming Events

Upcoming Webinar

ETIP Ocean and OceanSET will be hosting a [webinar](#) on 7 May 2020 at 11:00am CEST to provide an update on the ocean energy sector in Europe. Register [here](#).

Event Updates

The [11th Scottish Highland Renewable Energy Conference \(SHREC 2020\)](#), originally scheduled for late April 2020 in Inverness, Scotland, has been postponed to 24 September 2020.

[AUVSI Xponential 2020](#), originally scheduled for early May in Boston, Massachusetts (US), has been postponed to 9-12 August 2020.

The [International Conference on Renewable Energy and Sustainable Technologies](#), originally scheduled for mid-June 2020 in Rome, Italy, has been postponed to 22-23 October 2020.

New Documents on *Tethys Engineering*

[On the dynamics of an array of spar-buoy oscillating water column devices with inter-body mooring connections](#) – Oikonomou et al. 2020

The performance of an array of floating Oscillating Water Column (OWC) devices, known as spar-buoy OWC, is analysed for a configuration with inter-body mooring connections. This configuration has the potential of being a more economically viable solution due to drastic reductions in the amount of mooring cables, when compared to independently moored configurations. Numerical simulations for an array of independently moored devices and for an unmoored array are presented and compared.

[Operational fatigue loading on tidal turbine blades using computational fluid dynamics](#) – Finnegan et al. 2020

This study uses an advanced computational fluid dynamics model to explore the operational fatigue loadings induced on tidal turbine blades. Two factors are considered, the presence of a support structure and varying vertical velocity profile of the tidal current. In order to perform the investigation, a model of a concept 16 m diameter horizontal axis tidal turbine with a monopile support structure is created. An investigation of the operational fatigue loadings due to variations in the positioning and the diameter of the support structure, the tidal turbine blade loads were found to varying by up to 43% of the maximum total thrust force.

[Prospects of ocean-based renewable energy for West Africa's sustainable energy future](#) – Adesanya et al. 2020

Currently, ocean in West African region is mostly utilized for the extraction of oil and gas from the continental shelf. However, this resource is depleting, and the adaptation of

ocean energy could be of major importance. The purpose of this paper is to discuss the possibilities of ocean-based renewable energy (OBRE) and analyze the economic impact of adapting an ocean energy using a thermal gradient (OTEC) approach for energy generation.

[A DLM immersed boundary method based wave-structure interaction solver for high density ratio multiphase flows](#) – Nangia et al. 2019

In this paper we present a robust immersed boundary (IB) method for high density ratio multiphase flows that is capable of modeling complex wave-structure interaction (WSI) problems arising in marine and coastal engineering applications. An effective wave generation and absorption technique for a numerical wave tank is presented and used to simulate a benchmark case of water wave distortion due to a submerged structure. The numerical scheme is tested on several benchmark WSI problems from numerical and experimental literature in both two and three dimensions.

[Risk and cost optimised condition monitoring system design for marine renewable energy](#) – Kenny 2020

Marine Renewable Energy (MRE) has significant potential to contribute to global energy security and sustainability. However, the high initial Levelised Cost Of Energy (LCOE) of MRE, as well as issues with survivability and reliability, present challenges for its commercialisation. Predictive maintenance using Condition Monitoring Systems (CMS) addresses these challenges by improving availability and reducing operational expenditure. A portfolio approach to sensor selection and risk reduction is proposed, incorporating a Failure Mode and Effects Analysis (FMEA) to identify and prioritise risks versus reward.

[Integrated membrane distillation-reverse electrodialysis system for energy-efficient seawater desalination](#) – Tufa et al. 2019

Although desalination market is today dominated by Seawater Reverse Osmosis (SWRO), important technological issues remain unaddressed, specifically: relatively low water recovery factor (around 50%) and consequent huge amount of brine discharged, and energy consumption (3–5 kWh/m³) still far from the minimum thermodynamic value (~1 kWh/m³). Herein, the energy performance of an innovative systems combining SWRO, Membrane Distillation (MD) and Reverse Electrodialysis (RED) for simultaneous production of water and energy is investigated.

News & Press Releases

[Eco Wave Power Enters Concession Agreement with APDL to Enable the Construction of an up to 20 MW Wave Energy Power Station in Portugal](#) – Eco Wave Power

Onshore marine energy developer, Eco Wave Power (EWPG Holding AB) recently entered an official Concession Agreement with APDL (A Administração dos Portos do Douro, Leixões e Viana do Castelo) regarding the usage of an area potentially suitable for the construction, operation, and maintenance of a wave energy power plant of up to 20 MW in four locations owned and operated by APDL. APDL will provide Eco Wave Power with the concession for its' breakwaters for a period of 25 to 30 years.

International tidal technology developers sign agreement with Morlais project – Morlais

North Wales tidal stream energy project, Morlais, has had a significant boost with the announcement that three new turbine developers have signed-up to the project. The deal comes following months of discussion with French firms SABELLA and HydroQuest as well as Spanish developer Magallanes. All three companies aim to deploy their devices on a commercial scale at the Crown Estate-designated zone off the coast of Anglesey, north Wales. Morlais is run by social enterprise, Menter Môn and has the potential to become one of the largest tidal stream energy sites in the world.

ORPC trials its autonomous turbine generator – Offshore Energy

Ocean Renewable Power Company (ORPC) has recently completed testing of its autonomous turbine generator unit (ATGU) at UMaine Advanced Structures and Composites Center. The trials demonstrated its ability to operate in power generation and also propulsion modes. The ATGU generates electricity from moving water currents in oceans and rivers. The ATGU system has the design for self-deployment and retrieval, but it can also provide power to subsea sensors and vehicles. Up next for the ATGU are sea trials in Maine.

New inventions boost renewable energy - City University of Hong Kong

A materials scientist at City University of Hong Kong (CityU) and his research teams are advancing the frontiers of renewable energy research with two significant inventions that tackle the looming energy crisis. Led by Professor He Jr-hau from the Department of Materials Science and Engineering, the inventions include the development of a novel wave energy device that generates energy while reducing carbon dioxide (CO₂), as well as a new photoelectrochemical system that will increase the efficiency of solar-to-hydrogen energy conversion by two-fold and at half the cost.

TiPA project drives down tidal energy cost – Offshore Energy

The EU supported Tidal Turbine Power Take-off Accelerator (TiPA) project has developed technology that reduced the cost of tidal energy by close to 30 percent. The project set out with the goal of reducing the cost of tidal power production by 20 percent. However, the Edinburgh University analysis found that the new generator actually reduced the cost by 29 percent. Aachen University in Germany carried out initial trials of the prototype generator. Subsea testing then followed by project lead Nova Innovation at Babcock's Rosyth site in Scotland.