

TETHYS ENGINEERING BLAST



5 June 2020

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 (MRE). 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

Tethys Engineering Photo Library

We have recently made improvements to the [Tethys Engineering Photo Library](#), which hosts photos and illustrations of MRE devices, arrays, and facilities that have been graciously provided by many of the leading developers from around the world and are free for third party use.

EMEC Consultation

The European Marine Energy Centre (EMEC) has opened a [consultation on the revised decommissioning programme](#) for Magallanes Renovables' 2 MW ATIR platform, which is currently deployed at the Fall of Warness test site. EMEC invites stakeholders and members of the public to provide responses via email (info@emec.org.uk) or phone by 9 June 2020.

Calls for Papers

The Marine Technology Society Journal is accepting manuscript submissions for a [special issue](#) entitled, *Utilizing Offshore Resources for Renewable Energy Development: Marine Renewable and Offshore Wind Energy*. The deadline for manuscript submissions is 22 June 2020.

The Journal of Marine Science and Engineering is accepting manuscript submissions for a [special issue](#) entitled, *Advances in Wave Energy Harvesting*. The deadline for manuscript submissions is 26 June 2020.

Funding/Testing Opportunities

The [Testing Expertise and Access for Marine Energy Research \(TEAMER™\) program](#), sponsored by the United States (US) Department of Energy and directed by the Pacific Ocean Energy Trust, will provide testing and expertise support to technology developers and researchers seeking access to the nation's best facilities and expertise through 3 to 4 annual open funding calls over each of the next three years. The first [Request for Technical Support](#) application period will remain open through 31 July 2020. An [informational webinar](#) is now available.

Interreg North-West Europe's [Ocean DEMO](#) (Demonstration Programme for Ocean Energy Pilot Farms and Supporting Technologies) project recently opened its [3rd Call for Applications](#). Successful applicants will receive free access to test their ocean energy products and services in real sea environments at the project's network of test centers. Applications close 18 September 2020 at 17:00 UTC.

Employment Opportunities

Marine Power Systems is seeking a [Design Engineer](#) with expertise in the assembly and maintenance of very large, complex systems within CAD, and a [Project & Development Engineer](#) with expertise in the project engineering, development, and construction of large structures.

France Energies Marines is seeking a [Full Stack Engineer/Developer](#) for the RESCORE Project (RESource Center for Ocean Renewable Energy), which aims to establish a resource center based on a web-based tool allowing access to relevant information and other assets deemed valuable for the development of the ocean renewable energy sector in France. Please note that the application submission deadline will be extended.

Upcoming Events

Upcoming Webinar

In the framework of European Union (EU) Sustainable Energy Week 2020, Ocean Energy Europe and the International Renewable Energy Agency will host a [joint webinar](#) on 19 June 2020 at 2:00pm BST. The webinar will focus on new international developments, both in technology and support schemes, and examining the future of the global leadership role that Europe currently enjoys in ocean energy technology. Register [here](#).

Upcoming Workshop

The International Energy Agency's Ocean Energy Systems will be facilitating an online data workshop on 10 June 2020 that will bring together research projects from around the world investigating the potential system benefits of integrating MRE into established power systems. The workshop focuses on data requirements for such studies, accessibility of data on marine energy resource, power conversion curves/matrices, generation, and demand. Researchers interested in participating can contact Henry Jeffrey (henry.jeffrey@ed.ac.uk) and Shona Pennock (shona.pennock@ed.ac.uk) at the University of Edinburgh for further details.

Event Updates

[HYDROVISION International](#), originally scheduled for 14-16 July 2020, will now be held from 17-19 November 2020 in Minneapolis, Minnesota (US).

The Institute of Electrical and Electronics Engineers' [Power & Energy Society's General Meeting \(IEEE PES 2020\)](#), originally scheduled for 2-6 August 2020 in Montreal, Canada, will now be held virtually.

New Documents on *Tethys Engineering*

[Performance analysis of two vertical-axis hydrokinetic turbines using variational multiscale method](#) – Mohamed et al. 2020

The performance prediction of two counter-rotating vertical axis hydrokinetic turbines is presented in this paper. The flow field is governed by the 3D time-dependent incompressible Navier–Stokes equations. The system of equations is discretized using the Arbitrary Lagrangian-Eulerian Variational Multi-scale formulation for turbulence modeling on moving domains. A grid convergence study based on the evaluation of the grid convergence index for the computed torque and the time-averaged axial wake velocity is performed.

[Efficiency and Survivability of a Floating Oscillating Water Column Wave Energy Converter Moored to the Seabed: An Overview of the Esflowc MaRINET2 Database](#) – Kisacik et al. 2020

The performance of floating oscillating water column (OWC) type wave energy converters (WECs) has been widely studied using both numerical and experimental methods. However, due to the complexity of fluid–structure interaction of floating OWC WECs, most of the available studies focus on 2D problems with WEC models of limited degrees-of-freedom (DOF) of motion, while 3D mooring effects and multiple-DOF OWC WECs have not been extensively investigated yet under 2D and 3D wave conditions. Therefore, the present study focuses on wave flume experiments to investigate the motion and mooring performance of a scaled floating OWC WEC model under 2D conditions.

Optimization of net power density in Reverse Electrodialysis – Ciofalo et al. 2019

Reverse Electrodialysis (RED) extracts electrical energy from the salinity difference between two solutions using selective ion exchange membranes. In RED, conditions yielding a large net power density (NPD) are generally desired, due to the still large cost of the membranes. NPD depends on a large number of physical and geometric parameters. In the present study, a simplified model of a RED stack was coupled with an optimization algorithm in order to determine the conditions of maximum NPD in the space of the variables H^{CONC} , H^{DIL} , U^{CONC} , U^{DIL} for different sets of “scenario” variables.

A review on the technologies, design considerations and numerical models of tidal current turbines – Nachtane et al. 2020

Hydrofoils (HF) are essential elements of tidal current turbine (TCT) and should be properly designed as they play a vital role in improving the turbine output and providing adequate resistance to the blade structure. In connection with the hydrofoil designs, it is noteworthy that the primary objectives in their designs are to increase the coefficient of lift and to reduce the coefficients of drag and pitching moment, thus delaying the cavitation phenomenon. In this paper, the technology developments of the hydrofoil designs used in the horizontal axis TCT industry are reviewed, including the hydrodynamics design and the mechanical structure design.

Numerical and Experimental Investigation on a Moonpool-Buoy Wave Energy Converter – Liu et al. 2020

This paper introduces a new point-absorber wave energy converter (WEC) with a moonpool buoy—the moonpool platform wave energy converter (MPWEC). The MPWEC structure includes a cylinder buoy and a moonpool buoy and a Power Take-off (PTO) system, where the relative movement between the cylindrical buoy and the moonpool buoy is exploited by the PTO system to generate energy. A 1:10 scale model was physically tested to validate the numerical model and further prove the feasibility of the proposed system.

On the Marine Energy Resources of Mexico – Hernández-Fontes et al. 2019

The Atlantic and Pacific coasts of Mexico offer a variety of marine energy sources for exploitation. Although the Mexican government has made important efforts to reduce its dependence on fossil fuels, national participation in clean energies is still limited in terms of electricity production. This paper presents a practical theoretical assessment of marine energy sources around Mexico, with the aim of identifying potential zones for subsequent, more detailed, technical evaluations and project implementations. Using global databases, the percentages of energy availability for the defined thresholds were computed to establish the prospective regions with the most persistent power availability.

News & Press Releases

[Oregon's PacWave Aims to Jump-Start US Marine Energy Market](#) – Green Tech Media

Oregon State University's PacWave testing facility is in its permitting home stretch and could begin construction this year. The project has received \$35 million from the US Department of Energy and \$3.8 million from the state government of Oregon. In the works since 2013, PacWave will comprise four wave-energy testing berths at a site located about seven miles from shore on Oregon's Central Coast. Each berth will have its own transmission cable, and the testing site will come pre-permitted for different types of technologies.

[EU Approval: Seal of Excellence for AW-Energy Oy and its WaveRoller® Wave Energy Project](#) – AW-Energy Oy

Finnish company, AW-Energy Oy, a global leading wave energy technology company and developer of WaveRoller®, has received the EU Seal of Excellence award from Horizon 2020, the EU's research and innovation funding programme. An international judging panel including business angels, entrepreneurs, venture capitalists and experts from innovation hubs, evaluated AW-Energy's wave energy project. It was judged to provide strong added-value, being commercially viable and better than existing solutions on the market.

[New partnership with Chilean company REDE](#) – Oneka Technologies

Oneka Technologies is pleased to announce that it signed an agreement with REDE (Renewable Energy Development Enterprise) which is developing projects in Chile and bringing renewable energy solutions. Chile is a country facing frequent droughts and has to import its fuel, making conventional desalination an inadequate solution to solve water scarcity. However, the country is rich in wave energy, and Oneka is excited to collaborate with REDE to turn that resource into a sustainable and affordable source of drinking water.

[Hydrokinetic Clean Energy Harnessed From Florida's Gulf Stream In Historic OceanBased Perpetual Energy Demo](#) – Business Wire

An offshore demonstration with game-changing implications for the future of perpetual clean energy, conducted from May 25 through 28 by OceanBased Perpetual Energy, LLC in collaboration with the Southeast National Marine Renewable Energy Center at Florida Atlantic University, has demonstrated that clean, renewable perpetual energy can be derived by harnessing the perpetual Gulf Stream current off the coast of South Florida. The successful OceanBased demonstration is the first ever to yield energy from the powerful Gulf Stream for a continuous 24 hours using only the water's perpetual flow.

[DTOcean Plus Standalone Tools Ready for Verification](#) – Wave Energy Scotland

The development of the standalone alpha versions of the whole suite of design tools for the H2020 DTOcean Plus ocean energy systems is now complete. The alpha versions are now ready for the verification phase and then demonstration against real scenarios. Project partners are intensifying training and education activities to strongly engage with potential users of the tools. The verification phase will be carried out by the testing of each tool and module in order to verify that they meet the functional and technical requirements defined at the beginning of the project.