20 October 2023

The Portal and Repository for Information on Marine Renewable Energy (PRIMRE) provides access to marine energy data, information, and resources in the U.S. and internationally. The bi-weekly PRIMRE Blast highlights relevant announcements and upcoming events; new content in the Knowledge Hubs; and international marine energy news. Email us to contribute!

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Announcements

Community Energy Innovation Prize

The U.S. Department of Energy (DOE) recently launched the Community Energy Innovation Prize, a competition that will award cash prizes and mentorship opportunities to organizations supporting innovation, entrepreneurship, capacity building, and economic development in communities historically underrepresented in climate and energy technology funding. Collegiate Track submissions are due 3 November 2023 and Clean Energy Ecosystem and Manufacturing Ecosystem Track applications are due on 2 February 2024.

Marine Energy Graduate Student Research Program

The U.S. DOE's Water Power Technologies Office (WPTO) and the Oak Ridge Institute for Science and Education (ORISE) recently opened applications for the 2024 Marine Energy Graduate Student Research Program, which supports graduate students working on marine energy by providing access to expertise, resources, and capabilities available at DOE offices, national laboratories, government and industry partners, and other approved facilities. Applications are due 1 December 2023.

Earthshot Prize Applications

As an Official Nominator for The Earthshot Prize, the European Marine Energy Centre (EMEC) is inviting expressions of interest from ocean energy, offshore wind, and green hydrogen related solutions through 30 October 2023.

Calls for Abstracts

The [Call for Abstracts](#) for the [34th International Ocean and Polar Engineering Conference (ISOPE 2024)](#) is open through 20 October 2023. ISOPE 2024 will take place on 16-21 June 2024 in Rhodes, Greece.

The [Call for Abstracts](#) for the [43rd International Conference on Ocean, Offshore & Arctic Engineering (OMAE 2024)](#) is now open through 26 October 2023. OMAE 2024 will take place 9-14 June 2024 in Singapore.

The [Call for Abstracts](#) for the [Environmental Interactions of Marine Renewables Congress 2024 (EIMR 2024)](#) is now open through 17 November 2023. EIMR 2024 will take place on 15-19 April 2024 in Orkney, Scotland.

The [Call for Abstracts](#) for the [Asian Offshore Wind, Wave and Tidal Energy Conference (AWTEC 2024)](#) is now open through 20 March 2024. AWTEC will take place 20-24 October 2023 in Busan, Korea.

Call for Papers

The Marine Technology Society Journal is seeking manuscript submissions for a special issue on [Marine Energy - An Update on Developments Globally](#) through 1 March 2024. The issue will examine a variety of topics, including technology development, resource assessment, social and economic considerations, and the development of international standards and certification.

Funding & Testing Opportunities

The U.S. DOE is now accepting applications for the [Renewable Energy Siting through Technical Engagement and Planning (R-STEP)](#) program, which seeks to expand the decision-making capacity and expertise of state and local governments around large-scale renewable energy planning, siting, and permitting. Applications are due 3 November 2023.

The U.S. Testing Expertise and Access for Marine Energy Research (TEAMER) program is now accepting [Request for Technical Support 11 applications](#) until 3 November 2023. Applicants can apply to work with approved facilities on tank and flume testing, lab/bench testing, numerical modeling and analysis, and open water support.

The U.S. DOE and Department of the Interior recently released the [Installation Noise Reduction and Reliable Moorings for Offshore Wind and Marine Energy Funding Opportunity Announcement](#), which includes $6.4 million for projects to improve the reliability of moorings for floating offshore wind energy and marine energy systems and $10 million for projects to reduce the noise associated with the installation of fixed-bottom offshore wind energy projects. Concept papers are due 9 November 2023 and full applications are due 29 February 2023.

The Marine Energy Test Area (META) in Wales is hiring a [Commercial Manager](#) who will be responsible for developing META by engaging with the market, enhancing its product offerings, and identifying commercial opportunities. Applications are due 17 November 2023.

The Marine Offshore Renewable Energy Lab (MOREnergy Lab) of Politecnico di Torino, Italy, is looking for a [Postdoctoral Research Fellow](#) to carry out activities related to the techno-economic modelling and optimization of offshore renewable energy systems. Applications are due 15 December 2023.

Upcoming Events

Upcoming Webinars

The U.S. WPTO is hosting an "[R&D Deep Dive Webinar: Spatial Environmental Assessment Tool - Connecting Marine Energy and the Environment](#)", on 9 November 2023 from 1:00-2:00pm EST (6:00-7:00pm UTC).

The U.S. WPTO is also hosting its next [Semiannual Stakeholder Webinar](#) on 13 November 2023 from 10:30am-12:00pm PST (3:30-5:00pm UTC). The webinar will dive into current and future funding opportunities and other accomplishments, news, and updates. Register [here](#).

Upcoming Workshop

The Argentine Network of Marine Energies, in collaboration with the Center for Ocean Energy Research (COER), Maynooth University, Ireland, and the Marine Offshore Renewable Energy Lab are hosting the [8th Wave Energy Workshop](#) in conjunction with the 2023 Argentine Meeting on Marine Energies (ENAEM 2023) on 6-8 November 2023 in Buenos Aires, Argentina.

Upcoming Conferences

The Maritime Association is hosting [BlueTech Week 2023](#) on 13-17 November 2023 in San Diego, California, U.S. Register [here](#).

Marine Renewables Canada is hosting the [Marine Renewables Canada 2023 Conference](#) on 4-6 December 2023 in Ottawa, Canada. Register [here](#).

WavEC Offshore Renewables, in collaboration with the Netherlands Embassy, is hosting the [2023 WavEc Seminar](#) on 6 December 2023 in Lisbon, Portugal. Register for free [here](#).

The [Pan American Marine Energy Conference (PAMEC 2024)](#) will take place on 22-24 January 2024 in Barranquilla, Colombia. Pre-conference workshops will take place 19-20 January 2023. Registration is now available [here](#).

New Documents on Tethys Engineering

Tethys Engineering hosts thousands of documents on the technical aspects of marine energy research and development, including journal articles, conference papers, and reports.

[Turbulence modeling to aid tidal energy resource characterization in the Western Passage, Maine, USA](#) – Deb et al. 2023

Numerical models combined with field measurements are regularly used to characterize tidal energy resources at potential energetic sites. However, most existing works only focus on the tidal hydrodynamic characteristics, and turbulence parameters are often not reported because of the lack of high-quality turbulence measurements and the limitations of numerical models in resolving turbulent eddies. In this study, we used FVCOM – a hydrostatic primitive equation (HPE) model – to characterize the tidal energy resource in the Western Passage, Maine, USA, by taking care of the essential macro-scale turbulence properties. In this study, we used FVCOM – a hydrostatic primitive equation (HPE) model – to characterize the tidal energy resource in the Western Passage, Maine, USA, by taking care of the essential macro-scale turbulence properties.

[Reviewing the energy, environment, and economy prospects of Ocean Thermal Energy Conversion (OTEC) systems](#) – Aresti et al. 2023

Ocean Thermal Energy Conversion (OTEC) technology, a Renewable Energy System (RES), uses the temperature difference (usually, around 20 °C) between the sea surface and the sea bed (usually, at approximately 1 km depth) to produce electricity either in an open or closed cycle system. The sea temperature difference availability, the different technology types and the positioning of OTEC structures are some of the aspects discussed in the current study, with regard to the efficiency and sustainable potential of such systems. Moreover, this review study develops and expands as to the so called 3E aspects, namely the Energy, Economy and Environment, providing a critical overview of each aspect in the literature.

[Control Co-Design of Power Take-off Systems for Wave Energy Converters using WecOptTool](#) – Ströfer et al. 2023

Improved power take-off (PTO) controller design for wave energy converters is considered a critical component for reducing the cost of energy production. However, the device and control design process often remains sequential, with the space of possible final designs largely reduced before the controller has been considered. Control co-design, whereby the device and control design are considered concurrently, has resulted in improved designs in many industries, but remains rare in the wave energy community. In this paper we demonstrate the use of a new open-source code, WecOptTool, for control co-design of wave energy converters, with the aim to make the co-design approach more accessible and accelerate its adoption.

MHKDR Highlight

The Marine Hydrokinetic Data Repository ([MHKDR](#)) is the repository for all data collected using funds from the U.S. DOE's WPTO, including results from tank tests and open sea trials.

[RM3 Wave Tank Validation Model](#) – **National Renewable Energy Laboratory (data submitted 2023, last updated 2023)**

> An approximately 1/75th scale point absorber wave energy absorber was built to validate the testing systems of a 16k gallon single paddle wave tank. The model was build based on the Reference Model 3 design and incorporated a linear position sensor, a force transducer, and wetness detection sensors. The data set also includes motion tracking data of the device's two bodies acquired from 4x Qualisys cameras. The tank wave spectrum is measured by 4 ultrasonic water height sensors.

[Aquantis 2.5 MW Ocean Current Generation Device](#) - [Scaled Tank Test Design and Results](#) – **Dehlsen Associates, LLC (data from 2015, last updated 2020)**

> Aquantis 2.5 MW Ocean Current Generation Device, Tow Tank Dynamic Rig Structural Analysis Results. This is the detailed documentation for scaled device testing in a tow tank, including models, drawings, presentations, cost of energy analysis, and structural analysis. This dataset also includes specific information on drivetrain, roller bearing, blade fabrication, mooring, and rotor characteristics.

[CFD Data on a Vertical Axis Wave Turbine](#) – **University of Texas Rio Grande Valley (data from 2023, last updated 2023)**

> In this study January to July, 2023, different variations of the original geometry of a vertical-axis wave turbine (VAWT) were generated and evaluated for hydrodynamic power efficiency using computational fluid dynamics (CFD). The key geometrical parameters considered in this parametric study included the chord length of the rotor blades and the horizontal semi-axis length. The immersion depth of the rotor was also examined as a key deployment parameter for the wave turbine.

Marine Energy Software Update

[Marine Energy Software](#) is a collection of commercial and open-source software relevant to marine energy development, including simulating devices, and processing and analyzing data.

[WEC-Sim Advanced Features Series](#)

> The WEC-Sim team recently updated the advanced features series that demonstrates how to apply different WEC-Sim features. The series demonstrates how to set up batch runs in WEC-Sim, how to run WEC-Sim with nonlinear hydrodynamics and body-to-body interactions, how to model power take-off systems using PTO-Sim and implement

control, how to model mooring systems and cables, and examples of many other WEC-Sim features. Recordings of the series are available on the [WEC-Sim YouTube channel](#), and slides are available on the [WEC-Sim documentation](#).

WEC-Sim+MOST

The WEC-Sim development team at Sandia and NREL and the MOREnergy Lab at the Polytechnic University of Turin have partnered to bring the offshore energy industry an exciting new numerical modeling capability: **WEC-Sim+MOST.**

[*WEC-Sim (Wave Energy Converter SIMulator)*](#) is an open-source software for simulating wave energy converters, developed jointly by Sandia National Laboratories (Sandia) and the National Renewable Energy Laboratory (NREL). WEC-Sim is developed in MATLAB/Simulink using the multi-body dynamics solver Simscape Multibody. The software can model floating offshore systems that are comprised of rigid and flexible bodies, joints, power take-off systems, and mooring systems.

MOST (MATLAB for Offshore Simulation Tool) is a software for simulating offshore floating wind turbines (OFWT), hybrid wind-wave energy converters, platforms with multiple turbines, actively controlled water ballast, etc. developed by the MOREnergy Lab since 2021. The software is built in MATLAB/Simulink on top of WEC-Sim. MOST has a greatly reduced computational expense using aerodynamic and mooring lookup tables and ROSCO wind turbine controllers.

WEC-Sim+MOST is a new collaboration that brings the floating offshore wind turbine modeling capabilities of MOST into WEC-Sim. WEC-Sim and MOST are now seamlessly packaged, installed, and run together. MOST documentation is hosted alongside the [WEC-Sim documentation](#). Users are encouraged to post questions and discussions related to MOST on the [MOREnergyLab fork of WEC-Sim](#). A [WEC-Sim Application with MOST](#) highlights how to use this exciting new feature which can unlock modeling of hybrid energy systems.

MHKiT-Python v0.7.0 Release

The *Marine and Hydrokinetic Toolkit ([MHKiT](#))* is open-source software, developed in Python and MATLAB, for rapid data processing, visualization, quality control, resource assessment, and device performance. [MHKiT-Python](#) and [MHKiT-MATLAB](#) provide robust and verified functions in both Python and MATLAB that are needed by the MRE community to standardize data processing. MHKiT v0.7.0 features a new mooring module that supports outputs from MoorDyn and allows users to import data, calculate lay length, and visualize mooring line movement in 2D and 3D. It also includes a revamped Dolfyn module that includes turbulence calculation and performance measures for tidal power according to IEC/TS 6200-200.

News & Press Releases

[CorPower C4 exporting power to the Portuguese grid.](#) – **CorPower Ocean**

CorPower Ocean's first commercial scale Wave Energy Converter, the CorPower C4, continues to make rapid progress after its first seven weeks of operation off the coast of Aguçadoura in northern Portugal, accelerating through commissioning and exporting power to the grid. The main steps of the commissioning program have now been completed, verifying that the machine functions are operating as specified. All operational modes, including Storm Survivability, Derated and Tuned Production modes as well as Maintenance modes have been successfully tested. In addition, the C4 device has shown its capacity to make autonomous decisions transitioning between different machine states according to ocean conditions, which are monitored by onboard sensors and control systems.

[Seaturns launches wave energy demonstrator offshore France](#) – **Offshore Energy**

French start-up Seaturns has deployed a scaled wave energy prototype at Ifremer's sea trials site in Sainte-Anne du Portzic, near Brest. The 1:4 scale prototype will undergo trials to validate the performance and reliability of the device in marine and operational environment, which is one of the necessary steps before developing the technology at full-scale. Seaturns' wave energy converter can be seen as a floating oscillating wave surge converter using the principle of the oscillating water column. It works by having mooring lines coiled around the device, covering the surge induced by the incident swell into pitch. The sea trials at Sainte-Anne du Portzic site are expected to last for almost one year, according to Seaturns.

[IIT Madras researchers patent 'Combined Power Generation Technology' that can generate electricity from tidal and wind sources](#) – **IIT Madras**

Indian Institute of Technology Madras (IIT Madras) Researchers have patented a 'Combined Power Generation Technology' technology that can generate electricity from both Tidal and Wind sources. This can be deployed as a mobile vehicle For Power Generation, Transmission and Storage. The current innovation is an energy converter system that generates electricity in coastal areas to reduce electricity demand. The converter system can be deployed depending on the power requirements in the coastal areas. At present, the Researchers are focused on scalability and affordability and are trying to build a cost-effective prototype using 3D-Printing and other technologies. A wind turbine mounted on a vehicle's roof will employ the converter technology to generate wind energy as well as convert tidal energy into electrical energy.

[Could PacWave test site potentially offer its own moorings for wave energy developers?](#) – **Offshore Energy**

Researchers from the National Renewable Energy Laboratory have identified the most cost-effective ways for the U.S. Department of Energy to acquire mooring systems for

PacWave – a new wave energy test site offshore Oregon – which could facilitate the test campaigns for developers. PacWave test site is set to test various sizes and shapes of wave energy converters (WECs) over the next couple of years, starting from 2025 – when it is expected that the site will open its berths to developers for the first time. The facility has energetic waters, subsea power cables, and on-land infrastructure ready to use for WEC developers wanting to test their devices. However, WEC developers do not always have mooring system components designed or acquired for device stationkeeping during testing, and PacWave does not own any such components for developers to use.

Brand new NEMMO blades are ready to be deployed – **NEMMO**

The Next Evolution in Materials and Models for Ocean Energy (NEMMO) project recently reached its last and most significant milestone – producing novel–design tidal blades. NEMMO partner INPRE Composites completed the manufacturing of four novel-design blades last week. Three of these brand-new blades are now being shipped to the site of Magallanes Renewables' ATIR tidal energy platform in Scotland for installation. The fourth one was produced for structural testing. These new blades will soon be installed in the current tidal site of Magallanes Renewables' ATIR platform in Scotland, hopefully within the next few months. The final test of these blades will be performed at the tidal site following the final setup of the device and its control system. Magallanes Renewables will monitor and evaluate the blades' performance and any eventual behavioural changes due to ageing, fouling, cavitation, etc.