



## 8 September 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!

---

[Announcements](#)  
[Upcoming Events](#)

[Tethys Eng. Documents](#)  
[Projects Database Update](#)

[MHKDR Highlight](#)  
[News & Press Releases](#)

---

### 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.

#### WEC Seals Survey

Pacific Northwest National Laboratory (PNNL) is conducting a project to understand lifetime prediction of sealing materials in Wave Energy Converter (WEC) Hydraulic Power Take-Off Systems and requests your participation in this [brief survey](#) that will help gather information about different WECs, types of polymer sealing materials, and their applications, as well as exposures of these materials. Responses are due 30 September 2023.

#### Calls for Abstracts

The [Call for Abstracts](#) for the [Offshore Technology Conference \(OTC 2024\)](#) is open through 12 September 2023. OTC will take place 6-9 May 2024 in Houston, Texas, U.S.

The [Call for Abstracts](#) for the [Ocean Sciences Meeting \(OSM 2024\)](#) is open until 13 September 2023. OSM will take place 18-23 February 2024 in New Orleans, Louisiana, U.S. Abstracts are being considered for sessions on [Offshore Renewable Energy: Resource Characterization & Environmental Impacts](#) and [Making Waves with Communication: Approaches to Communication, Outreach, & Engagement for Ocean Sciences](#).

The [Call for Papers](#) for the [2024 American Control Conference \(ACC\)](#) is open through 22 September 2023. ACC will take place 8-12 July 2024 in Toronto, Canada.

The [Call for Abstracts](#) for [OCEANS 2024 Singapore](#) is now open through 15 October 2023. OCEANS will take place in 14-18 April 2024 in Singapore.

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.

### Funding & Testing Opportunities

The U.S. DOE Water Power Technologies Office (WPTO) recently published a [Notice of Intent](#) to issue a \$14.5 million funding opportunity to support marine energy research at U.S. institutions of higher education, including minority-serving institutions. WPTO expects to release this funding opportunity in fall 2023 in partnership with DOE's Wind Energy Technologies Office (WETO).

The U.S. DOE's WETO and WPTO and the Department of Interior's Bureau of Ocean Energy Management and Bureau of Safety and Environmental Enforcement also published a [Notice of Intent](#) to issue a funding opportunity to improve the reliability of mooring lines and to reduce noise associated with installing fixed-bottom offshore wind energy foundations. This funding opportunity is expected to be released in October 2023.

The Supergen Offshore Renewable Energy (ORE) Hub has launched its [4<sup>th</sup> Flexible Funding Call for Proposals](#) and is seeking proposals from eligible UK universities or other institutions to facilitate a program of coordinated UK-led ORE research projects. Expressions of interest are due 11 September 2023.

The National Oceanic and Atmospheric Administration [recently announced](#) the [Ocean-Based Climate Resilience Accelerators](#) program, which will foster public-private partnerships to help support small businesses that are developing sustainable technologies, including renewables. Applications are due 11 September 2023.

The U.S. DOE WPTO and the Minority-Serving Institutions Science Technology Engineering Mathematics (STEM) Research and Development Consortium have opened a [\\$1.2 million funding opportunity](#) to support promising, potentially high-impact water power research ideas from minority-serving colleges and universities. Concept papers are due 12 September 2023.

The National Science Foundation and U.S. DOE WPTO [recently announced](#) a special funding focus on new science and engineering proposals submitted to the [Engineering Research Initiation \(ERI\) solicitation](#) focused on marine energy and powering the blue economy. ERI supports eligible new researchers, educators, and innovators. Proposals are due 15 September 2023.

The European Commission is accepting proposals for the [Innovation Fund's Third Small-scale Call for Projects](#) through 19 September 2023. The call will provide grants to small-scale projects with a capital expenditure between €2.5 and €7.5 million in the areas of renewable energy, decarbonisation, energy storage, and carbon capture, use, and storage.

### Career Opportunities

The University of Edinburgh is seeking a [Research Associate in Hydro-environmental Modelling for Tidal Stream Energy](#) to study the interactions of tidal stream turbine devices with the environment and inform co-design. Applications are due 11 September 2023.

The European Marine Energy Centre is looking for an [Assistant Project Manager](#) to join the Islands Centre for Net Zero team and support the delivery of the ten-year project across Orkney, Shetland, and the Outer Hebrides (Scotland). Applications are due 12 September 2023.

PNNL is seeking a [Post Bachelor Research Associate - Marine Technology Electrical Engineer](#) to join its multidisciplinary team of engineers and scientists developing and assessing technology for the marine environment. Applications are due 24 September 2023.

PNNL is also seeking a [Post Doc Research Associate - Coastal Ocean Modeling](#) to conduct coastal modeling research related to: 1) wave and/or tidal modeling for energy resource characterization using unstructured-grid models; 2) modeling of wave-current interaction; and 3) multi-scale modeling and analysis of coastal processes under further climate. Applications are due 1 October 2023.

---

## Upcoming Events

### Upcoming Webinars

The International Energy Agency's Ocean Energy Systems (IEA-OES) is hosting a webinar, "[Ocean Energy Outlook in the USA & Canada](#)", on 12 September 2023 at 7:00-8:00am PDT (2:00-3:00pm UTC). The webinar will explore the latest advancements, projects, and key policies in these countries' ocean energy sectors and introduce to a new tool supported by IEA-OES, showcasing global ocean energy projects. Register [here](#).

Marine Energy Wales is hosting a [Funding Webinar: SMART Flexible Innovation Support](#) for its members from 9:00-10:00am UTC on 26 September 2023. The webinar will feature a series of presentations on the funding and support available followed by a question-and-answer period.

OES-Environmental is hosting a public webinar, “[Coordinating and Disseminating Research on Environmental Effects of Marine Renewable Energy](#)” from 8:00-9:30am PDT (3:00-4:30pm UTC) on 28 September 2023. During the webinar, the team will provide updates on progress and what's to come in the 2024 State of the Science report, and then be joined by two presenters to highlight research on underwater noise and collision risk, as well as practical applications of OES-Environmental resources. Register [here](#).

### Upcoming Conferences

The University Marine Energy Research Community (UMERC) is hosting the [2<sup>nd</sup> Annual UMERC Conference](#) on 4-6 October 2023 in Durham, New Hampshire, U.S. Register [here](#).

The [Ocean Energy Europe \(OEE\) Conference & Exhibition](#) is taking place on 25-26 October 2023 in The Hague, Netherlands. Register [here](#).

The [Offshore Energy Exhibition & Conference \(OEEC\)](#) is taking place on 28-29 November 2023 in Amsterdam, Netherlands. Register [here](#).

### Upcoming Workshops

PNNL and the Atlantic Marine Energy Center (AMEC) are hosting two stakeholder workshops on environmental effects of marine energy on [3 October 2023 from 8:30-12:30 EDT](#) and on [7 October 2023 from 12-4 EDT](#), before and after [UMERC](#). The workshops will discuss the effects of tidal energy on the marine environment. Anyone is welcome to attend the workshops, but online registration is encouraged. Additional information on the workshops will be available on the event pages soon, and shared via emails with those who register.

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.

---

## **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.*

**[A scalable wave resource assessment methodology: Application to U.S. waters](#) – Kilcher et al. 2023**

Waves deliver large quantities of energy to populated coastlines around the world, and wave energy technology research and development has accelerated over the last two decades. Throughout this time national and regional resource assessments have utilized disparate methodologies, which can cause confusion and skepticism. In this work, we describe a theoretical wave resource assessment methodology that addresses many of the

major areas of inconsistency and debate. Applying this revised methodology to U.S. waters, we find the theoretical U.S. wave energy resource to be 3300 TWh/yr, with region totals of 2000 TWh/yr in Alaska, 510 TWh/yr along the U.S. west coast, 380 TWh/yr in Hawaii, 290 TWh/yr along the east coast, 69 TWh/yr in the Gulf of Mexico, and 17 TWh/yr in Puerto Rico and the U.S. Virgin Islands.

### **Effects of Slotted Blades on the Hydrodynamic Performance of Horizontal Axis Tidal Turbines – Yang et al. 2023**

The horizontal axis tidal turbine (HATT) is a device that harnesses the energy of ocean currents and converts it into electrical energy. The blade plays a crucial role in the efficiency of power generation in HATTs. This study focuses on the use of slotted blades to enhance the efficiency of HATTs and investigates the flow control mechanism of these slots using computational fluid dynamics (CFD) methods. Initially, CFD simulations were conducted to analyze the impact of the slot's geometry parameters on a two-dimensional (2-D) slot and to demonstrate its passive fluid control mechanism. Subsequently, the slot was implemented on three-dimensional (3-D) blades to examine its effect on the hydrodynamic performance of the blades.

### **Experimental study of a miniature organic Rankine cycle unit using ocean thermal energy – Hu et al. 2023**

Miniature ocean thermal energy conversion (OTEC) unit is an attractive candidate for sustainable energy supply of autonomous ocean observation platforms. Due to the variability of power load, the OTEC remains susceptible to operation under off-design conditions. A miniature ORC-based OTEC unit was developed and constructed. The performance of the unit under design and off-design was experimentally examined. The effects of operating parameters (i.e., pump frequency and turbine frequency) on power generation and thermal efficiency were evaluated using response surface methodology. The results indicate that the unit can produce 0.917 kW net power with a thermal efficiency of 1.46% at 27 °C heat-source temperature and 6 °C cold-source temperature.

---

## **Marine Energy Projects Database Highlight**

The [\*Marine Energy Projects Database\*](#) provides up-to-date information on marine energy projects, test sites, devices, organizations, and technologies around the world.

### **CalWave Scripps X1 Pilot – CalWave Technologies**

CalWave, a leader in wave energy development, has successfully concluded its open-ocean wave energy pilot after 10 months of continuous operation off the coast of San Diego. The project, which deployed in September 2021, was supported by a US Department of Energy (DOE) award with the goal to demonstrate CalWave's scalable and patented xWave™ technology as a cost-effective, sustainable solution for energy generation. Not only does the demonstration represent California's first at-sea, long-

duration wave energy project, but it also serves as a critical step toward proving wave power as a commercially viable renewable resource.

### **Morlais – Menter Môn**

Morlais is a Menter Môn project which aims to benefit local communities, the economy and help tackle climate change by using renewable energy to generate clean low carbon electricity. The Morlais project manages a 35 km<sup>2</sup> area of seabed off the coast of Holy Island, Anglesey and has the potential to put Ynys Môn on the map in terms of tidal stream energy. The first stage of the project focussed on securing consent from Welsh Government and Natural Resources Wales. Community and stakeholder consultation and engagement was key part of this process. The application was submitted in the autumn of 2019 consent was awarded in December 2021. The second stage of the project will put the necessary infrastructure in place for developers of tidal stream energy devices to deploy their technology in the zone.

### **HERO WEC - Waves to Water Prize – National Renewable Energy Laboratory**

In less than two years' time, a multidisciplinary research team at the U.S. Department of Energy's (DOE) National Renewable Energy Laboratory (NREL) designed, built, and lab tested a novel technology: the hydraulic and electric reverse osmosis (HERO) wave energy converter (WEC). NREL created the HERO WEC alongside teams competing in the "Waves to Water Prize". While the NREL researchers were not competitors, they did abide by the prize guidelines to better understand what was required of competitors. A trial run at the prize finale site also prepared the crew to help prize finalists safely deploy their own prototypes in the water.

---

## **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.*

### **Tidal Currents in San Juan Archipelago, Washington – University of Washington (data from 2022, last updated 2023)**

Re-analyzed acoustic Doppler current profiler (ADCP) data originally collected by NOAA (National Oceanic and Atmospheric Administration) CO-OPS (Center for Operational Oceanographic Products and Services) and equivalent point data from Pacific Northwest National Laboratory's FVCOM (Finite Volume Community Ocean Model) model of the region. Data are processed to products describing characteristics of tidal currents relevant to tidal turbines, as well as power output estimates for a notional turbine deployed from a surface platform or from the seabed at each location.



## **[UNH TDP - Concurrent Measurements of Inflow, Power Performance, and Loads for a Grid-Synchronized Vertical Axis Cross-Flow Turbine Operating in a Tidal Estuary](#) – National Renewable Energy Laboratory (data from 2021, last updated 2023)**

This data was collected between October 12 and December 15 of 2021 at the University of New Hampshire (UNH) and Atlantic Marine Energy Center (AMEC) turbine deployment platform (TDP). This data set includes over 29 days of grid connected turbine operation during this 65 day time frame. The priority for this measurement campaign was to collect data while the turbine was electrically connected to the grid by means of a rectifier and inverter. The [Fall\\_2021\\_UNH\\_Measurement\\_Timeline.png](#) highlights when each instrument was functioning and the [Fall\\_2021\\_UNH\\_Test\\_Log.jpg](#) indicates the four main regions for analysis available from this measurement campaign.

## **[Virtual Flow Solver - Geophysics: A 3D Incompressible Navier-Stokes Solver](#) – Stony Brook University**

Virtual Flow Solver - Geophysics (VFS-Geophysics) is a three-dimensional (3D) incompressible Navier-Stokes solver based on the Curvilinear Immersed Boundary (CURVIB) method. The CURVIB is a sharp interface type of immersed boundary (IB) method that enables the simulation of fluid flows in the presence of geometrically complex moving bodies. The CURVIB method can be applied to wind/marine hydrokinetic turbine simulations and energy applications. VFS-Geophysics is the result of many years of research work by several graduate students, post-docs, and research associates that have been involved in the Computational Hydrodynamics and Biofluids Laboratory directed by Professor Fotis Sotiropoulos.

---

## **News & Press Releases**

### **[CorPower Ocean deploys C4 Wave Energy Converter.](#) – CorPower Ocean**

CorPower Ocean has successfully installed its first commercial scale wave energy converter in northern Portugal, as it accelerates towards making wave energy a bankable technology for mass deployment. The CorPower C4 device was launched in the port of Viana do Castelo, before being towed to the Aguçadoura site located 4km offshore. After connecting to a pre-installed UMACK anchor on the seabed, the device was connected to the Portuguese national grid through a subsea export cable. The system will now undergo a commissioning program, with functions and operational modes being gradually verified. Operations and Maintenance methods for offshore service access, device retrieval and tow-back to the service base in Viana do Castelo will also be tested.

### **[EuropeWave pre-commercial procurement programme unveils 3 finalists](#) – EuropeWave**

Three cutting-edge wave energy projects have been selected to fabricate, deploy and demonstrate their prototype designs in the third and final phase of the EuropeWave Pre-Commercial Procurement (PCP) programme. These projects will share a budget of €13.4

million to continue the development of their wave energy device concepts. Following a thorough evaluation of the designs developed by the five projects in the second phase of the programme, which concluded at the end of June 2023, the three successful projects progressing to phase 3 are (subject to contract): CETO Wave Energy Ireland Limited – ACHIEVE; IDOM Consulting, Engineering, Architecture S.A.U. – MARMOK Atlantic; and Mocean Energy Limited – Blue Horizon 250.

### **Oscilla Power Completes Preliminary Steps for Launch of Triton-C at Wave Energy Test Site – Oscilla Power**

In preparation for launching its Triton-C wave energy converter (WEC), Oscilla Power has completed two key preliminary steps: relocating the Triton-C and performing setup and staging activities at the launch site at the Wave Energy Test Site (WETS) in Hawaii. These steps are necessary precursors to a full, commercial-scale demonstration once work on the WETS site is completed by the U.S. Navy. During the 12-hour effort, the Triton-C was towed from Honolulu Harbor to the grid connection point at the WETS site in Kaneohe Bay where the Triton-C will eventually be tethered for a commercial-scale demonstration. At this location the team was able to rehearse and work through some of the activities needed for the ultimate deployment.

### **TEAMER Network Director Announces RFTS 10 Technical Support Recipients – TEAMER**

On August 18, 2023, the U.S. Testing Expertise and Access to Marine Energy Research (TEAMER) program selected ten projects through its tenth Request for Technical Support (RFTS), reflecting a total funding amount of more than \$1 million. These projects will receive support for testing expertise and access to numerical modeling, laboratory or bench testing, tank/flume testing, and expertise within the growing TEAMER Facility Network. Selected applicants, along with their supporting Facility, will now submit their completed Test Plans, a requirement before assistance activities can commence. Applications for RFTS 11 are currently being accepted through November 3, 2023.

### **WES investigating the potential of combined wind/wave structures – WES**

Following the promising range of potential benefits identified in the scenarios within the “Wave and Floating Wind Energy - Opportunities for Sharing Infrastructure, Services and Supply Chain” report supplied by Offshore Wind Consultants (OWC) Ltd, Wave Energy Scotland (WES) has begun a series of tank tests at the University of Edinburgh’s FloWave facility. There are some clear synergies between the technical requirements and suitable locations for floating wind and wave energy. To maximise the future cost reduction in both sectors, it may be effective to share some of the sub-systems and infrastructure between these two technology types. Versatile wind and wave platforms (where projects are in the same region and use common platform designs) may therefore provide an attractive solution to both sectors.