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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

Powering the Blue Economy: Power at Sea Prize

The U.S. Department of Energy's (DOE) Water Power Technologies Office (WPTO) recently launched the [Powering the Blue Economy: Power at Sea Prize](#), which will award up to \$1.7 million to competitors to advance technologies that use marine energy to power ocean-based activities. Submissions for the Concept Phase are due 26 July 2024.

ETIPP Seeking Regional Partners

The Energy Transitions Initiative Partnership Project (ETIPP) is [seeking applications from regional partners](#) around the United States to design a 12- to 18-month project that will help increase the resilience and reliability of a clean energy grid in selected communities. ETIPP offers technical assistance to remote and island communities to analyze energy systems and plan for increased resilience. Applications are due 10 January 2024.

Community Energy Innovation Prize

The U.S. 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. Clean Energy Ecosystem and Manufacturing Ecosystem Track applications are due on 2 February 2024.

InDEEP Phase 2

The U.S. DOE's Water Power Technologies Office WPTO is launching Phase 2 of the [Innovating Distributed Embedded Energy Prize \(InDEEP\)](#) to encourage innovation in distributed embedded energy converter technology to generate new, precommercial materials for wave energy conversion. Join the [Informational and Networking Webinar](#) on 18 December 2023, the [Webinar on Wave Energy 2.0](#) on 10 January 2024, the [Webinar on DEEC-Tec 2.0](#) on 17 January, the [Webinar on Innovation Methods 2.0](#) on 24 January, and the [Webinar on TPL Assessment 2.0](#) on 31 January to learn more about InDEEP and useful tools.

SEAT Webinar Recording Available

The Spatial Environmental Assessment Toolkit (SEAT), developed by researchers from Sandia National Laboratories, Integral Consulting, and Montana State University, is a series of open-source tools to help stakeholders simulate site- and technology-specific environments to assess the impacts of marine energy deployments. Learn more about SEAT in the latest [WPTO R&D Deep Dive webinar recording](#).

Calls for Abstracts

The [Call for Abstracts](#) for [European Geophysical Union \(EGU24\)](#) closes on 10 January 2024. EGU24 will take place on 14-19 April 2024 in Vienna, Austria, and online.

The Centre for Ocean Energy Research (COER) at Maynooth University Ireland has opened the [Call for Posters](#) for its [2024 Wave Energy Workshop](#) until 15 January 2024. The workshop will take place on 26 January 2024 in Maynooth, Ireland.

The [Call for Abstracts](#) for the [International Conference on Ocean Energy \(ICOE 2024\)](#) is now open through 5 March 2024. ICOE 2024 will take place 17-19 September 2024 in Melbourne, Australia.

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 on 20-24 October 2024 in Busan, Korea.

Funding & Testing Opportunities

The U.S. DOE WPTO is accepting marine energy-related submissions for the [Small Business Innovation Research \(SBIR\) and Small Business Technology Transfer \(STTR\) programs](#), which offer competitively awarded grants to small businesses to support scientific excellence and technological innovation. The deadline to submit letters of intent is 3 January 2024.

The U.S. DOE recently announced up to \$10 million in funding for the [Inspiring Generations of New Innovators to Impact Technologies in Energy 2024 \(IGNIITE 2024\)](#) program, led by the Advanced Research Projects Agency-Energy (ARPA-E). The new program will support early-

career scientists and engineers seeking to develop impactful new energy technologies. Concept papers are due 5 January 2024.

The European Commission's Horizon Europe Framework Programme has opened a [Call for Additional Activities for the European Partnership for a Climate Neutral, Sustainable and Productive Blue Economy](#). This call is open to companies from European Union countries and a selected number of non-European Union/non-Associated countries. Applications are due 28 February 2024.

The UK Research and Innovation (UKRI) recently announced the [Ayrton Fund](#), which is a UK government commitment of up to £1 billion that aims to accelerate the clean energy transition in developing countries, by creating and demonstrating innovative clean energy technologies and business models. Applications will open on 8 January 2024 and close on 9 April 2024.

Career Opportunities

The Environmental Fluid Mechanics group at the University of Washington is seeking a [PhD candidate](#) interested in wave-structure interaction, focusing on applications in marine renewable energy and coastal protection design. Applications are due 15 December 2023.

IFREMER, the French Institute for Ocean Science, has launched a call for proposals for [post-doctoral fellowships](#) focused on wave energy conversion, wave tanks, and hydrodynamics of floating structures. Applications are due 8 January 2024.

Pacific Northwest National Laboratory (PNNL) is seeking an [Operations Specialist 3](#) to work with researchers to ensure that PNNL processes and procedures are followed for all laboratory and field research activities. Applications are due 12 January 2024.

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 23 January 2024.

Swansea University is advertising a [fully funded PhD opportunity](#) on fatigue-resistant elastomers with integrated electrodes for modular self-sensing wave energy converters. Applications are due 26 January 2024.

Upcoming Events

Upcoming Webinar

The [IMPACT](#) and [VALID](#) projects are jointly hosting a webinar, "[Harnessing Ocean Power: Progressing with Wave Energy Converter Technology through Rig Testing](#)", on 31 January 2024 from 2:00-3:00pm CET (1:00-2:00pm UTC). Register [here](#).

Upcoming Conferences

The [Pan American Marine Energy Conference \(PAMEC 2024\)](#) will take place on 22-24 January 2024 in Barranquilla, Colombia. Register [here](#).

[Ocean Sciences Meeting 2024](#) will take place 18-23 February 2024 in New Orleans, Louisiana, U.S. Early bird registration is available through 10 January 2024 [here](#).

Marine Energy Wales is hosting the [Marine Energy Wales Conference 2024](#) on 13-14 March 2024 in Swansea, Wales.

Upcoming Workshops

In addition to the PAMEC 2024 Conference Program, PAMEC in partnership with key partners, is hosting several workshops prior to the conference.

- Pacific Northwest National Laboratory is hosting an [Ocean Thermal Energy Conversion \(OTEC\) Workshop](#) on 19 January to review OTEC technologies, discuss potential environmental effects, and examine additional uses of deep cold water. Register [here](#).
- The PRIMRE team is also hosting a workshop on [Marine Energy Data Organized – PAMEC Workshop on PRIMRE and International Data Sharing](#) on 20 January to present on the resources available within PRIMRE and discuss opportunities for international databases to connect to the system. Register [here](#).
- Fundy Ocean Research Centre for Energy (FORCE) is also hosting a workshop on [Monitoring for Interactions Between Marine Animals and MRE Devices](#) on 20 January to present on environmental monitoring around wave and tidal devices. Register [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.

[Cooperative model predictive control for Wave Energy Converter arrays](#) – Zhang et al. 2023

It is well known that commercial Wave Energy Converters (WECs) are likely to be deployed in arrays, which gives the possibility to enhance the energy harvesting properties of the wave farm as a whole. Advanced control strategies are necessary to exploit the potential and capture as much energy as possible in a limited sea space. Centralized control is a natural benchmark, as it sees the array as a large-scale system, making energy maximization a large plantwide problem. However, centralized control has a high requirement for computational efficiency. In this paper, a cooperative model predictive control (MPC) is proposed to achieve energy maximization while reducing computational cost.

[Quantifying the surge-induced response of a floating tidal stream turbine under wave-current flows](#) – Zhang et al. 2023

Understanding the impact of dynamic effects induced by wave-current conditions on the hydrodynamic performance of a floating horizontal axis tidal turbine (HATT) is crucial toward developing floating tidal turbines to harness tidal energy in deep water sites. The complicated of the wake of a HATT has not yet been fully understood. In this paper, a Computational Fluid Dynamics (CFD) model used to study the performance of a turbine supported by a moored floating platform, due to surge only and in wave-current flows. The CFD model is compared against piled turbine tests, providing an error of 1.36% in power coefficients at the studied $TSR = 3.9$.

[Internal flow effects in OTEC cold water pipe: Finite element modelling in frequency and time domain approaches](#) – Habib et al. 2023

In this study, a Finite Element Model (FEM) was developed to analyse the stability of an Ocean Thermal Energy Conversion (OTEC) Cold Water Pipe (CWP). The general equation describing the pipe dynamics was adapted from a previous study and modified to consider the non-linear drag force. The flow field and change in the flow direction were imposed by varying the coefficient of the centrifugal force to 0, 0.5, and 1. The pipe material properties were varied using GFRP, PE, ABS, and HDPE. Pipe length was varied from 600 to 1000 m with a 100 m increment. Initially, the analysis was performed in the frequency domain, yielding Eigen frequencies in complex numbers.

Marine Energy Atlas Highlight

The [Marine Energy Atlas](#) is an interactive mapping tool that maps high-resolution, spatially comprehensive data on global wave, tidal, riverine, ocean current, and ocean thermal resources.

[Riverine Resource Data on the Atlas](#)

The Marine Energy Atlas contains more than offshore data – it also has information on riverine resources. River data includes the theoretical power and technically recoverable resource – both in gigawatt hours per year. There is also a layer delineating the hydrologic watershed basins in the contiguous United States. These data are courtesy of NHDPlus (National Hydrography Dataset Plus), a geospatial hydrologic dataset built by the U.S. Environmental Protection Agency Office of Water and the United States Geological Survey National Hydrography Dataset.

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.

Full Scale 1.5MW Pembrokeshire Demonstration – Bombora Wave

With the support of local and specialist suppliers, Bombora's team are currently designing and fabricating a full-scale 1.5 MW mWave prototype in Pembrokeshire, Wales. Bombora is working closely with Pembrokeshire Coastal Forum, the Milford Haven Port Authority and plans to access the Marine Energy Test Area (META) in Pembrokeshire. Bombora launched a £17 million project to construct and test the first mWave off the coast of Pembrokeshire at the end of 2017. In 2018, Bombora successfully secured a £10.3 million Welsh European Funding Office grant to support this project via the Welsh Government.

Islay Community Demonstration – Flex Marine Power Ltd

Flex Marine Power Ltd (FMP), in association with the Islay Energy Trust, propose to install a single 50kW SwimmerTurbine™ in the Sound of Islay, Scotland, with the power being transmitted to Islay for private connection. A key objective of the project is to demonstrate FMP's core model of delivering technology and methods which safely integrate with local skills and infrastructure.

Water2Energy Zeeland Pilot – Water2Energy

Water2Energy installed a 100kW-rated ducted vertical axis tidal turbine in a sluice gate in the Port of Flushing in the Dutch Province of Zeeland. The W2E turbine technology, represents a new generation of a Darrieus-type water current turbine that features adjustable blades. Mounted on the steel frame, the vertical axis tidal turbine tested at the Port of Flushing was able to generate enough electricity to power the operations of the nearby sea locks, or up to 100 households.

News & Press Releases

Flagship European tidal energy project provides pathway to significant reduction in tidal energy costs – EnFAIT project

A groundbreaking European project, led by one of Scotland's leading tidal developers, has demonstrated that the cost of tidal energy could potentially be reduced by as much as 40 percent, and has produced findings that could redefine the boundaries on what can be achieved by tidal power globally. The €20m EnFAIT (Enabling Future Arrays in Tidal) Horizon 2020 project, brought together the expertise of seven partners including Scottish tidal developer Nova Innovation, who manage the world's first offshore tidal array – the Shetland Tidal Array, and the Offshore Renewable Energy Catapult, with the objective of lowering the cost of tidal energy. Starting in 2017 and recently completing, the project has delivered cost reduction, innovation and industry learnings over the past six years.

Interview: Moroccan start-up set to transform power supply of ports with wave energy – Offshore Energy

Born from the vision of two engineers, the Moroccan start-up Advanced Third Age Renewable Energies Company (ATAREC) has set its sights on exploiting the vast wave energy potential that exists around port breakwaters and other infrastructures exposed to sea, with its full-scale demonstrator already deployed and operating at the Port of Tanger-Med – one of the largest ports in Africa and the Mediterranean Sea. Founded by Mohamed Taha El Ouaryachi and Oussama Nour, two Moroccan engineers with a clear vision to create sustainable and green energy solution, ATAREC has developed its flagship wave energy device dubbed WaveBeat.

ABL defines tidal power exclusion zone offshore France – ABL

ABL France has successfully completed a marine technical study for leading French tidal energy developers Normandie Hydroliennes (NH) and Hydroquest. The project aims to support the safe development of the tidal turbine pilot projects NH1 and FloWat – located off Normandy, France. The NH1 and FloWat tidal turbines will be installed close to the Raz Blanchard ferry route, one of the most powerful tidal sites in the world. In order to mitigate the risk of ferries losing position and passing through the tidal turbine farms, an exclusion zone had to be defined and presented to local authorities. Normandie Hydroliennes (NH) and Hydroquest contracted ABL's team in France to provide the technical study to justify the required vessel exclusion zone at the project site.

CETO Wave Energy Ireland awarded €45k funding for WECHULL+ Project – Carnegie Clean Energy

Carnegie Clean Energy Ltd is pleased to announce the successful award of €45,238 in funding to its wholly owned subsidiary, CETO Wave Energy Ireland (CWEI), for its integral role as an industry partner in the WECHULL+ Project. This initiative, led by the Research Institute of Sweden (RISE), is dedicated to the investigation and testing of an innovative concrete material specifically tailored for application in wave energy converters (WECs). The project, funded by the Sustainable Energy Authority Ireland (SEAI) under the European Clean Energy Transition Partnership (CETP), brings together a consortium of European entities, including Delft University of Technology (Netherlands), Ocean Harvesting Technologies (Sweden), Gdansk University of Technology (Poland), SolarDuck (Netherlands), Plataforma Oceánica de Canarias (Spain), Pekebex (Poland), and CWEI.

OPT secures \$6.5M contract for its PowerBuoys with US government – Offshore Energy

U.S.-based company Ocean Power Technologies (OPT) has secured a letter contract with a \$6.5 million ceiling for its wave-powered buoys to bolster maritime domain awareness for U.S. government agencies. OPT received a letter contract from a U.S.-based prime contractor for multiple maritime domain awareness buoys advancing our commitment to national security and intelligence. The collaboration between OPT and the prime

contractor will focus on providing multidomain marine solutions in support of U.S. government agencies. OPT's PowerBuoys will play a pivotal role in enhancing surveillance capabilities above and below the waterline, contributing significantly to maritime domain awareness initiatives.

Installation of Dragon 12 seabed anchor completed successfully – Minesto

Minesto, leading developer of ocean energy, recently successfully completed the installation of a drilled and grouted seabed anchor solution for the Dragon 12, at the company's production site offshore in Vestmannastrandir, Faroe Islands. The installation was carried out by Minesto's collaboration partner Leask Marine Ltd. The Dragon 12 kite system is assembled, tested and ready for installation, commissioning, and power production. The innovative seabed anchor solution is developed by Leask Marine together with Minesto and has for the first time been installed. The Dragon 12 system is on the quayside in Vestmanna and is ready for installation and electricity production. Compared to a traditional gravity-based foundation, seabed anchoring reduces costs for tidal energy array buildout and lowers carbon emissions.