

TETHYS ENGINEERING BLAST



24 February 2023

[Tethys Engineering](#) is an online knowledge hub that facilitates the exchange and dissemination of information on the technical and engineering aspects of marine energy, as part of the [PRIMRE](#) universe. 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. Email tethys@pnnl.gov to contribute!

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Announcements

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In order to highlight more of the data, information, and resources available within the *Portal and Repository for Information on Marine Renewable Energy (PRIMRE)*, we will be rebranding the *Tethys Engineering Blast* as the *PRIMRE Blast* in the coming weeks. We will continue to include all the regular content but will expand the newsletter to include content from the other *PRIMRE Knowledge Hubs* as well. Please reach out to tethys@pnnl.gov if you have any questions.

DOE Request for Information

The U.S. Department of Energy (DOE) Wind Energy Technologies Office (WETO) and Water Power Technologies Office (WPTO) are [requesting information](#) on university-based offshore wind energy centers and the co-location of aquaculture and ocean renewable energy. Responses are due by 5:00pm EDT (9:00pm UTC) on 15 March 2023.

New Marine Energy Atlas Video

PRIMRE recently published a [new video](#) on the [Marine Energy Atlas](#), a free interactive mapping tool that allows anyone to access the data they need to harness the power of oceans and rivers. The Atlas is one of seven *PRIMRE* Knowledge Hubs and supports everything from project siting to device design by providing access to high resolution comprehensive data sets.

Ocean Data Survey

Ocean Motion Tech is partnering with the Oregon State University to study the community impacts of increased ocean data collection enabled by small-scale marine energy. To participate, please complete the online survey corresponding to your specific role: [Ocean Scientist](#), [Non-Scientist Data User](#), [Coastal Community Member](#), or [Marine Energy Researcher/Developer](#).

Calls for Abstracts

The [Call for Academic Posters](#) for the [All-Energy Conference & Exhibition](#) is open through 28 February 2023. All-Energy will take place 10-11 May 2023 in Glasgow, Scotland.

The Call for Abstracts for the [9th International Ocean Thermal Energy Conversion Symposium](#) is open until 1 March 2023. Email your title, authors, and abstract (<500 words) [here](#). The event will take place 4-5 May 2023 in Houston, Texas, U.S.

The Partnership for Research in Marine Renewable Energy (PRIMaRE) has opened the [Call for Abstracts](#) for the [10th PRIMaRE Conference](#) through 10 March 2023. The conference will take place on 27-28 June 2023 in Bath, England.

The Pan American Marine Energy Conference (PAMEC) Association is now accepting [Expressions of Interest](#) to submit an extended abstract for presentation at [PAMEC 2024](#) through 15 March 2023. Extended abstracts will be due 26 June 2023. PAMEC will take place on 22-24 January 2024 in Barranquilla, Colombia, with pre-conference workshops on 19-20 January 2024.

The [Call for Abstracts](#) for the [University Marine Energy Research Community \(UMERC\) 2023 Conference](#) is now open through 23 April 2023. UMERC 2023 will take place on 4-6 October 2023 in Durham, New Hampshire, U.S. Apply for travel/registration support by 15 June 2023.

Funding & Testing Opportunities

The U.S. Testing and Expertise and Access for Marine Energy Research (TEAMER) program, sponsored by the U.S. Department of Energy's (DOE) Water Power Technologies Office (WPTO) and directed by the Pacific Ocean Energy Trust (POET), is now accepting [Request for Technical Support 9](#) applications until 3 March 2023.

The European Commission has also launched the third call for large-scale projects under the [European Union Innovation Fund](#). The call is open until 16 March 2023 for projects located in European Union Member States, Iceland, and Norway.

Spain's Ministry for the Ecological Transition and the Demographic Challenge recently published the first call for aid from the [Renmarinas Demos Program](#) to promote test platforms and the demonstration of new prototypes in the field of marine renewable energy. Applications will be accepted between 31 January and 24 March 2023.

The Horizon Europe Framework Programme recently launched a funding opportunity entitled, “[Demonstration of sustainable tidal energy farms](#)”, to de-risk tidal technology development and increase knowledge of potential environmental impacts. Applications are due 30 March 2023.

The Sustainable Blue Economy Partnership, a Horizon Europe co-funded partnership, recently announced its first [Joint Transnational Call](#) to support transnational research and innovation projects related to the blue economy. An [informational webinar](#) will take place from 1:00-3:30pm UTC on 2 March 2023. Pre-proposals are due 14 April 2023.

The U.S. DOE has opened applications for the [Energy Transitions Initiative Partnership Project \(ETIPP\)](#) for remote and island communities seeking technical assistance to transform their energy systems and increase energy resilience. An [informational webinar](#) will take place at 1:00pm MDT (7:00pm UTC) on 11 April 2023. Applications are due 19 May 2023.

Student & Employment Opportunities

The Research Corporation of the University of Hawai'i is seeking a [Technical Program Manager](#) for a portfolio of projects related to the Navy's Marine Energy Program and other federally funded marine energy research projects, with an emphasis on the management of the Navy's Wave Energy Test Site (WETS). Applications are due 27 February 2023.

The Environmental Research Institute is seeking to appoint a [Postdoctoral Research Associate or Research Fellow](#) with interests in island energy systems, renewable energy or more widely in social sciences, environmental or resource economics, circular economy, environmental management and stewardship, or net-zero aviation. Applications are due 6 March 2023.

The European Marine Energy Centre (EMEC) is looking for a [Project Officer](#) to provide support with planning, resourcing, delivering, and monitoring projects as part of the Project Management Team. Applications are due 12 March 2023.

The Western Norway University of Applied Sciences has a vacancy for a [PhD Research Fellow](#) in hydrodynamics of floating ocean renewable energy technologies. The position will contribute to the HYDROMORE project, which seeks to establish new best-practice approaches for designing future ocean energy mooring systems. Applications are due 15 March 2023.

EMEC is also looking for an [Environmental Officer](#) to implement its environmental monitoring programme, support the development of its technical expertise, undertake fieldwork at EMEC sites and elsewhere, and provide guidance to manage risks associated with marine renewable activities. Applications are due 19 March 2023.

Upcoming Events

Upcoming Webinar

ETIP Ocean, the European Technology & Innovation Platform for Ocean Energy, is organizing a webinar on the development of a Lift-Based Wave Energy Converter (LiftWEC) on 21 March

2023 from 3:00-4:00pm UTC. This webinar will act as an end of project dissemination event where work completed will be outlined and key findings shared. Register [here](#).

Upcoming Conferences

The [12th Annual North Carolina Renewable Ocean Energy Symposium](#) will take place 20-21 March 2023 in Wanchese, North Carolina, U.S. Register [here](#) by 24 February 2023.

The Pacific Ocean Energy Trust is hosting the [Ocean Renewable Energy Conference \(OREC 2023\)](#) on 21-22 June 2023 in Portland, Oregon, U.S. Additional details coming soon.

Upcoming Deep Dive

The Dutch Marine Energy Centre is hosting a [Marine Energy Deep Dive on Offshore Innovations and the Blue Economy](#) on 21 March 2023 from 5:30-7:00pm CEST (4:30-6:00pm UTC) in The Hague, Netherlands. Register [here](#).

New Documents on *Tethys Engineering*

[Analyzing the U.S. Marine Energy Technological Innovation System](#) – Hirsch 2023

The University Marine Energy Research Community uses the Technological Innovation System (TIS) framework to conduct a systematic analysis of the marine energy research and innovation system within the United States. A TIS includes the actors, institutions, networks, infrastructures, and relationships that influence the speed and direction of innovation (Bergek et al., 2008; Hekkert et al., 2011). The report describes the current state of the TIS, its structure and its functionality, and draws on other research in innovation systems and policy to provide recommendations for strengthening the TIS to support innovation in the US marine energy sector.

[Impacts of tidal stream power on energy system security: An Isle of Wight case study](#) – Coles et al. 2023

The new Energy System Model for Remote Communities (*EnerSyM-RC*) is implemented to quantify impacts from adopting tidal stream power alongside solar PV, offshore wind and energy storage in the Isle of Wight energy system. Based on scenarios with gross renewable energy generation matched to projected annual demand (equivalent to 136 MW mean power), installing 150 MW of solar PV, 150 MW of offshore wind, and 120 MW of tidal stream capacity enhances supply–demand balancing whilst also reducing the magnitude of maximum power surplus, both by 25% relative to the best performing solar+wind system. Tidal stream adoption also reduces total land/sea space by 33%.

[Performance variations of wave energy converters due to global long-term wave period change \(1900–2010\)](#) – Ulazia et al. 2023

Long-term ocean climate effects on wave energy are often analysed from the viewpoint of the well-known increment of wave height over the decades. However, this increment associated with the increase of wave energy flux and absorbed power does not consider the influence of variations in the wave period, whose contribution is more important according to an adimensional performance analysis given by the capture width ratio. This study identifies significant past variations in wave periods during the 20th and 21st centuries using the reanalysis ERA-20C globally and at specific locations, such as Ireland, via calibration with ERA5.

Thermodynamic and exergoeconomic optimization of a novel cooling, desalination and power multigeneration system based on ocean thermal energy – Geng & Gao 2023

For isolated islands and remote coastal and offshore areas, a multi-generation system based on ocean thermal energy conversion (OTEC) is one promising solution for electricity and water supply since it can exploit seawater resource and ocean thermal energy (OTE) simultaneously. In order to further improve the energy utilization efficiency, this paper proposes a novel combined cooling, desalination and power (CCDP) system consisting of open-OTEC cycle, dual-Kalina cycle, ejector refrigeration cycle (ERC) and reverse osmosis (RO) desalination. The integration of RO with OTEC can produce fresh water efficiently.

Representative linearised models for a wave energy converter using various levels of force excitation – Farajvand et al. 2023

In guiding the progression, development, and operation of wave energy converters (WECs) in a more efficient way, mathematical analysis and understanding of the dynamic process is essential. Mathematical WEC models, obtained either by numerical analysis or physical modelling, form the basis of most (model-based) energy maximising control strategies available in the literature, where experimental design and system identification methodology directly impact the resulting model. This study, using an experimental-based WEC model, investigates the dynamic behaviour of a WEC by analysing the dominant poles of the system, generated using fully nonlinear computational fluid dynamics-based numerical wave tank experiments.

Physical Modelling of Tidal Stream Turbine Wake Structures under Yaw Conditions – Zhang et al. 2023

Tidal stream turbines may operate under yawed conditions due to variability in ocean current directions. Insight into the wake structure of yawed turbines can be essential to ensure efficient tidal stream energy extraction, especially for turbine arrays where wake interactions emerge. We studied experimentally the effects of turbines operating under varying yaw conditions. Two scenarios, including a single turbine and a set of two turbines in alignment, were configured and compared. The turbine thrust force results confirmed that an increasing yaw angle results in a decrease in the turbine streamwise force and an increase in the turbine spanwise force.

News & Press Releases

[MeyGen sets record with world's first 50GWh of electricity generated by tidal energy](#) – Offshore Energy

The MeyGen tidal energy project, developed by SIMEC Atlantis Energy, has become the first tidal stream array in the world to generate 50GWh of clean electricity from tidal energy. The achievement represents a significant milestone in delivering tidal stream power at scale, according to SIMEC Atlantis Energy. Total global generation from all other tidal energy devices and sites is less than 50% of the record-setting 50GWh achieved by MeyGen, the company noted. The MeyGen site has been operational since 2017, and features SIMEC Atlantis' longest-deployed turbine in continual operation since December 2018, with an average availability of 95%.

[A tidal wave of opportunity: An update on the MaxBLADE project](#) – The Engineer

Until now, tidal energy generation has been costly and difficult to engineer. The new MaxBLADE project in Scotland is set to change that. The European Union Horizon Europe MAXBlade project, which started in January 2023 – led by TechnipFMC, including Orbital Marine Power, Marasoft, TECNALIA, University of Edinburgh, EMEC, Laborelec and the European Composites Industry Association – plans to increase the length of the largest tidal blade from 10 to 13 metres, resulting in a 70 per cent increase in the area the blade can sweep. The team believes this will have the single biggest effect on bringing down the Levelised Cost of Electricity from tidal energy.

[OceanEnergy completes tank trials of scaled OE35 wave energy device](#) – Offshore Energy

Irish company OceanEnergy has concluded the latest round of tank testing of its scaled OE35 wave energy device model at Lir-National Ocean Test Facility (Lir NOTF) as part of the Wave Energy Demonstration at Utility Scale to Enable Arrays (WEDUSEA) project. In January 2023, OceanEnergy, which acts as the co-ordinator the €19.6 million WEDUSEA partnership project, tested a scaled model of the OE35 at the Deep Ocean Basin at Lir NOTF. This was a scale model of the OE35 that will be deployed for sea trials at the European Marine Energy Centre (EMEC) site in the Orkney Isles for a two-year period at a later stage of the WEDUSEA project.

[Turn the tide: is it time for tidal stream energy?](#) – Engineering & Technology

What the harbour porpoises, razorbills and recreational kayakers will make of the whirring turbines beneath the surging seas around Anglesey is largely unknown. But a patch of ocean off the coast of North Wales is now the focus of an emerging and under-exploited source of energy – tidal power. If all goes to plan, it could become one of the largest tidal energy sites on the planet. Here, across 13 square miles of Irish Sea in depths of up to 50m, companies will begin harnessing the kinetic energy of the tidal stream in an experiment to put tidal devices through their paces for longer and at a larger scale than

before. This is the Morlais project – a halfway house for proven tidal technology seeking to demonstrate both its commercial worth and its impact upon sea life and the ocean.

South Korea to support OTEC scheme in Pacific Ocean – Offshore Energy

The Republic of Korea has pledged to provide official development assistance for marine energy programs in the Pacific Ocean, including the support for an ocean thermal energy conversion (OTEC) scheme in Marshall Islands. According to the information from United Nations Department of Economic and Social Affairs, South Korea will provide 50kW OTEC generators as well as air conditioners and heaters which can cool and heat about 5000 m² areas for Marshall Islands. In addition, South Korea will assist capacity building so that Pacific islanders can use seawater on their own by establishing and operating Sustainable Seawater Use Academy.