

# TETHYS ENGINEERING BLAST



**12 March 2021**

*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. If you have specific content you would like circulated to the greater MRE community, please send it to [tethys@pnnl.gov](mailto:tethys@pnnl.gov) for consideration.

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## **Announcements**

### *Tethys Engineering Community*

Did you know that the [Tethys Engineering Community](#) page lists a diverse group of researchers, developers, regulators, and other stakeholders working in the field of and/or interested in MRE? The list is defined by registered users within *Tethys Engineering* who have given permission to share their professional contact information with other registered users. [Log in](#) or [register for an account](#) to share your profile and stay connected with the MRE community!

### EuropeWave Prior Information Notice

Wave energy developers interested in participating in [EuropeWave](#)'s Pre-Commercial Procurement, a tender which will open in June 2021, can now register their interest, ask questions, and provide feedback. A [Prior Information Notice](#) has been published online and a free [webinar](#) will be held on 14 April 2021 at 9:00am UTC to provide an overview of the project and explain the innovative 'stage-gate' design of the procurement process.

## Industry Surveys

The Interreg-funded Selkie project is developing open source, multi-use engineering tools, templates, standards, and models for the wave and tidal stream energy industries in Ireland and Wales, and recently launched several surveys. [This questionnaire](#) will be used to inform the development of a Techno-Economic GIS Tool. [This questionnaire](#) will be used to inform the development of a Foundations and Moorings tool. Finally, [this survey](#) is focused on the innovation activity of firms in the offshore renewable energy sector and the potential supply chain for the sector.

The International Electrotechnical Commission System for Certification of Equipment for Use in Renewable Energy Applications (IECRE) has launched a [survey](#) to better understand the growing needs for certification in the marine energy sector. The survey closes 30 March 2021.

## Calls for Papers

*Energies* is accepting manuscript submissions for several upcoming Special Issues, including "[Marine Renewable Energy Technology](#)" (due 11 May 2021), "[Wave Energy Converters \(WECs\)](#)" (due 30 June 2021), "[Reliability of Marine Energy Converters](#)" (due 31 August 2021), and "[Nearshore Wind and Wave Energy Potential](#)" (due 1 November 2021).

*Frontiers in Marine Science* is inviting contributions to a Research Topic entitled, "[Novel Technologies for Assessing the Environmental and Ecological Impacts of Marine Renewable Energy Systems](#)". Abstracts are due 26 May 2021 and manuscripts are due 26 November 2021.

## Funding/Testing Opportunities

The Supergen Offshore Renewable Energy Hub is inviting applications for the [Early Career Researcher \(ECR\) Research Fund](#). The fund is designed to be a flexible research fund for ECRs to support small activities that either supports and develops your existing research activities, or develops your skills further. Applications are due by 12:00pm UTC on 26 March 2021.

Sustainable Energy Authority of Ireland (SEAI) has launched a €10 million funding call to support innovative energy research, development, and demonstration (RD&D) projects, including ocean energy, offshore wind, and green hydrogen-related developments. Applications for the [SEAI RD&D Funding Programme Call](#) are due by 3:00pm BST (2:00pm UTC) on 29 March 2021.

The U.S. Department of Energy (DOE) recently announced \$115 million for small businesses pursuing clean energy research and development projects through its Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. This [funding opportunity](#) is open to small businesses that have previously received SBIR or STTR grants to compete for additional funding. Letters of Intent are due by 5:00pm EDT (9:00pm UTC) on 31 March 2021.

The Interreg Atlantic Area's Blue-GIFT has announced the [Third Call for Applications](#) to test MRE technologies at the project's test sites. This access will allow developers to perform low cost tests and validation of their floating offshore wind, wave, tidal, or floating solar energy technologies in real sea environments. Applications close at 5:00pm UTC on 2 April 2021.

The U.S. DOE has allocated \$100 million in funding through the Advanced Research Projects Agency-Energy's (ARPA-E) 2021 [OPEN Funding Opportunity](#) to support the development of potentially disruptive new technologies across the full spectrum of energy applications. Concept papers are due by 9:30am EDT (1:30pm UTC) on 6 April 2021.

INORE (the International Network on Offshore Renewable Energy) recently announced the 2021 [Call for BECS \(Blue Energy Collaborative Scholarships\) proposals](#) sponsored by OES (Ocean Energy Systems). The BECS grant, up to €1000, will enable collaboration between INOREans and can be put towards travel expenses and accommodation, or to fund remote work. The call closes on 9 April 2021.

### Employment Opportunity

The Environmental Research Institute (ERI) at the University of the Highlands and Islands (UHI) is recruiting for a [Research Fellow in Marine Renewable Energy and the Environment](#) to join the multi-disciplinary team working across engineering, marine sensing, hydrodynamics and robotics to study environmental and bio-physical interactions. Applications are due 5 April 2021.

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## Upcoming Events

### Upcoming Webinars

The U.S. DOE Water Power Technologies Office (WPTO) is hosting a [R&D Deep Dive Webinar Series](#) to share updates on tools, analysis, and emerging technologies to advance marine energy as well as next generation hydropower and pumped storage systems.

- Register [here](#) for “Crevice Corrosion in Seawater Using CFRP/Hybrid Composite as Part of a Novel Crevice Former” on 19 March 2021 at 1:00pm EDT (5:00pm UTC).
- Register [here](#) for “Summary of Marine and Hydrokinetic (MHK) Composites Testing at Montana State University” on 26 March 2021 at 1:00pm EDT (5:00pm UTC).
- Register [here](#) for “Introduction to Working with the U.S. Department of Energy: A Deep Dive into Hydropower and Marine Energy Opportunities for Students, Researchers, and Faculty” on 6 April at 1:00pm EDT (5:00pm UTC).
- Register [here](#) for “Leveraging the Advantages of Additive Manufacturing to Produce Advanced Composite Structures for Marine Energy Systems” on 9 April at 1:00pm EDT (5:00pm UTC).

ETIP Ocean (the European Technology & Innovation Platform for Ocean Energy) is hosting a webinar entitled, “[Decommissioning bonds - learnings on best practices](#)”, at 2:00pm UTC on 23 March 2021. During the webinar, speakers from the European Marine Energy Centre and Fundy

Ocean Research Centre for Energy will share their experiences with bonds, decommissioning, and finding the right balance between risk and reward. Register [here](#).

### Upcoming Conference

Energía Marina and its Marine Energy Research & Innovation Center (MERIC) are organizing an online international conference, [Chile Riding the Blue Energy Wave](#), on 12-13 April 2021. Register for free [here](#).

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## **New Documents on *Tethys Engineering***

### **OES Annual Report 2020 – Ocean Energy Systems (OES) 2021**

Ocean Energy Systems (OES) is the short name for the Technology Collaboration Programme on Ocean Energy Systems under the International Energy Agency (IEA). As of December 2020, 22 Member Countries and the European Commission are members of the IEA-OES, providing a broad international base of information, sharing experience and knowledge and further a diversified representation of interests: members are from governmental departments, utilities, universities and research organizations, energy agencies and industry associations. This Annual Report presents an overview of progress made by the IEA-OES in 2020, including summaries of ongoing projects and updated country reviews prepared by the Delegates.

### **Modelling a Heaving Point-Absorber with a Closed-Loop Control System Using the DualSPHysics Code – Ropero-Giralda et al. 2021**

The present work addresses the need for an efficient, versatile, accurate and open-source numerical tool to be used during the design stage of wave energy converters (WECs). The device considered here is the heaving point-absorber developed and tested by Sandia National Laboratories. The smoothed particle hydrodynamics (SPH) method, as implemented in DualSPHysics, is proposed since its meshless approach presents some important advantages when simulating floating devices. The dynamics of the power take-off system are also modelled by coupling DualSPHysics with the multi-physics library Project Chrono.

### **Strain gauge measurements on a full scale tidal turbine blade – Lake et al. 2021**

Testing of a floating tidal energy device over winter 2017/18 led to an opportunity to record and examine strain of a full scale composite turbine blade under operational conditions, with comparison of generating and parked behaviours. Comparison of the recorded data shows that blade strain correlates well with both torque and thrust over the averaging periods specified in IEC62600-200, although examination of frequency spectra generated from the strain data show that higher frequency fluctuations in strain are not necessarily detectable in the larger scale thrust and torque recordings with this particular measurement arrangement.

**[A study on the feasibility of using solar radiation energy and ocean thermal energy conversion to supply electricity for offshore oil and gas fields in the Caspian Sea – Zereshkian & Mansoury 2021](#)**

To investigate the ocean thermal energy conversion (OTEC), vertical changes of water temperature were studied using UNESCO data as seasonal thermocline for the Caspian Sea. Moreover, to investigate the possibility of the use of OTEC in the offshore regions, the surface water temperature data obtained from ECMWF from 2005 to 2014 were used, the number of days that the OTEC could be used in the field was calculated. The findings show that the use of the OTEC is only possible in the southern basin during July–September. The fields of Sardar Jangal, Shahdeniz, Ganeshli and Azari are the only oil and gas fields that can use this energy 54, 34, 31 and 31 days a year, respectively.

**[Performance and Wake Characterization of a Model Hydrokinetic Turbine: The Reference Model 1 \(RM1\) Dual Rotor Tidal Energy Converter – Hill et al. 2020](#)**

The mechanical power and wake flow field of a 1:40 scale model of the US Department of Energy’s Reference Model 1 (RM1) dual rotor tidal energy converter are characterized in an open-channel flume to evaluate power performance and wake flow recovery. The NACA-63(4)-24 hydrofoil profile in the original RM1 design is replaced with a NACA-4415 profile to minimize the Reynolds dependency of lift and drag characteristics at the test chord Reynolds number. Precise blade angular position and torque measurements were synchronized with three acoustic Doppler velocimeters (ADV) aligned with each rotor centerline and the midpoint between the rotor axes.

**[Wave Energy Converter Deployments at the Navy's Wave Energy Test Site: 2015-2019 – Cross and Rajagopalan 2020](#)**

A synopsis of wave energy converter (WEC) deployments at the U.S. Navy's Wave Energy Test Site (WETS), from the mid-2015 commissioning of the full three-berth site through 2019, is provided. This includes two deployments each of the Northwest Energy Innovations (NWEI) Azura device and the Fred. Olsen Ltd. BOLT Lifesaver, each with important modifications between deployments. A brief background of the site is included, as is a synopsis of two major efforts not directly related to WEC deployments—the development of a site-dedicated support vessel and work to redesign and make repairs to the WETS deep berth mooring systems.

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## **News & Press Releases**

**[Federal Energy Regulatory Commission issues OSU license for wave energy testing facility – Oregon State University \(OSU\)](#)**

The Federal Energy Regulatory Commission (FERC) has issued Oregon State University a license to build and operate the nation’s first pre-permitted wave energy testing facility,

culminating an unprecedented regulatory process that spanned nearly 10 years. PacWave South is the first commercial-scale, utility grid-connected test site in the United States to obtain a FERC license and will be the first marine renewable energy research facility in federal waters off the Pacific Coast. The test site, located about seven miles offshore southwest of Newport, Oregon, will offer wave energy developers the opportunity to try different technologies for harnessing the power of ocean waves and transmitting that energy to the local electrical grid.

### **[Green light for Thames tidal energy trial](#) – Port of London Authority**

A site for trialling energy-generating technology, powered by the tidal Thames, has been established by the Port of London Authority (PLA). The mooring at Gallion's Reach between Woolwich and Thamesmead, south east London, will enable promoters to test approaches for safe, sustainable energy generation in tidal inland waterways. Technology providers are being invited to arrange a slot to use the mooring each year, having secured all relevant consents. Tanya Ferry, PLA head of environment, said: "Safety is paramount. This site provides the best balance for safe trials, supported by a consenting regime to ensure negative impacts on wildlife and ecology are avoided too."

### **[Maine Developer to Move Forward with In-Water Testing of Current Energy Converter](#) – U.S. DOE WPTO**

The U.S. Department of Energy's Water Power Technologies Office (WPTO) recently announced the Ocean Renewable Power Company (ORPC) of Portland, Maine, will receive \$3,615,260 to build, test, and operate a modular current energy converter (CEC). Through the modular approach, each turbine-generator unit is installed as a standalone unit with the option for attaching adjacent modules to form horizontal or vertical arrays. This approach will allow future systems to be designed to specific river geometries and other river constraints. The ultimate project goal is to expand the number and geographic diversity of locations where CECs are commercially viable, while simultaneously advancing the state of CEC technologies.

### **[TEAMER Network Director announces RFTS 2 Awards](#) – TEAMER**

The U.S. Testing Expertise and Access to Marine Energy Research (TEAMER) program has selected 23 projects through its second Request for Technical Support (RFTS) for testing expertise and access to numerical modeling, lab testing, and tank/flume testing within an expanded facility network. Applicants will now work with the facilities to submit their completed Test Plans prior to commencement of their assistance activities. Supported by the DOE and directed by the Pacific Ocean Energy Trust (POET), TEAMER accelerates the viability of marine renewables by providing access to the nation's best facilities and expertise to solve critical challenges, build knowledge, foster innovation, and drive commercialization.

## **IMPACT Wave Energy Research Project Awarded €3.3m – CORDIS**

IMPACT (Innovative Methods for Wave Energy Pathways Acceleration through Novel Criteria and Test Rigs) is a new collaborative research and innovation project that will develop and demonstrate a next generation testing approach for Wave Energy Converters (WECs). Funded by the European Union's Horizon 2020 research and innovation programme, the three-year €3.3m IMPACT project aims to accelerate testing device development and reduce the technology cost as part of a global advancement in wave energy converter technologies. The main objective of IMPACT is to design and manufacture two novel test rigs covering up to 75% of WEC subsystems that affect the WEC's levelized cost of energy (LCOE).

## **In Breakthrough Clean Energy Deal, OceanBased Perpetual Energy to Produce Hydrogen For Summit Worx – OceanBased Perpetual Energy**

OceanBased Perpetual Energy, a pioneering South Florida-based ocean energy company, has inked a four-year contract to produce commercial-grade green hydrogen for Summit Worx, a South Carolina high-tech engineering firm. In a significant advancement for America's clean energy transition, the hydrogen will be produced using electrolysis powered solely by electricity generated from the perpetual flow of Florida's Gulf Stream. Summit Worx will assist OceanBased in building and integrating a fresh water electrolyzer that will include a self-contained desalination unit aboard a sea-based hydrogen production facility.