

TETHYS ENGINEERING BLAST



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[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. 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.

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Announcements

New Feature on *Tethys Engineering*

A new feature in the [Tethys Engineering Knowledge Base](#) allows users to filter content to publications with PDF attachments available (i.e., no paywalls or copyright restrictions). To utilize this feature, check the “Uploaded to *Tethys Engineering*” box under the “Attachment” filter in the Knowledge Base.

Ocean Observing Prize

The [Powering the Blue Economy: Ocean Observing Prize](#), a joint prize between the Water Power Technologies Office at the U.S. Department of Energy and the Integrated Ocean Observing System program at the National Oceanographic and Atmospheric Administration, is now open. Submissions for the first of a series of competitions, which seeks novel concepts that integrate ocean observing technologies with marine energy systems to address end-user needs, are due 12 February 2020.

Funding Opportunities

The €13 million [OceanDEMO project](#) has announced the [2nd call for applications](#). The project aims to accelerate ocean energy’s transition from single prototype to multi-device farms by providing access to world-leading test centers. Applications close 31 January 2020.

The Marine Energy Alliance (MEA) has opened their [2nd Call for Applications](#). The aim of MEA is to progress the technical and commercial maturity level of early-stage (TRL 3/4) marine energy technology companies with the overall goal of reducing the risk of device failure in subsequent demonstration phases. Applications are due 14 February 2020.

The U.S. Department of Energy (DOE) has released a [Funding Opportunity Announcement](#) for the DOE Small Business Innovation Research and Small Business Technology Transfer programs. Applications are due 24 February 2020.

The European Maritime and Fisheries Fund has launched the [Blue Economy Window call](#) to support the sustainable development of small and mid-size enterprises across the European Union. The deadline of the call is 27 February 2020.

Upcoming Events

Upcoming Webinars

The European Technology and Innovation Platform for Ocean Energy (ETIP Ocean) & DTOceanPlus will be hosting a [webinar](#) on 22 January 2020 from 3:00-4:00 p.m. UTC which will highlight DTOceanPlus' development of a novel framework for the standard representation of data formats for ocean energy systems. Register [here](#).

The Ocean Energy Research Association (OERA) will be hosting a [webinar](#) entitled, "Turbulence in High-Flow Tidal Channels" from 1:00-2:00 p.m. AST on 23 January 2020. Register [here](#).

Upcoming Workshops

The Centre for Ocean Energy Research at Maynooth University Ireland will be hosting its [6th Wave Energy Workshop](#) on 24 January 2020. The scope of the event will cover a range of topics across wave energy conversion, with a broad focus on modelling, control and estimation/forecasting. Register [here](#).

Oregon State University, the Pacific Marine Energy Center (PMEC), and Sandia National Laboratories will be hosting a [workshop](#) in Corvallis, Oregon from 3-4 February 2020. The workshop will overview the wave energy converter design theory and experimental testing approach, with specific attention focused on dynamics, control, signal processing, experimental design and analysis, and full-scale design.

Upcoming Conference

The inaugural [Pan American Marine Energy Conference \(PAMEC\)](#) will be held in San Jose, Costa Rica from 26-28 January 2020.

New Documents on *Tethys Engineering*

[Integrated characteristic curves of the constant-pressure hydraulic power take-off in wave energy conversion](#) – Chen et al. 2020

Power take-off is an indispensable link in wave energy utilization, and its efficiency should be comprehensively investigated at both full load and part load for the effective conversion in variable wave conditions. However, up to now, the research about this issue is still scarce because of its complexity and difficulty. To overcome this obstacle, this paper studies the overall conversion efficiency of the constant-pressure hydraulic power take-off of a floating-pendulum wave energy converter, at a range of the system pressure, system flow-rate and shaft speed, via the efficiency test and fitting formulas.

[Operating conditions leading to crack propagation in turbine blades of tidal barrages](#) – Luo et al. 2020

Tidal energy systems and specifically tidal barrages are renewable energy systems that use the potential energy of tides to produce electricity. Based on the analysis of a crack found in one of the blades of a prototype, this paper analyzes and discusses under which operating conditions the runner is more likely to suffer from fatigue problems. CFD and FEM simulation models have been used to determine the stress hotspots, which approximate very well the point where the real crack was initiated.

[Role of anion exchange membrane fouling in reverse electro dialysis using natural feed waters](#) – Rijnaarts et al. 2019

Reverse electro dialysis (RED) is a process to harvest renewable energy from salinity gradients. However, in large scale industrial applications, natural waters are used that pose challenges such as fouling. Fouling of anion exchange membranes (AEMs) by organic matter has been identified as a possible cause that lowers RED performance with natural waters. In this work, natural river and seawater at the Afsluitdijk (The Netherlands) are used to study the RED performance of six different AEMs.

[A techno-economic approach to wave energy resource assessment and development site identification](#) – Xu et al. 2020

A careful and detailed wave resource assessment is essential for identification of a successful wave energy project. However, current approaches inherently limit application to specific locations and wave energy converter architectures, rather than providing for broad application across the industry. The current work introduces a novel ‘top-down’ approach. The new approach incorporates novel device-agnostic performance constraints and economic considerations to identify priority development sites over broad coastal regions.

[Developing a coupled turbine thrust methodology for floating tidal stream concepts: Verification under prescribed motion](#) – Brown et al. 2019

Floating systems offer an opportunity to expand tidal energy resource through an increase in viable sites and greater flow speeds near the free surface. However, the close proximity of the free surface provides uncertainty regarding power delivery and survivability due to the presence of waves, which could be addressed through a numerical model that is capable of considering all components of a floating tidal system simultaneously. This paper presents the first step in the development of such a tool.

[Feasibility of seawater heat extraction from sub-Arctic coastal water; a case study of Onundarfjordur, northwest Iceland](#) – Eskafi et al. 2019

We studied the feasibility of seawater heat extraction in Onundarfjordur (Icelandic: Önundarfjörður), a fjord located in the north-western part of Iceland, with sub-Arctic Ocean temperatures. Measurements as well as simulations show that the seawater temperature in the fjord is generally higher than 1 °C with an upper limit of 10 °C. Our findings indicate, based on oceanographic conditions of the area of study, that heat extraction from Onundarfjordur is theoretically feasible.

News & Press Releases

[Global coalition focusing on ocean energy established, and it has some big backers](#) – CNBC

A global coalition focusing on ocean energy was announced Monday, with its members saying they want to advance the “sustainable deployment of ocean-based renewable energy” and, in addition, mitigate the impacts of climate change. Led by Denmark’s Orsted and Norway’s Equinor, members of the Ocean Renewable Energy Action Coalition also include organizations such as Shell, MHI Vestas and Siemens Gamesa. The coalition is set to have a strong focus on offshore wind but will also look at technologies including wave and tidal power.

[QED Naval and HydroWing acquiring Tocardo Tidal Power](#) – Tocardo

QED Naval and HydroWing are delighted to announce a new collaborative European joint venture and with it the acquisition of Holland’s premier tidal turbines business, Tocardo. This new and innovative joint venture provides a truly end to end service with a spectrum of turbines, foundation systems, marine operations, as well as design, support and service expertise. The companies have already been working in partnership on tidal projects in Europe and will be expanding on this as they further develop their complimentary technologies.

[DeltaSea Marine Debris Collection System Comes to Life](#) – World Maritime News

A full-scale prototype of DeltaSea, a new marine debris collection system, has been successfully tested at a shipyard in Vancouver, Canada. As informed, the testing, conducted in early December 2019, has validated all of the key operating parameters of

the technology and verified the engineering models that will be utilized for the supply of future operating units. The technology is being developed by Technika Engineering Ltd., a company based in Calgary, Canada, for the purpose of collecting plastics and other marine debris from water surfaces.

Two-Thirds of Contracts Awarded for 1.5MW Wave Energy Device Project – Bombora

Bombora has now contracted more than 70% of its ground breaking £17 million Pembrokeshire Demonstration Project. The project is currently on schedule for deployment in mid-2020. The project is part of Bombora's accelerated commercialisation plan to validate mWave's performance capabilities with a bigger scheme in Lanzarote, Spain already on the horizon. It will be the first time a full-scale 1.5 MW wave energy device has been deployed in the ocean.

WES Firms Up Seven Quick Connection Project Winners – Marine Energy

Wave Energy Scotland (WES) has recently named all the winners in a Europe-wide call to find new technologies to quickly and easily connect wave energy devices at sea. The seven winning projects for WES Quick Connections System programme have a total value of around £460,000. According to the tender documents, out of 21 candidates, WES has selected Apollo Offshore Engineering, Subsea Riser Products, Blackfish Engineering Design, Ditrel Industrial, Nova Innovation, Quocean and TTI Marine Renewables.