



**30 April 2021**

[Tethys](#) is an online knowledge base that facilitates the exchange and dissemination of information on the environmental effects of wind and marine energy. The bi-weekly *Tethys Blast* highlights new publications in the [Tethys Knowledge Base](#); relevant announcements, opportunities, and upcoming events; and news articles of international interest. [ORJIP Ocean Energy](#) has partnered with OES-Environmental to provide additional content. If you have specific content you would like circulated to the greater wind and marine energy communities, please send it to [tethys@pnnl.gov](mailto:tethys@pnnl.gov) for consideration.

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

[Marine Energy Documents](#)  
[Wind Energy Documents](#)

[Marine Energy News](#)  
[Wind Energy News](#)

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## **Announcements**

### [Tethys Peer Review Survey](#)

Please help us guide further development of *Tethys* and ensure it remains a valuable resource by completing this year's brief [Tethys Peer Review Survey](#) by 14 May 2021!

### [WREN Horizon Scan](#)

The WREN Environmental [Horizon Scan](#) is live! To participate in the scan and help us assess wind energy and environmental priority issues over the next 5-10 years, please take the survey [here](#). The scan covers both land-based and offshore wind energy and should take approximately 20-30 minutes to complete. Please complete the scan by 6 May 2021.

### [Marine Energy Collegiate Competition](#)

The application period for the U.S. Department of Energy's (DOE's) [2022 Marine Energy Collegiate Competition \(MECC\): Powering the Blue Economy](#) is now open. The MECC encourages multidisciplinary teams of undergraduate and graduate students to unlock the power

of the ocean, rivers, and tides to develop, design, and test the technologies that build resilient coastal communities and provide power at sea. Applications will close 7 May 2021.

### Calls for Abstracts

The Partnership for Research In Marine Renewable Energy (PRIMaRE) is now accepting abstracts for the [8<sup>th</sup> PRIMaRE Conference](#). Submissions are due by 30 April 2021. The 8<sup>th</sup> PRIMaRE Conference will take place online on 29-30 June 2021.

The Coastal & Estuarine Research Federation (CERF) 2021 Scientific Program Committee is accepting abstracts for [CERF 2021](#) through 5 May 2021. The 26<sup>th</sup> biennial conference will take place online on 1-4 and 8-11 November 2021.

The deadline to submit abstracts for [Global OCEANS 2021: San Diego – Porto](#) has been extended to 9 May 2021. Global OCEANS 2021 will be a hybrid conference, taking place online and in San Diego, CA (US) on 20-23 September 2021.

The North American Wind Energy Academy (NAWEA) and Center for the Research in Wind (CReW) are now accepting abstracts for the NAWEA Symposium and International Conference on Future Technologies in Wind Energy (WindTech) through 14 May 2021. [NAWEA/WindTech 2021](#) will take place in Newark, Delaware on 22-24 September 2021.

American Clean Power is inviting abstract submissions for several of its upcoming events:

- Abstracts for the [Siting & Environmental Compliance Virtual Summit](#), which will place on 20-22 July 2021, are due by 7 May 2021.
- Abstracts for the [Resource & Project Energy Assessment Virtual Summit](#), which will take place 27-30 September 2021, are due 14 May 2021.
- Abstracts for the [Offshore WINDPOWER Conference & Exhibition](#), which will take place 13-15 October 2021 in Boston, MA, are due 1 June 2021.

### Funding & Testing Opportunities

The U.S. [Testing Expertise and Access for Marine Energy Research \(TEAMER\) program](#), sponsored by the U.S. DOE and directed by the Pacific Ocean Energy Trust, is now accepting applications for its third Request for Technical Support (RFTS) through 9 May 2021. Beginning with RFTS 3, TEAMER will allow for longer access periods of up to nine months to complete an RFTS. The access period for RFTS 3 will be from roughly September 2021 through June 2022.

The International Network on Offshore Renewable Energy (INORE) has extended the submission deadline for the [2021 Call for Blue Energy Collaborative Scholarship](#), sponsored by Ocean Energy Systems (OES). Submissions are now due by 14 May 2021.

The U.S. Northeast Sea Grant Consortium, in partnership with the National Oceanic and Atmospheric Administration's Northeast Fisheries Science Center and the U.S. DOE's Wind Energy Technologies Office and Water Power Technologies Office, is [seeking proposals](#) to improve understanding of the effects of ocean renewable energy development on coastal

communities, including the fishing industry. Pre-proposals from eligible Northeast researchers are due 14 May 2021 and full proposals are due 16 July 2021 by 5:00pm EDT (9:00pm UTC).

### Student & Employment Opportunities

The Norwegian University of Science and Technology has announced [11 PhD positions](#) available with the Norwegian Research Centre on Wind Energy (FME NorthWind), including a PhD focused on just and inclusive wind power development on and offshore. Applications due 30 April 2021.

Aquatera is recruiting an experienced [Environmental/Energy Data Analyst and Manager](#) to work on its Economic Value of Ocean Energy (EVOLVE) project, which is exploring the contribution that marine based renewables can make to Europe's future energy systems. Applications are due 10 May 2021.

Swansea University's College of Engineering is seeking a [Research Assistant](#) to contribute to the SELKIE project. Specifically, the position will involve research in drone video remote sensing of tidal currents and a novel converging beam ADCP sensor for currents and turbulence. Applications are due 15 May 2021.

The Pacific Marine Energy Center (PMEC) at Oregon State University is recruiting a [Post-Doctoral Scholar](#) to support its marine energy research, development, and testing programs. Specifically, the position will support projects on sub-surface wave energy resources, upscaling wave energy converter (WEC) performance characteristics, and numerical and physical modelling of scaled WECs. Applications are due 1 June 2021.

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## **Upcoming Events**

### Upcoming Workshops

The U.S. DOE's National Renewable Energy Laboratory and the Hydropower Foundation are hosting a [STEM to Marine Energy Dialogue Workshop on Educational Resources](#) at 3:00pm MST (9:00pm UTC) on 18 May 2021. Register for free [here](#).

The Marine Alliance for Science and Technology for Scotland (MASTS), Environmental Interactions of Marine Renewables (EIMR) conference series, and Marine Scotland are hosting an online workshop entitled, "[Passport to the oceans of the future: delivering marine energy through science & policy](#)", from 2:30-5:30pm BST (1:30-4:30pm UTC) on 27 May 2021. Register for free [here](#) by 5:00pm BST (4:00pm UTC) on 26 May 2021.

### Upcoming Webinars

As part of the MarineData4Asia international event, Copernicus Marine Service is hosting a webinar, "Dive into the Copernicus Marine Service", on 4 May 2021 at 7:00am UTC, and a two-

day workshop, "Let's go further with the Copernicus Marine Data", on 11-12 May 2021. Learn more and register [here](#).

The Discovery of Sound in the Sea (DOSITS) Team facilitates a webinar series on topics related to underwater sound for the international decision-making community and other interested communities. The DOSITS Team is hosting a webinar, "Acoustic Tag Technologies and Applications", at 12:00pm EDT (4:00pm UTC) on 7 May 2021. Register [here](#).

The Portal and Repository for Information on Marine Renewable Energy ([PRIMRE](#)) is hosting a webinar, "Marine Energy Data Pipeline", at 11:00am PDT (6:00pm UTC) on 11 May 2021. During the webinar, the Marine Energy Data Pipeline team, led by the Pacific Northwest National Laboratory, will introduce the development of an open source time series data utility that can be used to convert raw data to a standardized format. Register [here](#).

The American Wind Wildlife Institute (AWWI) is hosting the first webinar in its new series on renewable energy and wildlife topics, "[Performance of GenEst Statistical Mortality Estimator](#)", at 1:00pm EDT (5:00pm UTC) on 26 May 2021. During the webinar, AWWI Technical Report authors will present on a study that compared the performance of the GenEst statistical mortality estimator to the two estimators most often used in North America, the Huso and Shoenfeld estimators. Register [here](#) and view the Technical Report [here](#).

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

### **Marine Energy**

#### **[A bird's-eye view on turbulence: seabird foraging associations with evolving surface flow features](#) – Lieber et al. 2021**

Understanding physical mechanisms underlying seabird foraging is fundamental to predict responses to coastal change. For instance, turbulence in the water arising from natural or anthropogenic structures can affect foraging opportunities in tidal seas. Yet, identifying ecologically important localized turbulence features (e.g. upwellings approximately 10–100 m) is limited by observational scale, and this knowledge gap is magnified in volatile predators. Here, using a drone-based approach, we present the tracking of surface-foraging terns (143 trajectories belonging to three tern species) and dynamic turbulent surface flow features in synchrony. We thereby provide the earliest evidence that localized turbulence features can present physical foraging cues.

#### **[Evaluating the eutrophication risk of an artificial tidal lagoon](#) – Kadiri et al. 2021**

It is understood that tidal energy schemes such as the tidal lagoon previously proposed in Swansea Bay would alter tidal flow characteristics, potentially having knock-on impacts on physical estuarine characteristics and ecological processes in the impounded area. This study examined the existing physical estuarine characteristics in Swansea Bay and evaluated the risk of eutrophication following tidal power plant operation under ebb-only

and two-way strategies using a simple risk assessment model. Two surveys were conducted to measure in-situ temperature, salinity, dissolved oxygen, chlorophyll-a, dissolved inorganic nitrogen and turbidity in the water column at 12 sampling stations selected to cover the location in the tidal energy scheme proposal.

**[Enabling conditions for an equitable and sustainable blue economy](#) – Cisneros-Montemayor et al. 2021**

The future of the global ocean economy is currently envisioned as advancing towards a ‘blue economy’—socially equitable, environmentally sustainable and economically viable ocean industries. However, tensions exist within sustainable development approaches, arising from differing perspectives framed around natural capital or social equity. Here we show that there are stark differences in outlook on the capacity for establishing a blue economy, and on its potential outcomes, when social conditions and governance capacity—not just resource availability—are considered, and we highlight limits to establishing multiple overlapping industries.

**Wind Energy**

**[Acoustic and Genetic Approaches for Informing Population Status and Trends of Migratory Tree Bats](#) – Hein et al. 2021**

Understanding bat populations is challenging, yet essential to ensure population viability. This paper reviews the existing information related to bat populations, uncertainty regarding current population estimates, practicable approaches for collecting acoustic and genetic data, and recommendations for near-term and long-term studies. Although the focus is related to wind energy, the methods are broadly applicable and being implemented by other industries, academia, government agencies, and nongovernmental organizations. Through systematic data collection from multiple methodologies, a weight of evidence may be built regarding the status and trends of bat populations, and whether mitigation is necessary to mitigate risk.

**[Potential environmental effects of deepwater floating offshore wind energy facilities](#) – Farr et al. 2021**

Since there are few prototype turbines and mooring systems of deepwater, floating offshore wind energy facilities (OWFs) currently deployed, their effects on the marine environment are speculative. Using the available scientific literature concerning appropriate analogs, including fixed-bottom OWFs, land-based wind energy facilities, wave and tidal energy devices, and oil and gas platforms, we conducted a qualitative systematic review to estimate the potential environmental effects of deepwater, floating OWFs during operation, as well as potential mitigation measures to address some of the effects. We evaluated six categories of potential effects.

**[Recommendations for the quantitative assessment of metal inputs in the marine environment from the galvanic anodes of offshore renewable energy structures](#) – Michelet et al. 2020**

The development of offshore renewable energies (ORE), in particular floating and fixed offshore wind structures in France, gives rise to new and more precise questioning from the French public authorities and civil society. In particular, a lot of questions have emerged in relation to the use of Galvanic Anode Cathodic Protection (GACP) systems and about the release of heavy metals associated with their functioning. In this context, a chemical risk assessment process has been conducted through a 1-year collaborative R&D project called ANODE in order to determine whether the chemicals released from GACP may represent a risk for the marine environment.

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## **News & Press Releases**

### **Marine Energy**

**[Orbital O2 Tidal Turbine Arrives in Orkney](#) – European Marine Energy Centre (EMEC)**

Orbital Marine Power's, O2, the world's most powerful tidal turbine, arrived in Orkney Waters on Saturday, 24 April, following launch from the Port of Dundee on Thursday 22 April. The turbine will be temporarily moored at Deer Sound while final commissioning is completed along with a programme of tow trials before installation at the EMEC Fall of Warness tidal test site for a long-term project. Following connection to the national grid, EMEC will undertake an independent power performance assessment for Orbital. The O2 is Orbital Marine Power's first commercial demonstrator and represents the culmination of more than 15 years of product development and testing in Orkney. It is envisaged that the O2 will become the basis for first commercial sales of the technology.

**[Verdant Power's Tidal Power Project Celebrates Earth Day Milestones](#) – U.S. DOE**

This Earth Day, Verdant Power is celebrating a major milestone—exactly six months since its Roosevelt Island Tidal Energy (RITE) Project, featuring its TriFrame™ mount housing three tidal power turbines, successfully deployed in New York City's East River – a tidal strait. In that time, the one-half scale demonstration array has continuously operated and generated 200MW—a U.S. record for marine energy production. Most importantly, the turbines performed at over 99% availability, and overall water-to-wire efficiencies reached to over 46%. Partially funded by the U.S. DOE's Water Power Technologies Office, the Verdant Power project was recently recognized as the first tidal energy project to be issued a license from the Federal Energy Regulatory Commission.

**[OPT Deploys PB3 PowerBuoy® for Enel Green Power in Chile](#) – Ocean Power Technologies (OPT)**



OPT deployed a PB3 PowerBuoy® for Enel Green Power (EGP) off the coast of Las Cruces, Chile to support the country's transition to clean energy. In September 2019, EGP purchased a PB3 PowerBuoy® and associated equipment from OPT to support Chile's Marine Energy Research and Innovation Center (MERIC) Project, a hub for innovation in marine energy in Chile and internationally. The autonomous offshore platform will eventually power a suite of oceanographic sensors and transmit real-time environmental data to a dedicated shore station studying the potential effect of marine energy under real-world sea conditions with minimal carbon footprint.

### **Magallanes Reinstall ATIR Tidal Turbine at EMEC – EMEC**

EMEC has welcomed Spanish tidal energy developer Magallanes Renovables back to its tidal test site at the Fall of Warness in Orkney, Scotland. The successful reinstallation of Magallanes' second generation 2 MW tidal platform 'ATIR' took place on 19 April 2021. The Magallanes team worked in collaboration with Orkney-based marine service provider Leask Marine, along with the Orkney Harbour Authority tug Thor, to install the platform in an operation lasting eight hours. In the coming weeks, the ATIR will be connected to the national electricity grid. Magallanes Renovables has been developing its tidal technology for over 12 years and tested a scale version of the ATIR at EMEC's Shapinsay Sound test site in 2014.

### **Lundin Energy Norway is collaborating with Ocean Harvesting Technologies – Ocean Harvesting Technologies**

Lundin Energy Norway is collaborating with Ocean Harvesting Technologies through a study on how installation of wave energy converters could provide clean, stable and cost-effective electricity to an offshore oil and gas platform. The one-year project will run until February 2022 and will provide valuable data and information on how to electrify major offshore operations with wave power, as well as setting both Ocean Harvesting Technologies and Lundin Energy Norway at the forefront of decarbonisation of oil and gas production in support of the shift to a lower carbon and sustainable energy future.

## **Wind Energy**

### **BOEM Announces Environmental Review of Proposed Wind Energy Facility Offshore Rhode Island and Massachusetts – Bureau of Ocean Energy Management (BOEM)**

BOEM announced a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for the Construction and Operations Plan submitted by Revolution Wind, LLC. If approved by BOEM, Revolution Wind would be allowed to construct and operate an 880-megawatt wind energy facility offshore Rhode Island and Massachusetts. The publication of the NOI opens a 30-day public comment period, which extends through 11:59 p.m. Eastern time on June 1, 2021. During this time, BOEM will hold three virtual public scoping meetings and accept comments to inform the preparation of the EIS. Registration for the virtual public meetings may be completed [here](#).

### **Next step for Hywind Tampen – Equinor**

The Hywind Tampen project is now moving from Stord to the deep-water site at Dommersnes where the concrete slipforming of the spar-substructures will be completed. This is the first concrete slipforming for an offshore project on the Norwegian continental shelf since the Troll A platform was delivered in 1995. Hywind Tampen is an 88 MW floating wind power project intended to provide electricity for the Snorre and Gullfaks offshore field operations in the Norwegian North Sea. Hywind Tampen will be the world's largest floating offshore wind farm and the world's first to power offshore oil and gas platforms. It is also the first floating wind project from Equinor using concrete technology for wind projects.

### **Novel Computational Framework Seeks Insight into Eagle Flight at Wind Plants: Machine Learning and Atmospheric Modeling Near Wind Plants Can Help Protect Golden Eagles – National Renewable Energy Laboratory (NREL)**

Golden eagles strike a cutting visage that, to put it mildly, grants the species an aura of regality. Not only are these birds highly revered, but highly protected—receiving protections under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. NREL scientists along with fellow researchers at the U.S. Geological Survey, Western EcoSystems Inc., and Conservation Science Global Inc. are developing a state-of-the-art computational framework for modeling golden eagle behavior near wind farms. In all hopes, this tool can help guide wind power plant siting decisions and dynamic curtailment strategies informed by real-time eagle flight path prediction.

### **Ørsted and Enefit form partnership to deliver large-scale offshore wind in the Baltics – Ørsted**

Ørsted, a global leader in offshore wind, and Enefit, a leading utility and the largest wind energy company in the Baltics, recently signed a memorandum of understanding (MoU) which outlines a vision for becoming the leading offshore wind developer in the Baltic countries. The MoU also sets out a vision to jointly move towards delivering the first offshore wind farm in the Gulf of Riga in the Baltic Sea, before 2030. In September 2020, the Latvian and Estonian governments signed a memorandum of understanding for a joint offshore wind farm, and, subject to a supportive regulatory framework for offshore wind being in place, it's Ørsted and Enefit's ambition to deliver this before 2030.

### **Agreement between METCentre of Norway and PLOCAN for the development of the offshore wind industry – PLOCAN**

The Marine Energy Test Centre (METCentre) and the Oceanic Platform of the Canary Islands (PLOCAN) have signed a collaboration agreement for the development of the offshore wind industry after decades of experience from the offshore industry. METCentre and Plocan have agreed to work on offshore wind in deep waters in their respective countries, as well as together when the opportunity arises; to seek areas of strategic benefit for both nations and their offshore wind supply chain through



cooperation and partnership; and to deliver activities for the mutual benefit of the test centres as well as for relevant industrial actors in Spain and Norway.