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[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**

### New Podcast Episode

Pacific Northwest National Laboratory's [Andrea Copping](#) was recently interviewed on [The Energy Transition Show](#) about the status of the marine energy industry internationally and understanding environmental effects. Listen to a free clip or the full podcast episode [here](#).

### UMERC Board of Directors

The Pacific Ocean Energy Trust (POET) recently announced the establishment of the University Marine Energy Research Community (UMERC). UMERC is sponsored by the US Department of Energy's (DOE) Water Power Technologies Office and is [seeking nominations](#) for the inaugural Board of Directors through 30 September 2021. Sign up for UMERC's email list [here](#).

### New Wind Energy & Wildlife Guide from AWWI

The American Wind Wildlife Institute (AWWI) recently launched a [new online interactive guide](#) that summarizes what we know about developing land-based wind energy in the US while protecting wildlife and their habitats.

## BOEM Comment Period Extended

The US Bureau of Ocean Energy Management (BOEM) [recently extended the public comment period](#) on its Notice of Intent to prepare an Environmental Impact Statement for the Sunrise Wind project offshore New York. Comments are now due 4 October 2021.

## Calls for Abstracts

The Call for Abstracts for the [Ocean Sciences Meeting \(OSM 2022\)](#) has been extended to 29 September 2021. Please consider submitting an abstract to Scientific Sessions OT15: Measuring, Modeling, and Mitigating Environmental Effects of Ocean Renewable Energy or OP04: Marine Renewable Energy: Resource Characterization, Bio-physical interactions, and Societal Impacts. OSM 2022 will take place online and in Honolulu, US from 27 February to 4 March 2022.

The Call for Abstracts for the [Floating Wind Solutions Conference & Exhibition \(FWS 2022\)](#) is now open, and will close on 1 November 2021. FWS 2022 will take place in Houston, US on 1-3 March 2022.

The Call for Abstracts for the [6<sup>th</sup> International Conference on Wind Energy and Wildlife Impacts \(CWW 2022\)](#) is now open, and will close on 11 November 2021. CWW 2022 will take place in Egmond aan Zee, Netherlands on 4-8 April 2022. Registration will open in early October 2021.

## Call for Papers

*Animals* is inviting submissions for a Special Issue titled, "[Bat Biology in Relation to Wind Energy Development](#)", which will focus on advancements in the methodologies used to assess bat populations, technologies used to study bat activity and behavior, and physiological characteristics that relate to how bats respond to various stimuli that may serve as either attractors or deterrents to wind turbines. Manuscript submissions are due 30 September 2021.

## Funding & Testing Opportunities

The Oceanic Platform of the Canary Islands (PLOCAN) has opened its [Summer Access Call for 2021](#). Applicants interested in accessing PLOCAN facilities and services are encouraged to contact PLOCAN before submitting their proposal. Applications are due 20 September 2021.

The Sustainable Energy Authority of Ireland and Lir National Ocean Test Facility are offering free-of-charge access to research and testing facilities for offshore renewable energy developers through the [Industry Access Programme](#). Applications are due 24 September 2021.

EuropeWave has launched its Pre-Commercial Procurement (PCP) programme, which aims to accelerate the design, development, and demonstration of cost-effective wave energy converters. The [Request for Tenders](#) for EuropeWave's PCP is open until 1 October 2021.

The Horizon Europe Framework Programme has launched the [European Innovation Council \(EIC\) Accelerator Challenges](#) to support small and medium enterprises developing game-changing innovations, including renewable energy. Applications are due by 6 October 2021.

The California Energy Commission (CEC) recently released a Grant Funding Opportunity titled, “[Propelling Offshore Wind Energy Research](#)”, which will fund R&D projects to demonstrate, test, and validate innovative floating offshore wind components and tools. CEC staff will host a [Pre-Application Workshop](#) on 1 October 2021 from 10:00am-12:00pm PDT (5:00-7:00pm UTC) to discuss the solicitation with potential applicants. Applications are due 15 December 2021.

The Horizon Europe Framework Programme also recently launched two new Calls for Proposals titled, “[Next generation of renewable energy technologies](#)” and “[Innovative foundations, floating substructures and connection systems for floating PV and ocean energy devices](#)”. Proposals for both Calls are due 23 February 2022.

### Student & Employment Opportunity

DP Energy is recruiting for an [Environment Project Manager](#) and an [Environment Coordinator](#) with experience in onshore and/or offshore wind energy to join its team involved in the development of renewable energy projects across Ireland, UK, Canada, and Australia.

The Environmental Research Institute at the University of the Highlands and Islands is recruiting for a [Research Fellow - Offshore Renewable Energy and the Environment](#) to work with Ørsted to design novel environmental and ecological monitoring techniques and next-generation measurement platforms. Applications are due 20 September 2021.

The US DOE is seeking candidates to serve as [Director of the Water Power Technologies Office](#). This position will oversee all office activities, including strategic planning, evaluation of long-term organizational objectives, and advancement of research, development, deployment, and demonstration activities, among other responsibilities. Applications are due 28 September 2021.

France Énergies Marines is recruiting for a [Programme Manager](#) to lead the Site Characterisation R&D Programme, which deals with the estimation of marine energy resources and covers R&D topics in the fields of modelling and observation. Applications are due 30 September 2021.

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## Upcoming Events

### Upcoming Workshops

As part of the Pacific Ocean Energy Trust’s Ocean Renewable Energy Conference ([OREC 2021](#)), the Portal and Repository for Information on Marine Renewable Energy ([PRIMRE](#)) team is hosting a free, online workshop on 24 September 2021 from 8:00-10:00am PDT (3:00-5:00pm UTC). The workshop will provide an overview of PRIMRE, its aggregate search, and ways to contribute, as well as live demonstrations of the newest Knowledge Hubs, the Marine Energy Atlas and MRE Software. Log in information is available [here](#).

OES-Environmental is also hosting a free, online workshop as part of [OREC 2021](#), on 24 September 2021 from 10:30am-12:30pm PDT (5:30-7:30pm UTC). The workshop will examine the scientific evidence from key stressor-receptor interactions to discuss risk retirement and move towards application in a regulatory context. The workshop will include presentations, discussions, and breakout groups, as well as an overview of the OES-Environmental guidance documents and their application in permitting processes. Log in information is available [here](#).

### Upcoming Webinars

The Marine Alliance for Science and Technology for Scotland (MASTS) is hosting a webinar titled, “The Importance of Environmental Science for Marine Renewables”, from 12:00-1:30pm UTC on 20 September 2021. The webinar will showcase the marine renewable energy research being carried out across MASTS. Register [here](#).

The Australian Ocean Energy Group (AOEG) is hosting a webinar titled, “Decarbonising the Blue Economy through accelerated adoption of ocean energy”, from 3:00-5:00pm AEST (5:00-7:00am UTC) on 22 September 2021. The webinar will highlight opportunities, challenges, and innovations currently in development by AOEG members. Register [here](#).

The European Marine Energy Centre is hosting a webinar titled, “Lessons learnt from developing the world’s most powerful tidal stream turbine”, from 10:30-11:45am BST (9:30-10:45am UTC) on 23 September 2021. The webinar will highlight lessons from the Floating Tidal Energy Commercialisation (FloTEC) project, led by Orbital Marine Power. Register [here](#).

The North American Wind Energy Academy is hosting a webinar titled, “Critical Partnerships for a Carbon-free Energy System”, from 10:00-11:00am EDT (2:00-3:00pm UTC) on 23 September 2021. During the webinar, a panel of renewable energy experts will examine research priorities and critical partnerships needed to achieve a carbon-free energy system. Register [here](#).

### Upcoming Conferences

[Seanergy 2021](#) will take place on 21-24 September 2021 in Nantes and Saint-Nazaire, France.

POET is hosting [OREC 2021](#) on 22-24 September 2021 online. View the agenda [here](#).

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

### **Marine Energy**

#### **[Quantifying the effects of tidal turbine array operations on the distribution of marine mammals: Implications for collision risk](#) – Onoufriou et al. 2021**

Owing to their predictability, tidal currents are an attractive source of renewable energy. However, data on the environmental impacts, especially at array scale, are lacking. We

present a spatial analysis of telemetry data, identifying the effects of the presence and operations of the world's first commercial sized tidal turbine array on the movements of an acoustically sensitive marine mammal; the harbour seal (*Phoca vitulina*). No significant change in at sea distribution was detected between pre and post installation of the 4 turbine array. However, seals showed overt avoidance responses during turbine operations, with a significant decrease in predicted abundance (95% CIs: -11%, -49%) within ~2 km of the array.

### **Clearing a Path to Commercialization of Marine Renewable Energy Technologies Through Public-Private Collaboration – Chang et al. 2021**

Governments are increasingly turning toward public-private partnerships to bring industry support to improving public assets or services. Here, we describe a unique public-private collaboration where a government entity has developed mechanisms to support public and private sector advancement and commercialization of monitoring technologies for marine renewable energy. These support mechanisms include access to a range of skilled personnel and test facilities that promote rapid innovation, prove reliability, and inspire creativity in technology development as innovations move from concept to practice. As a case study, we present the development of passive acoustic monitoring technologies customized for operation in energetic waves and currents.

### **The contribution of ocean-based solutions to carbon reduction in China – Feng et al. 2021**

Climate change has become a great challenge for humanity. However, the current climate change mitigation measures, primarily concentrate on land, more or less neglecting the vital role of the ocean-based solutions. While the ocean is a crucial regulator of the global climate, ocean-based solutions could also play an essential role in climate change mitigation and policymaking. This paper developed an Ocean-based Solutions Carbon Reduction Assessment Model (OSCRAM) that addresses coastal ecosystems, ocean energy, marine transportation, fishery, and seabed to estimate the oceanic contribution to climate change mitigation. It has been applied to evaluate the capacity of carbon emission reduction through oceans in China.

## **Wind Energy**

### **Assessing fatality minimization for hoary bats amid continued wind energy development – FriedenberG & Frick 2021**

Observations of bat fatalities at wind farms raise concern about impacts to biodiversity, particularly amid projections of wind energy build-out. We investigated how continued wind energy development in the United States and Canada, as well as adoption of measures to reduce bat fatality rates, influence the population viability of the hoary bat (*L. cinereus*). Our model included uncertainty about population size and dynamics as well as future wind energy development. Results indicate that current levels of wind energy build-out may have already caused substantial population declines. Under our lowest-risk

scenario of high maximum growth rate and low wind energy build-out, the median simulated population of 2.25 million hoary bats experienced a 50% decline by 2028.

### [An echosounder view on the potential effects of impulsive noise pollution on pelagic fish around windfarms in the North Sea – Kok et al. 2021](#)

Anthropogenic noise in the oceans is disturbing marine life. Among other groups, pelagic fish are likely to be affected by sound from human activities, but so far have received relatively little attention. Offshore wind farms have become numerous and will become even more abundant in the next decades. Wind farms can be interesting to pelagic fish due to food abundance or fisheries restrictions. At the same time, construction of wind farms involves high levels of anthropogenic noise, likely disturbing and/or deterring pelagic fish. Here, we investigated whether bottom-moored echosounders are a suitable tool for studying the effects of impulsive – intermittent, high-intensity – anthropogenic noise on pelagic fish around wind farms and we explored the possible nature of their responses. Three different wind farms along the Dutch and Belgian coast were examined.

### [Environmental and seasonal correlates of capercaillie movement traits in a Swedish wind farm – Kämmerle et al. 2021](#)

Animals continuously interact with their environment through behavioral decisions, rendering the appropriate choice of movement speed and directionality an important phenotypic trait. Anthropogenic activities may alter animal behavior, including movement. A detailed understanding of movement decisions is therefore of great relevance for science and conservation alike. The study of movement decisions in relation to environmental and seasonal cues requires continuous observation of movement behavior, recently made possible by high-resolution telemetry. We studied movement traits of 13 capercaillie (*Tetrao urogallus*), a mainly ground-moving forest bird species of conservation interest, over two summer seasons in a Swedish windfarm using high-resolution GPS tracking data (5-min sampling interval).

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## News & Press Releases

### Marine Energy

#### [Orbital to lead pioneering FORWARD-2030 tidal energy project – Orbital Marine Power](#)

The innovative Scottish technology developer, Orbital Marine Power (Orbital) will lead a pan-European consortium to deliver the €26.7m FORWARD-2030 project, set up to accelerate the commercial deployment of floating tidal energy. The FORWARD-2030 project consortium will receive €20.5m of grant support from the European Union's Horizon 2020 research and innovation programme to develop a multi-vector energy system for the future. This system will combine predictable floating tidal energy, wind generation, grid export, battery storage and green hydrogen production. The project will

see the installation of the next iteration of the Orbital turbine, integrated with a hydrogen production facility and battery storage at the European Marine Energy Centre in Orkney.

### **[U.S. Department of Energy Announces Finalists Advancing to Final Stage of “Waves to Water” Desalination Prize – US DOE](#)**

The Office of Energy Efficiency and Renewable Energy recently announced five winners in the CREATE Stage of the Waves to Water Prize, a competition focused on using the power of waves to develop clean energy-powered desalination technologies to help provide potable water to communities in need. Wave-powered desalination technologies hold the potential to deliver clean drinking water to communities in need—for example, in disaster recovery scenarios, as well as to remote and coastal communities. Over three years, the Waves to Water Prize provides innovators a pathway from initial concept to field-testing their wave energy-powered desalination devices. CREATE is the fourth of the five-stage Prize, with total funds of up to \$2.5 million. Competitors in the CREATE stage had 180 days to build a functional prototype or proof of concept of their system.

### **[Risk Assessment Program Fish Tagging FAQ – Fundy Ocean Research Centre for Energy](#)**

The Risk Assessment Program (RAP) for Tidal Energy is designed to create a tool to assess the probability that fish will encounter a tidal device in the Bay of Fundy’s Minas Passage. This probability will be determined by combining two data sets: physical (ocean movements) and biological (fish movements) to build encounter rate models. RAP is building the largest data set of fish movement in the Bay of Fundy, and developing a simple user interface to make this data available to people for the first time. To build this fish “atlas” for the Bay of Fundy, researchers are building maps of fish distributions using existing acoustic telemetry fish tagging data for nine species. The species selected are based on expected availability, conservation concern or value to commercial, recreation, and Mi’kmaq fisheries.

### **[Doing what no one else has, full scale wave energy generation – Wello](#)**

Wello, the Finnish wave energy conversion experts have been developing its own vision for wave energy conversion technology for over a decade. Wello had already deployed their original Penguin WEC-1, a full-scale prototype back in 2012 in Orkney, Scotland. During its deployment there were successes, some failures, lessons learnt, concepts proven, and ground-breaking technology pushed forward. Wello took all these lessons and put them into their newest wave energy conversion technology, a representation of utility to scale wave energy. Now Wello’s Penguin wave energy converter has started to generate electricity to the local Basque grid from the ocean. This is a feat, that few other developers have managed, full-scale real world wave energy generation.

### **[Series B investment by Schweizer Kapital Global Impact Fund AG supports the market entry of Ocean Hybrid Platform \(OHP\) and ModTroniX \(MTX\) – SINN Power](#)**

The Schweizer Kapital Global Impact Fund AG, an impact fund of the Schweizer Kapital Group, initiated and financed by Umut Ertan, continues the €4.7 million commitment

already made in 2018 as the main investor in SINN Power to provide financial and strategic support for the upcoming market entry. As part of the Series B financing round, the Schweizer Kapital Global Impact Fund AG invests another €3.0 million and becomes the main shareholder and sole investor in the Gauting-based SINN Power GmbH through the further acquisition of shares. SINN Power GmbH has been developing technologies and solutions for the generation, storage, and feed-in of renewable energies in the maritime environment since 2015.

## **Wind Energy**

### **Siemens Gamesa pioneers wind circularity: launch of world's first recyclable wind turbine blade for commercial use offshore – Siemens Gamesa**

Wind power is one of the cornerstones in the quest to tackle the climate emergency. With more than 200 GW of new offshore capacity projected by the Global Wind Energy Council to be installed by 2030, it is critical to quickly introduce recyclable solutions. Siemens Gamesa is leading the way for a sustainable future with the RecyclableBlade, the world's first recyclable wind turbine blades ready for commercial use offshore. With this technology, separation of the materials in the blade is possible at the end of its lifetime, enabling recycling into new applications and thereby defines the next milestone in sustainability. The first six 81-meter long RecyclableBlades have been produced at the Siemens Gamesa blade factory in Aalborg, Denmark.

### **Vineyard Wind 1 Becomes the First Commercial Scale Offshore Wind Farm in the US to Achieve Financial Close – Vineyard Wind**

Vineyard Wind, a joint venture between Avangrid Renewables, a subsidiary of AVANGRID, Inc., and Copenhagen Infrastructure Partners, recently announced that the company's first project has achieved financial close. Working with nine international and U.S. based banks, \$2.3 billion of senior debt has been raised to finance the construction of the project. The milestone enables Vineyard Wind to provide a notice to proceed to its contractors in the coming days and weeks, allowing suppliers to start hiring, training, and mobilizing people to prepare for both on and offshore construction. Onshore work will begin this Fall in Barnstable, with offshore work commencing in 2022. The first power from Vineyard Wind 1 will be delivered to the grid in 2023.

### **Biggest ever renewable energy support scheme backed by additional £265 million – UK Government**

Details of how the UK will get more electricity from renewable sources were published recently, as the Government announced the biggest-ever round of its flagship renewable energy scheme. The Contracts for Difference scheme is the Government's primary method of encouraging investment in low-carbon electricity. £265 million per year will be provided to businesses in the fourth round of the scheme, which aims to double the renewable electricity capacity secured in the third round and generate more than the previous three rounds combined. The announcement contains £200 million to support



offshore wind projects and £55 million for emerging renewable technologies (including tidal stream and wave). £24 million of that is ringfenced for floating offshore wind projects for the first time, showing commitment to the development of this technology.

### **GE Renewable Energy, Fraunhofer IGCV, and voxeljet AG plan to develop world's largest sand binder jetting 3D printer for offshore wind turbines – General Electric (GE)**

GE, Fraunhofer IGCV, and voxeljet AG recently announced a research partnership to develop the world's largest 3D printer for offshore wind applications in order to streamline the production of key components of GE's Haliade-X offshore wind turbine. The Advance Casting Cell 3D printer under development will be capable of printing molds to cast components for the nacelle of the GE Haliade-X that can each weigh more than 60 metric tons, reducing the time it takes to produce this pattern and mold from ten weeks or more to just two weeks. In addition, the use of the 3D printer is expected to reduce the product's carbon footprint by eliminating the need to transport the large parts from a central manufacturing location. The partners expect to launch the project during the third quarter of 2021 with initial printer trials starting during the first quarter of 2022.

### **Turkey reaches 10 GW wind energy milestone – WindEurope**

Turkey has rapidly developed into a leading market for wind energy. The country lately celebrated an important milestone: it reached a cumulative wind energy capacity of 10,000 MW. Over the past decade the country has developed a strong wind energy supply chain and managed to increase its wind energy capacity tenfold. All 10 GW installed in Turkey today are onshore wind. The 10 GW milestone is far from being the end of onshore wind energy development in Turkey. The country aims to add 20 GW of wind energy by 2030. Most of it will continue to come from onshore wind. But the country is now turning to the possibility of developing offshore wind as well. A roadmap published by the Izmir Development Agency to promote offshore wind development estimated Turkey's total offshore wind potential at 70 GW.