



**25 June 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**

### [Tethys Glossary](#)

Did you know the [Tethys Glossary](#) lists all of the terms used to tag documents on *Tethys*? Check it out to learn more about wind and marine energy technologies and their environmental effects.

### [Collision Risk Workshop Report & Recordings](#)

In March 2021, OES-Environmental and ORJIP Ocean Energy hosted a two-day online workshop focused on understanding collision risk to [fish](#) and [marine mammals](#) from tidal turbines. The [workshop report](#), and recordings from both days, are now available on *Tethys*.

### [NHA State of Marine Energy Survey](#)

The National Hydropower Association (NHA) has launched a 10-minute [State of Marine Energy Survey](#) to help the association understand the state of U.S. development, challenges facing the sector, and where investment is needed to advance commercialization. The survey is open to all marine energy professionals based in the U.S. and closes on 1 July 2021.

## Funding & Testing Opportunities

The [Pacific Marine Energy Center \(PMEC\)](#) is inviting applications for [collaboration grants](#) to facilitate short-term, on-site research opportunities in the U.S. The grants will allow graduate and undergraduate students to participate in marine energy projects underway at PMEC partner universities—Oregon State University, the University of Washington, and the University of Alaska Fairbanks. Applications are due by 30 June 2021.

In collaboration with Innovate UK, the UK Department for Business, Energy and Industrial Strategy launched an opportunity for businesses in England, Wales, and Northern Ireland to bid for funding from the [Industrial Energy Transformation Fund \(IETF\)](#). Applications for the [Phase 1: Spring 2021 IETF](#) close on 14 July 2021.

Interreg North-West Europe recently launched the [4th Ocean DEMO](#) (Demonstration Programme for Ocean Energy Pilot Farms and Supporting Technologies) [Call for Applications](#). Successful applicants will receive free access to test their ocean energy products in real sea environments at the project's network of test centers. Applications are due 10 September 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.

## Student & Employment Opportunities

The Pacific Northwest National Laboratory (PNNL) is seeking a [Post Doc Research Associate](#) to conduct marine energy modeling research and simulate the effects of tidal or ocean current energy extraction on physical and biogeochemical processes. Applications due by 26 June 2021.

The University of Edinburgh is seeking a [Research Associate](#) in Marine Renewable Energy on the Generation, Processing, Exploitation and Dissemination of Marine Datasets. This position will contribute to the RealTide and Resourcecode projects. Applications due by 29 June 2021.

PNNL is also seeking a [Post Masters Research Associate](#) who will work primarily on projects associated with developing marine energy projects for coastal communities and other small-scale markets, such as aquaculture, mariculture and ocean observing. Applications due by 9 July 2021.

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## **Upcoming Events**

### Upcoming Meeting

The U.S. National Academies of Sciences, Engineering, and Medicine is hosting the [16th Meeting of the Bureau of Ocean Energy Management \(BOEM\) Standing Committee on Offshore Science and Assessment](#) on 9 and 12 July 2021 to showcase and provide feedback on BOEM's recently released FY 2022-2023 Studies Development Plan. Register [here](#).

## Upcoming Trainings

The DTOceanPlus project is hosting two online training sessions to demonstrate its suite of second-generation advanced design tools for the selection, development, and deployment of ocean energy systems. On 1 July 2021, the team will demonstrate the Deployment tool, focusing on site characterization and station keeping, and the Assessment tool, focusing on environmental and social acceptance. On 6 July 2021, the team will demonstrate the Stage Gate tool, with links to other tools. Learn more and register [here](#).

## Upcoming Webinars

The International Integrated Wave Energy Research Group is hosting a webinar, "European Green Deal and Its Targets in terms of Ocean Energy", at 1:00pm CEST (10:00am UTC) on 6 July 2021. Register [here](#) by 5 July 2021.

The U.S. DOE Water Power Technologies Office (WPTO) is also hosting its [Semiannual Stakeholder Webinar](#) at 3:30pm EDT (7:30pm UTC) on 15 July 2021. During the webinar, the new Acting Director of WPTO will share water power highlights from the President's Fiscal Year 2022 budget request, and program representatives will highlight ongoing programs and open opportunities. Register [here](#).

## Upcoming Conferences

Bangor University is hosting the [8<sup>th</sup> Partnership for Research in Marine Renewable Energy \(PRIMaRE\) Conference](#) online on 29-30 June 2021. Register for free [here](#).

The American Clean Power Association (ACP) is hosting the [ACP Project Siting and Environmental Compliance Virtual Summit 2021](#) on 20-22 July 2021. Register [here](#).

The Pacific Ocean Energy Trust is hosting the [Ocean Renewable Energy Conference \(OREC 2021\)](#) on 22-23 September 2021 in Portland, Oregon and online. Registration is now open [here](#).

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

### **Marine Energy**

#### **[Characterisation of the Potential Impacts of Subsea Power Cables Associated with Offshore Renewable Energy Projects – Taormina et al. 2021](#)**

Given this exponential development of offshore renewable energy (ORE) projects, the number of subsea power cables is increasing considerably. Like any human installation or activity at sea, these cables can cause disruptions to marine life and habitats. It is within this framework that the collaborative project "SPECIES" ("Submarine PowER Cables Interactions with Environment & associated Surveys") was launched in 2016. The aim of this project was to improve knowledge of the potential interactions between the electric

power cables of ORE projects and benthic organisms, which would appear to be the most exposed communities. The aim of this report is to provide a synthesis of the results of the SPECIES project and the perspectives arising from it.

### **The Expected Impact of Marine Energy Farms Operating in Island Environments with Mild Wave Energy Resources—A Case Study in the Mediterranean Sea – Rusu et al. 2021**

A particularity of island areas is that they are subjected to strong sea state conditions that can have a severe impact on the beach stability, while on the other hand, they rely mainly on diesel combustion for electricity production which in the long run is not a sustainable solution. The aim of this work is to tackle these two issues, by assessing the impact of a hybrid marine energy farm that may operate near the north-western part of Giglio Island in the Mediterranean Sea. The main objective of this work is to assess the coastal impact induced by a marine energy farm, and for this reason, various layouts obtained by varying the number of lines (one or two) and the distance between the devices were proposed.

### **Substrate vibrations and their potential effects upon fishes and invertebrates – Hawkins et al. 2021**

This paper reviews the nature of substrate vibration within aquatic environments where seismic interface waves may travel along the surface of the substrate, generating high levels of particle motion. There are, however, few data on the ambient levels of particle motion close to the seabed and within the substrates of lakes and rivers. Nor is there information on the levels and the characteristics of the particle motion generated by anthropogenic sources in and on the substrate, which may have major effects upon fishes and invertebrates, all of which primarily detect particle motion. We therefore consider how to monitor substrate vibration and describe the information gained from modeling it. Unlike most acoustic modeling, we treat the substrate as a solid.

## **Wind Energy**

### **Risk Assessment to Model Encounter Rates between Large Whales and Sea Turtles and Vessel Traffic from Offshore Wind Energy on the Atlantic OCS – Barkaszi et al. 2021**

The objective of this study was to characterize the risk of vessel strikes on large whales and sea turtles from different vessel types that operate in support of the current leased and unleased Outer Continental Shelf (OCS) wind energy areas in the Atlantic and to develop a model that accounts for geospatial, temporal, and species-specific parameters in the vessel operations area for these wind energy areas. The study was conducted in four stages. The first stage characterized the baseline conditions for vessel traffic along the Atlantic OCS and within “wind farms”, including vessel types, operational parameters, and operational behavior of the vessels during different stages of offshore wind development (e.g., surveys, construction, operations).

## **[Impact of wind power plants on mammalian and avian wildlife species in shrub- and woodlands](#) – Schöll & Nopp-Mayr 2021**

While there is a growing body of literature analyzing and discussing the impacts of wind power plants on wildlife in open landscapes, little has been done to date on that issue in shrub- and woodland environments. Therefore, we explored the effects of wind power plants in shrub- and woodland areas on woodland-dwelling wildlife species in the continents Europe and North America. Our systematic literature review was based on peer-reviewed journal articles. Out of 825 peer-reviewed articles, we synthesized detailed information from 27 articles. Reviewing scientific literature indicated that there is still very limited knowledge on effects of wind power plants on shrub- and woodland-dwelling wildlife species.

## **[Potential effects of underwater noise from wind turbines on the marbled rockfish \(\*Sebasticus marmoratus\*\)](#) – Zhang et al. 2021**

Environmental assessments of underwater noise on marine species must be based on species-specific hearing abilities. This study was to assess the potential impact of underwater noise from the East China Sea Bridge wind farm on the acoustic communication of the marbled rockfish. Here, the 1/3 octave frequency band of underwater noise was 125 Hz with the level range of 78–96 dB re 1  $\mu$ Pa, recorded at distances between 15-20m from the foundation at wind speed of 3–5 m/s. Auditory evoked potential (AEP) and passive acoustic techniques were used to determine the hearing abilities and sound production of the fish.

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## **News & Press Releases**

### **Marine Energy**

#### **[How Wave Energy Could Go Big by Getting Smaller](#) – National Renewable Energy Laboratory (NREL)**

One way to harness the ocean's energy is through a device called a wave energy converter (WEC). To date, WEC designs have been generally centered on large, rigid bodies that float in the water and move relative to each other as waves roll past. Now, NREL is exploring ways to significantly advance wave energy converter design and development. With funding from the U.S. DOE's Water Power Technologies Office, NREL researchers are developing concepts in which many small energy converters can be aggregated to create a single structure. With this new approach to developing wave energy, the domain of distributed embedded energy converter technologies could help the promise of substantial renewable energy generation from ocean waves become a reality.

### **Waveswing takes final shape ahead of EMEC splash – Offshore Energy**

Scottish wave energy developer AWS Ocean Energy has reached a milestone in the construction of its Waveswing wave energy device, having joined two large concentric cylinders to give the device its final shape. Final hook-up of the internal systems for the 16kW partial-scale device is now underway. The fifty-tonne device was built by Malin Renewables, after securing a £1 million contract from AWS Ocean Energy early in 2020. The Scottish developer said it expects to start commissioning and testing of the submerged point absorber-type wave energy device early in July. The test programme will ensure that all of the subsystems operate as required before the Waveswing makes its journey to Orkney for deployment at European Marine Energy Centre's Scapa Flow site.

### **META Supports SELKIE Tool Testing to Advance Marine Energy Development – Marine Energy Test Area (META)**

The team behind Wales' META has recently welcomed its first deployment in their pre-consented test sites in Milford Haven. This first deployment of a new open-source tool, to measure high quality turbulence data, supports the industry need for META as an easily accessible testing hub for research and innovation. The tool has been developed by Swansea University under the SELKIE project; an EU Ireland-Wales Programme project developing a streamlined commercialisation pathway for the marine renewable energy (MRE) industry. This project led by a consortium of 6 partner organisations brings together academia and industry through the development of open-source, multi-use tools and models to reduce MRE costs as well as developing a cross-border innovation network to increase and diversify MRE businesses in Wales and Ireland.

### **Cape Cod Canal set for tidal turbine and oceanic sensors installation – Offshore Energy**

The first tidal turbine, along with an environmental monitoring system, will be installed this week at the Bourne Tidal Test Site, located in Cape Cod Canal in Massachusetts. The system will include several advanced marine sensors, as well as a concept tidal turbine provided by New Bedford-based hydrokinetic technology developer Littoral Power Systems. First, two sensors will be installed to monitor water conditions and fish behavior, along with a video camera to monitor the turbine and fish around it. However, since video cameras require lights to work in darkness and these change fish behavior, an acoustic camera will also be deployed which uses sound for imaging.

### **Paimpol-Bréhat Tidal Test Site: Improving the quality of tidal turbine blades – Tidal Stream Industry Energiser Project (TIGER)**

Within the framework of the TIGER project, the University of Le Havre Normandie is carrying out a study on the in-situ ageing of structural bonding of composite materials using non-destructive ultrasonic methods. The materials studied are conventional carbon-epoxy composite and recyclable composite based on recyclamine. To quantify the damage levels as a function of in-situ ageing time, the measurements will be compared with the results from a rheological model (finite element methods). The objective of this

work is to improve the understanding of ageing phenomena in a hostile environment, both in terms of the material and the quality of the adhesion, and thus contribute to improving the quality of tidal turbine blades and minimising manufacturing costs.

### **GKinetic to help tackle clean energy challenge faced by aquaculture – Offshore Energy**

Irish hydrokinetic turbine developer GKinetic Energy has joined the Sustainable Aquaculture Innovation Centre (SAIC) consortium to work together to reduce carbon output and accelerate the switch to cleaner energy alternatives in the aquaculture industry. SAIC connects over 200 businesses and organisations in the consortium group with a focus on SAIC's three workstreams: driving, nurturing and sharing innovation in the fast growing aquaculture sector. GKinetic's modular solution is well positioned to serve the decarbonization of the aquaculture industry, as it can provide uninterrupted power from flowing water and can be adapted to meet the energy needs of fish farms.

## **Wind Energy**

### **DOE Announces Winners of Annual Collegiate Wind Competition – U.S. DOE**

Congratulations to The Pennsylvania State University on winning the DOE's [Collegiate Wind Competition](#)! Thirteen multidisciplinary teams displayed their resilience and adaptability in a challenging year by presenting their work to a remote panel of judges at the virtual competition. DOE's Collegiate Wind Competition gives undergraduate students from a range of disciplines hands-on experience and industry connections—helping prepare them for jobs in the wind and renewable energy industries. The 2021 challenge was to research, design, and build a wind turbine for deployment in highly uncertain times, with a significant degree of unknown risks and delays. This challenge informed the teams' work as they created their turbine designs and wind project plans and engaged with their local communities. Watch highlights from the 2021 Competition [here](#).

### **Wind industry calls for Europe-wide ban on landfilling turbine blades – WindEurope**

WindEurope recently called for a Europe-wide landfill ban on decommissioned wind turbine blades by 2025. This comes after several industry-leading companies announced ambitious plans for blade recycling and recovery. A landfill ban would further accelerate the development of sustainable recycling technologies for composite materials. At the Spanish Wind Energy Association (AEE)'s Annual Congress Giles Dickson, CEO of WindEurope, and Juan Virgilio Márquez, General Director of AEE, called upon the European Commission to propose a Europe-wide ban on landfilling decommissioned wind turbine blades. The ban should enter into force by 2025 and also apply to other large composite components in the nacelles of modern wind turbines.



## **BOEM Announces Upcoming Environmental Review for a Proposed Wind Project Offshore New York and New Jersey – Bureau of Ocean Energy Management (BOEM)**

As part of the Biden-Harris administration’s commitment to creating nearly 80,000 jobs through developing 30 gigawatts of offshore wind by 2030, BOEM recently announced it will be conducting an environmental review of a potential wind energy project offshore New York and New Jersey. BOEM published a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) on a Construction and Operations Plans submitted by Empire Wind, LLC. If approved, Empire Wind would be allowed to construct and operate two wind energy facilities consisting of up to 174 turbines offshore New York and New Jersey, thereby generating over 2,000 megawatts of electricity. The publication of the NOI opens a 30-day public comment period to help BOEM define the EIS’ scope.

## **GE Renewable Energy and TNO to test new research on blade tip improvements aimed at reducing levelized cost of energy (LCOE) of offshore wind power – General Electric (GE)**

A consortium of GE Renewable Energy, LM Wind Power and TNO, are collaborating on the TIADe (Turbine Improvements for Additional Energy) project to develop technologies and design methods for more efficient operation of next-generation wind turbine rotors, wind farms with large rotor wakes, and demonstrate them in the field. The TIADe project touched a new milestone with the research wind turbine becoming fully operational. The innovations developed in the project will be tested on the full-scale 130 m diameter turbine recently installed in Wieringermeer, Netherlands. The turbine is powered by two-piece blades, which allows the outer 12 m of the blades to be replaced by several innovative tips.

## **USFWS Approves Avangrid Renewables’ Innovative Condor Conservation Plan – Avangrid Renewables**

Avangrid Renewables, LLC confirmed that the U.S. Fish and Wildlife Service (USFWS) has accepted the company’s innovative conservation plan for California condors and issued an incidental take permit for the Manzana Wind Power Project in Rosamond, Calif. This precedent-setting conservation plan will help fund condor recovery efforts at a facility operated by the Oregon Zoo. The funding included in the conservation plan will support the rearing of six condors, a number determined by a population viability analysis to mitigate the impacts of two potential adult condor fatalities over the 30-year permit period. The company’s operating wind facilities feature multiple technologies and procedures that significantly reduce risks to wildlife.

## **Siemens Gamesa to supply typhoon-proof turbines to Japan’s largest onshore cluster of four wind farms – Siemens Gamesa**

Siemens Gamesa will supply 79 of its industry-leading Typhoon-class onshore wind turbines for Japan’s largest wind farm cluster, strengthening its position as one of the leading renewable energy players in the country. The 339.7 MW Dohoku wind farm cluster consists of four projects to be developed by Eurus Energy, the country’s leading



independent renewable energy developer. Siemens Gamesa will also provide technical field assistance for construction and commissioning of the four wind projects, with expected full commissioning in the second half of 2023. Given that Japan faces very high wind speeds, including typhoons, Siemens Gamesa designed the typhoon-proof onshore turbines based on proven technologies to accommodate the local wind site conditions.