



**8 January 2021**

[Tethys](#) is an online knowledge base that facilitates the exchange and dissemination of information on the environmental effects of wind and marine renewable energy (MRE). 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 MRE communities, please send it to [tethys@pnnl.gov](mailto:tethys@pnnl.gov) for consideration.

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

[MRE Documents](#)  
[Wind Documents](#)

[MRE News](#)  
[Wind News](#)

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## **Announcements**

### ETIPP Community Technical Assistance

The National Renewable Energy Laboratory (NREL) is now accepting community technical assistance applications for the [Energy Transitions Initiative Partnership Project \(ETIPP\)](#), a partnership among U.S. Department of Energy (DOE) offices, national labs, and community organizations that will provide resources and access to on-the-ground support for remote and island communities in the U.S. seeking to transform their energy systems and lower their vulnerability to energy disruptions. Applications are due by 15 February 2021.

### Ocean Observing Prize

The U.S. DOE and National Oceanic and Atmospheric Administration (NOAA) are accepting applications for the [DEVELOP Competition](#) within the [Ocean Observing Prize](#)—a multi-stage prize that challenges innovators to integrate MRE with ocean observation platforms. The DEVELOP Competition comprises three contests—Design, Build, and Splash. Submissions for the Design Contest close at 5:00pm EST on 16 February 2021.

## Calls for Papers

*Energies* is accepting manuscript submissions for several upcoming Special Issues, including "[Policy and Technology for Ocean Renewable Energy](#)" (due 16 March 2021), "[Marine Renewable Energies: From Technological Advancements to Environmental Impact Assessment](#)" (due 31 March 2021), and "[Marine Renewable Energy Technology](#)" (due 11 May 2021).

## Funding/Testing Opportunities

The Supergen Offshore Renewable Energy (ORE) Hub has released its [Third Flexible Funding Call](#) and are seeking research proposals from universities or other institutions eligible to hold UK Research and Innovation awards to facilitate a programme of coordinated ORE research projects. Expressions of Interest are due by 5:00pm UTC on 11 January 2021.

Innovate UK has announced an upcoming [Smart Grants funding competition](#) for UK registered organizations to apply for a share of up to £25 million to deliver disruptive research and development innovations. The competition closes at 11:00am UTC on 20 January 2021.

The European Commission has released a [Call for Proposals](#) focused on innovative land-based and offshore renewable energy technologies and their integration into the energy system. Submissions are due by 5:00pm CEST (3:00pm UTC) on 26 January 2021.

The European Commission has also recently announced a [Blue Economy Call for Proposals](#) to help advance market-readiness of new products, services, or processes, including MRE projects. Proposals are due by 5:00pm CEST (3:00pm UTC) on 16 February 2021.

The Interreg Atlantic Area's Blue-GIFT recently 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.

## Student/Employment Opportunities

Australia's Blue Economy Cooperative Research Centre has launched a [PhD Scholars Program](#) with PhD topics available across its five research programs, including offshore renewable energy systems and sustainable development. Applications are due by 10 January 2021.

Bangor University is currently seeking a [Research Officer in Coastal Oceanography](#) to contribute to a research project funded by the Supergen ORE programme, investigating the interaction between highly turbulent tidal flows and the initiation of scour around a subsea cable in a mobile sedimentary environment. Applications are due by 18 January 2021.

Pacific Northwest National Laboratory is currently seeking a [Coastal and Marine Sciences Technical Intern](#) to join projects within one of three focus areas: (1) understanding the national laboratories' role and the unique place they have to accelerate work in coastal and marine ecosystems; (2) research and development of technologies focused on monitoring coastal

ecosystems; and (3) MRE technologies and powering the blue economy. Applications are due by 25 February 2021.

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## Upcoming Events

### Upcoming Webinar

The U.S. Bureau of Ocean Energy Management (BOEM) and the Oregon Department of Land Conservation and Development will be hosting an introductory webinar on the [Oregon Offshore Wind Mapping Tool \(OROWindMap\)](#) from 2:00-3:30pm PT (10:00-11:30pm UTC) on 28 January 2021. OROWindMap is a planning tool within the [West Coast Ocean Data Portal](#) that accesses relevant datasets and provides data visualization capabilities to inform the planning process for offshore wind energy leasing in federal waters offshore Oregon. Register [here](#).

### Upcoming Conferences

The [Supergen Offshore Renewable Energy \(ORE\) Hub Third Annual Assembly](#) will be held online from 18-22 January 2021. The conference will give those working in the offshore wind, wave, and tidal energy sectors the chance to explore cutting edge research, find out about the latest opportunities and challenges, and network with the community. Register for free [here](#).

The organizers of the Coastal Futures and Restoring Estuarine and Coastal Habitats (REACH) conferences have joined with the World Wildlife Fund UK and Sky Ocean Rescue to host a new online conference, [Ocean Recovery](#), from 19-21 January 2021.

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## New Documents on *Tethys*

### Marine Renewable Energy

#### [Legal framework of marine renewable energy: A review for the Atlantic region of Europe](#) – Ramos et al. 2021

Marine Renewable Energy (MRE) sources, such as offshore wind, waves, tides, ocean currents, thermal and salinity gradients, appear as promising low-carbon forms of energy. However, with the sole exception of offshore wind, MRE exploitation is far from being commercially feasible. Among the obstacles faced by the sector, the complex legal framework that applies to MRE projects stands out. In this context, the objective of this work is to assess the main aspects of the MRE legal framework, and when necessary, propose corrective measures for further development of the sector. For this purpose, the countries of the Atlantic region of Europe (France, Ireland, Portugal, Spain, and the UK), which present one of the world's largest MRE resource, were used as a benchmark.

#### [Sharing Environmental Monitoring Data](#) – ORJIP Ocean Energy 2020

The European Marine Energy Centre (EMEC) is a Steering Group member and jointly supports the secretariat function of the Offshore Renewables Joint Industry Programme for Ocean Energy (ORJIP OE). ORJIP OE is a UK-wide collaborative programme formed to ensure that environmental research conducted by the ocean energy sector will ultimately reduce the consenting risks associated with developing wave, tidal stream and tidal range projects. As part of EMEC's role in the joint secretariat, Aquatera Limited has contracted EMEC to provide a short summary of the opportunities, issues and challenges associated with sharing environmental monitoring data. EMEC has based this report on the practical experience it has gained since the centre's sites were established in 2003.

### **Impact of the use of offshore wind and other marine renewables on European fisheries – Stelzenmüller et al. 2020**

This study aims to provide an overview of the general impacts of the development of offshore renewables (OR) on fisheries in European sea basins. Furthermore, it highlights pathways for possible co-existence solutions for both sectors, a description of good practice examples and lessons learnt, research gaps, and policy recommendations. The research focusses on an in-depth spatial overlap analysis between the present-day fishing effort by fleet and the current and future spatial expansion of OR in European seas based on Automatic Identification System (AIS) and Vessel Monitoring System (VMS) data.

## **Wind Energy**

### **An investigation into the potential for wind turbines to cause barotrauma in bats – Lawson et al. 2020**

To date, no published research has calculated the pressure changes that bats may be exposed to when flying near wind turbines and then used these data to estimate the likelihood that turbines cause barotrauma in bats. To address this shortcoming, we performed computational fluid dynamics simulations of a wind turbine and analytical calculations of blade-tip vortices to estimate the characteristics of the sudden pressure changes bats may experience when flying near a utility-scale wind turbine. Because there are no data available that characterize the pressure changes that cause barotrauma in bats, we compared our results to changes in pressure levels that cause barotrauma and mortality in other mammals of similar size.

### **Changes in feeding behavior of longfin squid (*Doryteuthis pealeii*) during laboratory exposure to pile driving noise – Jones et al. 2020**

Anthropogenic noise can cause diverse changes in animals' behaviors, but effects on feeding behaviors are understudied, especially for key invertebrate taxa. With the offshore wind industry expanding, concern exists regarding potential impacts of pile driving noise on squid and other commercially and ecologically vital taxa. We investigated changes in feeding and alarm (defense) behaviors of squid, *Doryteuthis pealeii*, predated on killifish, *Fundulus heteroclitus*, during playbacks of pile driving

noise recorded from wind farm construction within squids' habitat. Fewer squid captured killifish during noise exposure compared to controls.

### **Offshore Wind Farm Artificial Reefs Affect Ecosystem Structure and Functioning: A Synthesis – Degraer et al. 2020**

Offshore wind farms (OWFs) are proliferating globally. The submerged parts of their structures act as artificial reefs, providing new habitats and likely affecting fisheries resources. While acknowledging that the footprints of these structures may result in loss of habitat, usually soft sediment, we focus on how the artificial reefs established by OWFs affect ecosystem structure and functioning. Structurally, the ecological response begins with high diversity and biomass in the flora and fauna that gradually colonize the complex hard substrate habitat. Functionally, the response begins with dominant suspension feeders that filter organic matter from the water column.

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## **News & Press Releases**

### **Marine Renewable Energy**

#### **Energy Department Invests \$22M in Marine Energy Foundational R&D and Testing Infrastructure – U.S. DOE Office of Energy Efficiency & Renewable Energy**

The U.S. DOE's Water Power Technologies Office (WPTO) recently announced 10 project selections totaling up to \$22 million to support marine energy research and development (R&D) and testing infrastructure. Seven out of the 10 projects selected will leverage the expertise and intellectual capital of non-federal research institutions, like universities, by supporting foundational R&D to complement research at the DOE National Labs. DOE is also adding a fourth National Marine Renewable Energy Center (NMREC) to its portfolio in the U.S. Atlantic region, complementing and expanding existing NMREC capacity.

#### **EMEC Commence Power Performance Assessment for Verdant Power, Inc – European Marine Energy Centre (EMEC)**

EMEC has initiated an independent power performance assessment for Verdant Power following the deployment of three 5th Generation (Gen5) tidal stream turbines in New York City's East River in October 2020. The EMEC team joined Verdant Power virtually to witness the start-up of the Triframe Gen5 turbines which began producing power within an hour of slack tides at the Roosevelt Island Tidal Energy Project site. This is the first remote witness of a power performance assessment that has been carried out by EMEC according to ISO/IEC 17025 methods and procedures and was made possible by months of preparation over 2020 due to the COVID pandemic restricting travel.

#### **Kraken, a new robotic arm for offshore operations – WaveEC Offshore Renewables**

WavEC recently announced the end of the Kraken project, which set out to develop a viable robotic arm to be used with Remotely Operated Vehicles (ROV) for the inspection, repair and maintenance of offshore structures, specifically for ocean energy devices. Led by WavEC in Portugal, and involving four project partners from three countries, the Kraken project's strategic goal was to develop and manufacture three distinctive components: a seven degree of freedom (eight function) 3D printed titanium robotic arm, a mechanical docking system and an intuitive human robot master interface. The Kraken project team has spent the last four years developing this new concept, which brings mature proven telemanipulation technologies from surgical rooms into the deep sea.

### **€5m boost for marine energy testing platform – reNEWS**

A hybrid testing platform for ocean energy has received a €5m funding boost from the EU's Horizon 2020 programme. It is hoped the VALID project will offer a step change in the testing and standardisation of ocean energy devices and components. The three-year H2020 project is specifically designed to develop a platform for accelerated testing with methodologies by combining the virtual and physical environment. It is also hoped it can reduce costs in the product developing process, tackle scaling challenges and lowering uncertainties once fully demonstrated in the ocean. VALID will use and adapt novel Hybrid Testing methodologies frequently used in the automotive industry through three different case studies that are specific to the ocean energy sector.

### **Atlantis Supplied, Scottish Manufactured Tidal Generation Equipment Arrives in Nagasaki, Japan Ahead of Deployment in the Naru Strait – Simec Atlantis Energy**

Atlantis is pleased to announce an important update in delivering Scottish made tidal generation equipment to Japan. The Atlantis designed and built tidal generation system has arrived in Nagasaki harbour, Japan having left Scotland in October. It will now be transported in January 2021 by support vessels to the designated deployment site in the Naru Strait, located between the islands of Naru and Hisaka in the Goto Island chain. The AR500 tidal generation system will be initially operating at a capped maximum generation output of 500kW, as data collection (performance and environmental) and device validation are undertaken for the client and Japanese regulatory bodies.

## **Wind Energy**

### **NREL and Project Partners Team-Up To Advance Species Conservation and Wind Energy Deployment: Intersections Between Wind Energy and Wildlife Set Up Opportunities for Coexistence – National Renewable Energy Laboratory (NREL)**

Wildlife impacts can extend permitting timelines, add unanticipated costs for developers and operators, and constrain energy output at wind energy facilities. Effectively responding to these challenges requires multi-stakeholder collaboration and expertise in a diverse array of fields. That is why NREL and Defenders of Wildlife launched [\*Wildlife and Wind Energy: Considerations for Monitoring and Managing Impacts\*](#), a nine-part

webinar series to help familiarize stakeholders with the nuances of land-based wind energy development in the context of species conservation.

### **[UK gives go-ahead to 2.4 GW Hornsea Three offshore wind farm](#) – Offshore Energy**

The UK Secretary of State for Business, Energy and Industrial Strategy gave the development consent to the Hornsea Project Three offshore wind farm on 31 December 2020. The 2.4 GW offshore wind farm will be built more than 120 kilometres off the north Norfolk coast and comprise up to 300 turbines. If built to full capacity, Hornsea Three could power the average daily needs of over 2 million UK homes. In January 2020, Ørsted commissioned the 1.2 GW Hornsea One, which then became the world's largest operational offshore wind farm. Offshore construction on the 1.4 GW Hornsea Two started in October and is scheduled to be completed by 2022.

### **[BOEM Releases Draft Environmental Analysis for Offshore Wind Energy Project](#) – Bureau of Ocean Energy Management (BOEM)**

In support of President Trump's America-First Offshore Energy Strategy, BOEM recently announced that it will publish a draft environmental analysis of the proposed South Fork Wind Farm and is requesting public comment. The draft environmental analysis, referred to as the Draft Environmental Impact Statement, analyzes the potential environmental impacts of the proposed action described in the South Fork Wind Construction and Operations Plan. South Fork Wind is proposing to construct up to 15 wind turbines with a capacity of 6 to 12 megawatts per turbine that will be located offshore approximately 19 miles southeast of Block Island, Rhode Island.

### **[Ramboll's True Digital Twin demonstrates its potential to increase lifetime of offshore wind structures](#) – Ramboll**

A pilot-test of Ramboll's True Digital Twin technology at the Wiking offshore wind farm has revealed a significant analytical potential to increase lifetime of offshore wind. The pilot-test is part of the ROMEO project, an initiative supported by the EU research programme Horizon 2020 that aims at advancing the energy transition in Europe and reduce the costs of offshore wind energy. The pilot-test, based on a measurement campaign using Structural Health Monitoring solutions, revealed a significant potential for lifetime extension for the offshore substation and offshore wind turbine foundations.

### **[BOEM Announces the Creation of the Center for Marine Acoustics](#) – ECO Magazine**

The ocean is vast and full of sounds. Many are naturally occurring while others are anthropogenic. When these anthropogenic sounds are unwanted, we call them noise. BOEM manages energy and mineral resource development on the Outer Continental Shelf subject to environmental safeguards, and noise is high on the list of issues we need to understand and address to protect ocean life. BOEM recently announced the creation of the Center for Marine Acoustics (CMA), an initiative that will strengthen BOEM's role as a driving force within the regulatory community on sound in the marine environment.