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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 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 for consideration.

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Announcements

WPTO-MHK Graduate Student Research Program

The Oak Ridge Institute for Science and Education (ORISE) is now accepting applications for the [WPTO-MHK Graduate Student Research Program](#), which is designed to provide graduate thesis research opportunities in marine and hydrokinetics (MHK) at U.S. Department of Energy (DOE) laboratories and other Water Power Technologies Office (WPTO) approved facilities. Applications are due by 5:00pm EST (10:00pm UTC) on 4 December 2020.

Collegiate Wind Competition

The U.S. DOE's National Renewable Energy Laboratory (NREL) recently released a request for proposals for student teams interested in competing in the [Collegiate Wind Competition \(CWC\)](#) in May 2022. The competition challenges students to design, build, and test a model wind turbine, and plan and financially analyze a wind power plant. Applications are due 8 December 2020.

Ocean Observing Prize

The U.S. DOE and National Oceanic and Atmospheric Administration (NOAA) recently announced the opening of 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.

Call for Abstracts

The University of Plymouth is accepting abstract submissions for the [14th European Wave and Tidal Energy Conference \(EWTEC 2021\)](#) until 1 November 2020. EWTEC 2021 will be held in Plymouth, UK from 5-9 September 2021.

Funding/Testing Opportunities

The [TEAMER](#) (Testing Expertise and Access for Marine Energy Research) Program, which provides MRE developers with access to a network of U.S. testing facilities, will begin accepting applications for its second round of Requests for Technical Support (RFTS) on 9 November 2020. Applications will be due by 18 December 2020.

The TEAMER Network Director is also accepting applications for additional facilities to join the [TEAMER Test Facility Network](#) for RFTS round 3 and beyond. Potential facilities (both physical infrastructure as well as expertise capabilities, such as modeling and analysis services) should submit an application by 4 December 2020.

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.

Employment Opportunities

The Pacific Marine Energy Center (PMEC) at Oregon State University is recruiting a [Post-Doctoral Scholar](#) to provide MRE research, development, testing, and student mentoring support. Applications are due by 30 October 2020.

The University of Manchester's Department of Mechanical, Aerospace, and Civil Engineering has a vacancy for a [PhD Candidate](#) interested in modelling the environmental impact of offshore wind farms. Applications are due by 31 December 2020.

WavEC is currently seeking Masters candidates interested in [developing automatization in image processing of marine communities](#), [aerodynamic analysis of floating offshore wind turbines](#), and a variety of other technical topics. View all available opportunities [here](#).

Upcoming Events

Upcoming Workshop

New York State Energy Research and Development Authority (NYSERDA) is hosting the [State of the Science Workshop on Wildlife and Offshore Wind Energy 2020: Cumulative Impacts](#) online from 16-20 November 2020. Plenary presentations and Q&A panel discussions will occur throughout the week, with smaller taxon-specific working meetings in late 2020 and early 2021, and a final group webinar in the spring of 2021. Register for free [here](#) by 30 October 2020.

Upcoming Webinars

The Marine Technology Society is hosting a webinar, “Bureau of Ocean Energy Management (BOEM): Update on Federal Offshore Renewable Activities & Future Outlook”, at 1:00pm EDT (5:00pm UTC) on 30 October 2020. Register [here](#).

Marine Energy Wales is hosting a webinar, “Marine Renewable Energy meets conservation in Welsh Waters: Balancing the needs of conservation and an emerging sector in developing a green recovery for Wales”, at 10:30am UTC on 9 November 2020. Register [here](#).

NREL and Defenders of Wildlife are hosting a nine-part webinar series, *Wildlife & Wind Energy Webinar Series: Considerations for monitoring and managing impacts*, through mid-November 2020. Register [here](#) for the eighth webinar, “Economics of Wind Energy: Understanding wildlife minimization in the context of development and financing”, at 3:00pm EST (7:00pm UTC) on 10 November 2020. Sign up [here](#) to receive updates on and invitations for all remaining webinars in this series. All webinars will be recorded and available on [Tethys](#).

The Discovery of Sound in the Sea (DOSITS) Team is hosting a webinar, “Regulatory Approach to Underwater Noise, U.S. Approach Compared to that of the E.U. and Other Locations”, at 4:00pm EST (8:00pm UTC) on 19 November 2020. Register [here](#).

Upcoming Conferences

The [National Offshore Wind Research & Development Symposium 2020](#) will be held online from 9, 10, & 12 November 2020. Register for free [here](#).

The International Network on Offshore Renewable Energy (INORE) Virtual Symposium 2020 will be held on 19 November 2020. Entries for the three-minute thesis competition close 6 November 2020. Register [here](#) by 18 November 2020.

New Documents on *Tethys*

Marine Renewable Energy

[Collision risk modelling for tidal energy devices: A flexible simulation-based approach](#) – Horne et al. 2021

For tidal energy devices, the potential risk for animals to collide with a device, particularly its moving parts such as rotor blades, is often a major barrier in the consenting process. Theoretical work surrounding collision risk has commonly made use of a formulaic modelling approach. However, whilst providing a platform to assess conventional horizontal axis tidal turbines, the frameworks applied lack the flexibility to incorporate novel device designs or more complex animal movement parameters. To demonstrate the novel simulation-based approach to estimating collision probabilities a hypothetical case study was used to demonstrate how the approach can assess the influence that variations in ecological and behavioural data had on collision probabilities.

Colonisation of wave power foundations by mobile mega- and macrofauna – a 12 year study – Bender et al. 2020

Environmental impacts from wave energy generators on the local mobile mega- and macrofauna community have been investigated in the Lysekil project by Uppsala University. Offshore renewable energy installations provide hard, artificial substrates, and as such, they could act as artificial reefs. Foundations with manufactured holes served as complex habitats and foundations without served as non-complex. In this long-term study, SCUBA surveys of mobile fauna in the years 2007, 2008, and 2016–2019 were analyzed. The results show a distinct reef effect on the foundations with significant greater species richness, total number of individuals, greater values of the Shannon-Wiener biodiversity index, and greater abundance of specific reef fauna.

Assessing the Impact of Rows of Tidal-Stream Turbines on the Overtides of the M2 – Potter et al. 2020

Flood-ebb asymmetry of a tidal flow has important implications for net sediment transport and the potential extractable resource. The asymmetry of the tide in U.K. waters may be understood through the interaction of the M2 (principal lunar) and M4 (first even overtide of the M2) tidal constituents. The interaction of the M2 tide with a tidal-stream turbine will alter the M4 tide, both augmenting and reducing the M4 amplitude, leading to an alteration of flood-ebb asymmetry. In this chapter the impact of a row of tidal-stream turbines on the overtides of the M2 has been investigated through a numerical modelling study. Further, the way that additional turbines alter the way the turbines impact the shallow-water tides individually is explored.

Wind Energy

An analysis of the socioeconomic and environmental benefits of wind energy deployment in Europe – Ortega-Izquierdo and del Río 2020

Among renewable energies capacity additions, wind energy has played a dominant role in the European Union and elsewhere, fuelled by technology cost reductions and public promotion schemes. In turn, wind deployment has led to considerable socioeconomic and environmental benefits in terms of CO₂ emissions reductions, avoidance of fossil fuels and employment creation. The aim of this paper is to assess those socioeconomic and

environmental benefits of wind energy deployment in the European Union and their evolution over time. Based on two novel methodologies, which allow a disaggregated analysis per country and stage of the supply chain (only for employment creation), an ex-post calculation of those benefits over the 2008–2016 period has been carried out.

Wildlife and infrastructure: impact of wind turbines on bats in the Black Sea coast region – Mantoui et al. 2020

In Eastern Europe, wind energy production is currently promoted as an important source of renewable energy, yet in most cases without appropriate consideration of the negative impacts wind turbines (WT) may have on protected species such as bats. Here, we present first data on fatality rates, fatality factors and the likely origin of bats killed by WT in the Dobrogea region (Romania), located in a major migratory corridor for wildlife in Eastern Europe. Over a 4-year period, we found a total of 166 bat carcasses from 10 species, mostly representing migratory species such as *Pipistrellus nathusii* and *Nyctalus noctula*. We documented 15 cases of barotrauma and 34 cases of blunt-force trauma in carcasses found below WT.

Noise mitigation for the construction of increasingly large offshore wind turbines – Koschinski and Lüdemann 2020

The aim of this report is to revisit the issue of underwater noise mitigation in the light of an anticipated further increase in turbine size. We describe and analyse the effectiveness of existing noise mitigation measures and readiness for use with increasingly large monopiles. Monopiles have by far the most extensive experience in the construction of offshore wind farms. Thus, they form the basis for comparative considerations. More experience is needed and explicitly desired with foundation types other than the monopile in order to make them a reliable, safe and economically viable alternative to the standard monopile and provide a benefit for the marine environment.

News & Press Releases

Marine Renewable Energy

Three Verdant Power Tidal Turbines Deployed in New York City's East River – Verdant Power

Verdant Power, a leading marine renewable energy (MRE) company, recently installed an array of three tidal power turbines at its Roosevelt Island Tidal Energy (RITE) Project site in the East River. The deployment came as the first U.S. licensed tidal power project. The RITE Project activity is a technology demonstration of Verdant Power's fifth-generation tidal power system and its novel TriFrame™ mounting system, which is the next step on a pathway to global commercialization and profitable commercial operations. This pre-commercial demonstration of the proprietary integrated system is

designed to optimize the economics of installation and maintenance over the system's 20-year life, and to prove performance.

Wello joins consortium for the SafeWAVE project – Wello

SafeWAVE aims to overcome non-technological barriers to marine renewable energy - specifically develop strategies focused on: environmental research demonstration; consenting and planning; and education and public engagement. The project will work to improve knowledge on the environmental effects and risks of wave energy through the collection, processing, analysis, and sharing of environmental data around devices operating at sea and modelling of cumulative impacts of future larger scale deployments. Wello's Penguin is soon to make it to the Bay of Biscay to start a round of continuous 2-year deployment and testing period. During this time, data from the Penguin and the surrounding ecosystem will be collected and analysed for SafeWAVE.

EMEC Enters Partnership with PTEC to Grow UK Tidal Energy Market – EMEC

The European Marine Energy Centre (EMEC), Orkney, Scotland, has joined forces with Perpetuus Tidal Energy Centre (PTEC) to develop a large-scale tidal energy site off the Isle of Wight, England. This site will be eligible to bid into future UK Contracts for Difference (CfD) allocation rounds enabling tidal energy technologies developed in the UK to deliver predictable low carbon energy. PTEC is a 30 MW tidal energy demonstration facility 2.5 km south of the Isle of Wight, with potential expansion capacity up to 300 MW. After signing off the agreements last week, EMEC is already working on site development and optimisation activities. This will build upon the early work done by the PTEC team to get the site consented in 2016.

Eco Wave Power Enters MOU with MSMART Future Technology Company in Vietnam – Eco Wave Power

Wave energy developer, Eco Wave Power recently announced the signing of a Memorandum of Understanding (MOU) with MSMART Future Technology, as the basis for the development of a 50MW wave energy array in Vietnam. The collaboration between the parties shall be executed in milestones. In the first phase, the Eco Wave Power engineering team, will perform an in-depth feasibility study, at the selected site in Vietnam. The study will include the installation of a wave measurement buoy, for collection of the site's wave climate. Once studies are completed to the satisfaction of the parties, they will work towards the establishment of a Joint Venture company in Vietnam for the development of a 50MW wave energy array.

OPT Contracts With ACET for U.S. Navy SLAMR Initiative – Ocean Power Technologies

Ocean Power Technologies (OPT) has been contracted by Virginia-based Adams Communications & Engineering Technology (ACET) to conduct a feasibility study. The evaluation of a PB3 PowerBuoy® power and 5G communications solution comes in support of the U.S. Navy's Naval Postgraduate School's (NPS) Sea, Land, Air, Military Research (SLAMR) Initiative, which conducts interdisciplinary research in unmanned

and robotic systems. OPT and ACET will review, validate, and determine the cost and configuration of integrating OPT solutions as the basis of an autonomous offshore 5G communications system. The study will detail preliminary operational, deployment, and maintenance plans, and regulatory approval requirements to support the SLAMR initiative's focus on unmanned and robotic systems.

Wind Energy

[GE's Haliade-X offshore wind turbine prototype operating at 13 MW](#) – GE

GE Renewable Energy recently announced that its Haliade-X prototype, the world's most powerful wind turbine operating to date, has been optimized and is now operating at a 13 MW power output. The prototype will undergo a series of tests to perform different types of measurements and obtain its type certificate in the coming months. The Haliade-X 13 MW, which is an updated version of the prototype that has been successfully operating in Rotterdam since November 2019, recently secured its provisional type certificate and set a new world record by generating 288 MWh in one single day. This 13 MW Haliade-X version will continue to feature 107-meter long blades and a 220-meter rotor and will be able to generate 4% more Annual Energy Production than the previous 12 MW version.

[DemoSATH construction is set to begin](#) – Saitec Offshore Technologies

Together with RWE Renewables, Saitec Offshore Technologies has selected leading global infrastructure operator Ferrovial for the manufacturing and assembly of the SATH floating platform in the DemoSATH project. The construction package will last 14 months and covers site preparation, concrete precasting, procurement of steel bulkheads and assembly of the floater along with management of the supply chain. The DemoSATH project will deploy the first multi-megawatt floating offshore wind turbine connected to the Spanish grid. The platform, including the 2MW turbine, will be towed to its anchorage point in a test field 2 miles off the coast at a depth of 85 meter. The unit is expected to go into operation early 2022.

[Wind Energy and Wildlife Share Future in the Skies and Seas: NREL Researchers Boost Offshore Wind Power While Protecting Ecosystems](#) – NREL

The U.S. Department of Energy's (DOE's) National Renewable Energy Laboratory (NREL) has long played a leadership role in fostering positive interactions between wind energy and wildlife, identifying measures to safeguard the health of coastal species and the surrounding environment while maximizing and strengthening the reliability of turbine output. NREL researchers are collaborating with academic, conservation, regulatory, and industry partners to understand the potential effects of offshore wind installations on the environment while maintaining optimal energy production. Experts at NREL are also developing new technologies and techniques to monitor and mitigate wind energy's impact on coastal ecosystems.

[Floating Offshore Wind Turbines Set to Make Inroads in U.S.](#) – Scientific American

A second phase of offshore wind development is about to get underway in the U.S., starting in Maine, a state that sees its energy future built on a new type of wind turbine. It is one that can float in deeper waters and that may be built more cheaply than existing wind turbines being constructed or planned along most of the U.S. East Coast. One of the main beneficiaries of what are called “floaters”—turbines that are held by mooring lines attached to anchors in waters deeper than 160 feet—will likely be the U.S. West Coast, where California and Hawaii are planning wind farms and Oregon and Washington are expected to follow. Floaters are likely to give a major boost to what has already become a large, capital-intensive renewable energy business.

[500MW Australian wind farm given green light](#) – reNEWS

Queensland state government has approved Cubico's 500MW Wambo Wind Farm project. Located in the south-west of the Australian state 20km north-east of Jandowae, it will comprise up to 110 wind turbines and a 50MW/200MWh battery storage and associated infrastructure. The project is being jointly developed by Cubico Sustainable Investments (Cubico), a long-term owner and operator of renewable energy assets, and Renewable Energy Partners. Cubico head of Australia David Smith said: "Construction of Stage 1 of the wind farm is expected to begin in late 2021, creating around 200 jobs, and be fully operational in 2023, providing a further 20 jobs."