



14 May 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 for consideration.

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Announcements

[Tethys Peer Review Survey](#)

We have extended the deadline for this year's [Tethys Peer Review Survey](#). Please help us guide further development of *Tethys* and ensure it remains a valuable resource by completing the brief survey by 21 May 2021.

[Collegiate Wind Competition](#)

Join the U.S. Department of Energy's (DOE's) virtual [Collegiate Wind Competition \(CWC\)](#) as multidisciplinary university teams present their past year's work in wind energy. The CWC challenges teams to design and test a model wind turbine, plan and financially analyze a wind plant, and create connections with the wind industry and their local communities. In addition to watching the student presentations 2-10 June 2021, viewers can join virtually to get to know the 2021 competitors at the industry networking event, take a virtual tour of the National Renewable Energy Laboratory's (NREL's) Flatirons Campus, and cheer on the 2021 winners at the awards ceremony on 11 June 2021. The schedule is available on the [CWC website](#). Links to the virtual events will be added in the coming weeks.

Calls for Abstracts

American Clean Power (ACP) has extended the deadline to submit presentation proposals for the [ACP Project Siting & Environmental Compliance Virtual Summit](#), which will take place online on 20-22 July 2021. Abstracts are due 21 May 2021.

ACP is also inviting abstracts submissions for the [ACP Offshore WINDPOWER Conference & Exhibition](#), which will take place in Boston, MA on 13-15 October 2021. Abstracts are due 1 June 2021.

Calls for Papers

Frontiers in Marine Science is inviting contributions to a Research Topic entitled, “[Novel Technologies for Assessing the Environmental and Ecological Impacts of Marine Renewable Energy Systems](#)”. Abstracts are due 26 May 2021 and manuscripts are due 26 November 2021.

Energies is inviting submissions for several Special Issues, including "[Turbomachinery, Energy and Environmental Technologies](#)" (due 30 June 2021), "[Analysis and Prediction of Wind Turbine Noise](#)" (due 1 October 2021), and "[Women’s Research in Wind and Ocean Energy](#)".

The *Journal of Marine Science and Engineering* is inviting submissions for several Special Issues, including "[Understanding Impacts of Marine Renewable Energy Structures on Nearshore Dynamics and/or the Environment](#)" (due 30 June 2021), "[Offshore and Onshore Wave Energy Converters: Engineering and Environmental Features](#)" (due 30 September 2021), and "[Impacts of Offshore Wind Farms on Marine Ecosystems, Fisheries and Societies](#)" (due 31 October 2021).

Funding & Testing Opportunities

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).

The Ocean Startup Project has launched its second [Ocean Startup Challenge](#), which will provide funding to support innovators who are leveraging Canadian ocean assets and capabilities to develop solutions to ocean industry challenges, including offshore energy. Applications close 1 June 2021.

Student & Employment Opportunities

Pacific Northwest National Laboratory (PNNL) is recruiting an [Offshore Wind Energy Engineer](#) to develop and implement offshore wind energy research projects with an emphasis on environmental monitoring and wildlife impacts, resource characterization, and grid integration. Applications are due 1 June 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.

Upcoming Events

Upcoming Workshops

The U.S. DOE's NREL 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

Australia's Blue Economy Cooperative Research Centre (CRC) is hosting a webinar, "[Facilitating Consenting and Deployment of Marine Energy Devices through Risk Retirement](#)", at 12:00pm AEST (2:00am UTC) on 19 May 2021. This webinar will present the uncertainties around potential effects of wave and tidal devices and describe the process for simplifying data collection and evidence bases that support risk retirement. Register [here](#).

SWCA Environmental Consultants is hosting a webinar series to discuss how the U.S. permitting landscape and agencies are reacting to the priorities and administrative actions of the Biden administration. Register [here](#) for "[Clean Water Act: Regulatory Updates and Associated Recommendations for Project Permitting](#)" at 11:00am PDT (6:00pm UTC) on 20 May 2021. Register [here](#) for "[Integrating NEPA, Section 106, and Community Outreach to Comply with Biden Administration Environmental Justice Priorities](#)" at 11:00am PDT on 24 May 2021.

The New York State Energy Research and Development Authority (NYSERDA) is hosting the [Culmination Webinar](#) for the [State of the Science Workshop on Wildlife and Offshore Wind 2020: Cumulative Impacts](#) at 9:00am PDT (4:00pm UTC) on 21 May 2021. This webinar is an opportunity to learn about the research priorities identified by the seven taxon-specific work groups that have been meeting throughout the winter of 2020/2021. Register [here](#).

The OceanSET project and the European Technology and Innovation Platform for Ocean Energy (ETIP Ocean) is hosting a webinar, "[Ocean energy progress in Europe](#)", at 11:00am CEST (9:00am UTC) on 26 May 2021. During the webinar, speakers from OceanSET, the European

Commission, and Ocean Energy Europe will provide an update of ocean energy activities across Europe and outline how the sector could evolve toward meeting deployment goals. 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](#).

Offshore Wind California is hosting a webinar, “Permitting Offshore Wind in California: Navigating the Federal and State Approval Processes”, at 10:00am PDT (5:00pm UTC) on 26 May 2021. During the webinar, experts will discuss permitting, explore California permitting requirements, and address whether state and federal processes can be done concurrently, jointly, and what the timelines look like. Register [here](#).

The U.S. DOE’s NREL and Water Power Technologies Office are hosting a webinar at 12:00pm EDT (4:00pm UTC) on 27 May 2021 to introduce the recently upgraded Marine Energy Atlas, a data and visualization platform that houses the highest resolution publicly available long-term wave hindcast data set that covers the East Coast, West Coast, Alaska, and Hawaii. Register [here](#).

Event Update

The Center for Research in Wind (CRew) has postponed the [2021 North American Wind Energy Academy \(NAWEA\)/WindTech Conference](#). The 2022 NAWEA/WindTech Conference will be held in person at the University of Delaware. Abstracts already submitted will be withdrawn, and a new call for abstracts will be issued.

Past Events/Recordings

Recordings of the recent Science+ meeting, Energy-environment-society interactions, are now available online [here](#). This meeting gathered thought-leaders from across disciplines to better understand the ecosystem effects of wind, solar, and marine energy infrastructure.

Recordings of Maine Audubon’s recent webinars on offshore wind in Maine are now available online. View the recording for “Offshore Wind Energy and Maine: A Primer” [here](#), “Offshore Wind Energy and Birds” [here](#), “Offshore Wind and the Marine Environment - Marine Mammals and Bats” [here](#), and “Offshore Wind and the Gulf of Maine” [here](#).

New Documents on *Tethys*

Marine Energy

Cost-benefit analysis of tidal energy production in a coastal lagoon: The case of Ria Formosa – Portugal – Rodrigues et al. 2021

The energy that can be extracted from tidal currents is one of the most promising renewable energy sources due to its high density/predictability. Within this paper this energy source is evaluated economically respecting sustainability principles. This evaluation contrasts from previous studies due to the application of a cost-benefit analysis based on a hydro-morphodynamic model, and moving away from the classic proxy of wind energy. It further includes, via the Monte Carlo method, a probabilistic underpinning to the project. The hydro-economic model was applied to a tidal energy project using an Evopod 1:4th scale prototype, based on a real deployment of an Evopod 1:10th scale device in the Ria Formosa, Algarve.

Sustainable energy planning for remote islands and the waste legacy from renewable energy infrastructure deployment – Kouloumpis & Yan 2021

The aim of this paper is to present a life cycle sustainability framework developed and applied for the case of the island of Ushant off North West France. Seven renewable energy generation scenarios were examined and assessed using technoeconomic, social and environmental indicators utilising life cycle costing and life cycle assessment modelling. The results show that only three out of the seven examined renewable energy scenarios manage to cover the 6,807 MWh per annum demand. These scenarios can improve all the indicators against the business-as-usual diesel generation scenario except the ones related to toxicity and reduce greenhouse gas emissions by more than 92%.

Development of Acoustic Doppler Aquatic Animal Monitoring (ADAAM) for application to marine life movement in high-energy tidal channels – Trowse & Zedel 2021

Acoustic Doppler current profilers (ADCPs) are the standard tool for monitoring ocean currents, and they are widely used by the tidal energy industry for physical site characterisations and monitoring. In this study, we make use of data collected using a co-located BioSonics DTX split-beam echosounder, ADCPs, and optical imaging systems to validate fish counts and velocities derived from ADCP data. The study area consists of Grand and Petit Passages in Digby County, Nova Scotia, as well as the surrounding areas of St. Mary's Bay and the outer Bay of Fundy. Grand and Petit Passages are characterised by strong tidal currents, and are sites of interest for the development of in-stream tidal energy technology.

Wind Energy

A roadmap towards quantitative cumulative impact assessments: Every step of the way – Piet et al. 2021

Currently most Cumulative Impacts Assessments (CIAs) are risk-based approaches that assess the potential impact of human activities and their pressures on the ecosystem thereby compromising the achievement of policy objectives. Here we present a first step-

wise approach to conduct a fully quantitative CIA based on the selection and subsequent application of the best information available. To illustrate this approach, we applied it in a North Sea CIA focusing on two sectors, i.e. fisheries and offshore windfarms, and how they impact the ecosystem and its components, i.e. seabirds, seabed habitats and marine mammals through various pressures.

Methods to quantify avian airspace use in relation to wind energy development – Largey et al. 2021

A range of methods and technologies have been applied to the collection of bird flight parameters, such as height and speed, to improve the estimation of potential collision compared with traditional visual methods, but these are currently not applied in a consistent and systematic way. To this end, a systematic literature search was conducted to (1) examine the methods and technologies that can be used to provide bird flight data to assess the impact of wind energy developments and (2) provide an updated framework to guide how they might be most usefully applied within the impact assessment process. Four empirical measurement methods were found that improve the estimation of bird flight parameters: radar, telemetry, ornithodolite and LiDAR.

Combining offshore wind farms, nature conservation and seafood: Lessons from a Dutch community of practice – Steins et al. 2021

Large-scale development of offshore wind farms implies an increase in marine resource use conflicts. Managing potential impacts on marine ecosystems and on resource access for traditional and prospective users is key. Multi-use scenarios are a solution but are often approached as a 'design question' that can be settled through Marine Spatial Planning (MSP). In practice, regulatory, technical and socio-economic factors often hinder multi-use. Overcoming such barriers requires active collaboration between all stakeholders, yet meaningful participation in MSP processes often is a challenge. This paper explores the role of Communities of Practice as a participatory tool for developing multi-use.

News & Press Releases

Marine Energy

2021 Marine Energy Collegiate Competitors Help Chart the Blue Economy Course – U.S. DOE Office of Energy Efficiency and Renewable Energy (EERE)

EERE recently announced the winners of the 2021 Marine Energy Collegiate Competition (MECC), and Kelly Speakes-Backman, the Acting Assistant Secretary for Energy Efficiency and Renewable Energy, recognized them during the closing plenary for the 2021 International Conference on Ocean Energy. Managed by the National Renewable Energy Laboratory on behalf of EERE's Water Power Technologies Office, the competition inspired multidisciplinary teams of undergraduate and graduate students

to unlock the power of the ocean, rivers, and tides to create a business plan and develop, design, and test the technologies that build resilient coastal communities and provide power at sea.

EMEC Delivers World's First International Power Performance Assessment to Verdant – European Marine Energy Centre (EMEC)

The European Marine Energy Centre (EMEC) has completed an independent power performance assessment for Verdant Power's New York tidal power array at the Roosevelt Island Tidal Energy (RITE) site. The report confirms active power output was 187 kW at 2.5 m/s peak flood tide and turbines performed at over 99% availability. Overall water-to-wire efficiencies reached over 46%. This is the world's first marine energy Renewable Energy Test Report (RETR) and follows EMEC becoming the world's first International Electrotechnical Commission (IEC) Renewable Energy Testing Laboratory (RETL) for ocean energy in August 2020.

MPS To Deploy Commercial Megawatt Scale Device at BiMEP, Spain – Marine Power Systems (MPS)

Marine Power Systems have confirmed that Biscay Marine Energy Platform (BiMEP), in the Basque Country (Northern Spain), has been chosen for the deployment of a grid-connected commercial megawatt scale device. The site offers ideal deep water testing conditions and a direct connection into the electricity grid. The berth has been secured and a geotechnical survey of the site is being undertaken. This represents a significant milestone for Marine Power Systems and the development of their unique and flexible technology as the business moves towards market readiness. This project will prove the reliability and effectiveness of their technology at scale as well as support the certification process.

CorPower nears completion of world's largest wave energy test-rig – CorPower Ocean

CorPower is nearing completion of the world's largest wave energy test-rig following an intense two-year project. The 45-tonne moving mass system located in Stockholm is capable of simulating ocean wave conditions anywhere in the world. Measuring 40m in length and 9m in width at 7.2MW rating, the system will play a fundamental role supporting CorPower's flagship HiWave-5 demonstration project, involving the deployment of the firm's first full-scale wave energy converter off the coast of Portugal, later this year. The purpose of the dry testing is not only to test the overall performance of the system, but also to debug, stabilize and fine-tune it before it goes into the ocean.

Canada backs international standardisation of marine energy – Offshore Energy

The Government of Canada has awarded funding to Marine Renewables Canada to support the work of the country's experts participating in the development of international standards for marine renewable energy. The funding was awarded through Natural Resources Canada's Energy Innovation Program. The standards are best practices

based on industry experiences from across the world. They will reduce the cost of deploying marine renewable technology while facilitating international collaboration and trade. Informed by industry, these regulations are expected to accelerate economic growth while stimulating innovation and increasing industry competitiveness.

Wind Energy

[Biden-Harris Administration Approves First Major Offshore Wind Project in U.S. Waters](#) **– U.S. Department of the Interior**

Secretary of the Interior Deb Haaland and Secretary of Commerce Gina Raimondo recently announced approval of the construction and operation of the Vineyard Wind project — the first large-scale, offshore wind project in the United States. The 800-megawatt Vineyard Wind energy project will contribute to the Biden-Harris administration’s goal of generating 30 gigawatts of energy from offshore wind by 2030. The project will be located approximately 12 nautical miles offshore Martha's Vineyard and 12 nautical miles offshore Nantucket in the northern portion of Vineyard Wind’s lease area. It will create 3,600 jobs and provide power for 400,000 homes and businesses.

[X1 Wind prepares PivotBuoy floating wind platform for Canaries deployment](#) – PivotBuoy

X1 Wind is preparing to deploy its ground-breaking PivotBuoy® floating wind technology in the Canary Islands after successfully completing the assembly and load-out of a fully functional prototype. The prototype has been developed through the €4million PivotBuoy Project awarded by the European Commission Horizon 2020 Program. It will be installed at the Oceanic Platform of the Canary Islands (PLOCAN) test site with full exposure to open ocean conditions in a bid to demonstrate the efficiency of the innovative structural design and mooring system. The 1:3 scale prototype (X30) will be stationed at a 50m water depth through a single point mooring system in a downwind configuration – creating a ‘weathervaning’ solution which maximises use of passive systems.

[South Korea Unveils EUR 27 Billion Floating Wind Project](#) – Offshore Wind

The Government of South Korea will invest KRW 1.4 trillion (around EUR 1 billion) in the first phase of the project to develop a 6 GW floating wind farm offshore Ulsan, the country’s president Moon Jae-in said. The mammoth project will need a public-private investment of some KRW 36 trillion (EUR 26.7 billion), with the full commissioning expected in 2030. Some 20 per cent of the electricity produced at the wind farm could be used to produce around 84,000 tons of hydrogen per year, Moon said. This one project alone would meet half of the country’s offshore wind capacity target by 2030. The project is expected to create 210,000 jobs, Moon said. The 6 GW wind farm will be built at the site of the Donghae 1 gas field which is scheduled to end production in 2022.

[Vibrating instead of hammering: new research project investigates innovative installation technique for offshore foundations](#) – RWE

“VISSKA” is the German acronym for a research project aimed at exploring the use of vibratory pile driving at the Kaskasi II offshore wind farm, in terms of installation, noise emissions and the impact on the behaviour of porpoises. This year, RWE will start constructing the Kaskasi offshore wind farm (342 megawatts) off the German island of Heligoland. It will be the first commercial offshore wind farm in the world to use the improved installation method for driving the wind turbine foundations into the seabed to target penetration depth. The innovative vibro pile driving technology significantly speeds up the process of installing the foundations, is gentler in its impact on the structure and produces far less noise.

Hexicon to develop TwinWay project for floating wind in Norway – Hexicon

Hexicon will develop a demonstrator project for floating wind power at the Norwegian Marine Energy Test Centre’s (Metcentre) deep water area off of Norway’s coast. The project, TwinWay, is a pilot to commercialise new offshore floating wind technology. The intention of the TwinWay project is to show proof of concept for Hexicon’s floating wind foundation through twin wind-turbines pilot unit designed for, installed, and operated at Metcentre. Floating wind platforms enable installation in greater water depth, allowing higher average wind speed and lower visual impact. Metcentre has applied for consent for a new larger capacity of 85 MW, expected to be granted in 2021. Hexicon has signed a conditional site exclusivity agreement with a reservation of 6 megawatt.