



10 December 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

New Podcast Episode

Pacific Northwest National Laboratory's Andrea Copping was recently interviewed on the [Wild About Conservation](#) podcast about environmental effects of marine energy. Listen for free [here!](#)

Horizon Europe Update for UK Applicants

If you're a UK-based researcher or innovator, you can now apply to most Horizon Europe funding opportunities on the same terms as EU-based applicants. The UK government [recently announced](#) a new financial safety net for successful UK-based applicants. Learn more [here](#).

BOEM Seeking Comments

The US Bureau of Ocean Energy Management (BOEM) is seeking public input on proposed offshore wind lease sales in the [Gulf of Mexico](#) through 16 December 2021 and the [Carolina Long Bay](#) area through 7 January 2022. BOEM is also accepting public comments to inform the preparation of an Environmental Impact Statement for the [New England Wind Proposal](#) through 22 December 2021 and the [Morro Bay Wind Energy Area](#) through 11 January 2022.

Call for Abstracts

The [Call for Abstracts](#) for the 9th Partnership for Research in Marine Renewable Energy (PRIMaRE) Conference is now open through 14 February 2022. The conference will take place in Cornwall, UK on 6-7 July 2022.

Calls for Papers

Frontiers In Energy Research is accepting submissions for several Research Topics, including “[Offshore Wind Energy: Modeling and Measurements](#)” (due 28 January 2022) and “[Offshore Wind and Wave Energy and Climate Change Impacts](#)” (due 23 February 2022).

Inventions is accepting submissions for a Special Issue, "[Marine Renewable Energy, an Important Resource Towards a Low Carbon Future](#)", until 1 March 2022.

Energies is accepting submissions for several Topical Collections, including "[Women's Research in Wind and Ocean Energy](#)" and "[Feature Papers on Wind, Wave and Tidal Energy](#)".

Funding & Testing Opportunities

The Offshore Renewable Energy Catapult is now accepting applications from UK innovators to join the second cohort of the [National Launch Academy](#), a technology accelerator programme for the offshore wind industry. Applications are due 15 December 2021.

The US California Energy Commission released a Grant Funding Opportunity titled, “[Propelling Offshore Wind Energy Research](#)”, which will fund projects to demonstrate, test, and validate floating offshore wind components and tools. Applications are due 15 December 2021.

The US Testing Expertise and Access for Marine Energy Research (TEAMER) Program is now offering limited [open water support for marine energy testing](#) through its facility network. Applications for the 5th TEAMER Request for Technical Support are due 16 December 2021.

The New York State Energy Research and Development Authority recently launched a [Request for Proposals](#) to support the collection of data through acoustic and oceanographic surveys in the New York Bight Wind Energy Areas to facilitate the responsible development of offshore wind. Applications are due by 3:00pm EST (8:00pm UTC) on 10 January 2022.

The European Maritime, Fisheries and Aquaculture Fund has launched a Call for Proposals to support strategic collaboration in the Atlantic, Black Sea, and Western Mediterranean. Proposals for Topic 1, “[Innovative multi-use projects combining offshore renewable energy with other activities and/or with nature protection in the Atlantic](#)”, are due 12 January 2022.

The US DOE’s National Renewable Energy Laboratory (NREL) has extended the deadline for its [Request for Proposals](#) to support research into the behavior of bats at wind turbines and species-specific responses to deterrent stimuli. Proposals are now due by 12:00pm MST (7:00pm UTC) on 14 January 2022. Awardees will receive \$450k to \$700k each to fund the research.

Student & Employment Opportunities

The European Marine Energy Centre is currently looking for an [Environmental Data Engineer](#), a [Stakeholder Engagement Officer](#), a [Marketing Officer](#), and an [Orkney Renewables Marketing Officer](#), among other positions. Applications are due by 1:00pm UTC on 17 December 2021.

The Joint Nature Conservation Committee is seeking a [Senior Marine Ornithologist](#) to support a range of projects, including research on seabird interactions with offshore wind developments. Applications are due on 20 December 2021.

Upcoming Events

Upcoming Webinars

The European Technology and Innovation Platform for Ocean Energy (ETIP Ocean) is hosting a [webinar on the economic and social value of ocean energy](#) at 2:00pm UTC on 14 December 2021. During the webinar, the lead authors of two key studies that calculate the benefits of ocean energy in Europe in terms of Gross Value Added and jobs will present the results. Register [here](#).

The American Wind Wildlife Institute and NREL are hosting a webinar on [Bat Behavior and Interactions with Wind Turbines](#) on 14 December 2021 from 2:00-4:00pm ET (7:00-9:00pm UTC). This webinar will explore several research questions related to available technology used to study bat behavior, bat behavior near wind turbines, collision conditions, and potential improvements for minimization strategies. Register [here](#).

As part of the US Offshore Wind Synthesis of Environmental Effects Research ([SEER](#)) project, PNNL and NREL are hosting the [second of four webinars](#) on the environmental effects of offshore wind energy from 8:00-9:30am PST (4:00-5:30pm UTC) on 15 December 2021. The webinar will feature presentations and panel discussions on benthic disturbance and the effects of new offshore wind farm structures on fish ecology. Register [here](#). If you missed the first webinar on underwater noise and entanglement considerations, view the slides and recording [here](#)!

Upcoming Conferences

The Supergen Offshore Renewable Energy (ORE) Hub is hosting the [4th Supergen ORE Hub Annual Assembly](#) on 18-20 January 2022 in Plymouth, UK and online. To accompany the event, the Hub is also hosting an [Early Career Researcher Forum](#) on 18 January 2022. Register for free.

[OCEANS 2022 Chennai](#), scheduled for 21-24 February 2022, will now take place as a hybrid event, with the option to attend the conference in Chennai, India or virtually. Register [here](#).

The Basque Energy Cluster and Ocean Energy Europe (OEE) have teamed up to host a joint event on 18-20 October 2022 in Donostia-San Sebastián, Spain, combining the International Conference on Ocean Energy and OEE's Conference & Exhibition ([ICOE-OEE 2022](#)).

New Documents on *Tethys*

Marine Energy

[Predicting coastal impacts by wave farms: A comparison of wave-averaged and wave-resolving models](#) – David et al. 2022

Wave energy converters (WECs) will have to be arranged into arrays of many devices to extract commercially viable amounts of energy. To understand the potential coastal impacts of WEC arrays, most research to date has relied on wave-averaged models given their computational efficiency. However, it is unknown how accurate wave-averaged model predictions are given a lack of validation data and their inherent simplifications of various hydrodynamic processes (e.g., diffraction). This paper compares the predictions of coastal wave farm impacts from a coupled wave-averaged and flow model (Delft3D-SNL-SWAN), to a wave-resolving wave-flow model (SWASH) that intrinsically accounts for more of the relevant physics. Model predictions were compared using an idealized coastal bathymetry over a range of wave conditions and wave farm geometries.

[A review of tidal energy—Resource, feedbacks, and environmental interactions](#) – Neill et al. 2021

Here, we review both tidal range and tidal stream energy, with a focus on the resource, feedbacks, and environmental interactions. The review covers a wide range of timescales of relevance to tidal energy, from fortnightly (spring-neap) and semi-diurnal variability, down to array, and device-scale turbulence. When simulating the regional tidal energy resource, and to assess environmental impacts, it is necessary to account for feedbacks between the tidal array and the resource itself. We critically review various methods for simulating energy extraction, from insights gained through theoretical studies of “tidal fences” in idealized channels, to realistic three-dimensional model studies with complex geometry and arrays of turbines represented by momentum sinks and additional turbulence due to the presence of rotors and support structures.

[Accelerating ocean-based renewable energy educational opportunities to achieve a clean energy future](#) – Constant et al. 2021

The ocean-based renewable energy workforce needs engineers and scientists to develop cost-effective technologies, as well as trade and maritime workers to eventually deploy the technologies at scale. In the United States, educational institutions, state governments, and private developers are taking action to understand job skills and capability requirements and to develop educational and training programs to meet offshore workforce needs; most are focused on offshore wind power, with gaining interest in marine energy. This article explores the workforce requirements of the growing ocean-based renewable energy industry and the current state of education and training programs to meet those requirements in order to identify gaps and make recommendations for further workforce development activities and initiatives.

Wind Energy

[A model for estimating life cycle environmental impacts of offshore wind electricity considering specific characteristics of wind farms](#) – Kouloumpis & Azapagic 2022

Offshore wind electricity is becoming an important source of renewable energy due to its global warming potential (GWP). However, the GWP can vary significantly, depending on many factors, including the capacity of the installation, distance from the shore, supporting structure and maintenance requirements. Currently, there is a lack of life cycle assessment (LCA) studies that take these specific conditions into account. As a consequence, developers and policy makers rely on average GWP values which could lead to inaccurate estimates of the GWP and other impacts. To address this gap, this paper presents a new model for estimating the life cycle impacts of offshore wind electricity taking into account specific technical characteristics of individual installations and whole wind farms. Aimed at non-experts, the model provided freely with this paper is developed in Excel and follows the ISO 14040/44 LCA methodology.

[A review of the effectiveness of operational curtailment for reducing bat fatalities at terrestrial wind farms in North America](#) – Adams et al. 2021

Curtailment of turbine operations during low wind conditions has become an operational minimization tactic to reduce bat mortality at terrestrial wind energy facilities. Site-specific studies have demonstrated that bat activity is higher during lower wind speeds and that operational curtailment can effectively reduce fatalities. However, the exact nature of the relationship between curtailment cut-in speed and bat fatality reduction remains unclear. To evaluate the efficacy of differing curtailment regimes in reducing bat fatalities, we examined data from turbine curtailment experiments in the United States and Canada in a meta-analysis framework. We used multiple statistical models to explore possible linear and non-linear relationships between turbine cut-in speed and bat fatality. We found strong evidence that implementing turbine curtailment reduces fatality rates of bats at wind farms.

[Offshore Windfarm Footprint of Sediment Organic Matter Mineralization Processes](#) – De Borger et al. 2021

Offshore windfarms (OWFs) offer part of the solution for the energy transition which is urgently needed to mitigate effects of climate change. Marine life has rapidly exploited the new habitat offered by windfarm structures, resulting in increased opportunities for filter- and suspension feeding organisms. In this study, we investigated the effects of organic matter (OM) deposition in the form of fecal pellets expelled by filtering epifauna in OWFs, on mineralization processes in the sediment. OM deposition fluxes produced in a 3D hydrodynamic model of the Southern Bight of the North Sea were used as input in a model of early diagenesis. Two scenarios of OWF development in the Belgian Part of the North Sea (BPNS) and its surrounding waters were calculated and compared to a no-OWF baseline simulation.

News & Press Releases

Marine Energy

[UK government announces biggest investment into Britain's tidal power](#) – UK Government

The UK government will invest £20 million per year in Tidal Stream electricity as part of its flagship renewable energy auction scheme, kickstarting a brand-new chapter for the tidal industry and creating jobs across the UK. As part of the fourth allocation round of the Contracts for Difference Scheme due to open next month, the UK government will ensure that £20 million per year will be ringfenced for Tidal Stream projects, giving the marine energy sector a chance to develop their technology and lower their costs in a similar way to the UK's world-leading offshore wind industry. This will bring the total funding for this allocation round to £285 million per year.

[EuropeWave's successful wave energy projects unveiled](#) – EuropeWave

The EuropeWave project recently announced the successful tenderers in its innovative Pre-Commercial Procurement (PCP) process. Following a strong response to the initial call for tenders, seven successful project teams have been selected by a panel of independent experts and will share a budget of €2.4 million to further develop their wave energy device concepts in the first half of 2022. The EuropeWave project, a five-year collaborative R&D funding programme, is a partnership between Wave Energy Scotland (WES) and the Basque Energy Agency (EVE). Match-funded by the European Commission via its Horizon2020 programme, this transnational collaboration will channel almost €20 million to procure the most promising wave energy technology solutions from developers across Europe and beyond.

[Dutch Government supports joint research infrastructure for offshore renewable energy](#) – Dutch Marine Energy Centre

Nine Dutch research institutes and test facilities recently joined forces to accelerate the development of offshore renewable energy (ORE) research. Backed by the Dutch Government, the NL-MARINERG-i consortium will provide significant support to European targets for ORE and key priorities such as the Green Deal. The NL-MARINERG-i is part of the European MARINERG-i consortium, which has been selected as one of the eleven key priorities of the European research roadmap ESFRI (European Strategy Forum on Research Infrastructures) 2021. The team is now embarking on a preparatory phase, establishing the legal, governance, scientific and business components required to implement the MARINERG-i Research Infrastructure.

[Ocean DEMO backs six offshore renewable energy developers](#) – Offshore Energy

The EU-funded Ocean DEMO (Demonstration Programme for Ocean Energy Pilot Farms and Supporting Technologies) project has awarded recommendations for support to six offshore renewable energy developers to test their ocean energy products at Europe's

world-leading test centres. Successful applicants will receive free access to test their ocean energy products and services in real sea environments at the project's network of test centres. The following technology developers were recommended for support packages under the Ocean DEMO's fourth call, and two of them already started testing in real sea conditions: Aquantis, Dutch Wave Power, LHYFE Labs, Mocean Energy, OV Wind, and University of Edinburgh.

World first IECRE Renewable Energy Certification Body for marine energy – Lloyd's Register

Lloyd's Register (LR) has been accepted as the world's first Renewable Energy Certification Body (RECB) for marine energy by the International Electrotechnical Commission's Renewable Energy System, (IECRE), which operates the global conformity assessment system in the three electrically producing renewable energy sectors: solar photovoltaic (PV) energy, wind energy, and marine energy. With IECRE recognition as an RECB for the marine energy market, which refers to the energy harnessed from wave, tidal, river current or ocean thermal gradient sources, and the wind sector, LR is now able to certify complex hybrid renewable energy projects on behalf of the IECRE that involve multiple technologies, such as wind, wave and tidal.

Wind Energy

Interior Department Approves Second Major Offshore Wind Project in U.S. Federal Waters – US Department of the Interior

As part of the Biden-Harris administration's goal to deploy 30 gigawatts (GW) of offshore wind energy by 2030, the Department of the Interior today announced it has approved the construction and operations of the South Fork Wind project offshore Rhode Island. This represents the Department's second approval of a commercial-scale, offshore wind energy project in the United States. Last week, Secretary Haaland celebrated the groundbreaking of the first commercial scale offshore wind project, located off the coast of Massachusetts. The approximately 130-megawatt South Fork Wind project will be located approximately 19 miles southeast of Block Island, Rhode Island, and 35 miles east of Montauk Point, New York. It will create about 340 jobs and provide enough power for about 70,000 homes.

Power Purchase Agreements Signed for Dogger Bank C – SSE Renewables

SSE Renewables and Equinor, the joint venture partners co-developing the 3.6GW Dogger Bank Wind Farm in the North Sea, recently announced that 15-year offtake Power Purchase Agreements (PPAs) have been signed for the third phase of the world's largest offshore wind farm. Dogger Bank Wind Farm will be constructed over 130km out to sea off the north-east coast of England, where wind speeds are higher and more consistent than near to the shore. Due to its size and scale, Dogger Bank Wind Farm is being built in three consecutive 1.2GW phases; Dogger Bank A, Dogger Bank B and Dogger Bank C. Each phase is expected to generate around 6TWh of electricity annually,

totalling 18TWh annually across all three phases – that’s enough renewable electricity to supply 5% of the UK’s demand and equivalent to powering six million UK homes.

Landmark Demonstration Shows How Common Wind Turbine Can Provide Fundamental Grid Stability: NREL Uses Advanced Grid Research Environment for First-Ever Example of Type-3 Turbines Using Grid-Forming Controls – NREL

In a milestone for renewable energy integration, the National Renewable Energy Laboratory (NREL) and partner General Electric (GE) have operated a common class of wind turbines in grid-forming mode, which is when the generator can set grid voltage and frequency and, if necessary, operate without power from the electric grid. The demonstration showed that the popular type-3 turbine technology can supply fundamental stability to the bulk power grid. GE’s grid-forming controls allow the turbine to make up for fewer conventional sources of stability on the grid, such as coal or natural-gas-fired generators, while also overcoming a well-known issue with electrical oscillations, in which voltage fluctuations are amplified and occasionally lead to power plant outages.

TetraSpar Demonstrator, the world’s first fully industrialized floating offshore foundation, is now commissioned and in operation – RWE

The floating wind foundation TetraSpar Demonstrator owned by Shell, TEPCO RP, RWE, and Stiesdal has been successfully connected to Norway’s grid. The floating foundation was towed from Denmark to Norway in July. It has now been fully commissioned and is producing power in automatic, unattended operation. The project will now enter its test phase where data on the performance and characteristics of the TetraSpar floating foundation will be captured and analyzed to pave the way for commercial-scale floating wind projects. The demonstration project has shown that Stiesdal’s ‘Tetra’ concept remains on target to offer important advantages over existing floating wind concepts, with the potential for leaner manufacturing, assembly, and installation processes, and with lower material costs.

Alinta Energy investigates 1000 MW Spinifex Offshore Wind Farm – Alinta Energy

Alinta Energy recently announced the potential for a 1000 MW wind farm to be established around 10km off the coast of Portland, in southwestern Victoria, that could supply the Portland Aluminium Smelter and east coast electricity grid. The Spinifex Offshore Wind Farm would connect to the grid via the smelter and would make the site among Australia’s first smelters to be powered by up to 100 per cent renewables. Up to \$4 billion of investment would generate new wind farm construction and operation jobs and help secure jobs at the site. The project specifics – for example, where turbines will go and how big they’ll be – are some way off and would be informed by environmental studies, the available technology and cost, site investigations, approvals processes and consultation with the community and experts.