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[Tethys](#) is an online knowledge hub 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. Email tethys@pnnl.gov to contribute!

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Announcements

SEER Workshop Report Now Available

The [U.S. Offshore Wind Synthesis of Environmental Effects Research \(SEER\)](#) effort recently published a [report](#) that summarizes the discussions and key takeaways from its May workshop on preconstruction research recommendations for offshore wind development on the U.S. Pacific Coast. Based on workshop feedback and over 40 resources, SEER developed a database of over 500 research recommendations, as well as a shorter summary version. View both on *Tethys* [here](#).

ORISE Applications

The U.S. Department of Energy's (DOE) Water Power Technologies Office (WPTO) and Oak Ridge Institute for Science and Education (ORISE) recently opened applications for the next cohort of students for the [Marine Energy Graduate Student Research Program](#). The program is accepting applications from master and doctoral students with a marine energy-focused research thesis and/or dissertation at a U.S. institution. Applications are due 2 December 2022.

SULI & CCI Applications

The U.S. DOE Office of Science is now accepting applications for the [Science Undergraduate Laboratory Internships \(SULI\)](#) program and the [Community College Internships \(CCI\)](#) program.

Interns will work directly with national laboratory scientists and engineers that support the DOE mission. The application deadline is 10 January 2023.

BOEM & NOAA Draft Strategy

The U.S. Bureau of Ocean Energy Management (BOEM) and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries) recently [announced](#) the release of the [Draft North Atlantic Right Whale and Offshore Wind Strategy](#) that identifies the agencies' goals and objectives to better understand the effects of offshore wind development on the whales and their habitat. Public comments are due 4 December 2022.

BOEM Seeks Public Comment

BOEM is also seeking public comments on [two proposed guidelines](#) that clarify the requirements that offshore wind lessees must include in Construction and Operation Plans (due 12 December 2022), on proposed Wind Energy Areas in the [Central Atlantic](#) (due 16 December 2022), and the draft environmental analysis for the [Empire Wind Project](#) off New York (due 17 January 2023).

Calls for Abstracts

American Clean Power (ACP) is now [accepting submissions](#) for panel and poster presentation opportunities at the [Siting and Environmental Compliance Conference 2023](#) through 2 December 2022. The conference will take place in Spring 2023.

The [Call for Abstracts](#) for [OCEANS 2023 Limerick Conference & Exhibition](#) is now open through 20 December 2022. The event will take place on 5-8 June 2023 in Limerick, Ireland.

ACP is also [accepting submissions](#) for panel and poster presentations opportunities at [CLEANPOWER 2023 Conference & Exhibition](#) through 30 December 2022. The event will take place on 22-25 May 2023 in New Orleans, U.S.

The [Call for Abstracts](#) for the [15th European Wave and Tidal Energy Conference Series \(EWTEC 2023\)](#) is now open through 28 January 2023. Full papers will be due 27 May 2023. EWTEC will take place on 3-7 September 2023 in Bilbao, Spain.

Funding & Testing Opportunities

The U.S. DOE'S WPTO has released a \$10.3 million funding opportunity, "[Marine Energy Systems Innovation at Sea](#)", to accelerate the development and testing of marine energy technologies with a focus on wave and ocean current. Concept papers are due 2 December 2022.

ProtoAtlantic is now accepting applications for the [ProtoAtlantic Customized Scale Start-Ups Support Program](#) at the Lir-National Ocean Test Facility in Ireland. The program will provide free facilities access to marine technology (wave, wind, tidal, floating solar, biotechnology, robotics) developers across the Atlantic Area. Applications are due 23 December 2022.

The U.S. DOE has opened applications for the [Small Business Innovation Research \(SBIR\) and Small Business Technology Transfer \(STTR\) Program](#), which offers grants to small businesses to support technological innovation. WPTO is hosting an [informational webinar](#) from 2:00-3:00pm EST (7:00-8:00pm UTC) on 1 December 2022 to provide information on water-power-focused topics. Letters of intent are due 3 January and applications are due 21 February 2023.

The European Commission has launched two new [Calls for Proposals](#) under the European Maritime, Fisheries and Aquaculture Fund aimed at supporting careers and regional projects for a sustainable blue economy in EU sea basins. Proposals are due 31 January 2023.

Student & Employment Opportunities

Oregon State University is seeking a [Marine Energy Testing Manager](#) to manage internal and external outreach and engagement with stakeholders including faculty, national and international testing facilities, and marine industries. Applications are due 30 November 2022.

Aquatera is hiring [Expert and Senior Environmental Consultants](#) to support environmental impact assessments for offshore wind, tidal, wave, floating solar, and other offshore renewable energy projects in the UK and internationally. Applications are due 1 December 2022.

The University of Hull's Aura Centre for Doctoral Training (CDT) in Offshore Wind Energy and the Environment is offering a [PhD scholarship](#) on the effects of very large scale offshore wind deployment on physical processes in the North Sea. Register [here](#) to attend an informational webinar at 6:00pm UTC on 29 November 2022. Applications are due 4 January 2023.

The University of Hull is also inviting applications for a [PhD project](#) on fishing and very large scale offshore wind deployment in the North Sea. Register [here](#) to attend an informational webinar at 6:00pm UTC on 1 December 2022. Applications are due 10 February 2023.

Upcoming Events

Upcoming Webinars

The European Technology & Innovation Platform for Ocean Energy and the Demonstration Programme for Ocean Energy Pilot Farms and Supporting Technologies are hosting a webinar at 2:00pm UTC on 14 December 2022. During the webinar, Mocean Energy, AWS, and CorPower Ocean will share lessons learnt from wave energy deployments. Register [here](#).

The New York State Energy Research and Development Authority (NYSERDA) is hosting a New York Offshore Wind Public Webinar from 12:00-1:00pm EST (5:00-6:00pm UTC) on 15 December 2022, which will focus on NYSERDA's recent activities in supply chain, workforce development, and environmental and fisheries research and engagement. Register [here](#).

New Documents on *Tethys*

Marine Energy

[Providing a detailed estimate of mortality using a simulation-based collision risk model](#) – Horne et al. 2022

Marine renewables could form a significant part of the green energy mix. However, a potential environmental impact of tidal energy converters (TECs) is collision risk between a device and animal, which has been a significant barrier in the consenting process. While it is important to understand the number of collisions of an animal with the device, the relative speed at which an animal collides with the device, and the point on the animal where collision occurs, will determine whether a collision is fatal, which is important in understanding population-level impacts. Using a simulation-based collision risk model, this paper demonstrates a novel method for producing estimates of mortality.

[Marine renewable energy project: The environmental implication and sustainable technology](#) – Cui & Zhao 2022

Although sustainable marine technology brings benefits to economic development, it also affects the marine environment due to the changes in the behavior of marine animals or marine eco-environment. Therefore, to seek a sustainable solution, this review considers the impact of marine renewable energy technology in the marine environment in order to achieve the environmental implications and sustainable technology development for sustainable marine renewable energy activity. Meantime, compared with existing marine renewable energy research, this study also resolves some potential problems, such as the challenges of high difficulty in sampling values or the limitation of ecological target data.

[Coupled Wave Energy Converter and Nearshore Wave Propagation Models for Coastal Impact Assessments](#) – Flanagan et al. 2022

Future nearshore wave energy converter (WEC) arrays will influence coastal wave and sediment dynamics, yet there are limited numerical methodologies to quantify their possible impacts. A novel coupled WEC-Wave numerical method was developed to quantify these possible influences on the nearshore coastal wave climate. The power performance of an Oscillating Surge Wave Energy Converter (OSWEC) array was simulated to quantify the wave energy dissipation due to the array. The OSWEC's effect on the local wave climate was quantified by a novel coupling of two numerical models, WEC-Sim and XBeach. WEC-Sim characterizes the power extraction and wave energy transmission across the OSWEC, while XBeach captures the change in wave dynamics due to the WEC and propagates the waves to shore.

Wind Energy

[Limited rigor in studies of raptor mortality and mitigation at wind power facilities](#) – Conkling et al. 2022

Wind power is an expanding source of renewable energy. However, there are ecological challenges related to wind energy generation, including collisions of wildlife with turbines. Lack of rigor, and variation in study design, together limit efforts to understand the broad-scale effects of wind power infrastructure on wildlife populations. It is not clear, however, whether these types of limitations apply to groups of birds such as raptors that are particularly vulnerable to negative effects of wind energy. We reviewed 672 peer-reviewed publications, unpublished reports, and citations from 321 wind facilities in 12 countries to evaluate methods used to monitor and mitigate for wind facility impacts on raptors.

[Framework for assessing and mitigating the impacts of offshore wind energy development on marine birds](#) – Croll et al. 2022

Marine birds in particular have life history traits that amplify population impacts from displacement and collision with offshore wind infrastructure. Here, we present a broadly applicable framework to assess and mitigate the impacts of OWED on marine birds. We outline existing techniques to quantify impact via monitoring and modeling (e.g., collision risk models, population viability analysis), and present a robust mitigation framework to avoid, minimize, or compensate for OWED impacts. Our framework addresses impacts within the context of multiple stressors across multiple wind energy developments. We also present technological and methodological approaches that can improve impact estimation and mitigation.

[Heterogeneous warming impacts of desert wind farms on land surface temperature and their potential drivers in Northern China](#) – Liu et al. 2022

To address rapid climate change, wind energy has been widely developed in China in the last two decades. However, wind farm (WF) turbulence effects can change the local climate by redistributing temperature, humidity, and heat fluxes. Previous studies indicate that WFs can significantly increase nighttime land surface temperature (LST); however, their conclusions are mainly derived from individual WFs and ignore heterogeneous impacts among multi-WFs in China. In this study, we detect impacts with MODIS LST products during 2001–2018 at sixteen WFs in the desert of northern China. The results suggest that the averaged warming impacts of WFs on LST are similar between nighttime (0.237 °C) and daytime (0.250 °C).

News & Press Releases

Marine Energy

[CorPower C4 system assembly completed in Viana do Castelo.](#) – CorPower Ocean

CorPower Ocean has completed the system integration of its first commercial scale wave energy converter (WEC), the CorPower C4. The latest milestone for the HiWave-5 Project was delivered within CorPower's ocean energy facility in Viana do Castelo, northern Portugal. It follows fabrication and testing of the C4 composite hull at the same location, using an in-house Mobile factory cell, and the delivery of the C4 Power Take Off (PTO) from Stockholm. Once completed, the C4 was powered up to the Portuguese grid before a series of pre-deployment checks to verify all system functions were initiated. The pre-deployment check program will now be completed prior to moving quayside for ocean deployment.

[Plans laid for the world's first tidal energy-powered deep sea container terminal](#) – Offshore Energy

Centre Port Holdings, a UK-based marine and renewable energy infrastructure developer, has unveiled plans for a scheme that will use tidal energy to power a deep sea automated container terminal capable of processing between 1.5 and 4 million containers annually. The first stages of development of a major tidal energy scheme in the Wash that incorporates the world's first tidal powered deep sea container terminal as well as providing landside flood defenses for up to a million people have been announced by Centre Port Holding's CEO James Sutcliffe. The Wash is a rectangular bay and multiple estuary at the north-west corner of East Anglia on the east coast of England.

[Launch of pilot buoy "Gaia"](#) – Ocean Oasis

The Norwegian company Ocean Oasis recently unveiled the prototype of its offshore floating desalination plant at Las Palmas in Gran Canaria. The prototype, named "Gaia", is powered by wave energy and will be tested at the Oceanic Platform of the Canary Islands (PLOCAN). This technology will allow the production of fresh water from ocean waters by harnessing the energy of the waves to carry out a desalination process and pump potable water to coastal users. The prototype, assembled in the port of Las Palmas, is 7 meters in diameter and 10 meters high and weighs about 100 tons. Gaia will be anchored in the southern area of the PLOCAN test site at Punta de la Mareta.

[Development on Minesto's Dragon Class project - new record-levels of electricity production](#) – Minesto

Minesto's microgrid power plant Dragon 4 (100 kW) has produced record-levels of electricity in October and November. A second foundation will now be installed, to run a mini array with two Dragon 4 units operating in parallel. The development of Minesto's utility-scale power plant Dragon 12 (1.2 MW) is also making significant progress. Installation of the Dragon 12 is now scheduled for spring 2023. Since its successful commissioning in September, the second *Dragon 4* unit has been producing electricity

throughout October and November, and has delivered record-breaking results in terms of total electricity generated, peak performance, and energy conversion at large.

Innovative pre-tension solution reduces InfinityWEC electricity production cost – Ocean Harvesting

The InfinityWEC wave energy converter has been upgraded with an innovative solution which uses hydrostatic pressure to provide a constant pre-tension force in the power take-off (PTO), reducing size, weight, complexity, and ultimately cost of electricity production (LCoE). In the upgraded InfinityWEC design, the PTO hull is split into two halves, with the top half moving up and down with the buoy, while the bottom half is fixed to the anchor. Similar solutions have been used by pressure-modulating wave energy converters, to extract energy from the variation in pressure below waves, close to the surface. InfinityWEC however, is a point-absorbing wave energy converter, with a buoy on the surface driving the PTO positioned close to the seabed.

Wind Energy

EDF Renewables, Enbridge and CPP Investments Announce France's First Offshore Wind Project, Saint-Nazaire, is Now Fully Operational – Enbridge

EDF Renewables, Enbridge, and CPP Investments have achieved a significant milestone as France's first commercial-scale offshore wind project, the 480-megawatt Saint-Nazaire Offshore Wind Farm, is now fully operational. Located between 12 and 20 km from the southwest coast of France, the wind farm will help support the French State's energy transition goals, which include targets to generate 32% of its energy from renewable sources by 2030. By providing secure, low carbon, affordable and reliable energy, Saint-Nazaire is also responding to the global energy challenge at a crucial time. The wind farm will produce the equivalent of 20% of the Loire-Atlantique's annual electricity consumption and supply the equivalent of the consumption of 700,000 people with electricity every year.

First power from Hywind Tampen – Equinor

Power production from the first turbine in the floating wind farm Hywind Tampen in the North Sea started at 12:55 CET on 13 November. The power was delivered to the Gullfaks A platform in the North Sea. “I am proud that we have now started production at Hywind Tampen, Norway’s first and the world’s largest floating wind farm. This is a unique project, the first wind farm in the world powering producing oil and gas installations,” says Geir Tungsвик, Equinor’s executive vice president for Projects, Drilling and Procurement. Owned by the Gullfaks and Snorre partners, the Hywind Tampen wind farm is expected to meet about 35 percent of the electricity demand of the two fields. This will cut CO₂ emissions from the fields by about 200,000 tonnes per year.

Vineyard Wind Partners with Local Tech Firm on Enhanced Marine Mammal Detection – Vineyard Wind

Vineyard Wind and Charles River Analytics recently announced a new collaboration aimed at further protecting marine mammals during the construction of the Vineyard Wind 1 project. As part of the effort, Vineyard Wind will employ Awarion™ technology for marine mammal, ship, and fishing gear detection. The technology is being provided by Charles River Analytics, a Cambridge-based research and development firm. Awarion™ is an artificial intelligence and computer vision system that complements and supports human lookouts and marine radar systems. The technology uses electro-optical and infrared video to detect, analyze, and report on the presence of whales, ships, and other objects, including fishing buoys and equipment, at long distances.

BOEM Identifies Draft Wind Energy Areas in the Central Atlantic for Public Review and Comment – BOEM

As part of the Biden-Harris administration's goal of deploying 30 gigawatts of offshore wind energy capacity by 2030, BOEM recently announced eight draft Wind Energy Areas (WEAs) offshore the U.S. central Atlantic coast for public review and comment. The draft WEAs cover approximately 1.7 million acres offshore North Carolina, Virginia, Maryland, and Delaware, with their closest points ranging from approximately 19 to 77 nautical miles off the U.S. central Atlantic coast. BOEM used a comprehensive process to identify the potential offshore locations that appear most suitable for renewable energy development, taking into consideration possible impacts to local resources and ocean users.

COP27: UAE and Egypt agree to build one of world's biggest wind farms – Reuters

The presidents of the United Arab Emirates (UAE) and Egypt witnessed the signing of an agreement on Tuesday to develop one of the world's largest onshore wind projects in Egypt, according to an official statement on the Gulf nation's state news agency. The memorandum of understanding was signed between the UAE's renewable energy firm Masdar alongside its joint venture with Egypt's main renewable energy developer Infinity and Hassan Allam Utilities. The 10 GW farm would produce 47,790 GWh of clean energy annually and offset 23.8 million tonnes of carbon dioxide emissions, equivalent to around 9% of Egypt's current CO₂ emissions.