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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

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Did you know that *Tethys* and *Tethys Engineering* are two of seven Knowledge Hubs within the *Portal and Repository for Information on Marine Renewable Energy* ([PRIMRE](#)) ecosystem? To learn more about *PRIMRE* and the other Knowledge Hubs, check out the [PRIMRE Factsheet](#)!

[WREN Webinar Recording Available](#)

Working Together to Resolve Environmental Effects of Wind Energy ([WREN](#)) recently hosted a webinar to present the results of stakeholder feedback identifying environmental priorities related to land-based and offshore wind energy development. View the webinar recording [here](#).

[AMEC Survey](#)

The Atlantic Marine Energy Center (AMEC), the newest national marine energy center established by the US Department of Energy (DOE), is a university-led consortium with a mission to advance the marine energy industry and provide power solutions to blue/maritime economies and coastal communities. One goal of AMEC is to collect information about those who have interests in marine energy to help foster connections, create exchange, and develop

relevant research. AMEC wants to know: Who are you? What is your stake in marine energy? What topics interest you? Visit the [AMEC website](#) and click the graphic to begin the survey.

BOEM Seeking Comments

The US Bureau of Ocean Energy Management (BOEM) is seeking public comments on the draft environmental impact statement for a proposed wind energy project offshore [New Jersey](#) (due 8 August 2022), and on the proposed sale notice for facilities offshore [California](#) (due 1 August 2022). BOEM and the National Marine Fisheries Service are also seeking comments on the [Draft Fisheries Mitigation Guidance](#) (due 22 August 2022) and are hosting several meetings in July to discuss ways to mitigate impacts from offshore wind on commercial and recreational fisheries.

Marine Data Challenge

The Copernicus Marine Service recently launched the [Marine Data Challenge](#) to encourage innovative solutions to important global challenges related to the blue economy, using the Copernicus Marine Service free data on the state of the ocean. Join the Kick Off Meeting on 12 July 2022 from 11:00am-12:00pm EEST (8:00-9:00am UTC) to learn more. Register [here](#).

Virtual Offshore Wind Tour

The Danish Energy Agency and the Ministry of Foreign Affairs of Denmark recently launched a [Virtual Offshore Wind Tour](#) to share Danish experiences with offshore wind development. The virtual platform features a 3D helicopter ride and is available in English, Japanese, and Korean.

New TEDx Talk on Tidal

TEDxAberystwyth recently hosted a TEDx talk, “[Tides as Part of the Energy Mix](#)”, where Dr. Danny Coles, a Research Fellow at the University of Plymouth, discussed the role tidal stream energy can play to meet raising demands for electricity supply.

Calls for Abstracts

The [Call for ePosters](#) for [Environmental Interactions of Marine Renewables \(EIMR 2022\)](#) has been extended through 13 July 2022. EIMR will take place 4-6 October 2022 online.

The [Call for Abstracts](#) for American Clean Power’s [Offshore WINDPOWER Conference & Exhibition 2022](#) is now open through 15 July 2022. The event will take place 18-19 October 2022 in Providence, US.

The Marine Alliance for Science and Technology for Scotland (MASTS) has opened the Call for Abstracts for its [12th Annual Science Meeting \(ASM\)](#) through 19 August 2022. MASTS 2022 ASM will take place 8-10 November 2022 in Glasgow, Scotland.

The American Meteorological Society (AMS) has opened the [Call for Abstracts](#) for the [103rd AMS Annual Meeting](#), which will place 8-12 January 2023 in Denver, US. Submission deadlines vary depending on the conference or symposia, but most abstracts are due 24 August 2022.

Funding & Testing Opportunities

The Testing and Expertise for Marine Energy Research (TEAMER) program, supported by the US DOE, is now accepting [Request For Technical Support \(RFTS\) 7](#) applications through 16 July 2022. Developers can apply for support in numerical modeling and analysis, bench/lab or tank/flume testing, and open water activities. Visit the [TEAMER website](#) for RFTS updates.

The European Commission is launching the Innovation Fund's second [Call for Small Scale Projects](#) in renewable energy, energy-intensive industries including substitute products, energy storage, and carbon capture, use and storage. Applications are due 31 August 2022.

Student & Employment Opportunities

The Bath Beacon in Zero-Carbon Offshore Power is inviting Expressions of Interest from researchers who would like to be hosted at the University of Bath as a [Marie Skłodowska Curie Actions European Postdoctoral Fellow](#). Applications are due 14 July 2022.

The Department of Terrestrial Ecology at Norwegian Institute for Nature Research (NINA) is seeking a [Research Scientist](#) to support on-going research on onshore and offshore wind energy, power lines, and their effects on the environment. Applications are due 31 August 2022.

Upcoming Events

Upcoming Webinars

The US DOE's WINDEXchange initiative is hosting an [Offshore Wind Webinar: Technology Below the Water](#) from 1:00-2:00pm EDT (5:00-6:00pm UTC) on 13 July 2022. During the webinar, offshore wind experts from the National Renewable Energy Laboratory and University of Massachusetts Amherst will discuss technology options and development considerations for diverse seafloor and oceanographic characteristics. Register [here](#).

American Clean Power is hosting a webinar, "[Standardizing the Prediction of Wind Turbine Sound Levels: A new ANSI/ACP Standard](#)", on 27 July 2022 from 1:00pm-2:00pm EDT (5:00-6:00pm UTC). The webinar will provide an overview of a new methodology for predicting sound power levels that will be issued as a new standard in the spring of 2022. Register [here](#).

Pacific Northwest National Laboratory's [Triton Initiative](#) is hosting the next webinar in its *Triton Talks* series on 27 July 2022 from 11:00am-12:00pm PDT (6:00-7:00pm UTC). During the webinar, the Triton Team will present Triton's research on the environmental effects of underwater noise and anthropogenic light associated with marine energy. Register [here](#).

Upcoming Workshop

On behalf of the New York State Environmental Technical Working Group, the New York State Energy Research and Development Authority is hosting the [3rd State of the Science Workshop on Wildlife and Offshore Wind Energy](#) on 26-28 July 2022 in Tarrytown, US and online. In-person registration has closed but virtual registration is available here until 26 July 2022. Register [here](#).

Upcoming Conferences

The [15th International Seabird Group Conference](#) will take place 22-25 August 2022 at University College Cork in Cork, Ireland. The conference will feature a workshop on offshore windfarm development: scientific issues and tools to assess the risk for seabirds. Register [here](#).

The Supergen Offshore Renewable Energy Hub is hosting its [Autumn Early Career Researchers Forum](#) on 28 September 2022 and its [Autumn Assembly](#) on 29 September 2022. Both events will take place in-person at the University of Oxford in Oxford, UK. Learn more [here](#).

New Documents on *Tethys*

Marine Energy

[Ecologically-sustainable futures for large-scale renewables and how to get there](#) – Scott 2022

To arrive at a sustainable future we need offshore renewables to succeed, and to do so we need to work together. There have been ecological showstoppers in the past and there will be again in the future unless we can co-design devices, array layouts and site locations of multiple very large-scale developments such that cumulative ecological effects can be assessed and conflicts with ecological laws, local communities and fishing industries be minimized. In order to effectively spatially manage our marine habitats, weigh-up ecological trade-offs and avoid/adapt to the worst effects of climate change, we need all those involved to understand, at some degree of detail, how our marine ecosystems function such that impact mitigation efforts can start at the design stage of devices and developments.

[Underwater Noise Measurements around a Tidal Turbine in a Busy Port Setting](#) – Haxel et al. 2022

Acoustic emissions from current energy converters remain an environmental concern for regulators because of their potential effects on marine life and uncertainties about their effects stemming from a lack of sufficient observational data. Several recent opportunities to characterize tidal turbine sound emissions have begun to fill knowledge gaps and provide a context for future device deployments. In 2021, a commercial-off-the-shelf hydrophone was deployed in a free-drifting configuration to measure underwater acoustic emissions and characterize a 25 kW-rated tidal turbine at the University of New

Hampshire's Living Bridge Project in Portsmouth, New Hampshire. Sampling methods and analysis were performed in alignment with the recently published IEC 62600-40 Technical Specification for acoustic characterization of marine energy converters.

[A study into the potential social value offered to Europe from the development and deployment of wave and tidal energy to 2050](#) – Ruiz-Minguela et al. 2022

This report gathers evidence on the direct and indirect impacts, in terms of job creation, training needs and business opportunities along the value chain, to the European society and economy of the development of wave and tidal energy technologies in Europe and their deployment globally to 2050. This study builds upon the study into the potential economic value of these technologies previously completed in the project and identifies specific opportunities, quantitative social benefits and high-level policy recommendations. Furthermore, the socioeconomic study has a particular focus on the potential benefits that ocean energy technologies can have on coastal communities. To this respect, results, analyses and conclusions have been based on three case studies of the European regions with strongest capabilities and opportunities in ocean energy.

Wind Energy

[Offshore wind farms contribute to epibenthic biodiversity in the North Sea](#) – ter Hofstede et al. 2022

The North Sea was once abundantly covered with hard substrates such as oyster beds, coarse peat banks and glacial erratics, providing habitat to a rich community of marine species. Most of these habitats were destroyed by bottom-trawl fisheries over the past century, and today, the seabed hosts a relatively poor species community. Emerging offshore windfarms include the re-introduction of hard substrate by means of scour protection around the foundation of wind turbines. It is assumed that the new habitat will contribute to marine biodiversity, and this study aims to demonstrate that. Video data were collected using a Remotely Operated Vehicle in four wind farms in the southern North Sea. A quantitative assessment was made to determine the effect of scour protection on community structure.

[Quantifying the land-based opportunity carbon costs of onshore wind farms](#) – Albanito et al. 2022

The development of onshore wind energy impacts the land where it is constructed, together with competition for natural resources between the energy and land sector. The loss of terrestrial carbon stocks and ecosystem services from land use change to wind farms can be interpreted as the opportunity cost that landowners give up by choosing to construct wind farms on their land. Here, we spatially quantify the impact onshore wind farms have on land when we factor in the opportunity carbon (C) costs. We found that, the construction of 3848 wind turbines in Scotland generated 4.9 million tonnes of carbon dioxide (CO₂) emissions from land use change. On average the emission intensity of land

use change in peatland is 560 g CO₂ kWh⁻¹, in forestry is 88 g CO₂ kWh⁻¹, in cropland is 45 g CO₂ kWh⁻¹, and in pastureland is 30 g CO₂ kWh⁻¹.

Floating Offshore Wind: Environmental Interactions Roadmap: Public Summary Report – ORE Catapult & Xodus Group 2022

It is vital that the floating offshore wind industry develops a sound understanding of the environmental interactions large scale projects will have on the marine environment. Interactions need to be understood, managed and mitigated before the first large scale projects are deployed, to ensure the industry can scale rapidly and support the delivery of a sustainable net zero. In this context, the Floating Offshore Wind Centre of Excellence (FOW CoE), have launched a “Floating Offshore Wind Environmental Interactions Programme and Roadmap”. The roadmap, delivered in partnership with Xodus, is the outcome of the programme’s first phase and it has identified and assessed FOW-specific environmental interactions. It outlines a portfolio of activities required to ensure these interactions are understood and that well established methods exist for their assessment.

News & Press Releases

Marine Energy

São Tomé & Príncipe and Global OTEC Sign Agreement to Develop World’s First Power Purchase Agreement for OTEC in SIDS – Global OTEC

Backed by the powerful Small Island Developing States (SIDS) DOCK Bureau comprising the Prime Ministers of the Kingdom of Tonga and Belize and the President of the Republic of Seychelles and the SIDS DOCK coalition of 32 countries, São Tomé & Príncipe and Global OTEC signed the world’s first agreement to develop a Power Purchase Agreement for the development and deployment of a 1.5 MW floating Ocean Thermal Energy Conversion (OTEC) platform offshore São Tomé island. The parties’ signatures of a Memorandum of Understanding marks the basis of a mutual understanding of the legal and commercial parameters involving the deployment of OTEC technology to the twin-island nation of São Tomé and Príncipe.

UK sets strong example with revenue support for 40 MW of tidal stream – Ocean Energy Europe

Ocean Energy Europe applauds the announcement of the first-ever tidal stream auction winners under the UK’s Contracts for Difference (CfD) scheme. The winning projects – Orbital Marine Eday 1 & 2, Morlais Magallanes and Meygen Phase 2 – will together generate over 40 MW of electricity for British homes and businesses. With its £20m (€23m) commitment for the sector, the UK joins Canada and France in providing revenue support to unlock the huge potential of the innovative ocean energy industry. By awarding contracts to three projects, the government also ensures healthy competition and large-scale growth potential across several tidal technologies. For the tidal industry’s

progress to be sustained, it is vital that the UK government creates long-term visibility by continuing to include ringfenced allowances in future allocation rounds.

Sustainable Marine Partners with Portugal's blueOASIS to Answer Clean Energy 'Call to Action' by Small Island Developing States (SIDS) – Sustainable Marine

Sustainable Marine has formed a strategic partnership with Portugal's blueOASIS to develop a range of 'SIDS-appropriate' marine renewable energy solutions, that can help unlock the vast ocean energy potential of SIDS. The partnership will combine the firms' respective world-class expertise in technical Research & Development to support the wider Blue Economy, and practical experience in delivering modular marine energy systems in environments with limited infrastructure. Sustainable Marine specialises in the development of modular platforms, mooring and anchoring solutions for marine renewable energy, floating wind and nearshore structures. Fast-expanding R&D and Consultancy firm, blueOASIS focuses on performing state-of-the-art applied research to foster secure, clean and efficient sustainable maritime solutions, and promote full decarbonization of the oceans.

ORPC to Install Its First River Hydrokinetic Power System in South America – ORPC

Ocean Renewable Power Company (ORPC), a developer of renewable power systems that generate electricity from free-flowing river and tidal currents, and its wholly-owned subsidiary, ORPC Chile, recently announced that the company has an agreement with the Municipality of Chile Chico in the Aysén region of Patagonia to install a RivGen® Power System there in 2023. ORPC's first installation there will be a RivGen Power System deployed at the meeting point of General Carrera Lake and Bertrand Lake, where the Baker River begins. The initial device will be connected to the Edelaysen utility regional grid network. In the next few years the municipality plans to expand electric vehicle charging networks and tourist traveler services, add public lighting in off-grid areas of the community, and create additional electrical capacity to support sustainable community development.

UKEF shows interest to fund SBS' tidal power project in Indonesia – Offshore Energy

UK-based tidal energy project developer SBS and its state-owned partner Indonesia Power have received expression of interest from UK Export Finance Agency (UKEF), confirming multi-million dollar project development financing for a tidal power scheme in Indonesia's Lantoka Strait. According to developers, the multi-million project development financing is for MW-scale tidal turbine generator facilities in Indonesia. The proposed Lantoka Strait plan of development for tidal energy arrays provides for clean, zero-emissions, sustainable, renewable tidal energy power to the communities of East Flores and Adonara. Under a fully-executed, 50-50 joint-participating agreement between Indonesia Power and SBS, Indonesia Power provides government/liaison and permitting, while SBS is the nominated project director.

Wind Energy

[3D-printed reefs to help restore marine biodiversity in the Kattegat in Denmark – Ørsted](#)

Ørsted and the World Wide Fund for Nature (WWF Denmark) are testing how 3D-printed reefs can benefit biodiversity in the Kattegat, a strait between Denmark and Sweden, which is experiencing a historically low cod stock. This is the first time 3D-printed reefs are used in Danish waters, and they will complement existing boulder reefs that Ørsted established when constructing the Anholt Offshore Wind Farm in 2012-13. Ørsted and WWF have deployed 12 3D-printed reef structures on the seabed between the wind turbines at Anholt Offshore Wind Farm in the Kattegat, which is part of the Greater North Sea ecosystem. The two partners behind the project hope that it will have positive effects on the Kattegat cod stock and in turn contribute to a healthier, more resilient marine ecosystem with improved biodiversity.

[Biggest renewables auction accelerates move away from fossil fuels – UK Government](#)

A record amount of renewable energy has recently been secured through the biggest ever round of the UK government's flagship auction scheme. The fourth round of the Contracts for Difference (CfD) scheme has been the most successful ever, securing almost 11GW across a range of clean technologies, including offshore wind, solar, onshore wind, and for the first time ever—floating offshore wind and tidal stream—helping to boost British energy security and independence with cleaner, more affordable and diverse energy created in the UK. The greatest capacity – almost 7GW - has been secured from new offshore wind projects around the coastline of Great Britain, enough to increase the country's overall capacity built and under construction by 35% and take a significant step towards meeting the government's 50GW of offshore wind ambition by 2030.

[First-of-its-kind wind project delivered by World Kinect Energy Services helps Finland achieve key sustainability milestone – World Kinect Energy Services](#)

The new Nuolivaara wind farm, which is scheduled to get operational within 2022, will serve as a key milestone in Finland's long-term sustainable energy program. A route-to-power purchase agreement (PPA) paved the way for the development of the wind project located in Nuolivaara, Finland – the first of its kind located north of the Arctic circle. The project is an extension of a partnership between energy and sustainability solutions provider, World Kinect Energy Services, and renewable energy developer and operator, wpd Europe. It's the second PPA between the two parties and follows the development of the 188 MW Karhunnevkangas wind farm in the Österbotten region of western Finland last year. Located 25km northeast of Kemijärvi, Finland, the new wind farm will generate a total capacity of 96.9 MW.

[The Crown Estate announces areas of search to support growth of floating wind in the Celtic Sea – The Crown Estate](#)

In a major step forward in supporting the UK's net zero ambitions, The Crown Estate has identified five broad 'Areas of Search' for the development of floating offshore wind in the Celtic Sea. These areas have been identified following technical analysis and extensive engagement between The Crown Estate, the UK and Welsh governments and key agencies, and specialist stakeholders. Further stakeholder and market feedback will be used to refine the Areas of Search into smaller project development areas, within which the first generation of commercial-scale floating windfarms could be built. These project development areas will be offered to the market via competitive tender, to be launched in mid-2023. It is intended that these areas will deliver 4GW of floating offshore wind power by 2035.

South Fork Wind and Leading Environmental Organizations Sign Agreement to Further Enhance Protections for North Atlantic Right Whales – South Fork Wind

South Fork Wind, a joint venture offshore wind project developed by Ørsted and Eversource, recently announced it has signed an agreement with leading environmental organizations to further enhance measures designed to protect the North Atlantic right whale during construction and operation of the offshore wind farm. The agreement with the National Wildlife Federation, Natural Resources Defense Council, and Conservation Law Foundation expands on the commitment from Ørsted, the leading U.S. offshore wind energy partner, and Eversource, New England's largest energy provider and experts in regional energy transmission, to responsibly build clean energy projects while minimizing and mitigating impacts to marine wildlife and critical habitat.