TETHYS BLAST

26 July 2019

The bi-weekly *Tethys* Blast highlights new information on *Tethys*, news articles of international interest, and opportunities in wind and marine renewable energy. We hope you find this a valuable tool to keep you connected to colleagues, new research, opportunities, and industry milestones.

Request for Information

The Department of Energy's (DOE) Water Power Technologies Office is requesting your input on the use of the Pacific Northwest National Laboratory's (PNNL) Marine Sciences Laboratory (MSL) facilities in Sequim, Washington, for research, technology development, and testing related to all aspects of renewable energy, maritime markets, and energy storage. This information will help DOE and PNNL prioritize resources and investments. Please respond to this Request for Information via email to wptorfi@ee.doe.gov by 8 August 2019.

Upcoming Workshop on Retiring Risk: Registration Extended

OES-Environmental (formerly Annex IV) and ORJIP invite you to join a workshop on Thursday, 5 September 2019 from 14:30 to 17:30 CEST on retiring risks of effects on marine animals from electromagnetic fields and underwater noise from marine energy devices. The workshop will be held in Naples, Italy, at the Centro Congressi della Stazione Marittima di Napoli, following the European Wave and Tidal Energy Conference (EWTEC). You can register for the workshop by sending an email to ORJIP (ORJIP@aquatera.co.uk) by 2 August 2019. Once you are registered, you will receive materials at least two weeks prior to the workshop. For more information, visit the workshop's event page on *Tethys*.

Upcoming Workshop on Ocean Energy Reliability

MONITOR and RiaSoR2 invite you to join a workshop on Tuesday, 3 September 2019 from 15:30 to 19:00 CEST on wave and tidal energy reliability. The workshop will be held in Naples, Italy, at the Renaissance Hotel Mediterraneo in Napoli during the European Wave and Tidal Energy Conference (EWTEC). You can register for the workshop by sending an email to carly.tait@emec.org.uk by 31 July 2019. For more information, view the workshop invite here.

Upcoming Webinar Showcasing *Tethys Engineering*

On Wednesday, 7 August 2019 from 9:00 to 10:00 PST, *Tethys* will be hosting a webinar to introduce *Tethys Engineering*, a new website that will cover the technical and engineering aspects of the marine renewable energy industry. The webinar will walk through the website, highlighting new content and features. For more information, visit the webinar's page on *Tethys*.

Call for Abstracts: Renewable Energy Sessions at AGU

The American Geophysical Union (AGU) is hosting two renewable energy sessions at its Fall Meeting on 9-13 December 2019 in San Francisco, CA: Marine & Hydrokinetic and Wind. Please consider submitting an abstract and attending both sessions. Abstracts are due no later than Wednesday, 31 July 2019 and can be submitted here.

Job Opportunity

The Pacific Marine Energy Center (PMEC) is currently looking for a Marine Energy Research Engineer with experience in hydrodynamics and power systems to join their team at the Applied Physics Laboratory at the University of Washington (APL-UW).

New Documents on *Tethys*

New documents are regularly added to *Tethys*, hand-selected for their relevance to the environmental effects of wind and marine renewable energy. Short excerpts from new or popular documents are listed below, accessible by the accompanying *Tethys* links:

Future policy implications of tidal energy array interactions – Waldman et al. 2019

> Tidal stream energy technology has progressed to a point where commercial exploitation of this sustainable resource is practical, but tidal physics dictates interactions between tidal farms that raise political, legal and managerial challenges that are yet to be met. Here we review the relevant physics, consider the implications for marine policy, and discuss potential solutions. Possible management paths range from minimal regulation to prioritise a free market, to strongly interventionist approaches that prioritise efficient resource use. We argue that an interventionist approach is necessary if the greatest possible energy yield is to be produced for a given level of impact.

Evaluating Changes in the Marine Soundscape of an Offshore Wind Farm via the Machine Learning-Based Source Separation – Lin et al. 2019

> Investigating the ecological effects of offshore wind farms requires comprehensive surveys of marine ecosystem. Recently, the monitoring of marine soundscapes has been included in the rapid appraisals of geophysical events, marine fauna, and human activities. Machine learning is widely applied in acoustic research to improve the

efficiency of audio processing. In this study, we used unsupervised learning to recognize different sound sources underwater. We also quantified the temporal, spatial, and spectral variabilities of long-term underwater recordings collected near Phase I of the Formosa I wind farm.

Working Group on Marine Benthal Renewable Developments – Vanaverbeke et al. 2019

This report provides an overview of the state of affairs (1) with regards to the deployment of wet renewables and (2) marine energy storage systems; (3) how they affect abiotic and biotic components of the marine ecosystem and (4) developments and concepts on cumulative impact assessments related to marine renewable energy devices and (5) future perspectives. This report provides a receptor-based summary of how the wet renewables can affect the marine environment. Receptors are either abiotic (hydrodynamics, physical seabed and sediment transport) or biotic (benthos, fish, marine mammals, birds, sea turtles, otters and polar bears).

Wind turbines in high quality habitat cause disproportionate increases in collision mortality of the white-tailed eagle – Heuck et al. 2019

To date it is unclear whether models that combine data on wind turbine densities and habitat suitability can explain the actual spatial occurrence of collision fatalities and how well these models perform in comparison to models including measures of bird population densities. Here we analysed whether collision mortality increases with wind turbine density and whether a high population density or habitat suitability in the vicinity of wind turbines amplifies the effect of wind turbine density on collision mortality. We combined opportunistic records of dead White-tailed Eagles by the public in Northeast Germany with data on the distribution of wind turbines, nest sites and habitat suitability.

Effects of a Tidal Lagoon on the Hydrodynamics of Swansea Bay, Wales, UK - Horrillo-Caraballo et al. 2019

A world's first tidal energy lagoon has been proposed in Swansea Bay area (Severn Estuary, west coast of UK). The Severn Estuary is a highly dynamic environment and understanding the bay hydrodynamics is important to the sustainable use of the coastal area in this region. A hydrodynamic model (DELFT3D) of Swansea bay has been set up to investigate the sediment pathways within this area. The focus of this paper is the potential link between tidal flows and the configuration of Swansea Bay with the construction of the tidal lagoon and as it is at present. The results will be useful for assessing tidal lagoon impact as well as many aspects of local shoreline management.

The proportion of flatfish recruitment in the North Sea potentially affected by offshore windfarms – Barbut et al. 2019

Several flatfish species are likely to be affected because areas with offshore wind farms (OWFs) in place or planned for show a spatial overlap with their spawning grounds. This study focuses on six commercially important flatfish species in the North Sea: common

sole (*Solea solea*), European plaice (*Pleuronectes platessa*), turbot (*Scophthalmus maximus*), brill (*Scophtalmus rhombus*), European flounder (*Platichthys flesus*), and common dab (*Limanda limanda*). We used a particle-tracking model (LARVAE&CO) coupled to a 3D hydrodynamic model to assess the effects of spatial overlap of OWFs with the species' spawning grounds on the larval fluxes to known nursery grounds.

News and Current Events

Marine Renewable Energy

NEMMO Project to Reduce Cost of Tidal Energy – Marine Energy

A new project, set to revolutionize tidal turbine blades, has started developing a computer model to simulate blade wear and tear. The simulations will be used by the NEMMO (Next Evolution in Materials and Modelling for Ocean energy) project team to deliver a more performant class of turbine blade. The NEMMO project will both improve the yield of tidal turbines and bring down the cost of producing energy from the tides. The project will produce an optimized tidal blade design using advanced computer modelling, innovative materials and new testing procedures.

Wave Energy Turbine Installed on Okinawa Shoreline – Okinawa Institute of Science and Technology Graduate University

A team from the Okinawa Institute of Science and Technology Graduate University (OIST) has installed a new turbine in Okinawa that can harness six times more energy than earlier models — generating more electricity and bringing wave energy closer to market. The "ducted" wave energy converter (WEC) marks the latest phase in research and development from the OIST Wave Energy Project. This new model includes a waveguide, a duct added to the front of the turbine that speeds up and focuses water flow. This duct allows more energy to be harvested from a single wave.

MaREI to lead €9m project to build floating offshore platform – MaREI

Marine and Renewable Energy Ireland (MaREI), the SFI Research Centre for Energy, Climate and Marine hosted by University College Cork has been awarded €9 million for the H2020 project MUSICA to build a pilot multi-use platform which will be a decarbonising one-stop-shop for small islands, including their marine initiatives (Blue Growth) and ecosystems. MUSICA which stands for Multiple Use of Space for Island Clean Autonomy will pilot a floating offshore platform which will provide 70% of the electricity and 100% of freshwater for a small island with up to 2000 inhabitants.

Alaskan Village, Maine Company and Alaska Governor Launch Sustainable River Energy Project – ORPC

The Igiugig Village Council (IVC) and ORPC, Inc., celebrated the launch of ORPC's commercial RivGen® Power System, a unique sustainable solution now available to

remote river communities in Alaska and worldwide. Alaska Governor Mike Dunleavy and a crowd of over 60 people gathered at Lake Iliamna and the Kvichak River in Igiugig for the unveiling of ORPC's first commercial device. The 40-kW power system will provide up to one-half of the Igiugig community's electricity needs annually and will reduce use of expensive and environmentally risky diesel fuel.

Nova Scotia gives green light to Calgary startup for new tidal project – The Star

A Calgary company has been granted permission to tap into the Bay of Fundy's massive tidal power and potentially put electricity onto Nova Scotia's grid. Ross Sinclaire, co-CEO of Jupiter Hydro Inc., said his company's tidal energy project will be distinct from others because it floats on the surface of the water and uses giant screws instead of bladed turbines. He expects it will be "way less costly in terms of maintenance than devices put on the ocean floor." He's spent about $2 million developing the technology and estimates it'll take $12-15 million to get it running in Nova Scotia waters by next spring.

Wind Energy

GE Renewable Energy unveils the first Haliade-X 12 MW, the world's most powerful offshore wind turbine - GE

GE Renewable Energy revealed the first manufactured components of the Haliade-X 12 MW offshore wind turbine at its production site in Saint-Nazaire, France. The new offshore wind turbine boasts unparalleled dimensions and the use of advanced technologies. The first nacelle revealed on July 22, 2019 will be shipped from Saint-Nazaire to Rotterdam-Maasvlakte in the Netherlands over the coming weeks, where its components will be assembled into the Haliade-X 12 MW prototype to be tested there. The prototype will be installed on land to simplify access for testing.

Orsted, Equinor share 1.7GW New York offshore prize – reNEWS

New York has selected Orsted and Eversource's 880MW Sunrise Wind and Equinor's 816MW Empire Wind projects in the state's first offshore wind solicitation. Subject to contract signing and Orsted's and Eversource's final investment decision, Sunrise is expected to be operational in 2024. Next steps for the developer partnership include negotiating a 25-year term offshore wind renewable energy certificate with New York State Energy Research and Development Authority. Equinor expects to develop its project with 60-80 wind turbines, with an installed capacity of more than 10MW each.

Scottish Offshore Wind Sites on Wildlife Watch – Offshore Wind

Marine Scotland Science (MSS) and the University of Aberdeen (UoA) carried out a multidisciplinary survey within the Moray Firth wind farm sites in June 2019. MSS colleagues and UoA postgraduate students set sail on the Alba na Mara to characterise the distribution of the prey species across the Smith Bank in relation to data available on top predator distribution. The areas targeted by this study include the fully constructed

Beatrice offshore wind farm, the Moray East offshore wind farm which is under construction; and the Moray West offshore wind farm which is still to begin construction.

EDF Renewables and Masdar places 415 MW order in Saudi Arabia – Vestas

A consortium formed by EDF Renewables and Masdar has placed a 415 MW order for the Dumat Al Jandal wind park in the Al Jouf region of Saudi Arabia. The project will be the country's first utility-scale wind park, showcasing the increasing competitiveness of wind energy globally. The order is an engineering, procurement and construction (EPC) contract for the supply and installation of 99 V150-4.2 MW wind turbines, as well as a 20-year Active Output Management 4000 (AOM 4000) service agreement for the operation and maintenance of the wind park.

DNV GL launches first LiDAR verification site in Asia Pacific – DNV GL

DNV GL, the world's largest resource of independent energy experts and certification body, has announced that it has launched its first LiDAR verification site in Asia, based in South Korea. Located at Youngkwang, Jella province the site provides optimal wind conditions for the verification of wind systems. Korean wind farm developer DaeHan Energy and distributor of LiDAR device manufacturer VisionPlus have already successfully completed their verification campaign at the site. Previously, LiDAR verification campaigns for Asian stakeholders had to be conducted at oversea sites.

Ocean Energy orjip working to accelerate offshore consenting

ORJIP Ocean Energy is a UK-wide collaborative programme of environmental research with the aim of reducing consenting risks for wave, tidal stream, and tidal range projects. Partnering with Annex IV, ORJIP provides content input to *Tethys* Blasts and wishes to make you aware of the following opportunities:

- The Katapult Ocean Accelerator Programme has launched its 2nd call for applications from start-ups looking to provide solutions to ocean challenges. The 3-month programme will focus on growth, investor readiness, leadership development, exponential tech and introductions to the Norwegian and global ocean tech ecosystem. Applications close 31 August 2019.