1 November 2019

The bi-weekly *Tethys* Blast highlights new publications on *Tethys*, opportunities in wind and marine renewable energy, and news articles of international interest. ORJIP Ocean Energy has partnered with OES-Environmental to provide additional content. We hope you find this a valuable tool to keep you connected to new research, opportunities, and industry milestones.

Announcements

WPTO Semiannual Stakeholder Webinar

The U.S. Department of Energy's Water Power Technologies Office (WPTO) will be holding the second installment of its semiannual stakeholder webinar on 5 November 2019 from 3:00 to 5:00pm ET. As the new fiscal year begins, program representatives will highlight key feedback received during discussions at the 2019 WPTO Peer Review, past year accomplishments, and upcoming priorities in 2020. Register for the webinar here.

Funding Opportunities

The National Offshore Wind Research & Development Consortium continues to make funding available for technology innovations that will reduce the levelized cost of electricity for offshore wind in the United States. Proposal submissions will continue to be accepted until 31 December 2019, or until all funds are committed.

The Offshore Wind Growth Partnership (OWGP) has issued its first two calls, offering up to £400,000 funding for projects that aim to improve the competitiveness of the existing UK supply chain, and encourage the development of new products and services for the sector. Calls close 7 November 2019.

Women in Wind Survey

The International Renewable Energy Agency (IRENA) has launched its second "Global Women in the Wind Energy Sector" survey and is calling for women in the field to complete the 20-minute survey. The survey is open from now until 15 November 2019 and can be accessed here.

Call for Abstracts

Abstracts are being accepted for the International Conference on Ocean Energy (ICOE) in Washington D.C. on 19-21 May 2020. The theme for ICOE 2020 is "Energizing a Powerful Blue Economy." The event will showcase innovations in ocean energy technology research and development, prepare ocean renewable energy to benefit the larger "Blue Economy" and the electrical grid, and identify research needed to further advance the state of the technology. The content and abstract submission deadline has been extended to 15 November 2019.

Upcoming Events

Upcoming Workshop

OES-Environmental (formerly Annex IV) and ORJIP Ocean Energy invite you to join a workshop on 4 December 2019 from 10:00 to 15:30 AEST at the Aerial UTS Function Centre in Sydney, Australia. The purpose of the workshop is to provide a state of the science on environmental effects of marine renewable energy and to examine pathways for determining data needs, monitoring requirements, and possible mitigation measures for working towards risk retirement of two stressors—electromagnetic fields and underwater noise—for permitting small installations of tidal and wave energy converters. For more information and to register for the workshop, please visit the workshop's event page on *Tethys*.

Upcoming Webinar

ETIP Ocean and OES-Environmental will be hosting a webinar on marine spatial planning opportunities and challenges in the ocean energy sector on 19 November 2019 at 7:00am PST / 3:00pm UTC / 4:00pm CET. Click here for log-in information.

Upcoming Conferences

The 10th Ocean Energy and Economic Development Symposium will be held in Kona, Hawaii on 8-9 November 2019.

BlueTech Week will be held in San Diego, California on 18-22 November 2019.

WindEurope Offshore 2019 will be held in Copenhagen, Denmark on 26-28 November 2019.

New Documents on *Tethys*

Investigation of existing post-construction mortality monitoring at Victorian wind farms to assess its utility in estimating mortality rates – Moloney et al. 2019

> Assessment of potential impacts on birds and bats due to collisions with turbines is now routinely undertaken at operating wind farms, and this includes post-construction

mortality monitoring. However, despite many years of monitoring, the accuracy of such estimates remains unclear, and it is not yet known whether turbine collisions are having a significant impact on populations of birds and bats. Therefore, it is timely to conduct a review of the postconstruction mortality monitoring that has been undertaken to date, to assess what conclusions can be drawn from the available data, and to develop options for improvements in the future.

Turbines' effects on water renewal within a marine tidal stream energy site – Guillou et al. 2019

As tidal stream energy sites contribute to a significant part of water transport in coastal shelf seas, turbines' implementation may lead to system-wide changes of the hydrodynamic circulation with potential effects on marine water quality. These aspects were investigated in north-western coastal waters of Brittany (France, western Europe) by simulating the decay of a tracer concentration within a control domain surrounding the tidal stream energy site of the Fromveur Strait. Simplified simulations were adopted to analyse the sensitivity of tracer distribution to stream energy extraction.

Harbour porpoise responses to pile-driving diminish over time – Graham et al. 2019

Using echolocation detectors and noise recorders, we investigated harbour porpoise behavioural responses to piling noise during the 10-month foundation installation of a North Sea windfarm. Current UK guidance assumes total displacement within 26 km of pile driving. By contrast, we recorded a 50% probability of response within 7.4 km (95% CI = 5.7–9.4) at the first location piled, decreasing to 1.3 km (95% CI = 0.2–2.8) by the final location; representing 28% (95% CI = 21–35) and 18% (95% CI = 13–23) displacement of individuals within 26 km.

Optimisation of tidal turbine array layouts whilst limiting their hydro-environmental impact – Phoenix and Nash 2019

The primary aim of this research was the further development of an existing two-dimensional tidal flow model for optimising tidal turbine arrays relative to both power output and potential hydro-environmental impacts. Turbine impacts are simulated using a momentum sink approach and an optimisation algorithm was implemented, which determines an optimal array configuration for maximum energy capture, whilst employing spatial and environmental impact constraints. To demonstrate the model's applicability to a real tidal environment, it was applied to a case study site; the Shannon Estuary, along the West Coast of Ireland.

Life cycle cost-benefit analysis of offshore wind energy under the climatic conditions in Southeast Asia – Setting the bottom-line for deployment – Nian et al. 2019

The wind conditions in Southeast Asia are generally much less favourable as compared to other parts of the world, but several economies in this region consider offshore wind energy as a long term solution to decarbonize the electricity sector and to diversify the

source of electricity. There is thus a need to evaluate the true benefits of offshore wind energy under the region's suboptimal climatic conditions. In response, this study employs the life cycle analysis approach to conduct a cost-benefit analysis of offshore wind energy in the context of Southeast Asia.

Automated detection and tracking of marine mammals: A novel sonar tool for monitoring effects of marine industry – Hastie et al. 2019

Many marine industries may pose acute risks to marine wildlife. For example, tidal turbines have the potential to injure or kill marine mammals through collisions with turbine blades. However, the quantification of collision risk is currently limited by a lack of suitable technologies to collect long-term data on marine mammal behaviour around tidal turbines. The aim here was to develop and test automated classification algorithms for marine mammals in sonar data. Data on the movements of harbour seals were collected in a tidally energetic environment using a high-frequency multibeam sonar on a custom designed seabed-mounted platform.

News & Current Events

Marine Renewable Energy

Portugal Takes a Step Closer to Commercial Wave Energy – AW Energy

Portugal takes a step closer to commercial wave energy using the technical capability of AW-Energy's WaveRoller to power up electricity for local homes. The first-of-a-kind commercially-ready offshore wave power generation device has been deployed offshore at Peniche, a seaside municipality in Portugal. Extended sea trials are being used to fine-tune the WaveRoller's control system to maximise its performance and yield. Engineers are also monitoring the device's performance using the company's monitoring software which can be used to remotely access the device from anywhere in the world at any time, to help assess and manage the performance of WaveRoller.

Province Creates New Tidal Energy Opportunity – FORCE

Nova Scotia's Bay of Fundy is the place to be to develop tidal energy technology. An independent and competitive process will be used to attract a new tidal project to fill the vacant berth at the Fundy Ocean Research Centre for Energy (FORCE). Project size will be limited to no more than four megawatts at a maximum rate of 53 cents per kilowatt hour. Companies will be required to have a minimum of $4.5 million in security to cover all costs associated with the Cape Sharp turbine and additional security will be required before any new device is deployed.

EMERGE Project Wraps Up Sea Trials – Marine Energy

UmbraGroup-led Electro-Mechanical Reciprocating Generator (EMERGE) project has delivered sea trial in Scapa Flow, Orkney Islands. The project is funded by Wave Energy Scotland within the innovation power take-off (PTO) Stage 3 call. The Electro-Mechanical Generator (EMG) is an innovative direct-drive system able to convert linear, reciprocating motion into electricity. It is based on the integration of a recirculating ballscrew and a permanent magnet generator. This project should allow developing engineering solutions for survivability in the marine environment and give valuable information concerning the EMG performance in real sea conditions.

First Wave Energy Marine Licence in Wales – Bombora Wave Power

Bombora has received the green light for both its on-shore and off-shore licence applications for the deployment and testing of their mWave™ wave energy technology off the coast of Pembrokeshire, Wales. This is the first Marine Licence to be granted for a wave energy device in Wales. Bombora is currently mid-way through its project to design, build, deploy, test and validate a 1.5MW mWave wave energy converter. In 2018 Bombora secured a £10.3 million European Regional Development Fund grant through the Welsh Government to support its Pembrokeshire mWave Demonstration Project.

SIMEC Atlantis Energy Signs Equipment and Services Supply Contract with Kyuden Mirai Energy – SIMEC Atlantis

SIMEC Atlantis Energy Limited (“Atlantis”), is delighted to announced that it has signed a contract to supply tidal generation equipment and offshore construction services to Japan’s Kyuden Mirai Energy (“KME”) for a demonstration project in Japan. The project, located in the straits of Naru Island within the southern Japanese Goto island chain, has a total budget of 1,800m¥. The project will seek to capitalise on Japan’s wealth of tidal resources which are some of the best in the world. The prefecture of Nagasaki has over 900 islands alone located in tidal rich waters.

Wind Energy

DOE Awards $28 Million for Wind Energy Research, Development, and Demonstration Projects – U.S. Department of Energy

The U.S. Department of Energy (DOE) announced the selection of 13 projects to receive a total of $28 million to advance wind energy nationwide. While utility-scale, land-based wind energy in the United States has grown to 96 gigawatts, significant opportunities for cost reductions remain, especially in the areas of offshore wind, distributed wind, and tall wind. The selected projects span the technology development spectrum—including testing, demonstration, integration, and technical assistance—and cover all three wind energy sectors: distributed, offshore, and land-based utility-scale wind.

ORE Catapult Launches New Multi-Million-Pound Floating Wind Centre of Excellence – ORE Catapult

The Offshore Renewable Energy (ORE) Catapult has launched a new multi-million pound national Floating Offshore Wind Centre of Excellence to drive forward the development of next generation offshore wind technologies. The aim is to develop an internationally recognised centre of excellence that will work to reduce the cost of energy from floating wind, accelerate the build out of floating farms, create opportunities for the UK supply chain, and drive innovations in manufacturing, installation and operations and maintenance.

GWEC and regional partners to accelerate wind energy growth in South East Asia through new cooperation – GWEC

The Global Wind Energy Council (GWEC) has signed a series of three MOUs with regional partners in Singapore, in order to support and accelerate the growth of wind energy in South East Asia, with a focus on Vietnam and Thailand. The agreements were signed with: Sustainable Energy Association of Singapore (SEAS); Binh Thuan Wind Energy Association (BWEA); and Thai Wind Energy Association (ThaiWEA). Vietnam and Thailand are positioned to become leaders in the region's energy transition, with enormous wind power potential.

Wooden towers get nod for Swedish wind farm – reNEWS

Swedish wind developer Rabbalshede Kraft has signed a letter of intent for the supply of 10 wooden turbine towers from Modvion for the former's Fagremo project in Vastra Gotaland county. The laminated wood towers for the 240-metre tip height turbines will be made locally in Toreboda. "By using modular Modvion towers in wood, we avoid logistical difficulties, reduce weight and approach completely carbon-neutral wind power," said Rabbalshede Kraft chief executive Peter Wesslau. If the project is a success, he added, Modvion could potentially deliver further towers to Rabbalshede Kraft with an estimated value of 500m-900m Swedish krona (€47m-84m) over the next five years.

National Consortium Poised To Make a Splash – U.S. Department of Energy

With a host of new partners and an open call for research proposals, the National Offshore Wind R&D Consortium—established with $41 million initial funding from the U.S. Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy (EERE) Wind Energy Technologies Office (WETO) and the New York State Energy Research and Development Authority (NYSERDA)—is ready to make a splash. Its goal is to support initiatives that remove technical barriers to offshore wind development across the nation.