

BULLETIN

As the authoritative international voice on ocean energy we collaborate internationally to accelerate the viability, uptake and acceptance of ocean energy systems in an environmentally acceptable manner.



NOVEMBER 2013

Brief review from the 25th ExCo Meeting held in Cape Town, South Africa on 22-23 October 2013

The Executive Committee of *Ocean Energy Systems (OES)*, an International Energy Agency (IEA) Technology Initiative, announces the outcomes of its 25th Meeting held in Cape Town, South Africa, on 22-23 October 2013, hosted by SANEDI, the *South African National Energy Development Institute*.

Delegates from 14 member countries were present - Spain, Monaco, Italy, Belgium, Germany, Ireland, UK, Norway, China, Republic of Korea, Japan, Australia, South Africa and Nigeria. Monaco is the newest member country, which has joined OES in June this year. Representatives from other countries have been invited to attend the meeting and two participated as observers: Indonesia and Costa Rica. The meeting was chaired by Spain and WavEC, from Portugal, provided secretarial services.

On the day before, the Delegates participated in a National Seminar on ocean energy organized by SANEDI. The official opening and welcome speech was delivered by Mr Kevin Nassiep, SANEDI CEO.

Highlights of the OES activities reported at the Meeting include:

- Tool for estimation of the cost of ocean energy - to be initiated during next year
- Worldwide Web GIS database for ocean energy - to be launch early next year.
- Research project "Assessment of Environmental Effects and Monitoring Efforts for Ocean Wave, Tidal and Current Energy Systems" - extended for a second period of 3 years, led by the US Department of Energy (DOE).

Australia

The potential of the ocean energy resource in Australia has been recognized and the industry is working to get this formally acknowledged in the Energy White Paper to be released next year by the new federal Government. The strategy for ocean energy in Australia is coordinated by the Clean Energy Council, an industry association made up of more than 600 member companies operating in the fields of renewable energy and energy efficiency.

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Comprehensive overviews of international activities and achievements on ocean energy were shared during the ExCo meeting, and are presented below.

- OES Workshop on "Numerical Modelling Tools" - will be held in November 2013 as part of the 3-year research project "The Exchange and Assessment of Ocean Energy Device Project Information and Experience", led by the US Department of Energy (DOE).
- Collaboration with the Organisation for Economic Co-operation and Development (OECD) project THE FUTURE OF THE OCEAN ECONOMY: Exploring the prospects for emerging ocean industries to 2030 - join meeting between the OECD and OES will be held in Paris, on 15 May 2014.
- New activities discussed: i) Technology Development Roadmap, ii) Permitting and Licensing, iii) Assessment of Ocean Thermal Energy Conversion (OTEC) Resources.

The Delegates visited the 400 MW Palmiet Pumped Storage Scheme located on the Palmiet River near Cape Town. This power plant is regarded as a forerunner in environmental engineering, built in a Biosphere Reserve.

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One of the main Governmental organisations in this area is CSIRO (Commonwealth Scientific and Industrial Research Organisation), which has been developing a national high resolution wave energy resource atlas and a multi-use marine mapping. The second relevant organization is Geoscience Australia, which is conducting an Australian Energy Resource Assessment expected to be released in late 2014.

The Australian Renewable Energy Agency (ARENA), the main national funding body for R&D, deployment and commercialisation of renewable technologies announced a \$3 billion budget, for the period 2012-2022, which includes an Emerging Renewables Programme for supporting pilot-scale ocean energy projects (\$89 million committed to date). Another funding body is the Australian Research Council.

The Standing Council of Energy and Resources (SCER) is developing a national framework for ocean-based renewable technologies.

There are three major demonstration projects going on in Australia:

- The commissioning of the Perth Wave Energy Project on Garden Island in Western Australia, from Carnegie, is expected for the first quarter of 2014. The 240 kW CETO 5 unit will be grid connected.
- The Port Fairy pilot project, from BioPower System, is on-track for deployment in late 2014. The 250 kW bioWAVE unit will be mounted on seabed at 30 m depth and grid connected. Presently the component testing is underway and the offshore site survey and licensing process is complete.
- Port MacDonnell 1 MW demonstration project by Oceanlinx was formally launched by the end of October 2013. Its greenWAVE single oscillating water column concept will go through a 12-month testing period. This project has received \$4 million funding from ARENA.

Other ongoing projects seeking funding to proceed with installation at the sea or in the permitting phase include Ocean Power Technologies (Portland, Victoria), Tidal Energy Australia (planning approval for West Kimberley, Western Australia), Wave Energy Rider (successful sea trial for proof-of-concept), Bombara Wave Power and Perpetuwave Power.

Belgium

The Gen4Wave Energy Platform, created to stimulate the development of wave energy, was officially launched in June 2013. This initiative was set up by a multidisciplinary team of Ghent University, with the support of several stakeholders. Its main goal is to raise awareness in industry about the opportunities in this emerging sector.

The FlanSea prototype was launched in Ostend Harbour in August 2013. This project has been conducted by the University of Ghent with a consortium of 6 companies.

There is another Belgium wave energy technology under development, Laminaria, which has been tested at 1:10 scale in a wave tank under the supervision of Ghent University and has recently received a grant from the Belgium Government to proceed with sea trials.

The Mermaid project, a combined wave and wind concept, based on the idea of an efficient offshore energy farm, is being developed by a strong partnership of Belgian companies, which consists of Electrabel (Group GDF Suez) and Otary NV. The suitable wave energy technology for this project is still to be selected or developed. Discussions about the economical feasibility of the concept are ongoing.

DEME Blue Energy, a subsidiary of the Belgian dredging, environmental and marine engineering group DEME, awarded development rights for two big tidal currents projects: The West Islay project (30 MW) off South West Scotland and the Fair Head project (100 MW) off Northern Ireland. The potential technology supplier is the MCT/Siemens turbine.

China

The 4th round of the Special Funding Programme for Marine Renewable Energy (SFPMR) was initiated in September 2013. 19 wave and tidal projects have just been confirmed. The total financial support of this round is 200M RMB (around \$30 million).

Jiangxia tidal power plant (3.9 MW) has been in operation for more than 30 years with only several major technology modifications, and the production is 7.3 million kWh/year. China has been conducting pre-feasibility studies to build another 4 tidal power plants: Jiantiao (21 MW), Rushan estuarine (40 MW), Bachimen (20 MW) and Maluan Bay (10 MW).

There are several wave and tidal currents devices being tested in the sea, funded by MoST and SFPMRE:

- Haiming I tidal current turbine (10 kW) was deployed at sea in June 2011, on Daishan Island, Zhejiang province, and has been providing power supply for a light house. The design and manufacture of the 2X300 KW project is expected to be deployed in 2015;
- Another technology, the Haineng tidal current turbine (2X150 kW), was also deployed for sea trial in Daishan, in August 2013. The same technology for installation of 2x300kw was deployed at the same place in October 2013.
- Three units of the Duck wave converter were tested on Wanshan Island, Guangdong province, between 2010 and 2013, rated at 10 kW and 100 kW. Based on the optimization of this technology, a new wave energy converter was designed, the Eagle wave converter (10 kW), which has been tested at sea on Wanshan Island, Guangdong province, for 3 months since December 2012;
- The NOTC wave pendulum was deployed for sea trial on Dagan Island, Shandong province, in March 2011 and July 2012 and a new project of 50 kW is in the design phase, expected to be deployed in 2015.

The Hybrid Demonstration marine renewable energy system on Dagan Island with total installed capacity of 105 kW (30kW from wave power, 60kW from wind energy and 15kW from solar power) has been in operation since June 2011. Three sites have been proposed as test centres: 1 small scale test site (for tidal and wave devices in Shandong) and 2 full scale test sites (one for tidal devices in zhejiang, the other for wave devices in Guangdong).

Denmark

The strategy for development of Wave Energy in Denmark was proposed in 2012 by the Danish Industrial Partnership. The partnership includes developers of different Wave Energy Converters (Wavestar, Floating Power plant, Resen Energy, Leancon, CrestWing and Weptos) and Offshore.dk, Aalborg University and Ramboll. This year the partnership was funded to provide detailed roadmaps for development of common key technologies such as mooring systems, PTO systems, power transmission and materials. DanWEC in Hanstholm host the secretariat of the partnership as well as co-ordinate the Roadmap Project.

Germany

In Germany there are now around 40 players from industry and academia identified with relevant activities in the sector: 10 universities involved and a few other R&D institutions, major utilities are co-funding ocean energy projects (Eon, Vatenfall, RWE Innogi) and more than 20 system manufacturers and suppliers are developing components, which clearly shows the opportunity that ocean energy represents for countries with low resource. Four German companies are involved in relevant technology development: Siemens, Schottel, Andritz Hydro GmbH and Voith Hydro.

Andritz Hydro Hammerfest, established in Norway, is developing drive train concepts for tidal turbines with around €1 million funding from the German Government.

The German marine propulsion specialist Schottel placed an investment into the UK tidal-power technology developer TidalStream Ltd.

Voith Hydro Ocean Current Technologies GmbH, a joint venture with RWE Innogy, tested a 1:3 scale project of 110 kW in the Republic of Korea, near Jindo. Its 1 MW device is due to be tested at the European Marine Energy Centre (EMEC) in 2013. The next phase will be the commercialization of the full scale prototype in small farms.

Fraunhofer IWES continue with their involvement in several national and international industry projects, mainly on tidal current technologies but also on wave energy and hybrid OTEC.



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Ireland

Ocean Energy is strongly featured in key Irish national policies. The Government has announced that will be shortly publishing the Offshore Renewable Energy Development Plan (OREDP). The process of developing this plan began with the carrying out of a Strategic Environmental Assessment. The OREDP “seeks to form a link between three critical policy areas for Ireland, namely, renewable energy, the marine, and the growth potential of the green economy. In this way, it is intended that the OREDP will provide a tool to inform and coordinate policy and implementation across the energy, environment and economic areas, thus supporting the sustainable exploitation of Ireland’s offshore wind and ocean energy resources out to 2030”.

The Marine Strategy in place supports existing and new test beds/facilities for demonstration and commercialisation purposes and Information and Communication Technologies (ICT) focusing on the development of innovative technologies that support real time information gathering. The integration of ICT in the marine environment will become strategically more important with the growth of the marine energy market. This is a key element of the *SmartOcean* concept being developed by the Marine Institute.

The National Research Prioritisation Study identified offshore marine renewable energy as one priority area to

tackling national challenges and opportunities where the focus is to position Ireland as a research, development and innovation hub for the deployment of offshore marine renewable energy technologies & services.

During 2013, substantial progress has been done at Atlantic Marine Energy Test Site (AMETS), in what concerns the sub-station and grid connection, completion of licensing and leasing permits and working with interested developers.

Further improvements have been done at the 1:4 scale Galway Bay Test Site. A call is open with particular emphasis on device deployment in Galway.

The Beaufort Research Facility in Cork is almost completed and will have a new flume of 35m x 12m x 3m (depth).

The Centre for Marine Renewable Energy Ireland (MaREI) has recently received €25 million funding from the Science Foundation Ireland (SFI) to develop all the range of marine associated energy issues required by the industry.

A major issue in Ireland is the ability to export clean energy to the UK, thus promoting the development of offshore renewable energy. In that context, a formal Memorandum of Understanding on renewable energy trading between Ireland and the UK was signed early in 2013 by the two Governments.

Italy

In general, Italy grants:

- a feed in tariff for RES plants with a capacity ≤ 1 MW (composed by a well-defined fixed tariff plus, in some cases, a specific premium);
- a sliding feed in premium for RES plants with a capacity > 1 MW (composed by a well-defined fixed tariff, minus the electricity price, plus premiums if foreseen).

In particular, the Ministerial Decree on renewable energy sources (DM July 6th 2012) establishes that the fixed tariffs provided for new wave and tidal energy power plants entering into operation in 2013 are:

- €300/MWh if the installed capacity is at most equal to 5 MW;
- €194/MWh if the installed capacity is greater than 5 MW.

The above mentioned Decree identifies four different ways of access to incentives: direct access, bid auctions (Dutch auctions), registries for new power plants, for fully reconstructed power plants, for reactivated, empowered and hybrids power plants and registries for rebuilding interventions. The Decree establishes specific limits for the annual capacity eligible to incentives. These limits are set up differently for each kind of renewable energy sources and for all the different ways of access to incentives (registries or bid auctions).

New, fully reconstructed, reactivated or empowered wave and tidal energy power plants can access directly to incentives if their capacity is not greater than 60 kW, otherwise they must apply for access to Registries.

For wave and tidal energy power plants, the maximum annual cumulative capacity eligible to access to Registries from 2013 to 2015 and so to obtain the incentives is of 3 MW. This limit could be modified from 2016.

The Decree doesn't provide Dutch Auctions for wave and tidal energy power plants.

For what concerns technologies: a Kobold Turbine was tested in the Mediterranean Sea, in the Strait of Messina. In the coming months, 3 new technologies will be tested in Italy: an OWC off the coast of Lazio, the ISWEC (Inertial Sea Wave

Energy Converter) floating device, created by a spin-off of the “Politecnico di Torino” University, off the coast of Sicily, and the wave energy technology developed by the Italian start-up “40th South Energy” off the coast of Tuscany. This last prototype has a capacity of 150 kW and will be tested in cooperation with Enel Green Power.

Japan

The 100 kW OTEC demonstration project in Okinawa has been officially inaugurated in June this year. The first tests of power generation, in March, were an important milestone. The Okinawa OTEC project has been developed by Saga University in cooperation with IHI Plant Construction, Xenosys and Yokogama Electric. It is the first OTEC plant to be grid connected.

The Government intends to set up a test site and is analysing several possibilities for floating wind, wave, tidal, ocean current and OTEC, based on the resource assessments recently prepared. A decision is expected to be adopted next year. The main funding body on ocean energy, NEDO, has in place a 1 billion JPY budget (ca. €7 million) in 2013 for research focused on modelling, tank testing, resource assessment and permitting for wave, tidal, OTEC and ocean currents. For 2014 a 2 billion JPY budget (ca. €15 million) has been allocated for wave and tidal energy projects. For 2015 a 2.5 billion JPY budget (ca. €18 million) is under consideration.

Monaco

The Principality of Monaco is the newest country that joined the OES in June 2013. This action was part of the Government concerns for combating climate change, recognizing the relevance for international cooperation. Monaco is a coastal country with 2,02 km² of area, bordered by the Mediterranean Sea, with a coast length of 3829 m. In Monaco, the sea is used as a renewable energy source for the development of a heat pump system. The first heat pump with sea water in Monaco dates back from 1963. Today, heat pumps produce 17% of the energy consumed in the Principality. Many buildings located on the coast benefit from this reversible system, for heating in winter and air-conditioning in summer.

New Zealand

The proposal set up by an industry-led consortium for creation of a NZ Marine Energy Centre has been approved by the Government.

Wave Energy Technology-New Zealand (WET-NZ) has been a R&D collaboration programme between Callaghan Innovation (formerly Industrial Research Limited) and Power Projects Limited. Two deployments at 1:2 scale were done in 2012, one in New Zealand with national funding and a second one in Oregon, USA with DOE funding.

A number of other technologies are in the process of seeking consent or trying to raise funds, among them: Energy Pacifica, Neptune Power and Crest Energy.

Nigeria

Nigeria is trying to move forward in marine energies and the country is interested in exploring its abundant OTEC potential to support and enhance their growing energy needs.

The Nigerian Institute for Oceanography and Marine Research (NIOMR) in collaboration with FOT-K Consortium in putting together a proposal to the Nigerian Government to undertake a feasibility study that will explore and identify suitable locations for the implementation of OTEC facilities offshore the Nigerian Continental Shelf. This study should lay the basis for a policy framework and roadmap for Ocean Energy. In this regard, a draft policy direction for ocean energy activities is being considered by the Federal Government of Nigeria.

The Government is also considering setting up a Centre for Ocean Renewable Energy and Resources (CORER) to be located, upon approval, within NIOMR. The members of its operational Board would be drawn from all relevant Nigerian agencies that are statutorily involved in ocean research, security, energy generation and distribution sectors.

Norway

The Research Council of Norway, Innovation Norway, and Enova are the three main funding bodies with available support schemes for R&D, prototyping and demo projects.

Several Norwegian wave and tidal developers have been active during this year: Flumill tidal current project is designing their second generation prototype with a large grant from Enova, after the 3-month testing programme at EMEC. Andritz Hammerfest Strom is undergoing tests at EMEC with their 1MW tidal turbine. Fred Olsen has been conducting full scale tests of the Lifesaver prototype (400 kW) outside Falmouth in the UK. Langlee Wave Power is developing a new model called Langlee Robusto. Other active developers include Straum, Ocean Energy AS, Havkraft, Tidal Sails and Aqua Energy.

Portugal

Portugal is facing the impacts of the economic crisis in the actual renewable energy support: the existing support scheme, the feed-in tariff for wave energy, is under review and negotiated with the promoters. Further, there is actually some uncertainty about the progress of the Portuguese Pilot Zone set up by the Government.

IST, the School of Science, Technology and Engineering of the University of Lisbon, has been developing a floating OWC concept which has been tested on a 1:16 scale at NAREC, UK, in the context of the EU-funded Marinet project, a network of European research infrastructures. Recent developments are being pursued with the bi-radial air turbine developed and built by IST, appropriated for this floating OWC device.

WavEC, a private non-profit association involving 11 companies, 2 R&D institutions and IST continues to have a strong involvement in R&D European funded projects. Oceanet, initiated in October 2013, is the new training network funded by the European Commission and coordinated by WavEC, which will provide the opportunity for a group of young researchers to be trained in first class European research & development institutes, universities and companies active in ocean energy.

During 2013, the Ocean Energy course of the European Master in Renewable Energy, an initiative developed by the European Renewable Energy Centres (EUREC), has been offered by IST and WavEC.

Pico project continues to be supported by WavEC. Since 2004 WavEC has been managing this shoreline OWC plant and making much effort to identify appropriate funding to maintain the project alive, as a grid connected testing infrastructure.

Republic of Korea

The Republic of Korea introduced in 2012, a *renewable portfolio standard* (RPS), that replaced the feed-in tariff incentive. The RPS requires 13 utility companies with a capacity in excess of 500 MW to generate 2% of total electricity from renewable sources in 2012, increasing to 10% by 2022. The introduction of a tradable renewable energy certificates (REC) is further being discussed for tidal current and wave energy.

South Korea's first tidal-power plant at the artificial sea-water Lake Sihwa, with an output capacity of 254MW, it is the world's largest tidal power installation. While it was partially operated for the investigation of environmental impacts, the gross generation was ca. 51 million kWh in the period August to December 2011 and ca. 466 million kWh in 2012. A Renewable Cultural Centre is being built at the Sihwa tidal barrage theme park and its completion is expected in 2014.

A number of sites of high tidal current energy density have been identified in the south east sea. A few tidal currents demonstration projects are now progressing from small scale units in the range of 20 - 100 kW, to 1 MW projects. Among them is the Uldolmok project, conducted by KORDI (Korea Ocean Research & Development Institute). Other South Korean companies active in this field are the Ocean Space Inc., Renetec, KEPRI and Hyundai Heavy Industries. Following the successful tests with a 20 kW unit during 2013, Hyundai Heavy Industries plans to build a 1MW demonstration plant in 2015.

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The construction of the 500kW OWC plant in Jeju Island has been delayed, and its completion is now expected for next year. Several universities and research laboratories are conducting research projects on wave and tidal current, with funding from 2 ministries: the Ministry of Trade, Industry and Energy (MOTIE) and the Ministry of Oceans and Fisheries (MOF). The MOF is also supporting a program for promoting ocean energy education, research and development in universities.

A number of OTEC projects were concluded in 2012 and the following are still active:

- Ocean thermal energy technologies using deep ocean water which develop the pilot plant of 20kW in 2013 and 50kW in 2015 (2010~2015)
- Use of cooling water discharged from power plant which tests 10kW plant in 2014 (2011~2014)
- Development of international standards for design and evaluation of ocean thermal energy utilization system (2012~2014)

South Africa

The South Africa's Electricity Plan prepared in 2010 expects 42% capacity from renewable energy by 2030 (solar, wind, small hydro and bioenergy). Ocean energy has not been included in the Plan but efforts have been done to form a Marine Energy Association with the goal of promoting ocean energy and try to get ocean energy targets in the Electricity Plan in the next period of review. Immediate actions being discussed include the preparation of a country roadmap for marine energy and a proper ocean energy atlas.

Spain

The Spanish ocean energy industry is progressing with the participation of big companies (Iberdrola, Abengoa, Repsol) and the involvement of regional governments (Basque Country and Canary Islands). The most advanced project is the Mutriku OWC plant, which has fulfilled two years of operation.

Two open sea test facilities, bimep and PLOCAN, are progressing and both of them are expected to be in operation in 2014. At Bimep four cables of 5 MW each and seven marker buoys have been installed and the onshore substation is under construction. The submarine electrical infrastructure (15MW) for the Oceanic Platform of the Canary Islands (PLOCAN) is expected to be installed by the end of 2013. Two Spanish technologies are expected to be tested at Plocan: the INNPACTO WAVE ENERGY (IWE), lead by PIPO Systems, and the UNDIGEN project, lead by the Wedge, both projects partially funded by the Spanish Government. EVE, the Basque Energy Agency, has recently launched a €3 million funding programme to support sea testing of marine renewables (including offshore wind turbines). The deadline for the applications is 16 December 2013. This is part of the Basque Country strategy to achieve the target of 60 MW in 2020 included in its Energy Strategic Plan.

The most important R&D project funded by the Spanish Government is the OceanLider, which has been running since 2009 and has been concluded this year. It has been



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led by Iberdrola with 20 industrial partners and 24 research centres, with an overall budget of €30 million, with 50% funding from the Government. Results are available at www.oceanlider.com (Spanish version).

A second R&D project (UHINDAR) led by Iberdrola was initiated in 2012 with €3 million funding from the Basque Government, for the development and testing of the OceanTec wave energy converter, a floating OWC device, with the participation of 8 companies and 1 research centre (Tecnalia). Further, Ocean Power Technologies, Galicia Mar Renovables (GMR) and Langlee Wave Power are developing wave energy projects in Spain. Two tidal currents projects are progressing: the GESMEY-PROCODAC project, a floating tidal current device, which completed the sea trials of a 1:10 scale prototype (supported by the Spanish Government), and the MAGALLANES project, a high-stability floating platform to support a 1MW turbine which is undergoing first small scale tests (1:10).

USA

On 29 August 2013, the U.S. Department of Energy (DOE) announced investments totalling \$13.5million (US), with the goal of advancing the technology performance of existing marine and hydrokinetic systems through the development and application of innovative components. Eight projects in three topic areas were selected for funding, focusing on: (a) *Advanced Controls*: to improve energy capture, availability, and safety; (b) *Next-Generation Power Take-Off (PTO) Mechanisms*: to increase energy efficiency, reduce weight, and improve reliability; and (c) *Optimized Structures*: to improve energy capture, reduce weight, and improve reliability.

DOE also announced awards totalling \$2.4M for MHK Environmental Effects Assessment and Monitoring. Nine projects were selected to gather essential data to increase understanding of the environmental effects of MHK technologies. Studies will include efforts in Environmental Monitoring of MHK Projects (7 Awards), and Analysis of Environmental Effects of MHK Surrogate Technologies (2 Awards).

DOE has released a call to support "Testing Infrastructure Development" for the full-scale testing of wave energy devices. This funding scheme is intended to identify possible site locations, designs, and estimated costs and evaluate the potential to establish a national wave testing facility within U.S. territorial waters. The call closed on 27 August and applications are being reviewed.

DOE is also launching an Incubator Program that seeks to introduce potentially high-impact "off-roadmap" new MHK technologies. Incubator activities will enable the "rapid on-ramping" of potentially transformational new energy technologies, dramatically increasing the rate of technology innovation. The objective is to kick start high-risk, high-reward innovation in water power technologies focused on innovative solutions and potentially breakthrough approaches that will accelerate efforts to meet the Program's leveled cost of electricity goals.

Northwest Energy Innovations (NWEI) has received a DOE award during 2013 to deploy their device at the United States Navy's Wave Energy Test Site (WETS) in Hawaii. The objective of the project is to redeploy the Wave Energy Technology - New Zealand (WETNZ) Oregon Device to conduct open-ocean, grid connected testing for a period of up to 12 months to optimize energy capture and validate LCOE model. Deployment is currently scheduled for February 2014.

UK

The UK Government remains much committed to the development of the marine energy sector. The UK Renewables Energy Roadmap update of 2012 confirms 200 - 300MW, circa 0.9TWh of commercial wave and tidal stream devices could be deployed by 2020.

The outcome of the recent array funding schemes highlighted the slower progress of wave energy. To identify key barriers and ways of removing them, the Department of Energy & Climate Change (DECC) has promoted a roundtable discussion with wave energy stakeholders with the aim to inform the next steps of UK policy development.

At the end of June, the UK Government released the draft strike prices for wave (£305/MWh) and tidal energy (£305/MWh), both up to 30MW per project. Final strike prices are expected to be published in December this year, with the publication of the Electricity Market Reform (EMR) final delivery plan.

In May 2013 the Crown Estate announced plans for a new leasing process for wave and tidal. The new application opened on 4 October and preliminary submissions must be received by 1 November 2013.

The two projects that awarded MEAD (Marine Array Demonstrator) funding in February (MeyGen first phase of the Inner Sound project and MCT/Siemens Skerries) are progressing, as well the two NER300 awarded projects (MCT/Siemens' Kyle Rhea and Scottish Power Renewables' Sound of Islay). Further two Scottish wave developers, Aquamarine Power Limited and Pelamis Wave Power, are to share a slice of a £13 million wave first array support programme part of the Scottish Government's £18 million Marine Renewables Commercialisation Fund. The remaining £5 million will be used for supporting enabling technologies and the pre-application call has just closed.



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OBSERVERS**Indonesia**

There has been much effort in Indonesia to bring ocean energy to the energy policy. Nowadays, ocean energy has been receiving a greater attention from universities, government agencies, companies and public in general and it is expected to be included in the new regulation for the energy mix. In particular small scale projects can be very useful for small communities in Indonesia.

The National Energy Council is reviewing the current energy policy, and considering to include ocean energy in the energy mix plan for 2010-2050.

The Indonesian Ocean Energy Association (INOCEAN) established in 2011 to foster research and development on ocean energy, has assessed the theoretical, technical and practical potential for wave, tidal and offshore currents and OTEC. Further, an ocean energy regulation roadmap has been published by this association. It is expected that these documents will be adopted into Official National Publications by the Ministry of Energy and Mineral Resources and scheduled to be launch by 22 December 2013.

Costa Rica

Ocean Energy has started very recently to be discussed in Costa Rica and stakeholder meetings have been already organized by the *Instituto Costarricense de Electricidad* (ICE, Costa Rican Electricity Institute), a public enterprise active in the fields of energy and telecommunications.

ICE has greatly contributed to Costa Rica's current position as one of the world's most advanced countries in the utilization of environmentally sustainable sources of energy. Renewable sources - hydropower, geothermal, wind and biomass - represent over 90% of the national electricity matrix.

ICE is willing to put in place a strategy for developing ocean energy in the country. A preliminary resource assessment has been done for wave energy, tidal and currents, supported by the Inter-American Development Bank.

An observer from Costa Rica attended the 25th OES ExCo meeting for the first time, and expressed the interest of his country in joining OES.

OES Collaborative Research Projects**Task 1**

Review, Exchange and Dissemination of Information on Ocean Energy Systems - ACTIVE
Operating Agent: WAVEC - Portugal
Duration: From 2001

Task 2

Development of Recommended Practices for Testing and Evaluating Ocean Energy Systems - CONCLUDED
Operating Agent: Ramboll - Denmark
Duration: 2002 - 2009

Task 3

Integration of Ocean Energy Plants into Distribution and Transmission Electrical Grids - CONCLUDED
Operating Agent: Powertech Labs - Canada
Duration: 2007 - 2010

Task 4

Assessment of Environmental Effects and Monitoring Efforts for Ocean Wave, Tidal and Current Energy Systems - ACTIVE
Operating Agent: Department of Energy - USA
Duration: 2009 - 2013; 2013 - 2016

Task 5

The Exchange and Assessment of Ocean Energy Device Project Information and Experience - ACTIVE
Operating Agent: Department of Energy - USA
Duration: 2012 - 2014

OES Members

2001	Denmark
	Portugal
	United Kingdom
2002	Ireland
	Japan
2003	Canada
2005	USA
2006	Belgium
2007	Germany
	Mexico
	Norway
2008	Spain
	Italy
	New Zealand
	Sweden
2009	Australia
2010	Korea
	South Africa
2011	China
2013	Nigeria
	Monaco

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