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## Editorial

Welcome to this twelfth issue of the OES-IA Newsletter.

This issue focusses on some of the newly created marine energy testing zones that are being created in different OES-IA member-countries for testing wave and marine currents energy prototypes, and deploying pre-commercial and commercial farms. These initiatives are expected to be an important contribution to enhancing technology development and facilitating market penetration of these Ocean Renewable Energy technologies.

It is important to mention the 8th European Wave and Tidal Energy Conference, held in Uppsala, Sweden on 7-10 September, which was organized and hosted by Uppsala University one of the oldest universities in Europe. Twenty sessions in which more than one hundred and twenty papers have been orally presented, in addition to more than twenty posters, have made this conference a very important event. It has attracted participants from the whole world, following was has happened with previous versions of these biennial European conferences on ocean renewables. In the forthcoming issue of the Newsletter the most important results of 8 EWTEC will be summarized.

Another very relevant initiative is the development of the Special Report on Renewable Energy and Climate Change Mitigation (SRREN) by the International Panel on Climate Change (IPCC). For the first time Ocean Energy will be included in a review report led by IPCC. The second meeting of Lead Authors of the SRREN took place in Oslo just before the 17th meeting of the Executive Committee of the Implementing Agreement on Ocean Energy Systems.

Such important events focussing on Ocean Energy, in addition to the development of governmental programmes, which encompass and support industry initiatives, are reasons to be optimistic about the foreseeable success of Ocean Renewable Energy technologies in the near future.

Teresa Pontes  
Annex I Operating Agent  
First OES-IA Chair

## National Activities

### RUNDE ENVIRONMENTAL CENTRE IN NORWAY

**Lars G. Golmen**  
*Runde Centre, Norway*

In June 2009 the Runde Environmental Centre opened its new building at Runde island in Norway (Fig. 1). The € 6 million facility will offer services and infrastructure to visiting scientists and the permanent staff is also conducting R & D and environmental monitoring. Runde is known for its birdlife, flora and fauna that attract thousands of visitors annually. Many of these are specialists in various fields of the natural sciences to whom the centre will provide services and infrastructure. Ocean renewable energy constitutes another key activity at the centre, which offers field test facilities, competence and educational services in this field to industry and specialists as well as to the public, students and schools.

The wave climate off Runde is the harshest on the whole Norwegian coast and the centre has an approved exposed test site for wave energy devices, which includes a cable connection to the local grid. The first deployments of WECs for demonstration started in the summer of 2009.

The seas around Runde host important fisheries and the municipality of Herøy is number 1 in deepwater fisheries in Norway and besides that also holds the largest fleet of offshore supply vessels. These two industries are both represented among the shareholders at Runde, where the bulk capital is private. The local fleet has very broad experience and capacity in offshore and deepwater operations and the Runde centre will work to engage this industry in ocean renewables as well. Other centre owners such as Rolls-Royce, Marin teknikk AS and Jets AS, represent other branches of the maritime industry that optimally matches the skills of the ship operators and the visions of the Runde centre.

The ca 2 000 m<sup>2</sup> building is divided into three main segments, one for the Visitor Centre, one for accommodation and one for offices and laboratories. It has the highest standards regarding energy control and saving and complies with the State energy agency ENOVA's "Pilothouse" standards. The competence centre for ocean energies will occupy part of the building space but will also have outdoors models and demo plants operating in the sea for training and trials. The centre will disseminate information from the global and to the local energy supply situation and basic facts and news on ocean energy.

The Runde website has more information: <http://www.rundecentre.no>

For specific requests, please contact Lars G Golmen, email: [lars.golmen@niva.no](mailto:lars.golmen@niva.no), tel: (47) 4789 0957.



Fig. 1: The building of the Runde Environmental Centre, Norway



Fig. 2: Location of Runde in the western coast of Norway.

## Development of Sem-Rev The French Full Scale Wave Energy Test Centre

**Hakim Mouslim**

Project Engineer, École Centrale de Nantes / CNRS, France

The Wave Energy Test Centre SEM-REV (Site d'Expérimentation en Mer pour l'Énergie des Vagues) is located off the northwest coast of France close to the École Centrale de Nantes (ECN), where relevant wave energy technology development has been carried out for more than ten years namely at its Hydrodynamics Laboratory. Figure 3 shows the lay-out of the site including the offshore testing area and the onshore facilities.

SEM-REV offshore site is a 1km x 1km area that will be fully instrumented with two wave measuring buoys and a matrix of current profilers, providing continuous wave climate information. Figure 4 maps the wave energy resource in the area. The test site will comprise a 2.5 MVA power cable connected to the national grid through an onshore substation. The Table below shows (left) the geotechnical, technical and operational conditions at SEM-REV and its surroundings and (right) the conflicts that have to be taken into consideration when planning the use of the sea for wave farms deployment. The planning of this wave test site focusses these requirements, having in view the preparation of detailed performance testing and future certification.

Technical, Environmental, Risk and Economics	Technical and Economical Conflicts
Bathymetry	
Wave energy resource	Navigation activities
Winds, tides and currents	Commercial fisheries
Grid connection requirements	Sand extraction zones
Operational capabilities in and near the test site area	Military exercises

After completing the initial site assessments and defining the regulatory frame, the development of SEM-REV is undergoing several consultation phases involving commercial fisheries committees, maritime navigation authorities, environmental organizations and local communities representatives. Regulation authorities have contributed to preparing a methodology for consent process of wave energy converter projects in France.

The SEM-REV permitting process is aiming at obtaining a consented zone with pre-arranged permits which will enable developers to operate easily under the site requirements. Nevertheless, the regulatory frame to be defined is intended to serve as a good baseline for wave energy project development in French waters.

SEM-REV is being funded by the Regional Development Programmed (CPER) 2007-2013 Alternative Energy & Research Scheme, with funding €5.5 million.

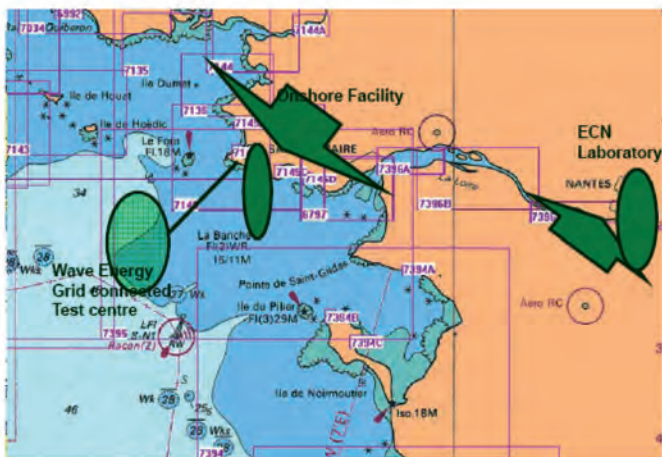


Fig 3 - Location of the SEM-REV Wave Energy Test Centre Offshore area, onshore facilities and ECN Laboratory

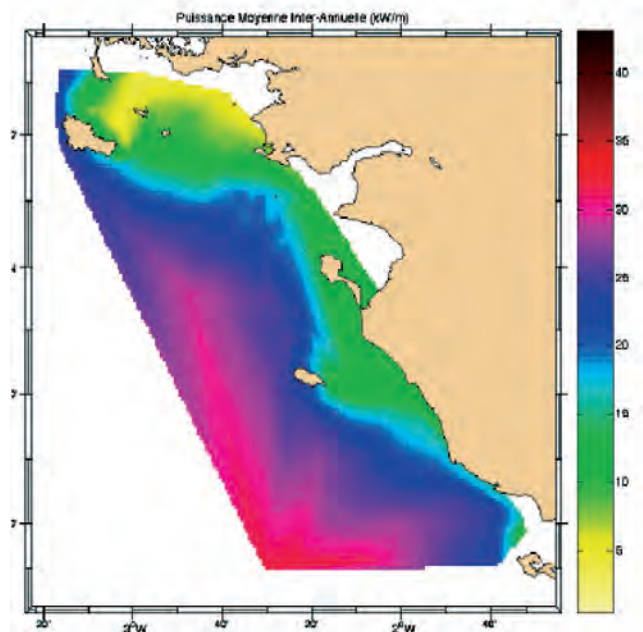


Fig 4 - Annual wave energy resource (color scale 0- 40 MW/km)

**WAVE ENERGY PILOT ZONE, PORTUGAL**

**Teresa Pontes**

*LNEG - Laboratório Nacional de Energia e Geologia, Lisboa, Portugal*

The first Portuguese Wave Energy Pilot Zone was created in January 2008 (Decree-Law 5/2008) with the multiple objectives of demonstrating wave energy prototypes and producing electrical energy by pre-commercial and commercial wave farms. In this way it contributes to wave energy technologies development and to facilitating market deployment.

The Pilot Zone (PZ) is located in the west central coast 130 km north of Lisbon (off S. Pedro de Muel). The area is 320 km<sup>2</sup> and it is located between the 30m and 90m bathymetric contours. The rated capacity is composed by two fractions; the first one being 80 MW to be integrated into the electrical distribution grid and the second is 250 MW to be integrated into the transportation grid. Figure 5 shows the location of the PZ and the bathymetry, and Figure 6 presents the annual wave power resource distribution along Portugal mainland coasts. Figure 7 presents histograms of the significant wave height  $H_s$ , energy (mean) period  $T_e$  and mean power direction  $\theta_m$ , as well as the wave power exceedence (cumulative frequency distribution) obtained from Wave-rider measurements at 50 m water-depth off S. Pedro de Muel for one year.

The Pilot Zone enjoys the best conditions for wave energy exploitation due to the highest wave power level (reaching in the nearshore, at less than 30m water-depth, about 30 kW/m) and very low conflicts with other competing activities are expected, except with fisheries that are carried along the whole coastal area. Following a good practice, a preliminary approach to the fishermen community was made with promising results. This community in principle was open to accept the point that if the PZ will be reserved for other activities than fishing, it can become nursing area thus increasing fish populations in the neighbourhood.

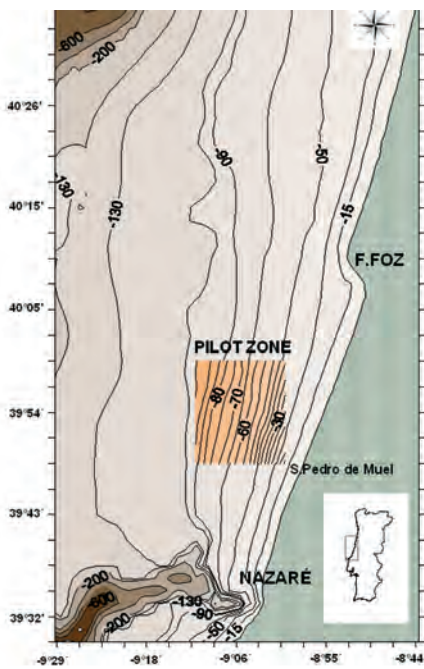


Fig 5 - Area off the central west coast of Portugal mainland incorporating the Wave Energy Pilot Zone. Bathymetric contours depth in meters.

The PZ will be managed by a society to be created for that purpose by REN (Redes Energéticas Nacionais National Energy Networks, S.A. , www.ren.pt ), the majority of its assets will be always state-owned (Decree-Law 238/2008). In addition to issuing permits (a one-stop-shop), this managing society will have the responsibility of the geophysical and environmental characterization ensuring the public access to the data through a GIS system, promoting the required infra-structures and the monitoring of the tests and operation of the prototypes and wave farms.

In addition to the creation of the PZ, another very important component of the public support for wave energy exploitation in Portugal is the remarkable feed-in tariff that has been set up together with a PPA (Power Purchase Agreement) ensuring developers the produced electrical energy purchase along the contract at the agreed tariff (DL 225/2007). For wave energy, the feed-in tariff varies according to the maturity of the wave energy converting system (prototype, pre-commercial or commercial wave farm), the degree of development of the technology under consideration (wave energy capacity that has been deployed in Portugal and elsewhere), and the participation of Portuguese entities (institutions and industry) in technology development. In the case of prototype demonstration, the tariff reaches 25 €/kWh for the first 20 MW installed capacity.

This set of supporting conditions for wave energy exploitation has led most developers from different countries to intend deploying their systems in Portugal.

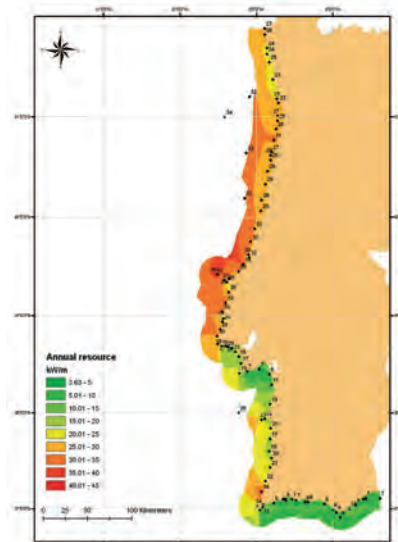


Fig 6 - Portugal mainland annual wave power level (kW/m). Data are obtained from ONDATLAS - Portuguese nearshore wave climate and energy atlas for mainland.

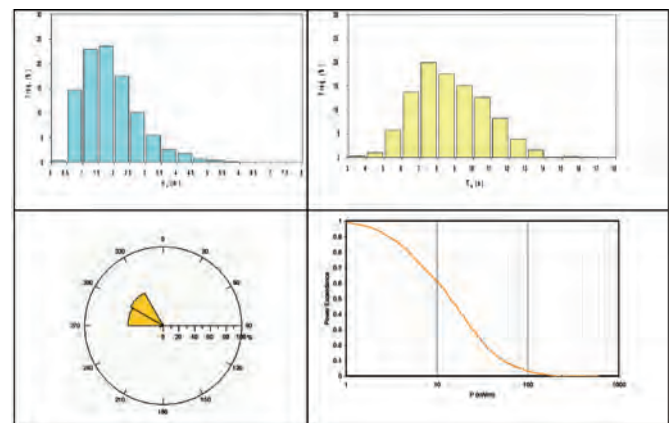


Fig 7 - Histograms of  $H_s$ ,  $T_e$  and mean power direction, and wave power exceedence probability obtained from one-year data measured at 50 m water-depth off S. Pedro de Muel.

## Agenda Events on Ocean Energy

### FORTHCOMING EVENTS

**3<sup>rd</sup> International Tidal Energy Summit**  
17-18 November 2009  
London, UK  
<http://www.tidaltoday.com/ITES/>

**2009 International Conference on Marine Engineering and Naval Engineering**  
4-6 December 2009  
Frankfurt, Germany

**BWEA Wave & Tidal 2010**  
4 March 2010  
Westminster, London, UK  
<http://www.bwea.com/marine/conference2010.html>

**AWATEA 4th Annual Conference**  
19-20 April 2010  
Wellington, New Zealand  
<http://www.awatea.org.nz>

**2010 Offshore Technology Conference**  
3-6 May 2010  
Houston, Texas, USA  
<http://www.otcnet.org/2010/index.html>

**All-Energy 2010 Conference**  
19-20 May 2010  
Aberdeen, Scotland, UK  
<http://www.all-energy.co.uk>

**OMAE 2010**  
6-10 June 2010  
Shanghai, China  
<http://www.oma2010.com/>

**World Ocean Council Conference Sustainable Energy Summit**  
15-17 June 2010  
Belfast, UK  
<http://www.oceancouncil.org/site/events>

**ISOPE 2010**  
20-26 June 2010  
Beijing, China  
<http://www.isope.org/>

**Renewable Energy Conference 2010**  
27 June - 2 July 2010  
Yokohama, Japan  
<http://www.re2010.org/>

**ICOE 2010**  
International Conference on Ocean Energy  
6-8 October 2010  
Bilbao, Spain  
<http://www.icoe2010bilbao.com>

### RELATED LINKS

**International Energy Agency**  
Information on the currently active IEA Implementing Agreements.  
<http://www.iea.org/textbase/techno/index.asp>

**European Ocean Energy Association**  
The EU-OEA unites the broad interests of the European ocean energy industry into a single, focused and independent voice. Together with its regional and industry partners, the EU-OEA and its members address issues of relevance to the industry with decision-makers including regulators, legislators, and policymakers.  
<http://www.eu-oea.com>

## Conference

### ICOE 2010

José Luis Villate  
Robotiker, Spain



Bilbao will host the third International Conference on Ocean Energy (ICOE2010) organised by EVE (the Basque Energy Board) and TECNALIA, with the partnership of the European Ocean Energy Association and the Implementing Agreement on Ocean Energy Systems of the International Energy Agency.

The event is intended to attract the top companies in the world from the ocean energy sector and will combine 3 days of conferences with an exhibition. The conference and exhibition will take place on October 6-8, 2010 at the Bilbao Exhibition Centre.

The conference will address the three main topics:

1. Ocean Renewable Energy Development, including all aspects needed to create power projects such as: resource and site assessment, advanced stage technologies, system and plant components, test site experience, pilot project planning and implementation experience. This topic will focus on the following ocean energy sources: wave, tidal streams and marine currents, tidal rise and fall, ocean thermal energy conversion and salinity gradient.

2. Removing barriers and creating opportunities for deployment. It includes a wide range of aspects which can facilitate the deployment of ocean energy such as socio-economic, environmental aspects and involvement in maritime spatial planning; interconnection and grid integration; financing, insurance and permissions; technology consolidation; standardisation and certification and lessons learnt from offshore wind.

3. Synergies with other maritime and energy sectors, aiming at showing similarities and common opportunities between ocean energy and other more mature sectors such as offshore wind, oil & gas, shipbuilding, installations and operations at sea or electrical conversion.

A call for abstracts closing in January 2010 has been launched one year in advance.

In conjunction with the ICOE2010 conference, the first EU-OEA industrial exhibition will be organised aiming to become an annual dynamic event for exchanging views on policy matters, to do business and to meet industry colleagues and experts in the field. The EU-OEA exhibition will provide a unique opportunity for leading manufacturers, utilities, developers, contractors, consultants, suppliers & service companies, financiers, universities & research institutes, NGO's and other organisations to showcase their products and services. Information concerning exhibiting is available at the EU-OEA website.

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**ANNEX II:** Development of recommended practices for testing and evaluating OES  
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**ANNEX III:** Integration of ocean energy plants into electrical grids  
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**ANNEX IV:** Assessment of environmental effects and monitoring efforts for ocean wave, tidal, and current energy systems  
*United States Department of Energy (DoE)*  
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### How to participate in the OES-IA

If your country has not signed the Implementing Agreement, contact the Executive Committee Chairperson who will provide you with information on how to proceed. If your country has signed the Implementing Agreement contact the Executive Committee member from your country or the Operating Agent of the Task(s) you are interested in.

The OES-IA Website: <http://www.iea-oceans.org>

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