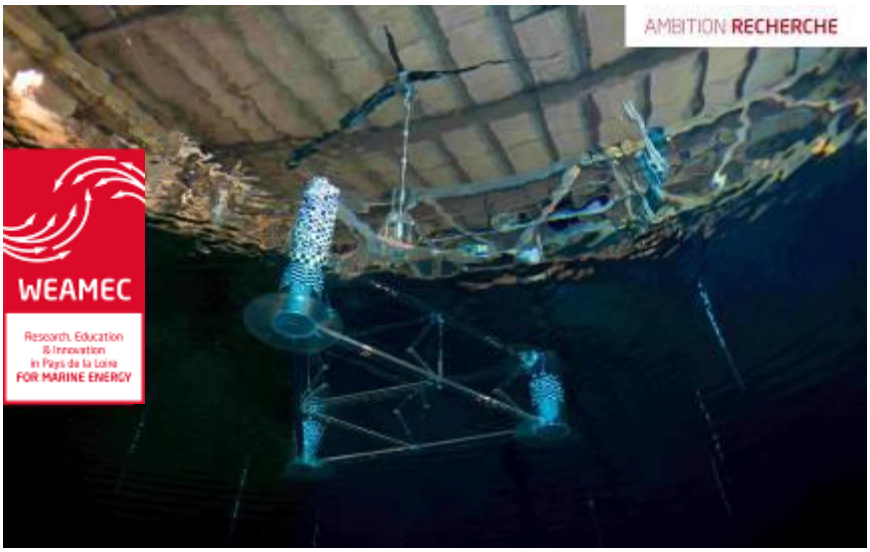

International strategy of WEAMEC

(West Atlantic Marine Energy Community)

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UNION EUROPÉENNE
Région PAYS de la LOIRE
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CONTENT

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1 Introduction

As the international dimension plays a major role for WEAMEC, partners have to get deeply involved in a collective strategy at this level. This strategy bas been elaborated, discussed and validated during numerous WEAMEC meetings with its partners (B to B meetings, Research Innovation and Facilities Meetings, Operational Steering Commitees, Strategic Steering Commitees,...)

2 International scene of Marine Renewable Energy

By the end of 2020, European countries are due to start implementing their National Energy and Climate Plans (NECPs) to meet the 32% renewables target in 2030. Wind and ocean energy will play a significant role for many European countries to meet this target, while creating job opportunities and reducing dependence on fossil fuels.

With 18.5 GW[1] of offshore wind (fixed and floating) and 15 MW[2] of wave and tidal energy capacity installed in European waters at the end of 2018, Europe is today a clear global leader in offshore renewable energy. Beyond Europe, new growth markets are fastly emerging in the United States and in Asia, especially for offshore wind power.

The supply chain for marine renewable energy is spread across multiple countries, with a significant presence in coastal areas but also in inland regions, which provide valuable expertise for the production of components and sub-components. The supply chain involves innovative SMEs, large manufacturers and academic organisations, benefitting from links with more mature industries, such as the shipping, offshore oil and gas, or aeronautics businesses. In 2019, more than 650 European organisations in 25 Member States are involved in R&D activities related to ocean energy and more than 400 European organisations are involved in different stages of the ocean energy supply chain[3].

In light of this situation, strategic partnerships for collaborative R&D between France and other countries are critical to grow the Marine Renewable Energy sector and meet the renewables target.

[1] *Offshore Wind in Europe – Key trends and statistics 2018*, Wind Europe, February 2019,
[2] *Annual Report – an overview of ocean energy activities in 2018*, Ocean Energy Systems
[3] *The EU Blue Economy Report. 2019*, European Commission, 2019

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3 WEAMEC international strategy

WEAMEC international strategy must focus on strategic development areas based on the pre-existing forces of the ecosystem, which need to be strengthened. These themes were discussed at the Research and Innovation meetings of WEAMEC and are as follows:

- **WEAMEC Research and Innovation roadmap**
- **Basins and sea test sites networks**
- **International training**

The resulting roadmap lays out the following medium-term objectives:

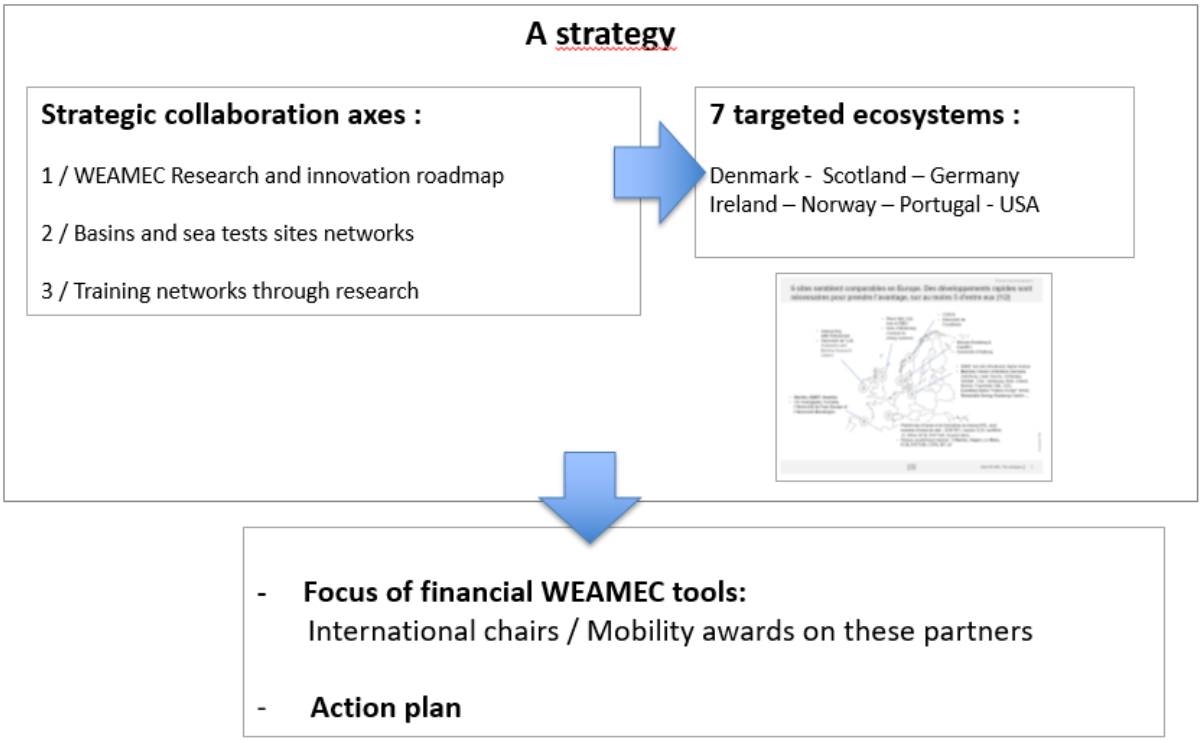

Figure 1: International stragtegy of WEAMEC

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3.1 WEAMEC Research and Innovation roadmap

The top priority themes included in the Research and Innovation roadmap of WEAMEC are:

1. **Reduce LCOE** :
   - of **offshore wind energy**, by increasing power and size of wind turbines, and in particular in extreme and complex conditions (hard soils, high amplitude waves, etc.),
   - of **floating wind turbines** (including "kite", autonomous floating system for far offshore, …) and floating substations.

2. Advancing **wave energy** by breaking concepts, and/or by coupling with other sources of energy, for offshore energy self-sufficiency applications, or supplying sites not connected to the grid.

3. Amplify the strong skills of the ecosystem and bring the effort to innovative key **cross bricks**.

The full Research and Innovation roadmap of WEAMEC is available here[4].

Objectives for 2020 :

- Participate in a demonstration project of a **floating wind turbine** on SEMREV.
- Participate in a project of development of a **wave energy converter** for non grid connected applications.
- Participate in at least two projects on the **critical technological building blocks:** anchor, dynamic umbilicals, environmental observatory, wind ressource assesment,...

[4] WEAMEC Research and Innovation roadmap : https://www.weamec.fr/en/blog/record_synthesis/research-innovation-roadmap-weamec/

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3.2 Networks of basins and sea test sites

Networks of basins and sea test sites aim at federating the test facilities at European level and proposing European projects to offer a testing framework. These projects are used to perform the tests on the best suited site considering the technology and its maturity level (type of testable technology on the site, electric power generated, sea conditions severity...). Within the WEAMEC ecosystem, this axis is carried mainly by ECN at international level with the wave basin, towing tank and SEMREV sea test site.

MARINET 1 project [2011-2015] was a significant step forward to structure the test facilities network. In total 28 sites were involved across Europe.

Thanks to this project, the wave basins of Central Nantes have been referenced at European level. As a result ECN has obtained the largest number of tests among all partners of the project. In addition the insertion in this network and the opportunity to compete for new projects of the same type technical results were very rewarding and some international technology developers have returned to continue their tests at ECN in B2b collaborations.

Situation in 2014 :

Structure of the network of European partners through the MARINET 1 project with test basins (with french Ifremer and ECN/basin level) and some test sites.

Objectives 2020 :

- To propose to the European funding a project with the majority of MARINET 1 partners in a new unifying project.

- To complete the equipment of the **ECN/SEMREV site** with the underwater connection HUB.

- To set up within 4 years two other projects enabling technology testing at sea. The aim is to develop the activity of the new test site and collect feedback on technologies developed at European level.

- To offer a 'network of excellence' structure at European level. The network would involve key partners through a labelling “European Strategy Forum on Research Infrastructures” (ESFRI)[5] issued to large European research structures. This approach at European level implies first a network organisation at French level.

[5] https://www.esfri.eu/

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3.3 International training

As part of its training activities, WEAMEC has the ambition to develop the training offer dedicated to the Marine Renewable Energy of the Pays de la Loire Region.

Research training networks at European level aim at establishing a wide range of Innovative Training Networks (ITN) projects or ERASMUS trainings.

Situation in 2014 :

Participation in OCEANET project (ITN project) by Ecole Centrale de Nantes and University of Nantes with the following partners:

- FRAUNHOFER IWES GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV - Germany
- UNIVERSITY COLLEGE CORK, NATIONAL UNIVERSITY OF IRELAND, CORK - Ireland
- WAVEC/OFFSHORE RENEWABLES - CENTRO DE ENERGIA OFFSHORE – Portugal

Objectives 2020:

For the [2015-2020] period the objectives are:

- to get granted two new ITN projects.
- to develop an international master after a benchmark at the European level

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4 Synthesis of partnerships

Two studies have been performed on the MRE ecosystem in Europe [6] [7].
Following the discussions in the RIME meetings, partnerships with seven international ecosystems to focus on have been validated in COMOP WEAMEC meeting. The identified partners are involved at different levels in the three themes structuring the WEAMEC international strategy (research and innovation, test sites, training through research):

- Denmark: DTU Wind, Aalborg University and DanWEC
- Scotland: Edinburgh University, EMEC and Flowave
- Germany: Fraunhofer IWES & IEE, Kiel University, TU Darmstadt and Stuttgart University
- Ireland: MaREI (Marine Renewable Energy Ireland), including Cork University, NUI Galway, University College of Dublin, University College Cork / Beaufort Building (LiR / National Ocean Test Facility)
- Norway: SINTEF Group, including MARINTEK and NTNU
- Portugal: WavEC Offshore Renewables
- USA: The Massachussets MRE research Innovation and Training ecosystem including the NorthEastern University.

These seven ecosystems are considered among the most dynamic in Europe and worldwide.

[6] Collaborative work from the regional actors coordinated by the CMI Office in 2013 – 2014.
[7] Ecosystèmes des Énergies Marines Renouvelables (EMR). Acteurs cibles en Europe: Technologies et maillage des compétences. SATT N 2016_00138 30/06/2016.

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