

## ERANet-LAC 3rd Multithematic Joint Call 2017/2018 involving Research Infrastructures

**TOPIC ENERGY: Ocean energy - Development of technologies for the ecological energy valorization of marine resources within existing large research infrastructures.**

**SUBTOPIC: Validation of computational models in laboratory and field facilities (including its application to production evaluation)**

<p><b>Specific challenge:</b> Why this topic is relevant and which societal challenges does it address?</p>	<ul style="list-style-type: none"> <li>• The numerical models must be accurate to describe key parameters for marine energy systems.</li> <li>• The computational model should be calibrated and validated with data from measurements and/or experiments</li> <li>• Improving human resources specialized in the area of computational modelling applied to ocean energies.</li> </ul>
<p><b>Scope:</b> Added value gained from EU-CELAC cooperation for both regions</p>	<ul style="list-style-type: none"> <li>• The computational models will be usable for both regions, enhancing the accuracy of predicting energy production.</li> <li>• Preparation of specialized human resources in both regions through the exchange of knowledge on these topics and complementing the work done.</li> </ul>
<p><b>Expected impact for both regions:</b></p>	<p>Computational model development will provide a tool to decrease the costs of ocean energy exploitation by:</p> <ul style="list-style-type: none"> <li>• anticipating the performance of the technologies,</li> <li>• increasing the efficiency of the technologies,</li> <li>• predicting and/or minimizing negative impacts on the environment,</li> <li>• strengthening the capabilities of human resources</li> <li>• optimizing solutions for the development of the technology.</li> </ul>
<p><b>Type of action suggested:</b> Research project, networking activities, mobility etc.</p>	<ul style="list-style-type: none"> <li>• Research project, networking activities, mobility etc. Research projects for data collection linked to research infrastructures (RI) for the calibration and validation of the models.</li> <li>• Development of a jointly-shared repository of the computational model developments for use by members within the collaboration.</li> </ul>

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## SUBTOPIC: Material development and/or evaluation for equipment operating in an aggressive saline environment

<b>Specific challenge:</b> Why this topic is relevant and which societal challenges does it address?	<ul style="list-style-type: none"> <li>• Development/testing of materials to improve economic viability of marine devices.</li> <li>• Biocorrosion / biofouling protection.</li> <li>• Abrasion.</li> <li>• Durability in aggressive marine environments robustness in extreme conditions linked to ocean technologies.</li> <li>• Human resources for the development of materials.</li> </ul>
<b>Scope:</b> Added value gained from EU-CELAC cooperation for both regions	The development of know-how regarding to existing and new ocean device materials applied to the wide range of technologies and sea conditions in both regions.
<b>Expected impact for both regions:</b>	Identification and/or development of suitable materials for marine energy devices. Uses of more adequate high-quality materials for devices
<b>Type of action suggested:</b> Research project, networking activities, mobility etc.	Research project, networking activities, mobility etc. Research and pilot projects for developing/testing new materials. Collaboration of academia and industry in the identification, development and production of high-quality, low cost materials

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## SUBTOPIC: Development of standard environmental impact evaluation methodologies.

<b>Specific challenge:</b> Why this topic is relevant and which societal challenges does it address?	The homologation of environmental methodologies and techniques must consider the differences within the countries of two regions. While the key points for environment evaluation are not necessarily common to all locations, generating these methodologies will ensure the minimization of the negative impacts of ocean energy exploitation and the selection/evaluation and data development for life cycle analysis (LCA)
<b>Scope:</b> Added value gained from EU-CELAC cooperation for both regions	<ul style="list-style-type: none"> <li>• The conservation and maintenance of environmental conditions and ecosystem services</li> <li>• Ocean energy systems will be introduced through a multidisciplinary and holistic approach.</li> </ul>
<b>Expected impact for both regions:</b>	<ul style="list-style-type: none"> <li>• Conservation of natural environments</li> <li>• Better integration of the ocean energy systems into the marine environments.</li> </ul>
<b>Type of action suggested:</b> Research project, networking activities, mobility etc.	Multidisciplinary work, research, field work and monitoring for the evaluation of potential impacts in the marine environment with close collaboration with activities in large research infrastructures (RI).

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## SUBTOPIC: Offshore and coastal multipurpose devices and multipurpose use (co-location, cogeneration)

<p><b>Specific challenge:</b> Why this topic is relevant and which societal challenges does it address?</p>	<p>The development of combined systems able to harness marine energy as well as perform another function, such as coastal protection and marine aquaculture, in deep and coastal waters is the road that seems most viable to reduce production costs, enhance the efficiency of the devices and produce energy at competitive prices. Uncertainties remain regarding the physical and technical features of the multipurpose systems such as interconnection, operative hours, synchronization between components, effects on the marine area, etc. Experimental modelling is needed to better understand such devices prior to placing any in real sea conditions.</p> <p>As an examples of those combined system:</p> <ul style="list-style-type: none"> <li>- Hybrid "wave-wind" or "wave-current" devices</li> <li>- Utilizing wave or tidal energy converter for water desalination</li> <li>- Energetic and non-energetic combined exploitation on marine sites.</li> </ul>
<p><b>Scope:</b> Added value gained from EU-CELAC cooperation for both regions</p>	<p>Preserve the marine environment and facilitate the development of its potential</p>
<p><b>Expected impact for both regions:</b></p>	<p>The multipurpose systems developed, tested, characterized and optimized can be implemented in both regions. They are envisaged as one of the most promising alternatives of low cost energy generation and synergies with other non-energetic utilization of the marine resources.</p>
<p><b>Type of action suggested:</b> Research project, networking activities, mobility etc.</p>	<p>Research project, networking activities, mobility etc. Development of experimental models and prototypes capable of representing offshore conditions.</p> <p>Testing multipurpose devices focusing on the synchronization of components and strategies for dealing with hazards.</p>

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## SUBTOPIC: R&D focus on testing of systems, subsystems and components of marine renewable energy prototypes.

<p><b>Specific challenge:</b> Why this topic is relevant and which societal challenges does it address?</p>	<p>The development of really innovative concepts to increase economic viability. The testing of these systems, subsystems and components individually will be followed by implementation in a full-scale prototype (rephrase). Integration of innovative components in multiple prototypes would reduce costs.</p> <ul style="list-style-type: none"> <li>- Applying feasible control systems to increase the efficiency of the devices</li> <li>- numerical analyses and near-full scale testing of the array of wave or current energy converters</li> <li>- PTOS</li> <li>- Electricity/Energy storage systems to stabilize the power production</li> <li>- Innovative foundation structures for the current turbines to be installed in specific sites.</li> </ul>
<p><b>Scope:</b> Added value gained from EU-CELAC cooperation for both regions</p>	<p>The innovative devices should provide better efficiencies, the consolidation of the technologies and technology transfer. Exchange of human resources could lead to the creation of complementary concepts resulting from the integrated needs of both regions.</p>
<p><b>Expected impact for both regions:</b></p>	<p>Reduction of costs for the development of prototypes, Technology exchange Open new markets for developers</p>
<p><b>Type of action suggested:</b> Research project, networking activities, mobility etc.</p>	<p>Research project, networking activities, mobility etc. Testing/validation/demonstration of innovative prototypes in real environment. Improvement of testing capabilities and the development of prototypes in connection with research infrastructure.</p>

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## SUBTOPIC: Data collection/evaluation of resources

<p><b>Specific challenge:</b> Why this topic is relevant and which societal challenges does it address?</p>	<p>Data collection is vitally important for the estimation and assessment of resources. However the availability of data, its measurement or its collection is non-existent, scarce or its quality does not fulfil the needs of the technological development/design. Without adequate data collection resource evaluation will be faulty and the design of technologies will not be optimum.</p>
<p><b>Scope:</b> Added value gained from EU-CELAC cooperation for both regions</p>	<p>Better understanding of processes affecting the development of technologies will be reached. Moreover, these technologies will be optimized for the particular conditions in which they will be placed. Consequently, better performance can be expected as well as the adaptability of the devices to a different and/or particular working conditions. The data collection and resource evaluation will produce information that is also useful for other purposes (e.g. environment conservation, monitoring of resources, sustainability).</p>
<p><b>Expected impact for both regions:</b></p>	<p>For both regions this offers generation of knowledge highly valuable for both regions in scientific, environmental and technology development; monitoring and determination of specific sites with the potential for the implementation of strategies focused on the harnessing of ocean energy; assessment of the impact of technologies through the comparison between a non-intrusive scenario and a modified one.</p>
<p><b>Type of action suggested:</b> Research project, networking activities, mobility etc.</p>	<p>Research project, networking activities, mobility etc. Research projects and networking activities should be conducted with focus on the recompilation of already existing data or previous evaluation of resources (state of the art), measurement and data collection of already known sites with the potential for the implementation of technologies for ocean energy exploitation, resource evaluation (local and regional scale) considering the temporal variations of the resources. The networking activities should enhance the capacity for the data collection and the techniques for analysis/evaluation of the resources. Research projects should be developed for specific data collection, with clear objectives and methodologies. The research projects can also serve as a starting point for the development of networking activities.</p>