IRENA
International Renewable Energy Agency

UNLOCKING THE POTENTIAL OF OCEAN ENERGY AROUND THE GLOBE
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Dublin, Ireland

Session: Innovative OE designs for islands

Projects and technologies in ocean energy in Mexico

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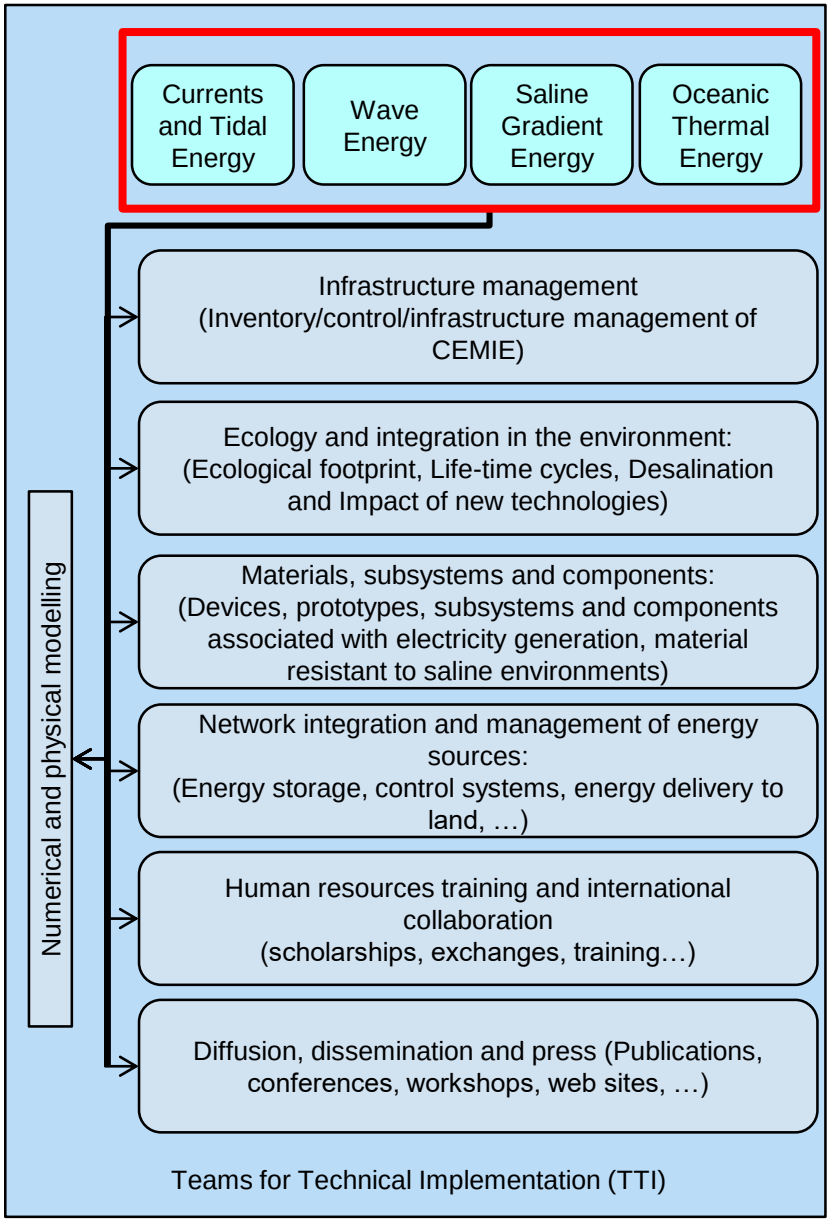
CEMIE-Océano

The CEMIE-Océano

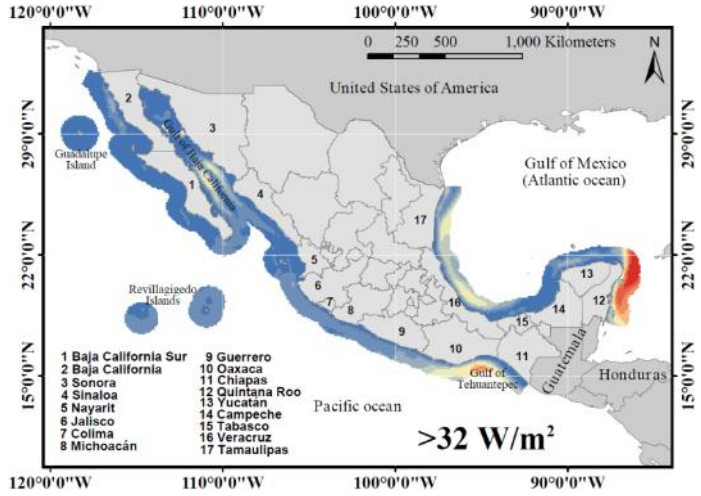
- coordinates applied research, innovation and technology development associated with the extraction of ocean energy
- will oversee the generation of innovative products and comprehensive technology to supply part of the demand for energy in Mexico in a sustainable, effective and profitable way
- is the most important multidisciplinary supplier of applied research, innovation and technology development in the field of ocean energy extraction in Latin America

Thematic Areas

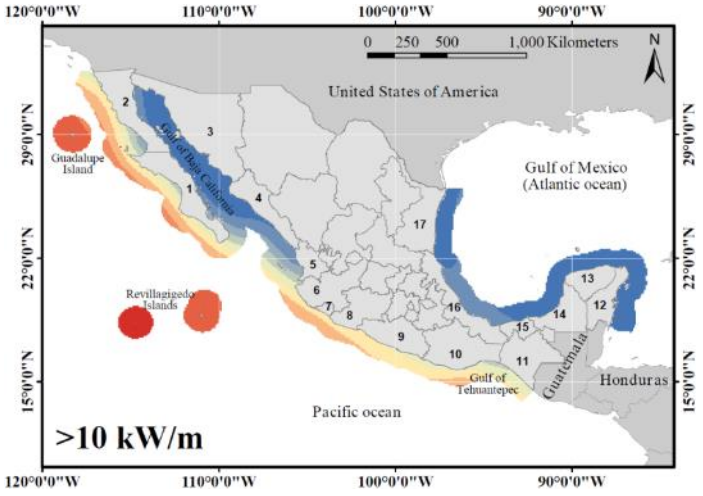


Power Availability in Mexico

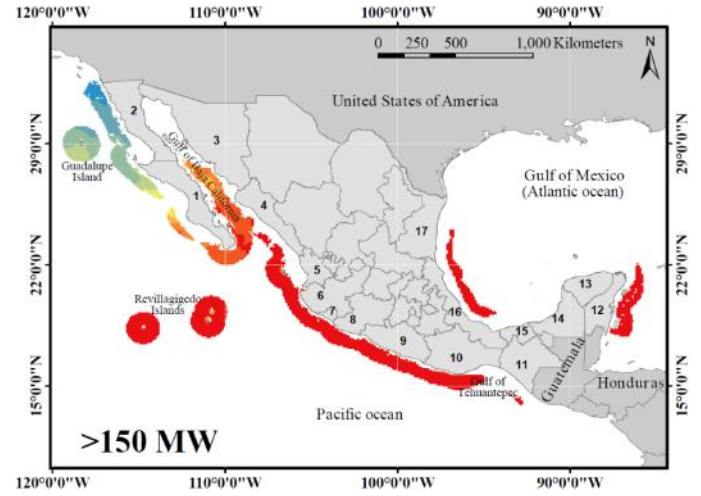
Ocean currents

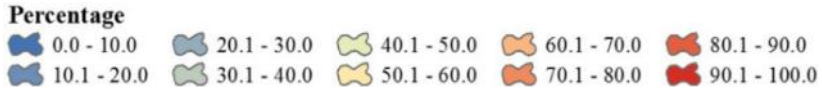


Waves

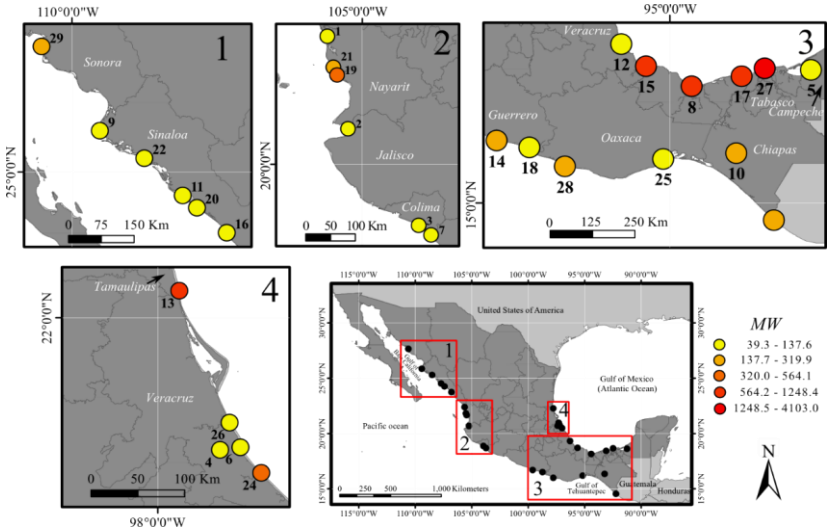


Thermal gradient





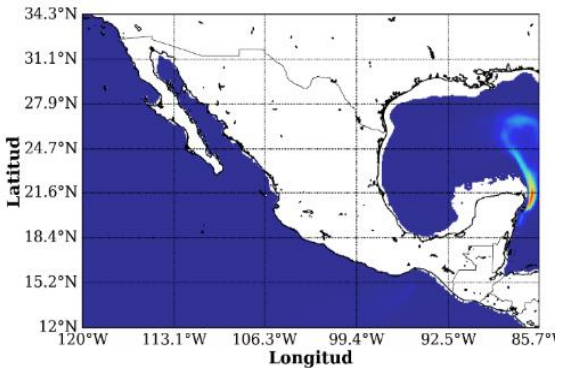
Salinity gradient



Ocean currents and tidal energy results

National Inventory

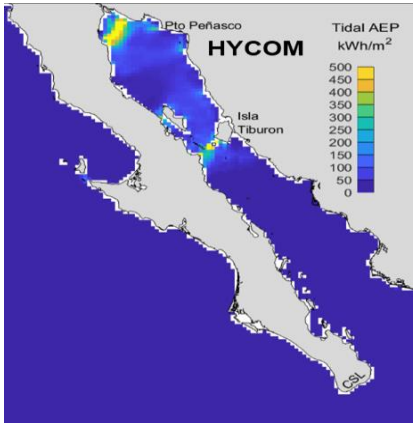
- Implementation of the ROMS model for the Mexican Pacific and the Gulf of Mexico-Caribbean Sea in 3D, with wind, heat flows and large-scale tides.
- Nested implementation for the GC and Yucatan



% time with V> 1 m/s

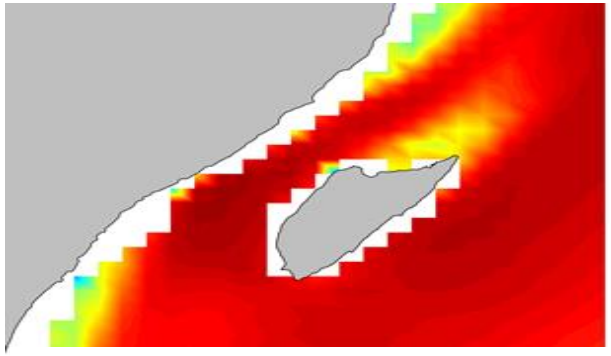
Gulf of California

- High GC Measurements from Nov 2017 to June 2019. Measurements in Adair Bay from Dec 2018 to Jun 2019.
- Resource evaluation with global (HYCOM) and local (DELFT) models, including tides and winds.
- Suggests maximum values of 500 kWh / m2 of annual accumulated power (PAA) available.



Yucatan current

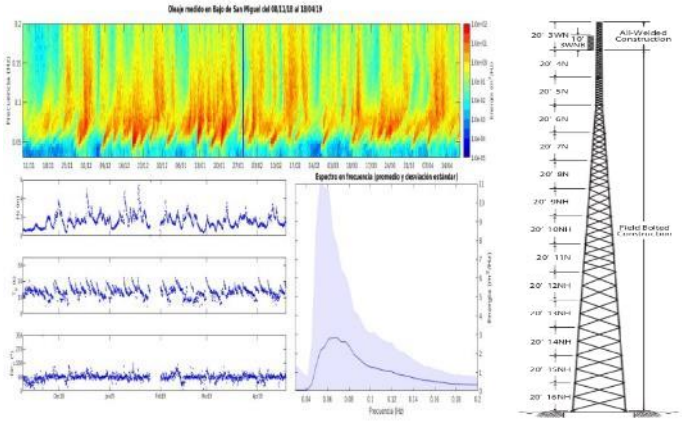
- Analysis of deep measurements 400 m CANEK (≥2 years): Tulum, Puerto Morelos, Cozumel: 4.49 MWh / m2 of PAA (Cp = 0.6).
- Shallow measurements 1 year in Cozumel, Oceanographic cruise
- Analysis and implementation of numerical models (HYCOM and DELFT 3D).
- HYPA hydrogenerator development.
- Aluminum alloy AA6061-T6 the most resistant to corrosion.



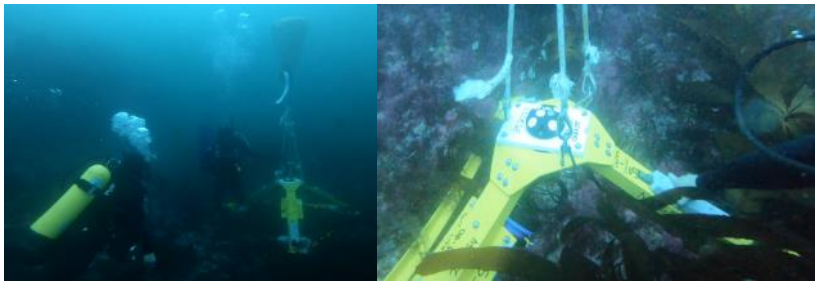
V^3 of HYCOM 1/25º

Wave energy

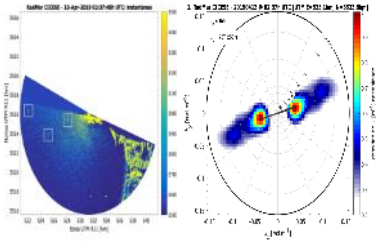
Implementation of a highly instrumented natural laboratory and two alternate laboratories for ocean energy and performance studies of WECs and others



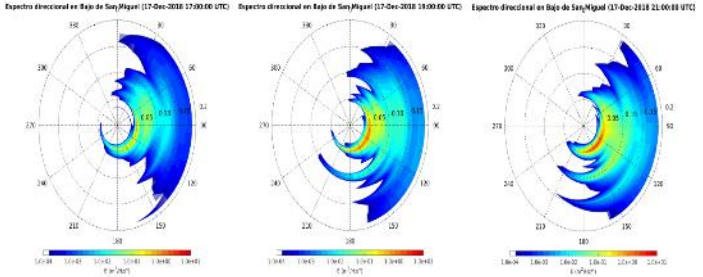
Control campaigns for measurements, monitoring and maintenance



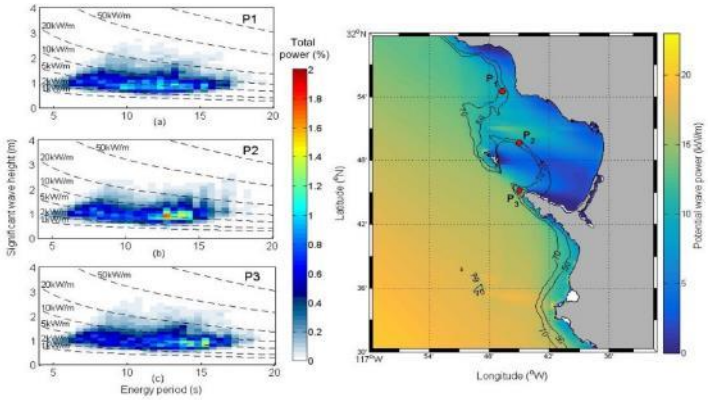
Marine Radar



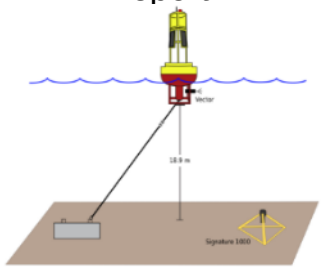
Measurement of meteorological and maritime variables



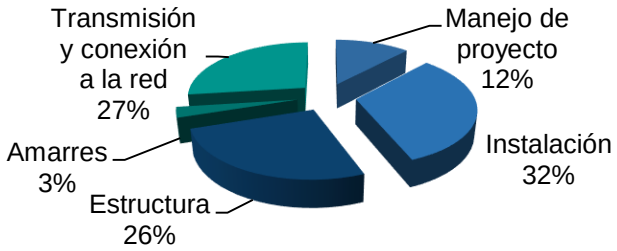
High resolution SAR image processing and numerical detail simulations at the chosen sites



On-site device operation condition report

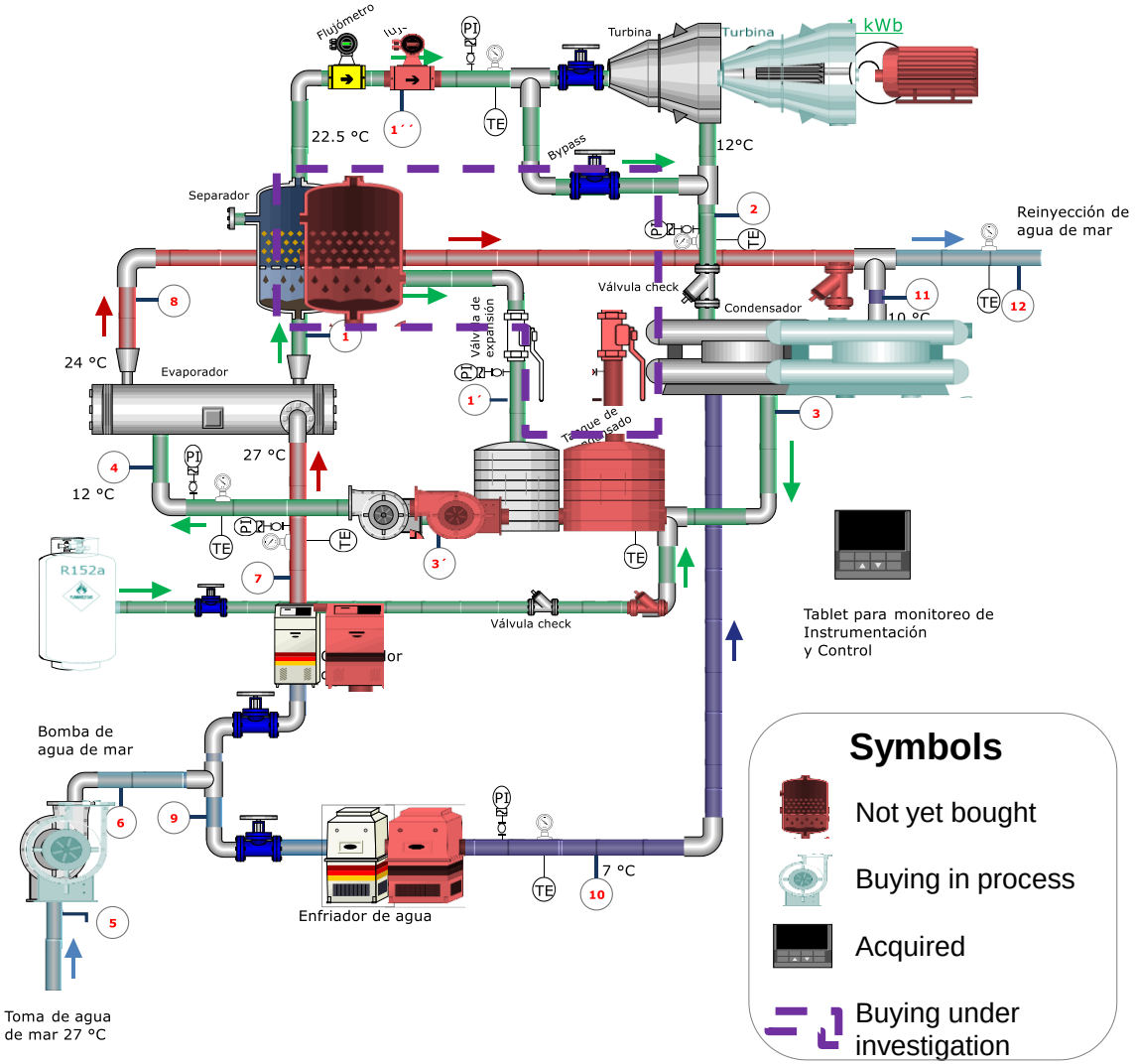


Technical-economic-environmental feasibility studies of the devices tested



Thermal gradient energy

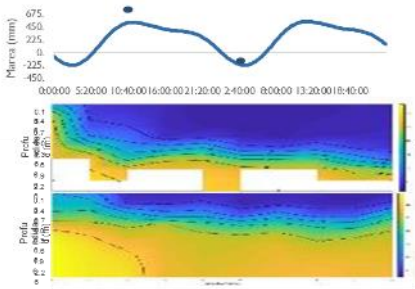
Prototype design

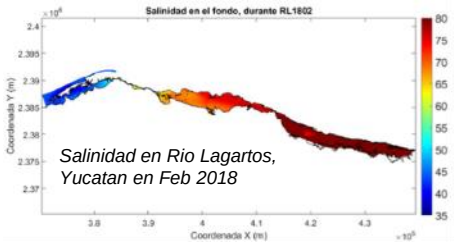


Symbols

- Not yet bought
- Buying in process
- Acquired
- Buying under investigation

Salinity gradient energy

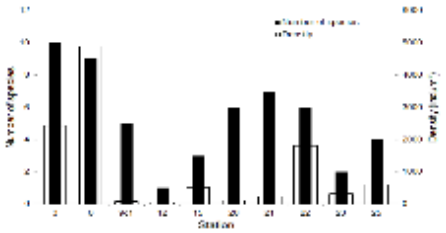




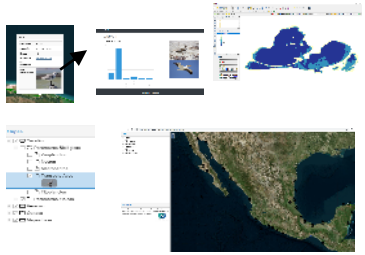
Salinidad en Rio Lagartos, Yucatan en Feb 2018

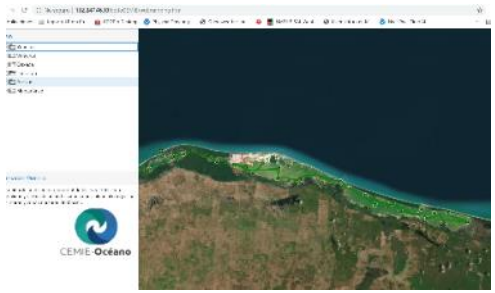
Salinidad en Rio Lagartos, Yucatan durante un año

Biological characterization

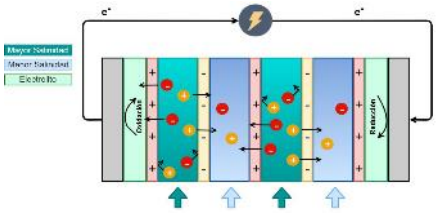


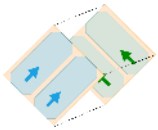
Information in GIS

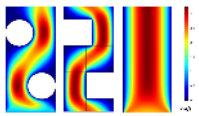




Design, modeling and construction of devices







- Field Data Processing
- Continuation of field measurements (Laguna Rio Lagartos and Jamapa River)
- Re-design and database construction
- Continuing generation of spatial maps
- Atlas settings and power in GIS
- Prototype construction
- Modeling results
- Design and creation of specific membranes
- Research in the development of membranes with other materials

Thank you for your attention

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