

# THE ENERGY MARE PROJECT

Cooperation for the use of renewable energies in the Atlantic Area

Brest, 13/11/2013



ATLANTIC AREA Transnational Programme  
ESPACIO ATLÁNTICO Programa Transnacional  
ESPACE ATLANTIQUE Programme Transnational  
ESPAÇO ATLÁNTICO Programa Transnacional

*Investing in our common future*



ERDF

**I. ENERGMARE PROJECT (basic information, partnership, technical activities)**

**II. FOCUS ON THE ACTIVITY 3 : Potential of marine renewable energies in Charente Maritime**

## ENERGY MARE

### Atlantic Area Programme 2007-2013

Cooperation for the use of renewable energies in the Atlantic Area

#### **Duration**

Start date: 15/11/2012 ---- End date: 15/11/2014

#### **Partnership**

1. Instituto Enerxético de Galicia (INEGA), Spain (lead partner).
2. Fundación Leading Innova (CT INNOVA), Spain.
3. Instituto De Engenharia Mecânica e Gestão Industrial (INEGI), Portugal.
4. École d'Ingenieurs en Génie de Systemes Industriels (EIGSI), France.
5. University of Strathclyde, UK.
6. University of Highlands and Islands. Environmental Research Institute (ERI), UK.
7. Limerick Clare Energy Agency, Ireland.
8. National University of Ireland, Galway. Civil Engineering and Ryan Institute, Ireland.
9. Consellería de Medio Ambiente, Territorio e Infraestruturas. MeteoGalicia, Spain.
10. Instituto Superior Técnico. Maretec, Portugal.
11. Technopôle Brest Iroise, France.

## ENERGYMARE: TECHNICAL ACTIVITIES

- **ACTIVITY 3: ANALYSIS OF THE POTENTIAL OF RENEWABLE ENERGY RESOURCES IN THE MARITIME ENVIRONMENT**

**Objective:** Identification and location of the Atlantic coastal areas with the physical, technical and biological properties needed for the implementation of energy production technologies

- **Action 1: Inventory of information and measurement tools of the sea energy resources.**
- **Action 2: Development and implementation of low cost buoys suitable for different technologies.**
- **Action 3: Elaboration of maps: offshore wind, wave and tidal energy.**

- **ACTIVITY 4: CREATION OF EXPERIMENTATION AREAS FOR ENERGY MEASUREMENT, PRODUCTION AND EVACUATION**

**Objective:** To locate the optimal site for the implementation of the experimentation area from its technical and environmental feasibility point of view, as well as the regulatory conditioners.

- **Action 1: Site identification and feasibility analysis..**
- **Action 2: Detailed study of the initial characteristics of the experimentation areas.**
- **Action 3: Creation of experimentation areas.**

- **ACTIVITY 5: ANALYSIS OF THE EXISTING TECHNOLOGY FOR THE PRODUCTION OF MARINE ENERGY**

**Objective:** To know the current state of the technological development by identifying prototypes that can be used. The different types of technologies currently available will be analyzed, identifying their strengths and weaknesses, as well as the necessary requirements for their experimentation as prototypes and for their commercial exploitation.

- **Action 1 : Assessment of the existing technology for the exploitation of the marine energy resources.**
- **Action 2: Experimentation with prototypes.**
- **Action 3: Continuous study of the development of the conditions in the experimental area.**

- **ACTIVITY 6: ANALYSIS OF THE EVACUATION AND TRANSPORT SYSTEMS OF MARINE ENERGY**

**Objective:** To advance in the overcoming of one of the big challenges of renewable energy production: evacuation, transport and storage.

- **Action 1: Analysis of the evacuation alternatives of the marine energy.**
- **Action 2: Design of electrical networks to transport the marine energy produced.**

- **ACTIVITY 7: ANALYSIS OF THE CONTEXT AND IMPACT OF THE DIFFERENT MARINE ENERGY SOURCES (OFF-SHORE SOURCES)**

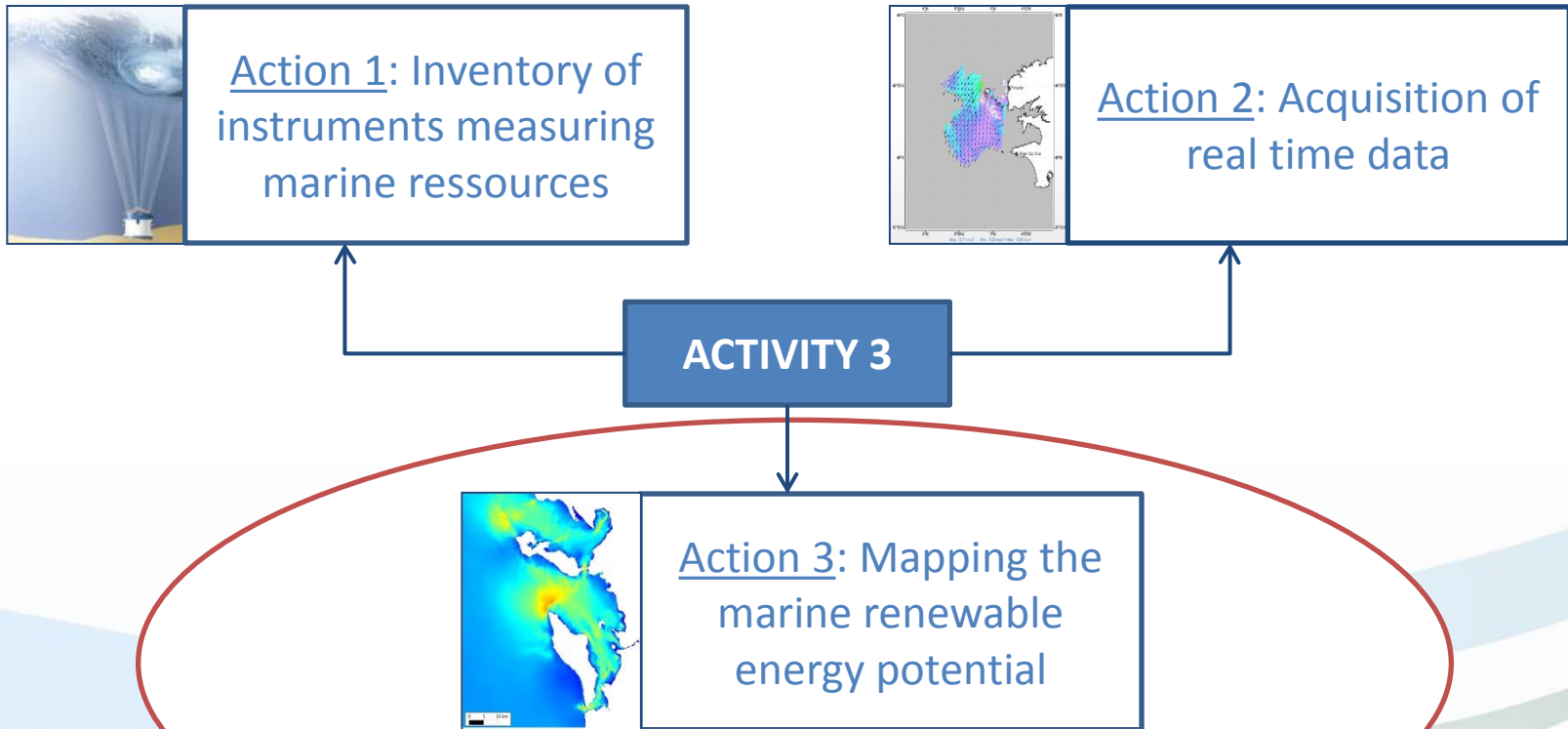
**Objectives:** To unify criteria for the establishment of a common energy policy which unifies administrative and legal aspects.

To know how can contribute the development of this sector to the economic and social development of the Atlantic Area economies.

- **Action 1: Analysis of the regulatory context .**
- **Action 2: Analysis of the economic and social impact .**

**>> FOCUS ON THE ACTIVITY 3 : Potential of marine renewable energies in Charente Maritime**

## Activity 3 – Potential of marine renewable energies

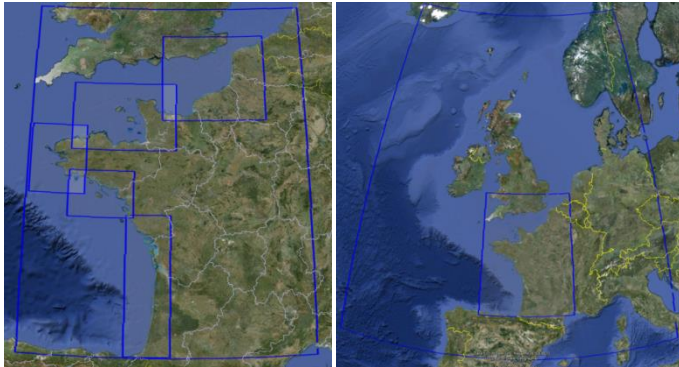


## Analysis for the Charente-Maritime area

- Data obtained with PREVIMER

### MARS2D Model (tidal currents)

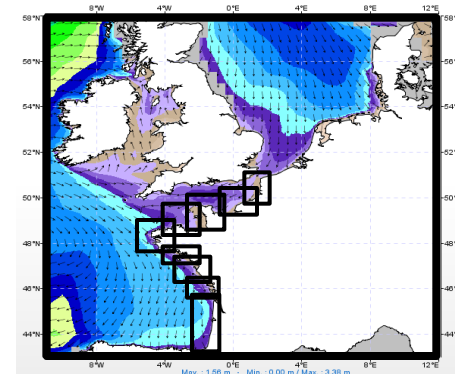
#### Different spatial extensions and resolutions



MARS2D Model	Range	Extension	Spatial resolution	Temporal resolution
ATLNE	Range 0	Atlantique Nord Est	2 km	1 h
MANGA	Range 1	Manche et Golfe de Gascogne	700 m	1 h
MANE	Range 2	Manche Est	250 m	15 mn
MANW	Range 2	Manche Ouest	250 m	15 mn
FINIS	Range 2	Finistère	250 m	15 mn
SUDBZH	Range 2	Sud Bretagne	250 m	15 mn
<b>AQUI</b>	<b>Range 2</b>	<b>Aquitaine</b>	<b>250 m</b>	<b>15 mn</b>

### WWIII Model (waves)

#### Different spatial extensions and resolutions



WW3 Model	Range	Extension	Spatial resolution	Temporal resolution
NORGAS	Range 1	Gascogne / Atlantique Nord	4 km	3 h
AQUITAINE	Range 2	Aquitaine	200 m	1 h
ARMOR	Range 2	Armor	200 m	1 h
<b>CHARENTES</b>	<b>Range 2</b>	<b>Charentes</b>	<b>200 m</b>	<b>1 h</b>
COTENTIN	Range 2	Cotentin	200 m	1 h
FINISTERE	Range 2	Finistère	200 m	1 h
LOIRE	Range 2	Loire	200 m	1 h
NORMANDIE	Range 2	Normandie	200 m	1 h
PDC	Range 2	Pas-De-Calais	200 m	1 h
SUDBZH	Range 2	Sud-Bretagne	200 m	1 h



## Analysis for the Charente-Maritime area

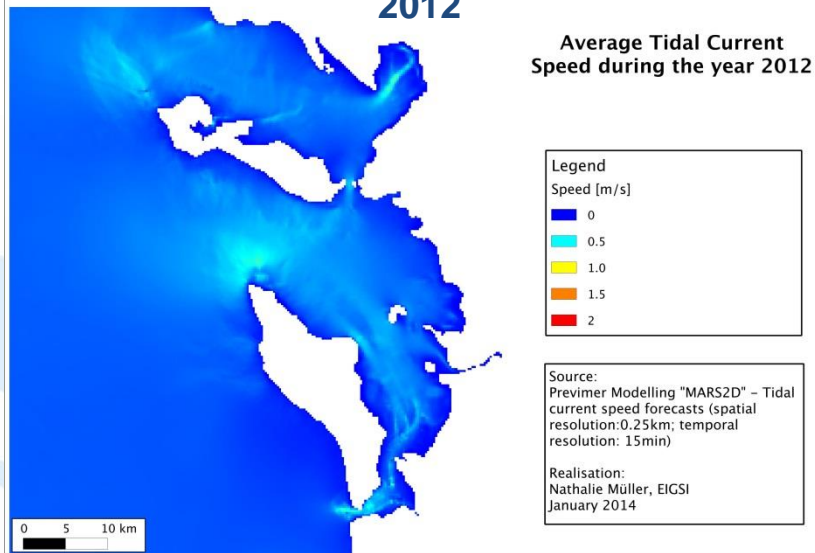
### “Tidal Current” studies

- Neap tides vs Spring tides
- Seasonal analysis
- Annual potential
- Site selection & characterisation

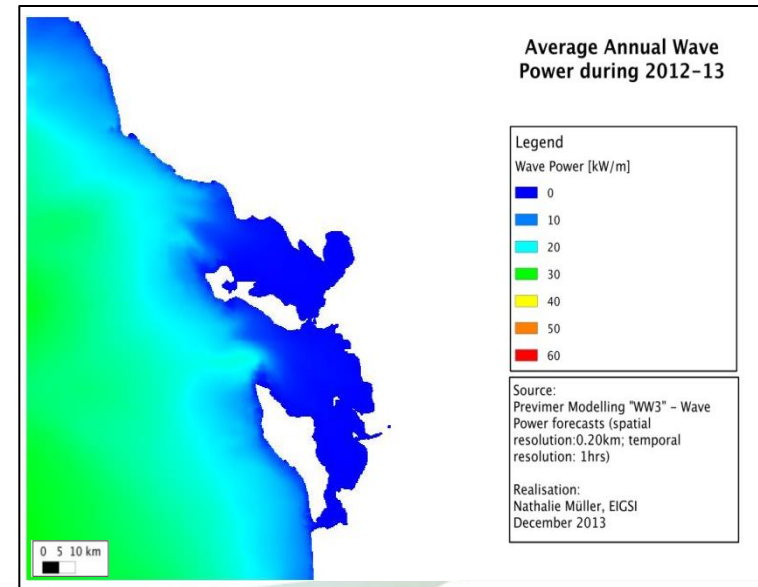
### “Wave” studies

- Seasonal analysis
- Annual potential
- Site selection & characterisation

### Average Tidal Current Speed for the year 2012



### Average Wave Power for the year 2012



# Cartography of marine resources



## Analysis for the Charente-Maritime area



# Cartography of marine resources



## Analysis for the Charente-Maritime area



# Cartography of marine resources



## Analysis for the Charente-Maritime area



# Cartography of marine resources



## Analysis for the Charente-Maritime area



## Other met-ocean models

- The Charente-Maritime study could be extended to all French coasts
- Other wave models used by Partners:
  - For the Spanish coasts, new wave modeling set-up is developed by MeteoGalicia;
  - For the British coasts, SWAN wave model is used by ERI;
  - For the Portuguese coasts, WaveWatch III model will be upgraded and local model will be used for the pilot zone.
- Other tidal current models used by Partners:
  - For the Spanish coasts, ROMS (Regional Ocean Modeling System) is used;
  - For the British coasts, UK Shelf Tidal model (Princeton Ocean Model) is used.
- → A common methodology has to be found

# Conclusions

- **Sharing information about the instruments that measure marine energy resources**
  - **Enrichment of the database**
  - **Communication to Regional Councils, developers ...**
- **Evaluating the marine energy resources in Europe**
  - **Diversity of modeling strategies**
  - **Cooperation across Europe has to be undertaken**

**Thank you for your attention!**