



Conferência Anual do Centro de Energia das Ondas  
Energias Renováveis Offshore e o seu Potencial nas Regiões Ultra-Periféricas

## Legal Framework

- Created: DECREE N° 5/2008 de 08 de Janeiro
- Base Lease: DECREE N° 238/2008 de 15 de December
- Concession agreement: RCM N° 49/2010 de 1de July

Contract signed on 20 October de 2010



**Area = 320 Km<sup>2</sup>**

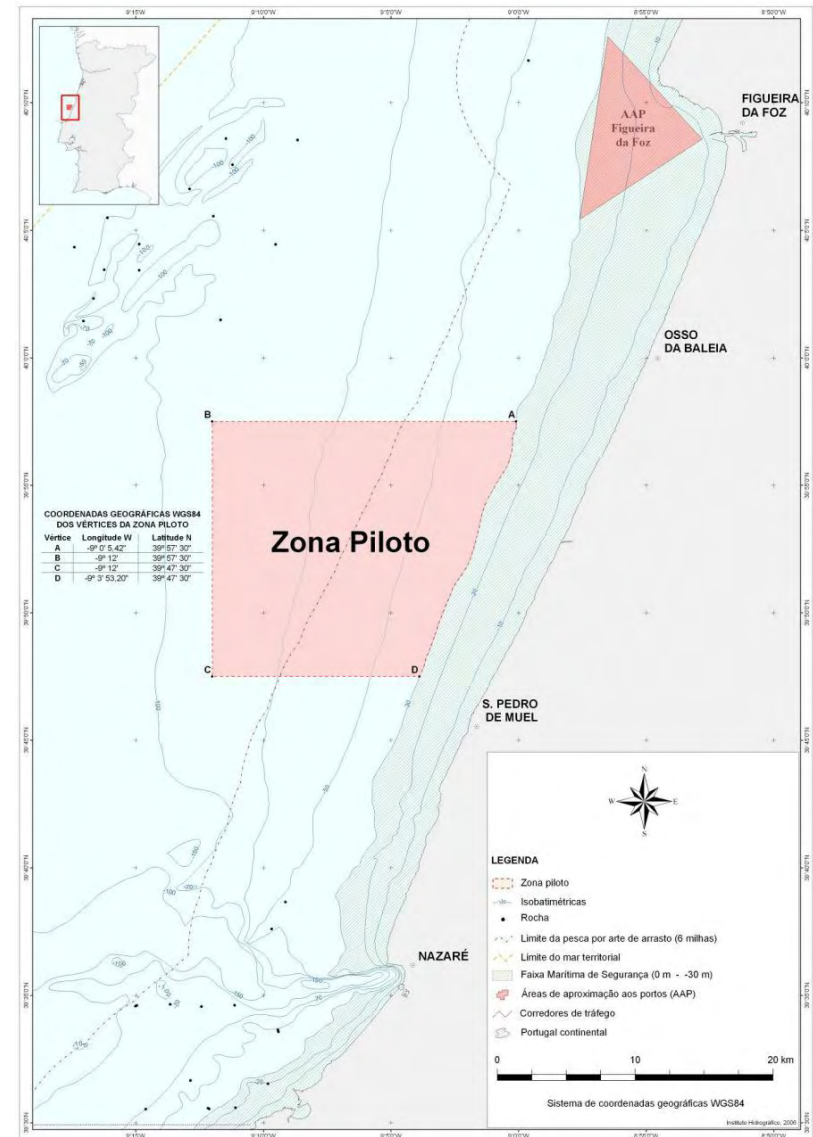
An open space, on the Atlantic coast, devoted to the development of marine energy.

## Contemplating the :

- test (proof of concept)
- Development (pre-commercial)
- Exploitation (commercial)

## With feed in Tariff

- differs from other similar spaces due to the possibility of developers continuing developing their projects until it became a wave park.
- No need to move for new location and start a new license process



# Characteristics of grant

(not energy producers)

- Grant for 45 years;;
- Authorization for the deployment of connection infrastructure to public electricity network;
- Use of water resources of the public water domain;
- Jurisdiction for the award of licenses and supervision.

One point stop

## Development plan-3 phases

### phase 1 (2011-2013)

- to equip the ZP with electrical connection to the network up to 12MW (4x2MW)
- Aim - ZP ready to receive, in demonstration of concepts scheme, electricity generation equipment (wind and waves) in the summer of 2013

## Equip the ZP with a test area

## Development plan in 3 phases

phase 2 & 3 (as needed)

- injection up to 80 MW (pre-comercial **phase 2**)
  - injection 250 MW (comercial **phase 3**)
- for marine energy systems

## What you're we doing

- ✓ Development plan;
- ✓ Budgeting;
- ✓ Scope extension request (floating offshore wind).

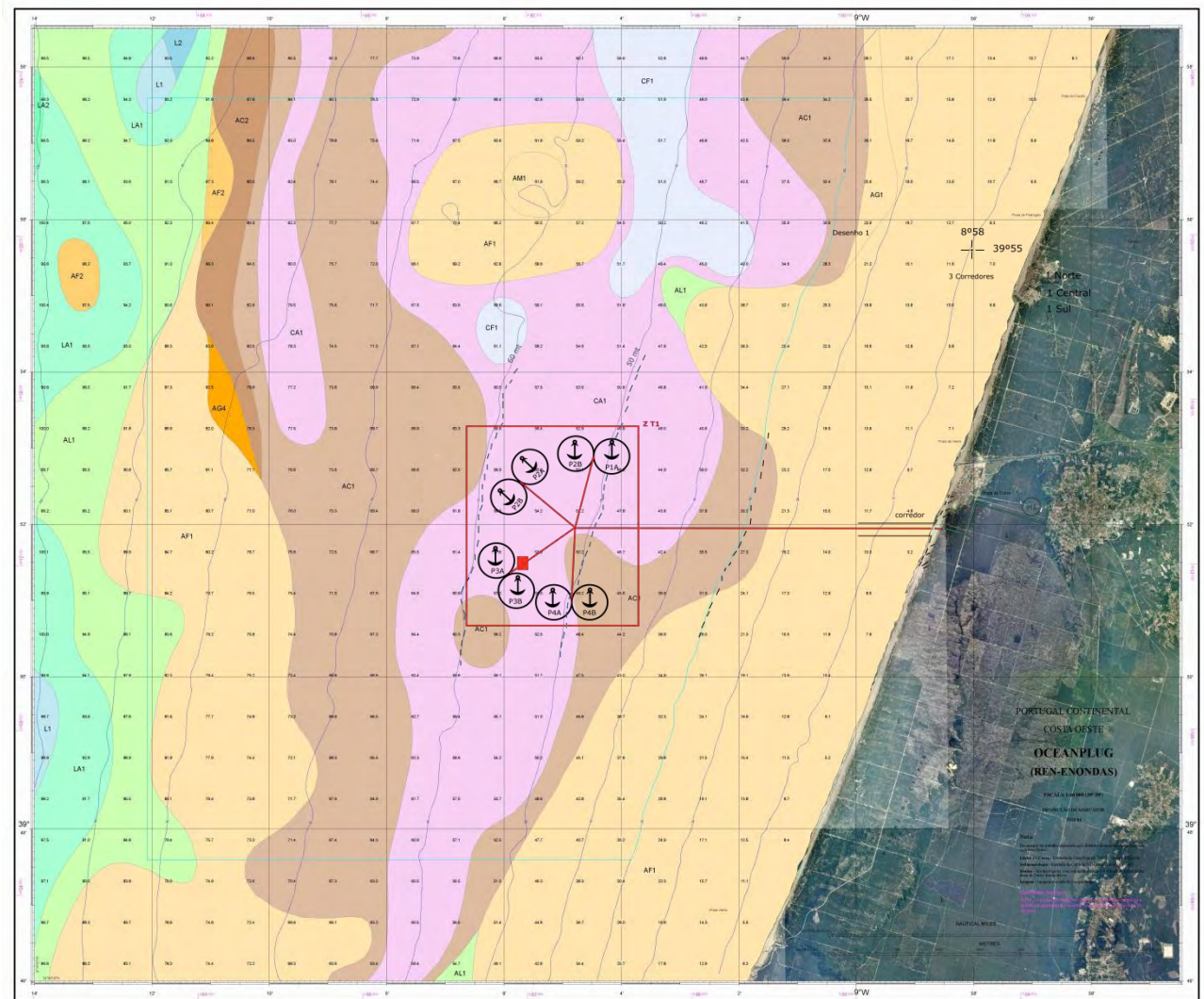
## Still in 2011

- Geophysical and environmental characterization (running);
- Pilot Zone access regulation (RAZP);
- Basic Engineering studies for infrastructures (running);
  - Offshore electrical connection to the electric network.

# Geophysical characterization

- Public service (available free of charge)
- Wave measure
- Geologic seabed profile
- Water Chemistry analyze
- Surface and bottom currents characterization
- Tides

A possible test zone configuration (still under study)



**LEGENDA** SEDIMENTOLOGIA

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## What we already know of PZ

- Good swell, without being too destructive;
- Rare storms, only in winter;
- Good working windows, with swell, without wind, even in winter;
- Good seabed, sand and gravel without outcrops;
- Near Ports and Shipyards.

Example of ZP seabed profile ⇒

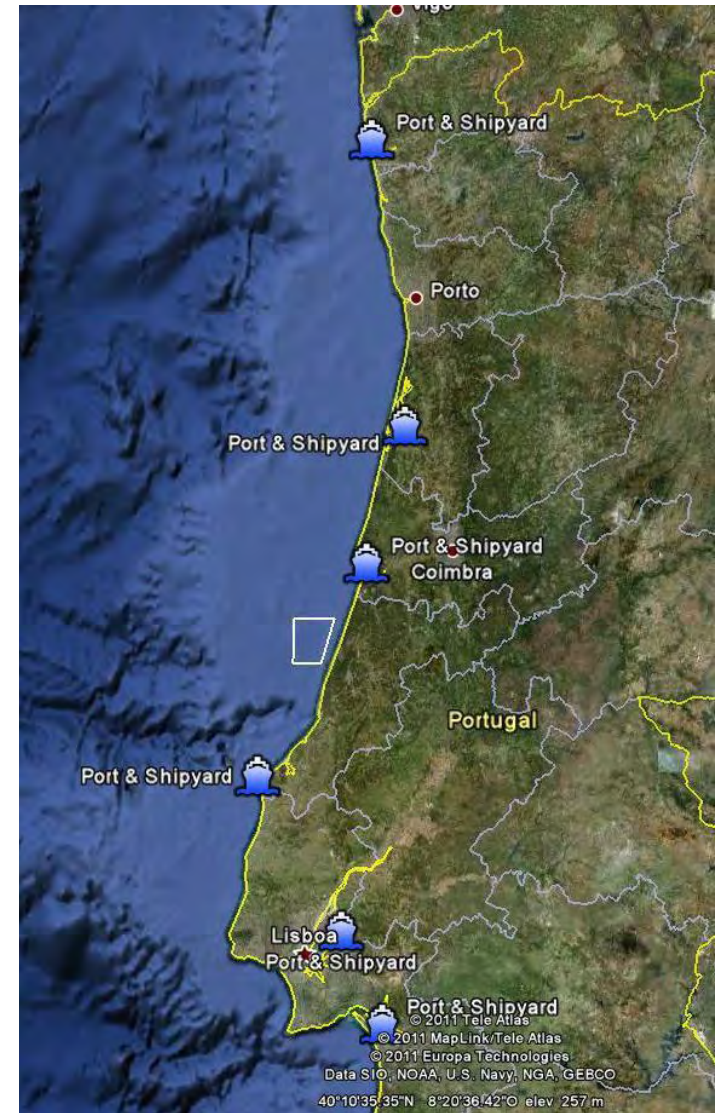


## Nearest ports:

Figueira da Foz - 35,3 km / 19 MN

Nazaré - 32,5 km / 17,5 MN

to the center of Pilot Zone

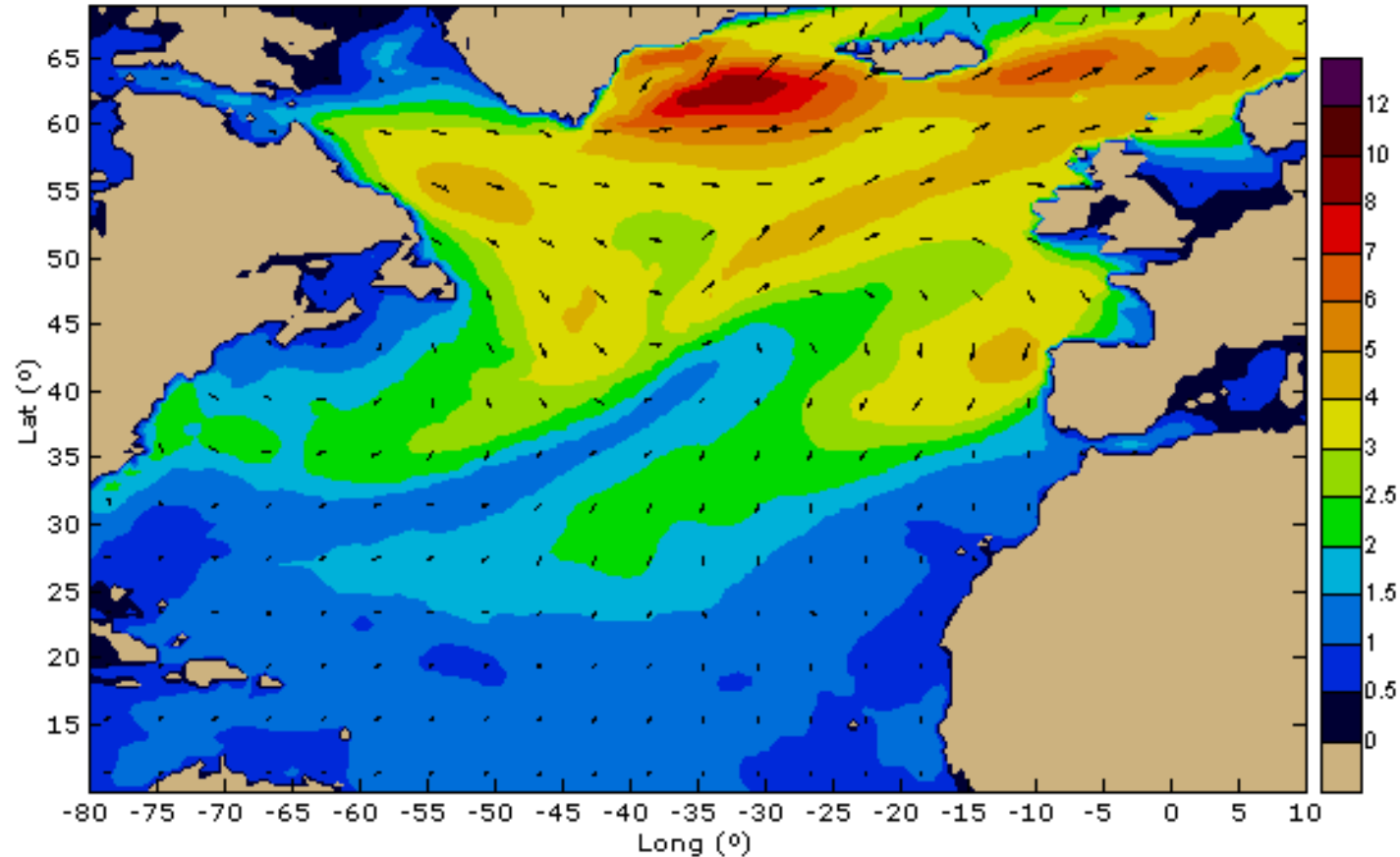


Altura Significativa (m) e Direcção Média (°)  
Significant Height (m) and Mean Direction (°)

Previsão/Forecast 20110417 00:00  
Corrida/Run: 20110412



Common North  
Atlantic wave system:  
The Greenland fetch



## Services available near Pilot Zone

- Universities and institutes devote for offshore R&D
- Shipyards
- Electrical industry
- Maritime operators
- Ports
- other

## So far (without disclosure)

- 11 technologies demonstrated interest in becoming in PZ, in demonstration of concept scheme;
- Of these, 3 with pre-registration;
- One technology is offshore wind;

## What are the advantages of wave energy

- Stability
- Good prevision

Better for grid integration

Good for ultra-periferic regions, special the isolated ones

So:

Looking to Madeira (equal real for other volcanic islands, like Azores)  
(nautical chart, next slide)

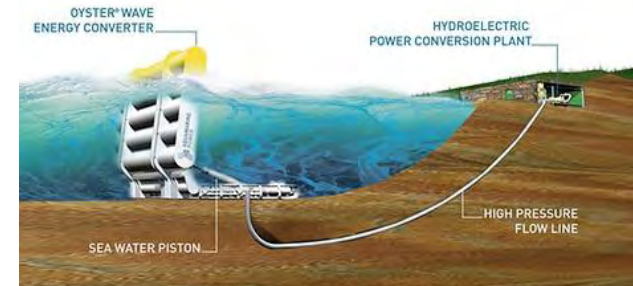
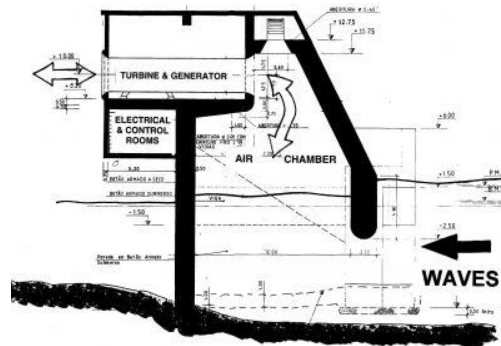
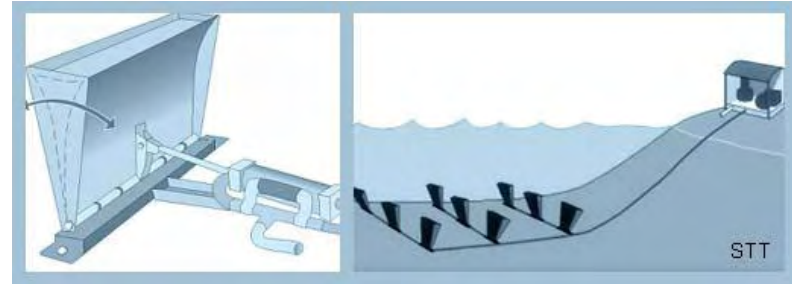


We can conclude that:

- No seabed for offshore floating devices
- the best technology will be, probably, the “near shore devices” or shore devices.

As example:

- Wave roller ([www.aw-energy.com](http://www.aw-energy.com))
- Oyster ([www.aquamarinepower.com](http://www.aquamarinepower.com))
- OWC Pico Power Plant ([www.pico-owc.net](http://www.pico-owc.net))



Which are in a more mature state of development



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