

Marine Renewable Energy in Portugal

Ana Brito e Melo

Research coordinator

ana@wavec.org

Energy of the sea | Madrid, 2 February 2010

The Wave Energy Centre in Portugal



Wave Energy Centre - WaVEC

Non-profit organisation, founded in 2003

- ❑ Development and promotion of Ocean Energy
- ❑ Technical & strategic support
- ❑ International collaboration outside Portugal
- ❑ Coordination or participation in R&D projects to support the development of ocean energy on national and international level



Project developers

CEO



GWH
Unipessoal Lda.

MARTIFER (also techn. dev.)
ENERGY SYSTEMS

Utilities



Research institutions



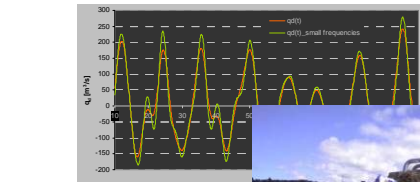
Engineering and construction firms (suppliers)



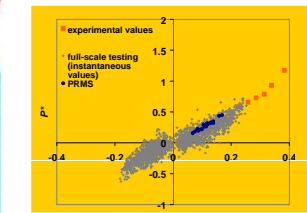
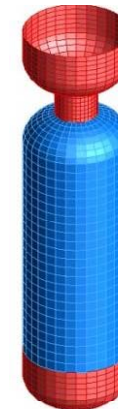
WavEC | Main areas of activities



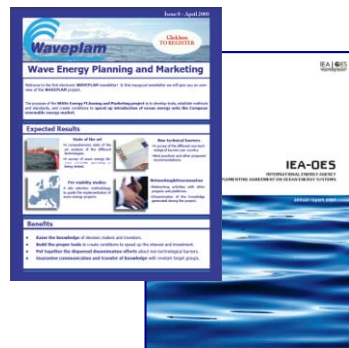
Due Diligence; Benchmark reports;
Potential & Feasibility Studies



Pico OWC;
AWS pilot plant;



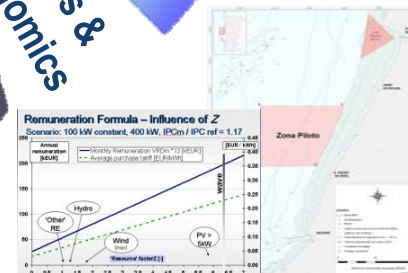
Pico & Douro OWCs;
EC-funded project CORES



OES-IA; Technical support of seminars; EC-funded projects: Waveplam, AquaRET



EC-funded project EQUIMAR;
Pilot Zone Proposal



R&D on tariff & socio-economics;
initiative for Pilot Zone activities

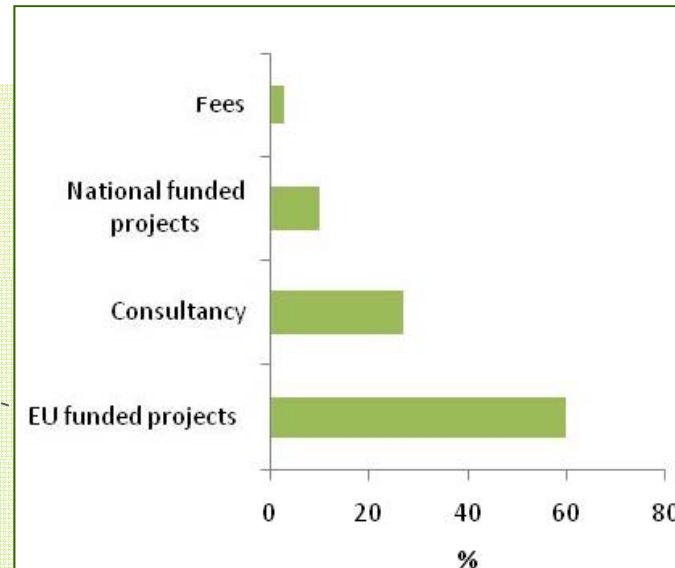
Our Clients

- DGGE (2004)
- AdL (2008)
- EDP (2006-08)
- GALP (2007-09)
- CEO (2008)

national

- Fundação EDP (2008)
- AWS B.V. (NL) - 2004
- ITPOWER (UK) - 2004
- Shell International (NL) - 2004
- Wave Dragon (DK) - 2006
- Lovdhal Ventures (N) - 2007
- Iberdrola (S) - 2008
- Energy Technology Institute (UK) - 2008
- Kenda Capital (NL) - 2008
- Scottish Government (Saltire Prize - 2008...)
- Voith-Hydro (UK) - 2009
- MOERI(Korea) - 2009
- OES-IA (2006 -..)

international



EU Projects

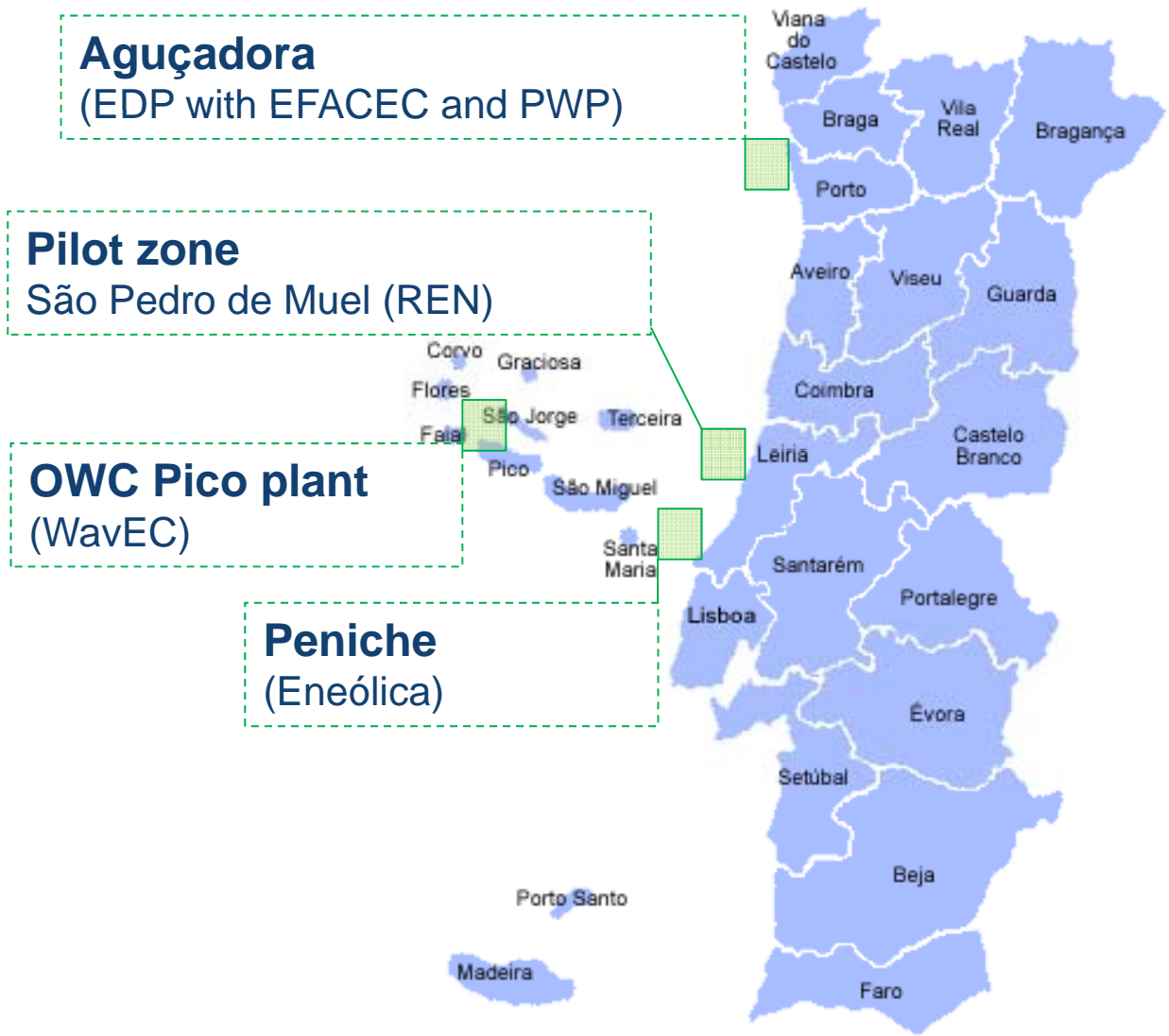


SURGE

STANDPOINT

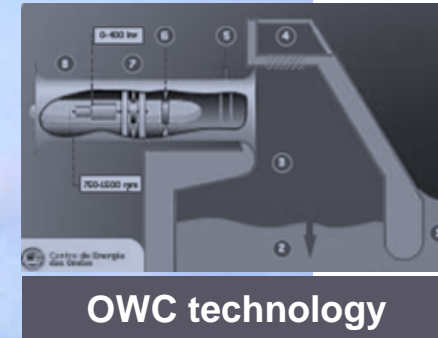


Infrastructures for testing



Projects | Pico Plant - 10 years

Shoreline OWC; 400 kW rated power
144m² chamber area, 7m depth
Originally finished in 1999 (European funded project)
Recovered in 2004-2006 (DEMTEC/national project)
Since 2004 owned by WavEC



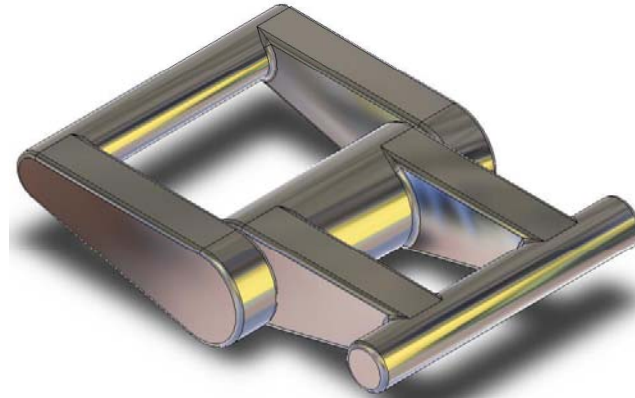
Projects in Portugal

Martifer

Own development

Searching a partnership to develop prototype

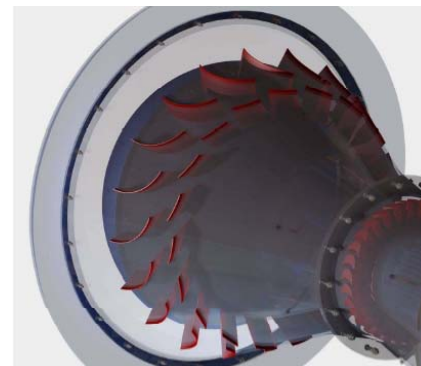
Purchased shipyard in Aveiro for future marine RE installations



Kymaner (created in 2005 to develop wave energy in Portugal)

In house wave energy technology development (based in Pico)

Air Turbines - Design, fabrication and assembly



Projects in Portugal

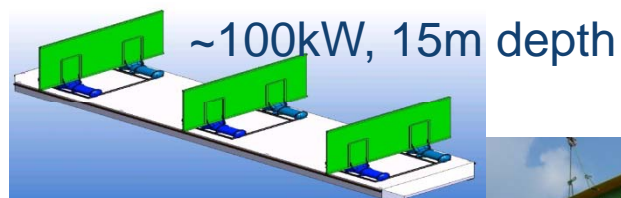
Eneólica

(AW-Energy; Finland)

Waveroller wave energy prototype

FP7 EU-funded project: *SURGE* (3 M€); 10/2009

Testing in Peniche

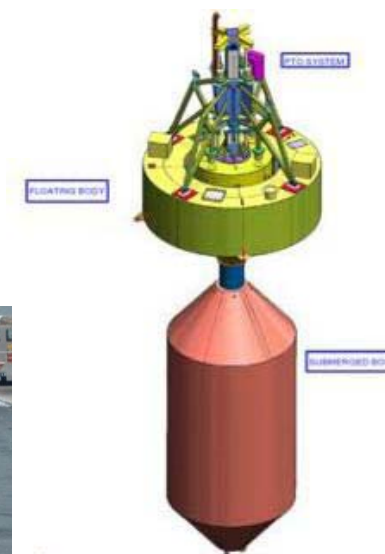


Generg

(Wavebob; Ireland)

Wavebob wave energy prototype

FP7 EU-funded project: *STANDPOINT* (5 M€); 11/2009)



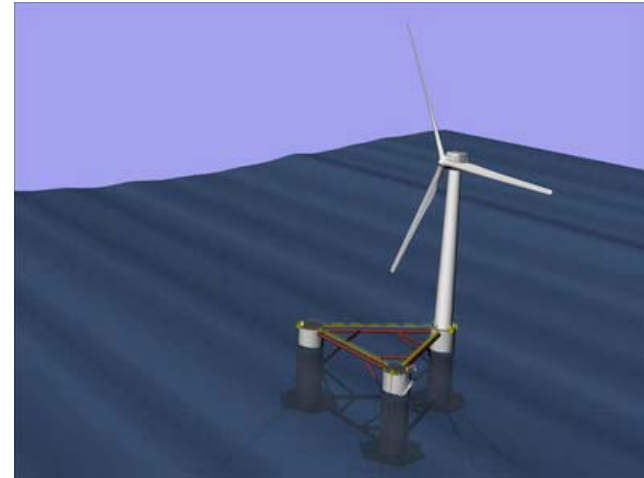
Projects in Portugal

EDP

WindFloat project - Floating offshore wind prototype

Using Aguçadoura infrastructure

Project developed by Principle Power Portugal (EDP + Principle Power USA)



Galp

Joint development and test at sea of a wave energy prototype

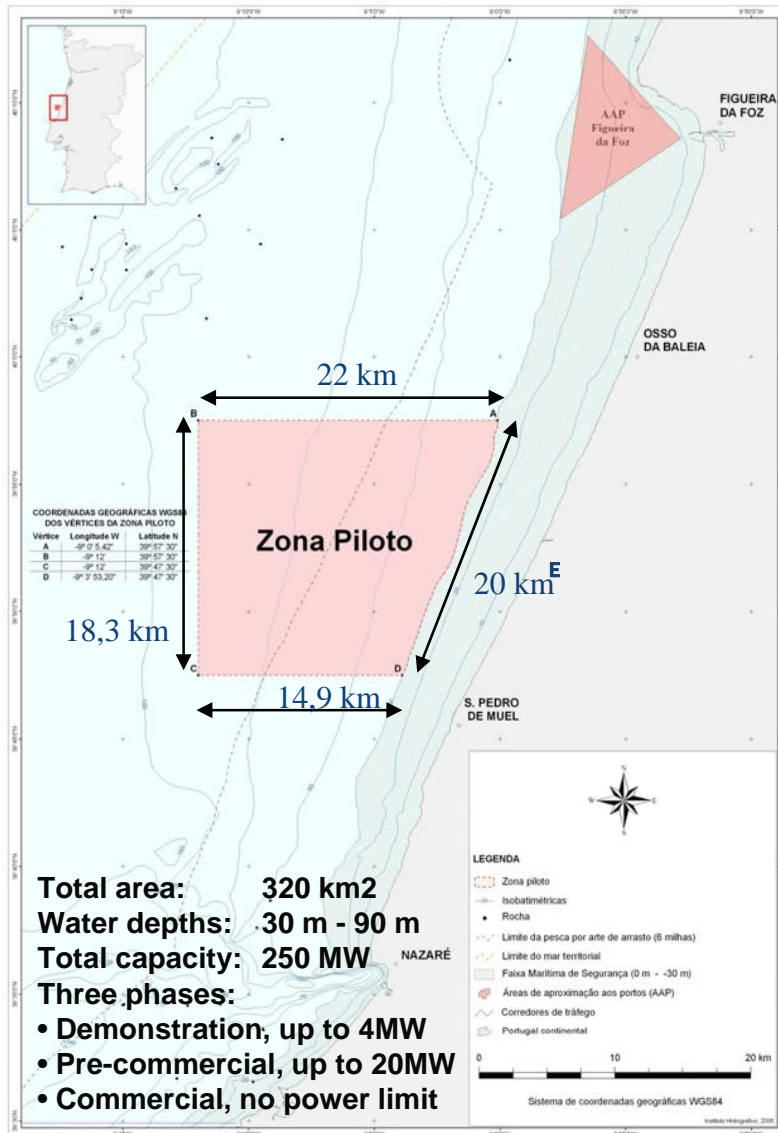
GWH – Energia das Ondas, Lda

Co-owners of Oceanlinx wave energy technology through the “New Energy Fund”

Plans for a prototype in Portugal



Public policies - the pilot zone



Jan 07 Proposal for creating the Pilot Zone approved

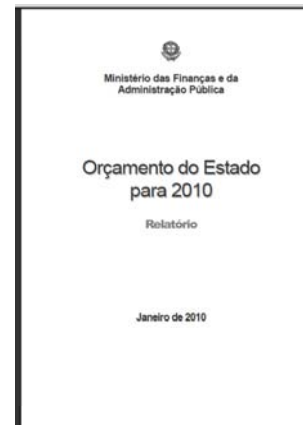
Jan 08 Dec-Law nº5/2008: Set up of Pilot Zone

Dec 08 Dec-Law nº238/2008: Set up of management body



Rede Energética Nacional
Concession holder of the National Electricity Transmission Grid

2010 Concession contract will be signed



“The contract will be signed in 2010... and the aim is to have the **infrastructures concluded in 2012.**”

Report of the Governmental Budget for 2010

Public policies - the pilot zone

Managing Body:

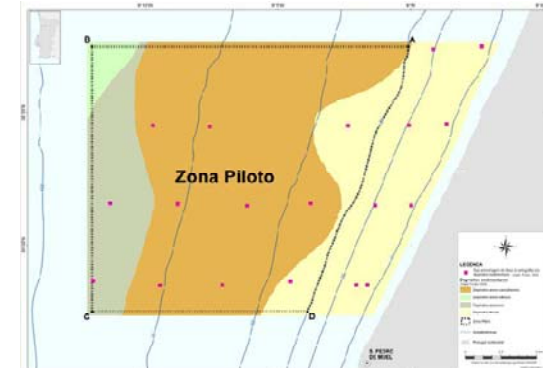
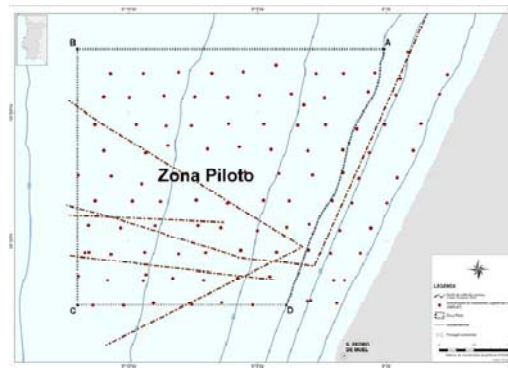
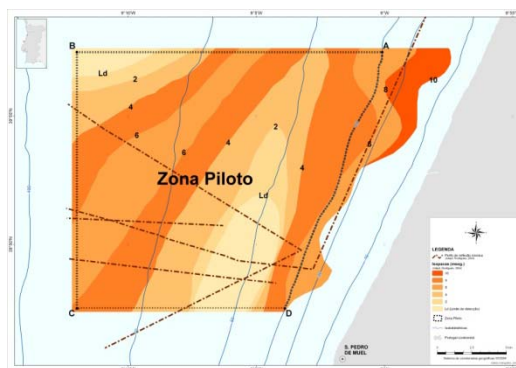


Rede Energética Nacional

Concession holder of the National Electricity Transmission Grid

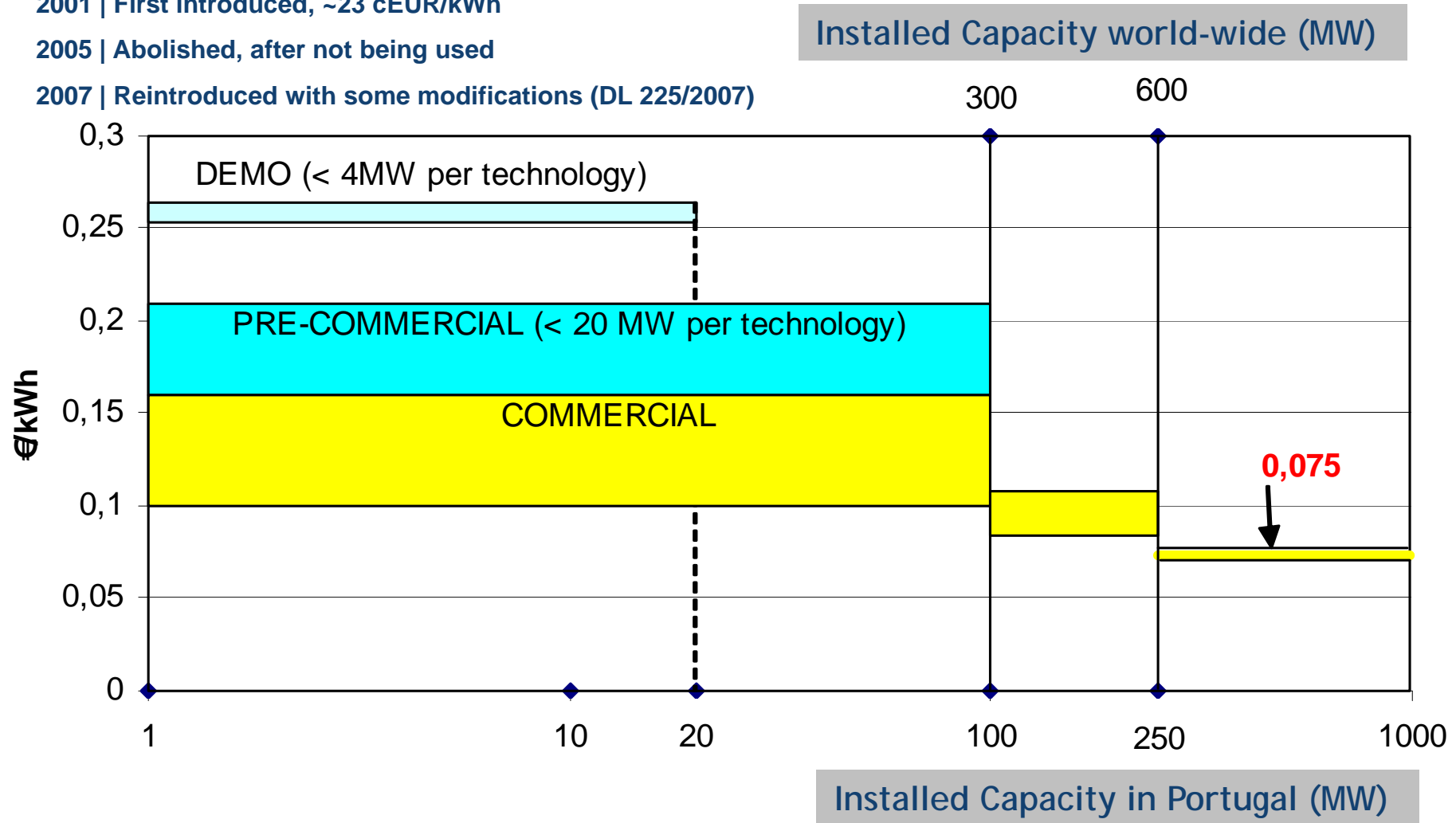
Responsibilities of the Managing Body:

- Development and promotion of the Pilot Zone
- Access and H&S regulations
- Inform the Government on technology, costs and impacts
- Promote innovation and national cluster



Public policies - Feed-in Tariff for wave energy

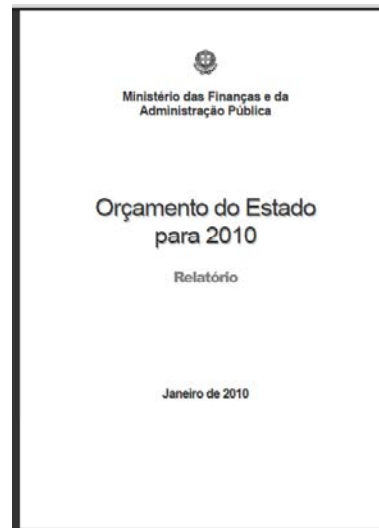
- 2001 | First introduced, ~23 cEUR/kWh
- 2005 | Abolished, after not being used
- 2007 | Reintroduced with some modifications (DL 225/2007)



Public policies - Wind offshore



- ❑ Up to now No feed in tariff for wind offshore
- ❑ However, wind offshore mentioned for the first time in the governmental budget 2010 Report:



“...Actions will be taken for use of territorial waters for wave and wind offshore energy ...”)

Report of the Governmental Budget for 2010

Plans: 2010 Offshore Energy Institute (IEO)



PCTE – “Pólo de Competitividade e Tecnologia da Energia”
(“Competitiveness and Technology Center for Energy” - ENERGYIN)

Set up in 2009 as non-profit association to promote Technology Development and Innovation in the Portuguese Energy Sector

“the heart” of a Portuguese ENERGY CLUSTER
Focus: Renewable Energies and Energy Efficiency

MARTIFER
ENERGY SYSTEMS

galpenergia

edp

efacec

MIT Portugal

Offshore Energy

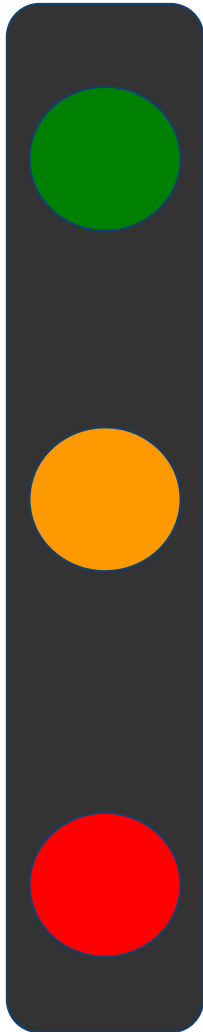
Anchor Project: New “Offshore Energy Institute” (OEI)

An entity that is based on WavEC, but with extensive capabilities and additional technical and human resources



WavEC: the “embryo” of the OEI

Portugal: Challenges on the road



- Good natural conditions
- Well infra-structured coast
- Public policies in place (waves): Feed-in tariff & Pilot zone
- Industry and R&D institutions involved
- Relevant R&D and field experience exists
- Societal good acceptance

- In spite of the relevant progress in the last 5 years, development will take **longer**, will be **harder** and **more expensive** than anticipated

- Projects indicated for pilot zone implementation
- **Will the conditions be attractive?**

Thank you!

Wave Energy Centre

Av. Manuel da Maia, 36, r/c Dto.,
1000-201 Lisboa, Portugal

Tel.: +351 21 848 2655

Fax: +351 21 848 1630

www.wavec.org

Ana Brito e Melo
ana@wavec.org

