Promoting a National Roadmap on Offshore Renewable Energies

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September 15th, 2011

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Unique Conditions in Portugal for marine energy

- Large coastal area with diversified waves and wind regimes
- Electrical grid along the coast
- R&D university and scientific institutions with experience and international recognition
- Experience in ocean energy projects
- Dynamic RES project developers operating internationally
- A Pilot Zone for test, pre-commercial and commercial wave (and wind) farms
- Other infrastructure available for marine energy testing (Aguçadoura)
- New legislation in development (Simplex for the Sea)
Portugal - Resources

- Portuguese Offshore: deep sea (more then 50 metres) prevailing in the nearshore (less than 10 km)

- Fixed wind energy on a great expansion in North Europe. Shall we promote this solution in Portugal?

- Diversified wave and wind technologies in Floating Platforms have been tested and still need substantial development until full commercialization

- Challenge to be defeated: matching a promising source of electric generation with all other marine activities, the lifestyle of coastal population and the environment
### National Plans for 2020 presented by APREN and by the Portuguese Government to the EU (NREAP – National Renewable Energy Action Plan)

<table>
<thead>
<tr>
<th>Technology</th>
<th>REPAP 2020</th>
<th>PNAER 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass</td>
<td>820 MW</td>
<td>952 MW</td>
</tr>
<tr>
<td>Geothermal</td>
<td>120 MW</td>
<td>75 MW</td>
</tr>
<tr>
<td>Hydro</td>
<td>9822 MW</td>
<td>9548 MW</td>
</tr>
<tr>
<td>Concentrated Solar Power</td>
<td>500 MW</td>
<td>1000 MW</td>
</tr>
<tr>
<td>Solar Photovoltaic</td>
<td>2000 MW</td>
<td>1475 MW</td>
</tr>
<tr>
<td>WAVE</td>
<td>300 MW</td>
<td>250 MW</td>
</tr>
<tr>
<td>Wind Onshore</td>
<td>7300 MW</td>
<td>6800 MW</td>
</tr>
<tr>
<td>WIND OFFSHORE</td>
<td>200 MW</td>
<td>75 MW</td>
</tr>
</tbody>
</table>
Threats and Opportunities

- How can Portugal react effectively in case of fuel supply shortage?
- How to encourage economical growth in a context of environmental protection, particularly with the reduction of gas emissions?
- Portugal imports technology and components for energy production. Is it possible to reverse this situation and make Portugal a leader in technological innovation in the energy sector?
- Marine energies offer a golden opportunity for Portugal:
  - Due to low technological maturity at world wide level
  - A very large Exclusive Economic Zone (18 X main land, and possibly 40 X)
  - Adequate characteristics of the Portuguese coast for wave and floating wind energy (and maybe seaweed?)
Why a Roadmap for marine energies?

- Marine energies may add value and increase Portuguese exports if, on a very short term, we launch an initiative strongly supported by all stakeholders that allows:
  - The development of a joint national vision
  - The definition of a nacional strategy for marine energies

- The compatibility between all current national iniciatives and visions is the baseline of the proposal presented for the set-up of a “Nacional Roadmap for Marine Energies”
Methodology of the International Energy Agency (IEA) for Energy Roadmaps:

- Based on four steps

- The methodology is supported on two complementary views:
  - A strategy set-up by specialists, or joint **Vision** based on their professional experience and perception;
  - The validation, monitoring and re-definition of the strategy, using modeling and analysis tools (a roadmap with finance support from FCT).
1st step of the Roadmap: Preparation and Planning

- **Preparation and Planning** (from 3 to 12 people and 6 months duration)
  → Coordination with all entities and initiatives – a roadmap for everybody


- Training of Public Administration
  October 2010, half-day, 43 public staff members and 24 Navy officers
  February 2011, full-day, 58 staff members

- October 2010, Seminar “Who is Who in Renewable Marine Energies” (65 presentations from public and private entities plus 13 other stakeholders - 78 entities, 47 private and 31 public). 137 participants
2nd step: Preliminary Vision for marine energies (10 to 40 people, 2 to 4 months)

- Roadmap goal

To define the main action paths for the development of a marine renewable energy national cluster with a focus on the export. Final objectives of the roadmap are:

- To accelerate the introduction of marine renewable energies in Portugal
- To maximize the value added by this sector and to contribute to the growth of the Portuguese economy

- One conclusion of the FCT project, “Roadmapping Offshore Renewables in Portugal”, was:

- The Roadmap should be implemented with specific action paths for each marine technology - waves, wind and seaweed - with different milestones: short, medium and long term
Vision: specific objectives for each technology and period

2010-2020
- Criar capacidade de I+D
- Provar conceito (2015)
- Demonstração comercial
- Manter e desenvolver indústria

2020-2030
- Expandir industria nacional
- Desenvolver mercado doméstico
- Exportação no mercado global

2030-2050
- Saturação no mercado doméstico
- Manter quota no mercado global

Ondas

Eólica fixa
- Desenvolver capacidades offshore
- Saturação mercado domestico
- Pequena quota de mercado global
- Manter mercado doméstico
- Manter pequena quota no mercado global

Eólica flutuante
- Criar capacidade I+D
- Provar conceito (2015)
- Demonstração comercial
- Manter e desenvolver indústria
- Expandir industrial nacional
- Desenvolver mercado doméstico
- Exportação no mercado global
- Desenvolver mercado doméstico
- Manter quota no mercado global
Vision: Preliminary definition of the objectives to reach

Need for defining a vision on national objectives for installed capacity to:
- Create an internal market to leverage the development of industry capacities
- Take advantage of the endogenous resources to reach the energetic and environmental goals

![Installed Capacity in Portugal (MW)](image.png)

- Wave
- Fixed Offshore Wind
- Floating Offshore Wind
Vision: Preliminary definition of the objectives to reach

Need to define national objectives in terms of market share to:

- Assure the industry development on the different supply chain levels
- Export goods and services and to reduce our dependency on foreign technology
- Add-value and to create jobs at national level

[Bar charts showing national and global market share for different years and technologies]
3rd step: Roadmap Development

- Roadmap Development (25 to 150 people, 4 to 6 months)

- Workshops with national specialists to identify most significant barriers to achieve the objectives and goals set on the Vision phase

- Definition of several actions (with a timetable) to mitigate the identified barriers

These actions shall be grouped in larger areas: Technology and R&D, Resource & Geographic Characterization, Licensing, Planning, Finance and Market, Infrastructures and Supply Chain, Dissemination and Public Outreach
3rd step: Roadmap Development - the start

- Workshop on March 2011 to simplify the Licensing Process of Marine Renewable Energies, with 56 entities, 26 from the public sector and 30 from the private

- Workshop on June 2011 to start the Marine Renewable Energies Roadmap
  114 people from 75 entities (45 private and 30 public)

Brainstorming on the following areas:
  - Licensing
  - Planning
  - Finance and Market
  - Information, Dissemination and Public Outreach
  - Infrastructures and Supply Chain
  - Resource, Technology and R&D
3rd step: Roadmap Development – next phases

- Looking for funding
- FCT Roadmap
- New project: Technological Observatory
  Brainstorming on Infrastructures and Supply Chain
  Industry sectors where Portugal shall compete globally

We expect your support
• **Roadmap Implementation and Revision** (20 to 100 people, recurrently)

- **Implementation**: to achieve the defined actions. The execution by the stakeholders that had participated on the roadmap set-up is a must.

- Regular revisions of the roadmap and adaptation of its objectives and priorities shall be carried out by specialists on workshops
Obrigado
Thank you

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