Ocean energy: a growing industry in need of reliable oceanic data

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Ocean Energy Europe

120 members - Lead Partners:

- Atlantis Resources
- DP Energy
- EDF
- Enel Green Power
- ENGIE
- Naval Energies
- Innovation
- Nova Innovation Ltd
- SEAI
- Scottish Development International
- ScottishPower Renewables
- Normandy West Marine Energy
Ocean Energy
5 Resources – 5 technologies – 5 opportunities

Tidal stream

Ocean Thermal Energy Conversion

Salinity gradient

Wave

Tidal range
2018 Ocean Energy is setting sail

Capacity worldwide (MW)

<table>
<thead>
<tr>
<th></th>
<th>Tidal Stream</th>
<th>Wave</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the Water</td>
<td>18</td>
<td>3,8</td>
</tr>
<tr>
<td>Under Construction</td>
<td>11,5</td>
<td>18,6</td>
</tr>
<tr>
<td>Permitted</td>
<td>200</td>
<td>132,6</td>
</tr>
</tbody>
</table>

2050: 10% of EU electricity, 400,000 jobs
2 years of achievements

- First tidal pilot farms producing GWh of clean, predictable electricity to the grid
- First turbine factory in Cherbourg
- First major contracts signed for wave developers
Setting sail, first Tidal arrays connected

Scotland
- MeyGen at Pentland Firth, 6 MW (4 x 1.5 MW), biggest tidal energy farm to date.
- Nova Innovation in Shetlands, 0.5 MW (5 x 0.1 MW)

Netherlands
- Tocardo 1.25 MW (Eastern Scheldt dam)
Setting sail, Wave technology progressing

United Kingdom
• Orkney: Wello, 1 MW

• Orkney: Laminaria, 200 kW (2018)

Portugal
• Peniche: AW-Energy, 0.35 MW
Why we need **Copernicus**...

10% reduction in current speed

= 

19% reduction in tidal farm revenue

=>

Data precision is key!
Tidal - Current mapping, speed, modelling, at different depths

OpenHydro/Naval Energies turbine, projects in France, Canada, Japan...
Wave - wave height & frequency, extreme events

Carnegie Wave Buoy, Perth, Australia
Salinity gradient – Resource evaluation, impacts of currents/waves

Fujifilm/Redstack prototype, Netherlands
OTEC - Temperature evaluation, weather information to secure operations at sea

NEMO project, Naval Energies, La Martinique (NER300)
Potential tailoring 1: higher resolution

- Existing data sets
  - Often estimates / extrapolations
  - Do not cover

- Copernicus resolution is 7x7km
  - Increase resolution to improve sitting assessments
  - Data closer to the coast to cover more potential sites, esp for tidal
Potential tailoring 2: focus on promising export markets
Potential tailoring 2: focus on export markets

- Information outside of Europe is patchy
  - Industrialised country don’t use ocean energy yet
  - Developing countries lack funding for assessments

- Available (& free) information will
  - lower development costs
  - Help identify new markets
  - Help refine known markets
The need for a longer term programme...

- Financial planning requires accurate assessment
- Renewable resource is inherently variable
- “In situ” studies are costly

Resource information over several years is precious
Thank you!