MARINE RENEWABLE ENERGY

BASQUE COUNTRY

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Objectives of the Basque Energy Strategy 3E2030

- Achieve **primary energy savings** of 1,250,000 toe per year between 2016 and 2030, equivalent to a saving of **17%** in 2030.
- Increase the use of **renewable energy by 126%** to achieve a utilisation of 966,000 toe by 2030.
- Promote an exemplary commitment by the **Basque public administration** that allows a **reduction in the energy consumption in its facilities by 25%** in 10 years.
- Achieve a **25% share for alternative energy use in road transport**, contributing to the progressive breaking of the dependence on oil and the use of more sustainable vehicles.
- Increase the contribution of **cogeneration and renewable energy for power generation** so that this rises from **20%** in 2015 to **40%** in 2030.
- **Improve the competitiveness** of the network of companies, technology centres and Basque scientific agents, promoting 9 priority areas for research, technological and industrial development in the energy field, **in line with the RIS3** strategy for smart specialisation in the Basque Country.
- Contribute to the mitigation of climate change by **reducing greenhouse gas emissions** by 3 Mt per year through energy measures, representing a reduction of **35%** of energy-related GHG emissions relative to 2005.
The Basque Energy Cluster comprises 350 companies, with a total turnover of nearly €50 billion and more than 64,000 jobs worldwide, ...

### Key figures of the Basque energy cluster (2013)

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td><strong>Companies</strong></td>
<td>343</td>
</tr>
<tr>
<td><strong>Total turnover in energy</strong></td>
<td>€46,811M</td>
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<tr>
<td><strong>Total employment in energy</strong></td>
<td>63,364</td>
</tr>
<tr>
<td><strong>Contribution to Basque Gross Value Added</strong></td>
<td>5.0-5.5%</td>
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<tr>
<td><strong>... in the Basque Country</strong></td>
<td></td>
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<tr>
<td><strong>Total expenditure on R&amp;D in energy</strong></td>
<td>€436M</td>
</tr>
<tr>
<td><strong>Total employees on R&amp;D in energy</strong></td>
<td>3,377</td>
</tr>
<tr>
<td><strong>R&amp;D Business Units</strong></td>
<td>18</td>
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<tr>
<td><strong>... in the Basque Country</strong></td>
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<td><strong>Note:</strong> based on 2014 data</td>
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Based on these competitive advantages, the Basque Country has chosen Energy as one of its top three priorities within its RIS3 strategy.
The Energy priority has been defined through an exhaustive Entrepreneurial Discovery Process that has involved agents from the triple helix.
The result consists on 8+1 strategic areas (power electronics as key enabling technology) around 3 main value chains
# The Marine Renewable Energy capabilities in Basque Country

<table>
<thead>
<tr>
<th></th>
<th>WIND</th>
<th>Turnover (M€)</th>
<th>Employees (Basque Country)</th>
<th>R&amp;D expense (Basque Country, M€)</th>
<th>Examples of Leading Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Companies in the value chain</td>
<td>105</td>
<td>713</td>
<td>3.013</td>
<td>39</td>
<td>Gamesa, Ingeteam, Iberdrola</td>
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<td>Turnover</td>
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<td>Employees</td>
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<td></td>
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<td>Iberdrola, Oceanotec, Bimep</td>
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<td>R&amp;D expense</td>
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<td>Examples of Leading Companies</td>
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<td>Turnover</td>
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<tr>
<td>Companies in the value chain</td>
<td>31</td>
<td>8</td>
<td>74</td>
<td>7</td>
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<tr>
<td>Turnover</td>
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### State of play MRE
Offshore Wind value chain
Wave energy value chain
Challenges for European offshore energy industry

**Main Industrial Challenge**

**Added Value at Competitive Cost**

- Impact in Investment Costs
- Impact in Operating Costs
- Manufacturing of Large Components
- Sensing, Instrumentation and Monitoring
- Power Transfer and Conversion
- O&M Optimisation
- Corrosion in Water
- Testing and Demonstration in Real Environment

**Technology Challenges**
Testing and validation infrastructure for offshore wind

WINDBOX ADVANCED MANUFACTURING CENTRE - public-private collaboration

- Basque Government supports initial investment
- Cluster manages the infrastructure
- Research Center operates the facility
- Industry Consortium supports operation
- Open access to any user

ADVANCED TEST AND VALIDATION CENTRE FOR WIND POWER

Testing capabilities for
- BLADE AND HUB BEARING
- HYDRAULIC PITCH SYSTEM
- YAW
- GENERATOR
Testing and validation infrastructure for wave energy

BIMEP provides manufacturers of ocean energy devices with the opportunity to install their equipment in open sea conditions for demonstration and operational (power generation) purposes or for testing. Key characteristics of the platform include:

- 20 MW of power
- 4 connection points for WECs.
- Easy WEC installation, testing and operation.
- An associated research centre bimep is equipped with modern subsea infrastructure for onshore grid connection and a comprehensive remote monitoring and control system for the systematic compilation and analysis of data on the systems being tested at sea.
The **Vanguard Initiative** is a coalition of European regions committed to boost the growth of their companies, based on technological development, inter-regional cooperation, bottom-up entrepreneurial innovation and industrial leadership.

1. Advanced Manufacturing for Energy Related Applications in Harsh Environments
2. High Performance Production with 3D Printing
3. Efficient and Sustainable Manufacturing
4. Biobased Economy
5. Nanotechnology
Which are the critical challenges and trends in MRE value chain?

Which technology developments are needed to tackle them?

Input

Research institutions

Pivotal companies

SMEs

Discussion and analysis

ADMA for Energy technology roadmap

VI regions’ industry’s opinion and contribution to EC’s industrial policy

Bottom-up approach

Capability mapping

Technology roadmapping

Industry challenge mapping

Interregional cooperation

ADMA for Energy Related Application in Harsh Environments Pilot Action
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