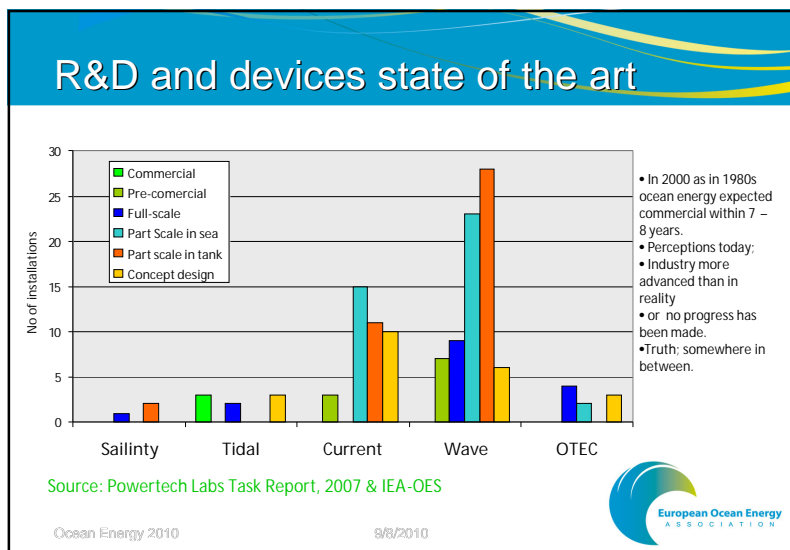




European Ocean Energy Association

- Established in 2006 - 70+ members strong
 - 5 Lead Sponsors
 - Alstom, DCNS, EDF, EVE, Statkraft
 - 4 Associations
 - WavEC, RenewableUK, APPA, OWEMES
- Goals & Objectives:
 - To strengthen coordination & development of OE sector in EU
 - To ensure the sector's best interest is represented within EC & EP
 - To ensure the sector's potential is reflected in European policies

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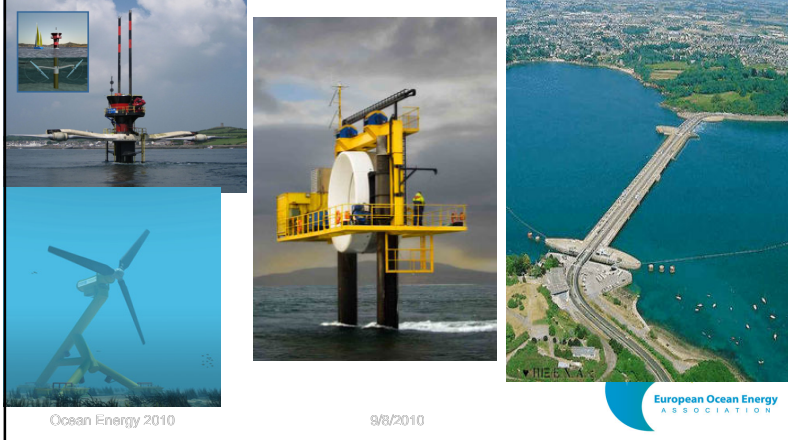


Typical Wave Energy Devices

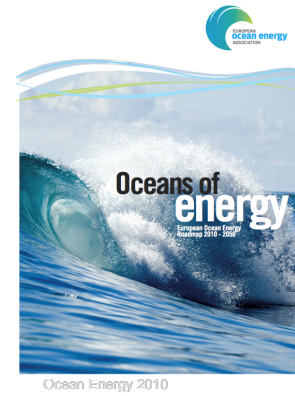
- PICO Plant, Portugal 1999, 400kW
- LIMPET, Wavgen, UK 2000, 500kW
- OE Buoy, Ireland 2006, 20 kW
- OceanLynx, Australia 2005, 450 kW
- AWS, Portugal 2005, 2MW
- Wave Roller, Finland 2006, 13 kW
- Pelamis, PT 2008, 3x750kW
- 2003, 20kW

Ocean Energy 2010 9/8/2010

Example of tidal devices



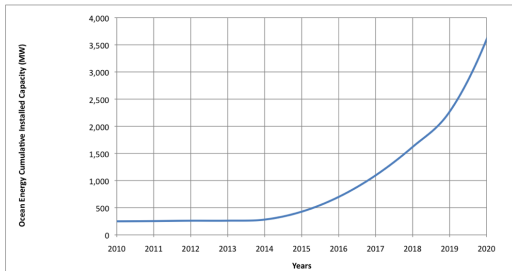
European Ocean Energy Roadmap 2010 – 2050



- Published to the EC may 2010
- Set key targets
- Describes
 - Energy potential
 - Opportunities for industrialization
 - Potential for green jobs
 - Requirements for R&D
- Identifies
 - Necessary actions
 - Required funding for de-risking projects
 - Necessary R&D financing
- European Industrial Initiative



Ocean Energy RM : potential by 2050

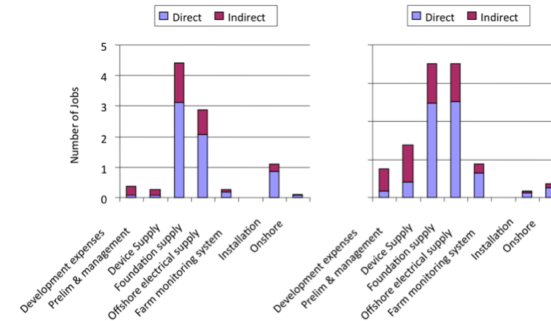


Year	2020	2025	2030	2035	2040	2050
GW	3,6	20	54	105	166	188
TWh/yr	9	53	150	317	546	645

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Ocean Energy RM : Job creation



10 jobs (direct & indirect per MW installed)

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EU Ocean Energy Targets

- **Generation Targets:**
 - 2020 - 1% of EU electricity generation
 - 2050 – 15% of EU electricity generation
- **What:**
 - European Industrial Initiative
- **How:**
 - OE needs to be one of the priorities in the SET-Plan
 - Adequate and well targeted funding for demonstration projects – FP7&8, NER300, EIB, ... ?
 - Transparent and stable legal framework with simplified consenting procedures

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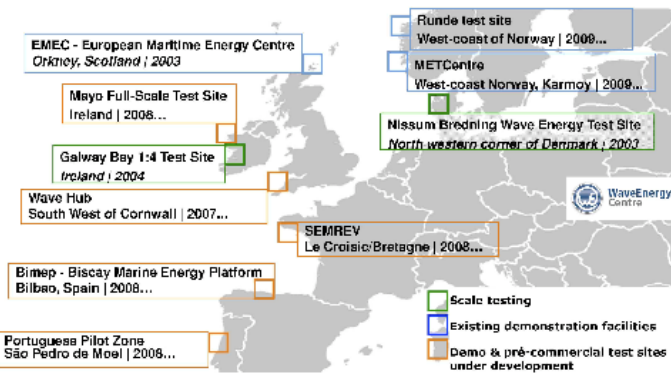
Important challenge : Infrastructures

- Onshore testing facilities for tank testing;
- Offshore testing facilities exist or are under construction in several MS - HOWEVER – few developers have been able to access the due to the lack of adequate private financing and public support mechanisms.

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Infrastructures



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European Test Sites, capabilities

Country	Location	Name	Year	Leaked Area	Water Depth	Energy Flux	Shoreline Distance	Port/Nearshore Distance	Phase	Grid Connection	Facilities	Devices	
A	Scotland	Orkney Island	EMEC	2003	3 km ²	35m – 75m	40 kW/m	2 km	Edinburgh, 430 km Inverness, 200 km Stromness, 8 km	4	4 Berths 15kV Grid Con.	Monitoring Station, Wave Buoys Oyster	Pelamis Wavecycler Oyster
B	Portugal	Pico Is. Azores	Pico Test Plant	1999	–	7m	30 kW/m	–	Peniche, 3600 km Horta, 36 km	3/4	15kV Grid Con. 1 Substation	Air Turbines	–
C	Portugal	Figueira da Foz	Portuguese Pilot Zone	2007	320 km ²	30m – 100m	40 kW/m	4 km	Leisoes, 148 km Peniche, 63 km Fig. da Foz, 37 km	4	2 Berths	–	Floating
D	Portugal	Agucadoura (Commercial)	(AWS) Pelamis Array	2002	–	40m	40 kW/m	5 km	Peniche, 240 km Lisoes, 32 km Mozambique, 25 km	5	3 Berths	Wave Buoys Substation	Pelamis
E	Denmark	Nissum Breeding	Danish Breeding Test Site	1990	–	6m	<1 kW/m	200m	Thyboron, 7.5 km	3	–	Pier, Monitoring Station	Wave Dragon Wavestar
F	Denmark	Roskilde Pier, Helsingør	Danish Exposed Test Site	1988	–	12m	7-11 kW/m	200m	Hansholm, 1.5 km	3/4	–	Pier	WaveLine Wavestar
G	Ireland	Galway Bay	–	2005	0.37 km ²	20m-25m	3 kW/m	1 km	4thBeep, 300 km Fyne, 230 km Galway City, 35 km	3	–	Wave Buoys	OE Buoy Wavebob
H	ENGLAND	St. Ives Bay, Cornwall	Wavehub	2010	8 km ²	50m – 65m	–	11 km	Falmouth, 140 km Falmouth, 100 km St. Ives, 9 km	4/5	4 Berths Max. 20kV 33kV Grid Con.	–	2-4 Wave Buys Dragon OPT, Pelamis Fred Olsen
I	Ireland	Frenchport, Co. Mayo	Irish Open Ocean Test Site	2009	21 km ²	40m – 120m	50 kW/m	7 km	Galway City, 250km Killybegs, 125 km	4/5	2 Berths	–	Wavebob OE Buoy
J	Spain	Armitas, Basque Country	BIMEP	2010	8 km ²	50m – 90m	21 kW/m	750 m	Bilbao, 24 km	4/5	4 Berths with 13 kV Line, 30kV Line	–	Wave Buoys
K	Spain	Mutriku, Basque Country	Mutriku Breakwater	2009	273 m ²	7m	7 kW/m	–	Bilbao, 64 km San Sebastian, 32 km	4/5	–	–	16 x 18.5 kW DWC
L	Spain	Santona, Basque Country	Berdrola, Santona	2008	1 km ²	50m	27 kW/m	4 km	Bilbao, 32 km Santona, 4km	4/5	–	–	1 x 40 kW Powerbuoy 9 x 150 kW
M	France	Pays de la Loire	–	2010	–	–	–	–	St. Nazaire, 30km Nantes, 74km	4/5	–	Wave Buoys	Searev

Table 5.1 European Test Sites

Infrastructural needs

- Development and / or refining of test sites for OE devices in real operating environments : direct EU support to the test facilities / sites;
- Financial support mechanisms to allow the use of existing centres : dedicated joint calls organised by EU, encouraging demonstration programmes of full / large scale projects.
- Need for a European network of onshore and offshore test sites to test and assess efficiency and reliability of ocean energy components, sub-systems and systems / collect, analyse and distribute the information

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MARINET

- Marine Renewables Infrastructure network for emerging energy technologies;
- EC funded project under the 'FP7-INFRASTRUCTURES-2010-1' call;
- Total budget of 9 M€;
- Focus will be on networking, training, dissemination and transnational access.

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MARINET - Infrastructure related R&D

- **Wave energy :**
 - Remote underwater motion measurements
 - Non-intrusive wave field measurements
 - Real time estimation of incident waves
- **Tidal energy :**
 - New instrumentation & field measuring technology
- **Offshore wind :**
 - Offshore wind measurements
 - Pile-sleeve-displacement measuring systems

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Conclusion

- **MARINET step in the right direction**
- **Additional EC support needed to refine the test sites**
- **Additional EC support needed for developers who want to use the test sites**

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