

Ocean Energy a future contributor to the EU Electricity Sector

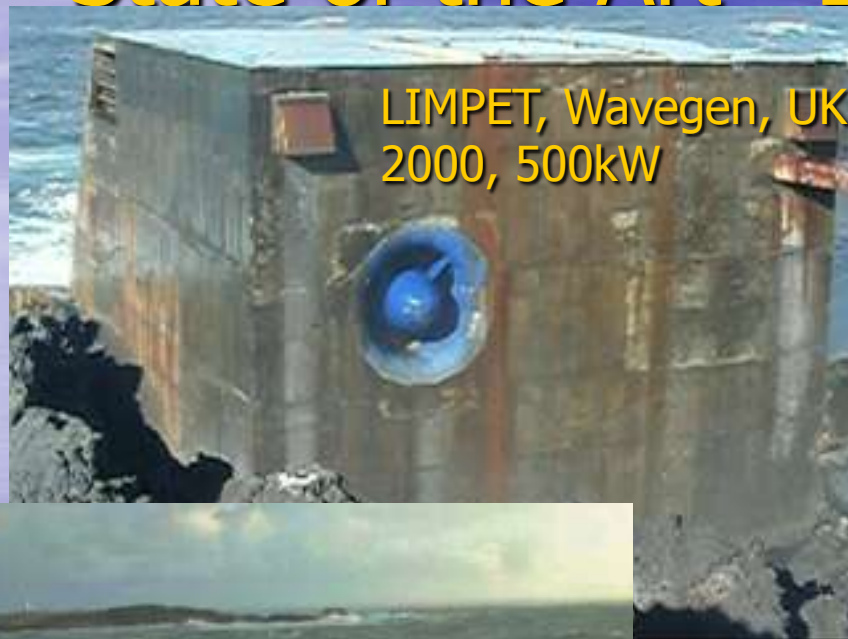
- The theoretical global resource is estimated to be in the order of:
 - 8,000 - 80,000 TWh/year for wave energy;
 - 800 TWh/year for tidal current energy;
 - 1,000 TWh in Europe (33% of consumption)
- No OE potential has been included by 2020

Worlds electricity consumption 16,000 TWh/year
Europes 3,000 TWh/year

Source: EC SET plan, World Energy Council

Wave Energy

State of the Art - Large Scale Demo

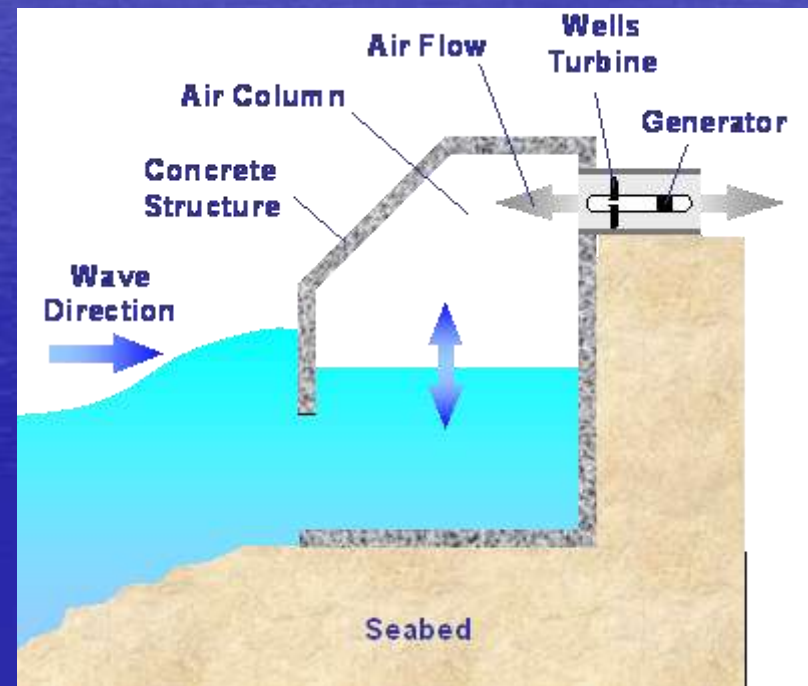


LIMPET, Wavegen, UK
2000, 500kW



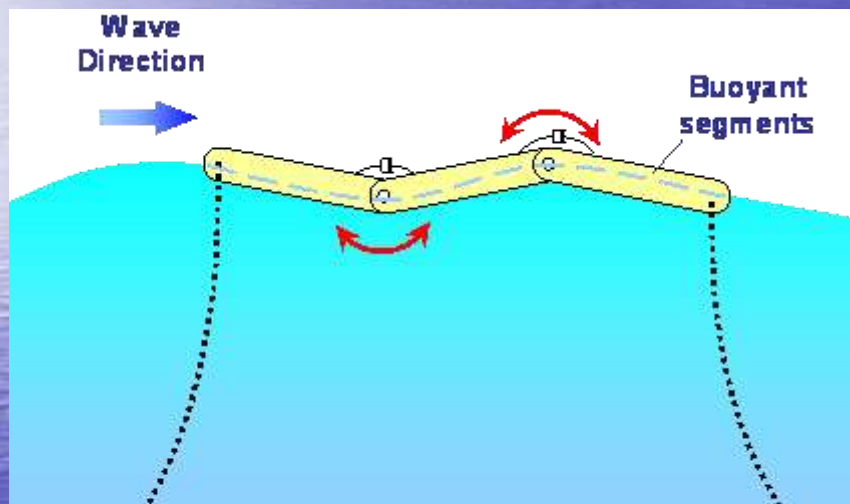
PICO Plant, Portugal
1999, 400kW

Oscillating Water Column



Wave Energy

State of the Art - Large Scale Demo



Pelamis Wave Power Ltd, Scotland
Tank tests in small scales (1:80, 1:35, 1:20)
Open sea tests 1:7 (2001), 1:1 (2004),
750 kW Orkney
1:1 (2008), 2.25 MW Portugal



Pitching Devices

Wave Energy

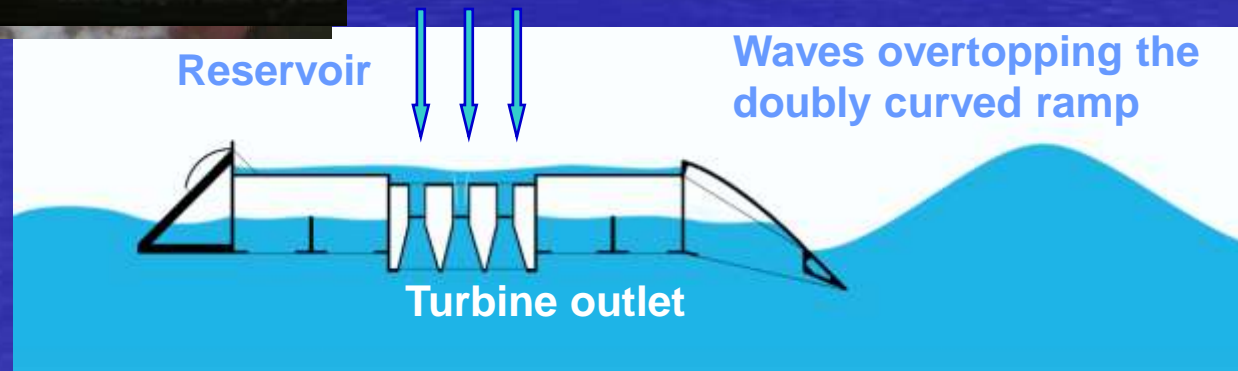
State of the Art - Large Scale Demo

The *Wave Dragon* is a slack-moored wave energy converter that can be deployed alone or in parks wherever a sufficient wave climate and a water depth of more than 25 m is found.



Climate	Power production	
12 kW/m	1½ MW	4 GWh/unit
24 kW/m	4 MW	12 GWh/unit
36 kW/m	7 MW	20 GWh/unit
48 kW/m	12 MW	35 GWh/unit

Overtopping Devices



Technology maturity

- The state of the art of ocean energy sector
 - Has matured significantly over the last 5 years
 - Stage of Development - Early Commercialization
- Wave energy (grid connected):
 - 0.4 MW and 0.5 MW OWC at the coast Pico and Islay
 - 2.25 MW Pelamis of Portugal coast by 2008
 - 7 MW Wave Dragon of Wales coast by 2008-2009
 -
- Tidal:
 - Barriers: 240 MW La Range, France by 1966
 - Current: 1 MW MCT of North Ireland by 2007-2008
- Highly dependent on financial support schemes
- Can reach 10,000 MW of installed capacity by 2020 with financial support equal to that available for other emerging RE sectors