

BEOwULF

FP6 Sustainable Energy Systems Integrated Project

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BEOwULF

Blue Energy from Ocean Waves & Lunar Forces

OBJECTIVES

General

- Successful Development of Ocean Energy Technology in Europe

Specific

- 20 MW installed by 2010

Research Issues Addressed

**Identified in the Final Report of European Thematic Network
funded under FP5 – www.wave-energy.net**

Creation of Interdisciplinary Research Groupings

Based around Pilot Plants

ORGANISATION

Vertical Work Packages

- **V1 Pneumatic Wave Energy Systems**
- **V2 Mechanical Wave Energy Systems**
- **V3 Overtopping Wave Energy Systems**
- **V4 Tidal Current Systems**

- **H1 Generic Technologies**
- **H2 Other Issues**

Horizontal

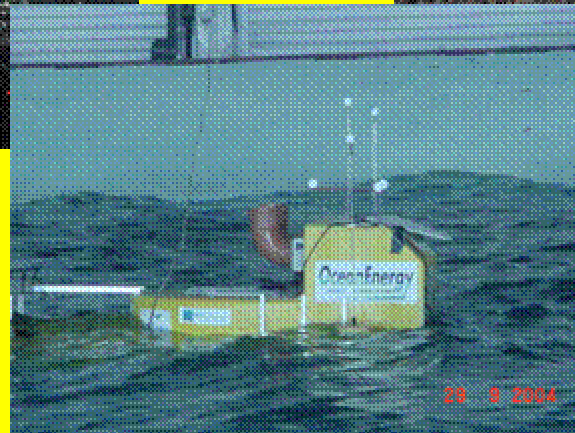
V1 Pneumatic Wave Energy Conversion Systems

Pilot Plants

LIMPET - Scotland

AZORES - Portugal

OE BUOY - Ireland



V1 Pneumatic Wave Energy Conversion Systems

Pilot Plants

LIMPET - Scotland

AZORES - Portugal

OE BUOY - Ireland

Breakwater OWC - Portugal

Research Topics

Air Turbines

Pneumatic Chamber Optimisation

Moorings

V2 Mechanical Wave Energy Conversion Systems

Pilot Plants

AWS - Portugal

PELAMIS - Scotland

LAB-BUOY - Greece



V2 Mechanical Wave Energy Conversion Systems

Pilot Plants

AWS

PELAMIS

LAB-BUOY

Research Topics

Electrical Power Take-off Systems

Hydraulic Power Take-off Systems

Mooring Systems

V3 Overtopping / Surging

Wave Energy Conversion Systems

Pilot Plants

WAVE DRAGON - Denmark

WAVE PLANE - Denmark

SEAPOWER RAFT – Sweden/UK



V3 Overtopping / Surging Wave Energy Conversion Systems

Pilot Plants

WAVE DRAGON
WAVE PLANE
SEAPOWER RAFT

Research Topics

Low Head Hydraulic Turbine Design &
Control Strategies
Overtopping Rates
Mooring Systems

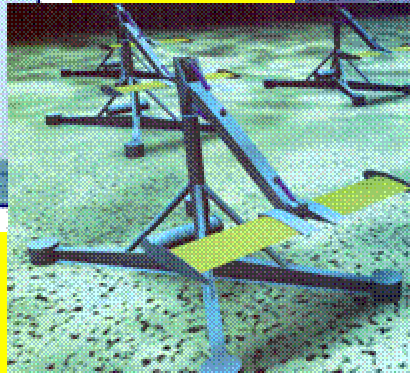
V4 Tidal Current Devices

Pilot Plants

SEAFLOW - UK

MESSINA - Italy

STINGRAY - UK??



V4 Tidal Current Devices

Pilot Plants

SEAFLOW

TEAMWORK

MESSINA

STINGRAY ??

Research Topics

Wave and Flow Induced Loading

Device Arrays – Blockage Effects

Floating Device Stability

H1 Generic Technologies

- **Resource Details and Device Survival**
- **Device Modelling – Wave / Tide to Wire**
- **Mooring Systems and Electrical Connections**
- **Electrical Power Quality**
- **Control Systems**
- **Deployment and Maintenance Systems**

H2 Other Issues

- **Socio-Economic Issues**
- **Environmental Issues**
- **Standards and Prenormative Issues**

LEAD CONTRIBUTORS

HMRC, Cork, Ireland – V1 WP Leader

SEEF, Scotland – V2 WP Leader

SPOK Denmark – V3 WP Leader

EDF, France – V4 WP Leader

I.S.T. and WE Centre, Lisbon - H1 WP Leader

CRES Athens – H1 WP Leader

NEXT STEPS

- **Finalise Work Programme**
- **Select Potential Contributors for all Work Packages**
- **Determine Budget**
- **Submit Proposal**

OTHER POTENTIAL CONTRIBUTORS

University of Edinburgh

University of Aalborg

R.G. University of Aberdeen

Queen's University Belfast

University of Limerick

University of Munich

Chalmers University

E.C.N. Nantes

University of Plymouth

Brunel University

University of Uppsala

Reading University

University of Gent

RAMBOLL, Denmark

INETI, Portugal

WaveGen, Scotland

Ocean Energy, Ireland

A.W.S. , Netherlands

O.P.D. Scotland

E.M.U, Denmark

WAVEPLANE DK.

SHAWATER, U.K.

Marine Current Turbines, U.K.

Teamwork Technology, Netherlands

Ponte di Archimede, Italy

Engineering Business, U.K.

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