Implementing Agreement on Ocean Energy Systems

International Vision for Ocean Energy
OES-IA covers all forms of ocean energy, excluding offshore wind
Products can include: electricity, heat, cooling, water (drinking and pressurized), biofuels
Ocean energy is a nascent but truly international industry
OES-IA Governments’ Representation

19 Members; membership by invitation from IEA in Paris

National governments represented by Contracting Parties

Wide range of Contracting Party roles and interests:

- Government departments (US, UK)
- Government resource agencies (Canada, Korea, China)
- National energy agencies (Sweden, Ireland, South Africa)
- Device/project developers (Australia, Norway, Italy)
- Research organizations (Spain, Portugal, Denmark, Germany)
- Universities (Japan, Belgium, Mexico)
- Industry associations (New Zealand)

Key Strengths

- Diverse membership
- Wide reach and range of members
- Collaborative efforts between countries
- Pooled capital, resources and effort
- Transfer of experience and knowledge
All Technologies have Long Developments

1885: First motor car
1908: First car in series

1888: 12 kW
1941: 1.25 MW units
2007: 5 MW units

1985: 100 W
1985: 500 kW
1995
2004
2008: 2.25 MW
Development Process

**Validation Model**
- Scale 1:25-100
- Fundamental testing: optimisation of the geometry and validation with numerical results

**Design Model**
- Scale 1:10-25
- Testing in realistic sea conditions: more accurate PTO, survival options, mooring systems

**Process Model**
- Scale 1:3-10
- Testing in conditions representative of deployment site

**Prototype**
- Scale 1:1-3
- Large scale pilot plant at sea: verification of electrical quality, performance, survival, etc

*Pre-commercial prototype: optimisation*
Pelamis | A multi-unit project in the Atlantic Ocean

- Attenuator - articulating device
- Pelamis Wave Power Ltd. (PWP); based in Scotland
- Capacity 2.25 MW (3 x 750 kW)
- Contract with a Portuguese company; deployment off Portugal September 2008
OES-IA’s **NEW** Mission & Vision

**2012 – 2016 VISION**

As the **Authoritative International Voice on Ocean Energy** we collaborate internationally to accelerate the viability, uptake and acceptance of ocean energy systems in an environmentally acceptable way.

**2012 – 2016 Organizational Values**

**Integrity:** Our information can be relied upon

**Knowledgeable:** All information is based upon fact. We ensure it is up-to-date and relevant

**Outcome – oriented:** We are driven by pragmatic solutions

**Inspirational:** We are committed to providing inspired and collaborative information to accelerate implementation of ocean energy

**Collegial:** We are committed to working inspirationally with each other to achieve our GOAL

**Note:** conference sponsorships and INORE
## Work Programme

### Tasks

<table>
<thead>
<tr>
<th>Task</th>
<th>Leader</th>
<th>Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>I  Dissemination</td>
<td>Portugal</td>
<td></td>
</tr>
<tr>
<td>II Guidelines for Testing</td>
<td>Denmark</td>
<td>Phase II</td>
</tr>
<tr>
<td>III Grid Integration</td>
<td>Canada</td>
<td></td>
</tr>
<tr>
<td>IV  Environmental Effects</td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>V  Device Performance</td>
<td>USA</td>
<td></td>
</tr>
</tbody>
</table>

Strategic Planning has led to several other Annex proposals – now under development

---

*Offshore Renewable Energy, Madeira*

*15 September 2011*
Annex I – Dissemination

Central information collation and dissemination
Annex on the technical, economic, environmental
and social aspects of ocean energy systems
Contribution to the definition of future priorities for
the Implementing Agreement as a whole

- Review and Analysis of Ocean Energy Systems
  Development and Supporting Policies | 2006
- Ocean Energy Glossary | 2007
- Wave Data Catalogue for Resource
  Assessment | 2007
- Ocean Energy: Global Technology
  Development Status | 2009
Annex II – Guidelines for Testing

- Generic and Site-related Wave Energy Data | 2010
- Guidelines for the Development & Testing of Wave Energy Systems | 2010
- Guidelines for the Design Basis of Marine Energy Converters | 2009
- Tidal Energy Development Protocol | 2008
- Energy Device Performance Protocol | 2007
- Preliminary Tidal-current Energy Device Performance Protocol | 2007
Annex III – Grid Integration

- Key Features and Identification of Needed Improvements to Existing Interconnection Guidelines for Facilitating Integration of Ocean Energy Pilot Projects | 2009

- Potential Opportunities and Differences Associated with Integration of Ocean Wave and Marine Current Energy | 2010

- Dynamic Characteristics of Wave and Tidal Energy Converters & a Recommended Structure for Development of a Generic Model for Grid Connection | 2010

- Integrating Wave and Tidal Current Power: Case Studies through Modelling and Simulation | 2011
Annex IV – Environmental effects

Objectives

1) Expand baseline knowledge of environment effects
2) Ensure that this information is widely accessible
3) Make available mitigation strategies
4) Foster efficient government oversight and public acceptance

Results

- Knowledge Management System - environmental effects of marine and hydrokinetic energy development
- Comprehensive report - worldwide focus on monitoring and mitigation methods and best practices

1st Experts’ Workshop on Environmental Effects
Dublin, 27 – 28 September 2010
OES-IA Annual Report

OES-IA Annual Reports
Single, detailed, authoritative reference source on OE status and development

2010 Annual Report
Three invited papers on key facilitators of ocean energy

2009 Annual Report
Five invited papers on technical and non-technical barriers to ocean energy

2008 Annual Report
Six invited papers on present status of ocean energy

Tables on:
• R & D Investment in OES-IA
• Worldwide OE installed capacity
• Electricity utility investment on ocean energy
International Vision for Ocean Energy

Motivation
1. Contribution of ocean energy remains unclear
2. Available ocean energy resources are not well understood
3. Timing of technological maturity is uncertain

Opportunity
• OES-IA members include most active countries
• Representatives can access national figures and databases
• OES-IA has publishing/broadcasting role

Audience
• Governments, policy makers, regulators and planners
• Industry participants, supply chain and general public

By 2030 ocean energy will have generated 160,000 direct jobs and savings of 5.2 billion tonnes of CO₂
An International Vision for Ocean Energy

- 20-page full-colour brochure
- Facts and figures as well as scenarios to 2050
- All forms of ocean energy in proportion to their present status
- Updated costs figures and ‘iconic figures’
- People, water and energy nexus

Phase II (2012): Market Development
- Simple, contestable scenarios for market growth
- MARKAL modelling with IEA Modelling Group in Paris

International Vision for Ocean Energy

- By 2050 ocean energy will have 240 GW of installed capacity, generating 552.4 TWh of electricity.
- By zero ocean energy will have attracted global investment of US$5 trillion, generating ,000, direct jobs and saving 1.5 billion tonnes of CO2 emissions.
Ocean Energy Systems

- OES-IA is a lively and active Implementing Agreement
- Membership growth is steady and continuous
- We are negotiating with a number of countries to join
- We have a target list of 27 countries to invite

- OES-IA has close working relationship with IEA Secretariat and related Implementing Agreements and other organizations (IEC, IPCC, others)

- OES-IA has a new 5-year Strategic Plan and, for the first time, a Communications Plan
- OES-IA will be re-branded in 2011
- Its profile is being raised within the industry through conference presentations/sponsorship, publications and website
If you have been, thank you for listening!

www.iea-oceans.org

OES-IA Executive Committee

Chair
Dr. John Huckerby
AWATEA, New Zealand
international@awatea.org.nz

Vice-Chair
Mr. Jose Luis Villate
TECNALIA, Spain
joseluis@robotiker.es

Vice-Chair
Mr. Eoin Sweeney
SEAI, Ireland
Eoin.Sweeney@sei.ie

Secretary
Dr. Ana Brito Melo
WAVE ENERGY CENTRE, Portugal
ana@wave-energy-centre.org