

REFERENCE	IEA Ocean Energy
Title:	Status and research and development priorities 2003. Wave & marine current energy.
Date:	2002
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IEA topics covered	Tasks I & II
Geographical focus:	Worldwide
Brief Abstract:	In collaboration with the DTI & FES the IEA Ocean Energy Systems Group published a report in 2002 on the research priorities for wave and tidal current energy converters. The report includes a comprehensive review of existing technology, a review of global marine renewable activities and a detailed list of research priorities or tasks for both wave and marine current. The list of R&D priorities is divided into marine current and wave, with specific headings in wave related to the type of wave device.

OUTPUTS	
Short Report?	NO
Major report?	YES
Visualisations?	YES
Information held on dedicated software?	NO
- which package?	

ARCHITECTURE	
Timescales used:	NONE
Trends and drivers?	NO
- list	
Enablers?	YES
- list	<ul style="list-style-type: none"> • enable concept developers to prove their devices, by supporting the development of individual device concepts rather than only generic studies. • robust assessment methodologies to be developed and applied to device concepts prior to their full support. • develop better understanding of environmental impacts and how these might be predicted for future schemes

Performance measures/targets?	NO
- list areas	
Mapping of RD&D activities?	YES. R&D activities, capabilities and policy support measures, are reviewed for 18 individual countries and the EC
Critical assessment of capabilities?	NO

PROCESS	
Methods used:	
- Desk study?	YES
- Consultation	YES
- Interviews?	Unclear
- Facilitated workshop(s)	NO
- Working groups/task force	NO
- Integrated Process	NO
Stakeholders engaged:	
- University based researchers	YES
- Other public sector researchers	YES
- Business – technology	YES
- Business – other	YES
- Government - energy	YES
- Government – SET	YES
- Government - other	YES
- NGOs	NO
No of people engaged:	36
Budget (if known):	Not known
Commitment to re-visit?	no

ACTIONS IDENTIFIED	
List of actions?	YES (MORE PRIORTIES)
Actions listed according to timescale?	NO
Actions prioritised?	NO
Sequencing/dependencies identified?	NO
Responsibility for actions identified?	NO, but a strategy for implementing the tasks is presented: <ul style="list-style-type: none"> • <i>Task sharing</i> which relies on IEA members devoting specified resources and personnel to a common work programme. • <i>Cost sharing</i> where members contribute to a common fund for conducting the work, which may be an experiment, an exchange of information or purchasing one piece of equipment
Types of actions identified:	
- Basic research?	YES. Research priorities are identified for (a) Ocean Energy (i.e. Tidal Current and Wave) (b) Tidal Current and (c) Wave. These are listed below
- list areas	Ocean Energy (Tidal Current and Wave) <ul style="list-style-type: none"> • Resource Assessment, need for better spatial

	<p>resolution and site-specific resource characterisation.</p> <ul style="list-style-type: none"> • Operation & Maintenance, including condition monitoring. • Biofouling, including antifouling paints and sonic / ultra sonic systems. • Impacts on Marine Life, particularly noise and interactions with fish and sea mammals, and effects on coastal processes such as sedimentation transport and deposition. • Sealing. • Weather and Wave Forecasting, for enhancing the operation and maintenance of offshore systems, and predicting the device output for grid management. <p>Tidal Current</p> <ul style="list-style-type: none"> • Cavitation (i.e. the formation of air bubbles in liquids by rapid pressure changes) - choice of blade profiles and materials to avoid cavitation efficiency losses and damage. • Interaction with the Marine Environment, impact on wake flow, sediment transport and deposition. Extractable energy flow; scale effects. • Turbulence, impact on fatigue and vibration problems. Development of appropriate design codes. • Installation, foundations and moorings problems. e.g. scouring effects. <p>Wave Energy</p> <p>priorities are classified according to device type</p> <ul style="list-style-type: none"> • <i>Overtopping devices</i>: impoundment and superstructure; power take off systems. • <i>Oscillating Water Columns</i>: design standards and performance prediction (including non-linear effects of wave dynamics, such as wave slam and extreme wave loading)., market Development and site selection (need for multiple suitable sites to gain economies of series production). • <i>Offshore Devices</i>: control systems, floating device array configuration, moorings, electrical cabling, hydraulics (including torque and environmental impacts). • <i>Generic Wave Issues</i>: Testing, proving, and certification (role of independent test centres), fabrication, transport & installation (provision of specialist infrastructure), standards (e.g. wave climate statistics), monitoring systems / SCADA, design wave data, power smoothing and conditioning. <p>These priorities are further refined into a long list in Chapter 10 of the report. This list identifies</p>
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	opportunities for task / cost sharing across IEA-OES members, and whether challenges are generic or device specific (and therefore not suited to IEA support)
- Applied research?	The list above contains applied research
- list areas	
- Development & demonstration	YES
- list areas?	<ul style="list-style-type: none"> • Set up test and certification facilities for device prototypes See above list for further development and demonstration issues.
- Other types of action?	YES
- list other types	<ul style="list-style-type: none"> • Set up Technology Information Centres (Possibly IEA-hosted), • Information sharing and technology transfer (links to offshore oil and gas and wind energy industries) • Specific areas for international co-operation are identified: technology assessment; resource assessment; technology transfer and information exchange; testing and certification; environmental impacts.