

Environmental impacts of Ocean Energy

Informal meeting

4th February, 2009

Teresa Simas



Equimar – Equitable testing and evaluation of marine energy extraction devices in terms of performance, cost and environmental impact



Team



Portugal

- Wave Energy Centre

United Kingdom

- The University of Edimburgh
- University of Strathclyde
- University of Exeter
- University of Manchester
- University of Southampton
- Pelamis Wave Power Ltd.
- European Marine Energy Centre
- University of St. Andrews (SMRU)
- Scottish Association of Marine Sciences
- Feisty Productions Ltd

Ireland

- University College Cork

Norway

- Det Norske Veritasv

Spain

- Fundación Robotiker

23 partners



France

- Electricité de France SA
- Institut Français de Recherche pour l'Exploitation de la MER (IFREMER)
- Actimar

Belgium

- European Union Ocean Energy Association

Italy

- Consiglio Nazionale delle Ricerche: Istituto di Scienze Marine

Netherlands

- Teamwork technology

Sweden

- Univesity of Uppsala

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Objectives



To deliver a suite of protocols for the equitable evaluation of marine energy converters (tidal and wave)



To harmonize testing and evaluation procedures across a wide variety of devices presently under development



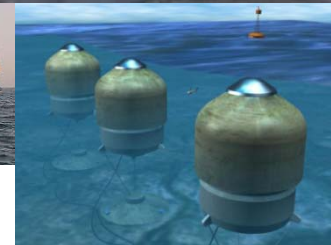
To accelerate the adoption of the technology matching with the resource



To establish the understanding of the environmental and economic impacts associated with the deployment of arrays of devices

Device assessment covers:

- Site selection
- Device engineering
- Scaling up of designs
- Deployment of arrays of devices
- Environmental impact
- Economic issues



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Project work packages



WP1: Knowledge base for marine energy systems

WP2: Physical environment specification

WP3: Concept appraisal and tank testing practices for 1st stage prototype devices

WP4: Sea trial testing procedures for marine energy extraction devices

WP5: Deployment assessment: performance of multi-megawatt device array

WP6: Environmental impact assessment

WP7: Economic assessment of large-scale wave energy deployment

WP8: Protocols synthesis

WP9: Dissemination and public engagement

WP10: Project coordination and management





WP6 Environmental impact assessment



To develop a common framework regarding
Environmental impact assessment issues to produce Best Practice Protocols

- 1 Discussion of common legislation baselines
- 2 Scientific protocols
- 3 Risks for large vertebrates and other critical uncertainties
- 4 Life cycle analysis approach
- 5 Environmental analysis of existing and future scenarios

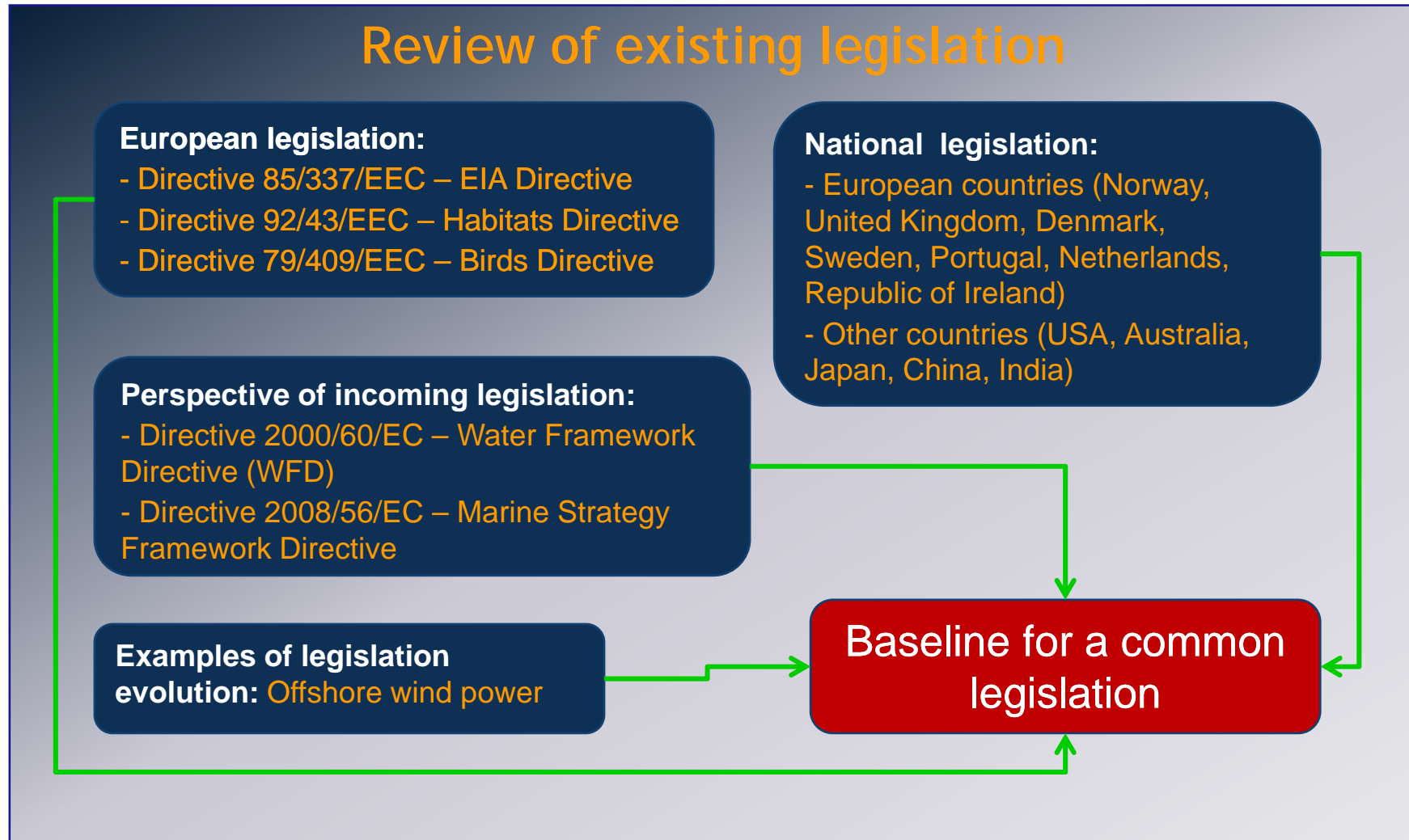


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Task 1 Discussion of common legislation baselines





Task 2 Scientific protocols

Help developers to carry out Environmental Impact Assessments following best practices

Principles

- Clear - (non-expert language)
- Pertinent - focus on important aspects
- Adaptive - allow evolution and deviation from guidance / recommended practice (any alternative should satisfy objectives and principles)

High level protocol

- Objectives
- Principles to be observed
- Definitions

Detailed protocol

- Recommended Practices – how to implement them
- Guidance – why and possible alternatives



EIA methodologies



Mitigation measures



Baseline environmental studies



Monitoring guidelines



Task 3 Risks for large vertebrates and other critical uncertainties



- Risk of collision between marine animals and marine energy devices

- Encounter model (SAMS¹)
- Data from live animals (USTAN²)



- Other uncertainties: identify uncertainties regarding environmental impact that require further research

- Road map taking into account existing research groups working in the concerned areas, a route map to solve uncertainties will be established

¹Scottish Association of Marine Sciences

²University of St. Andrews – Sea Mammal Research Unit



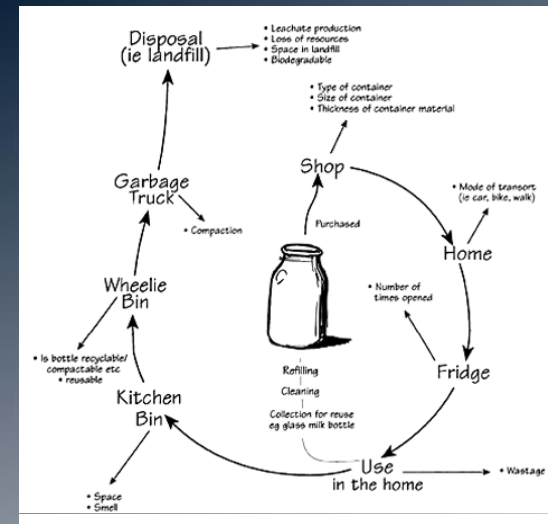
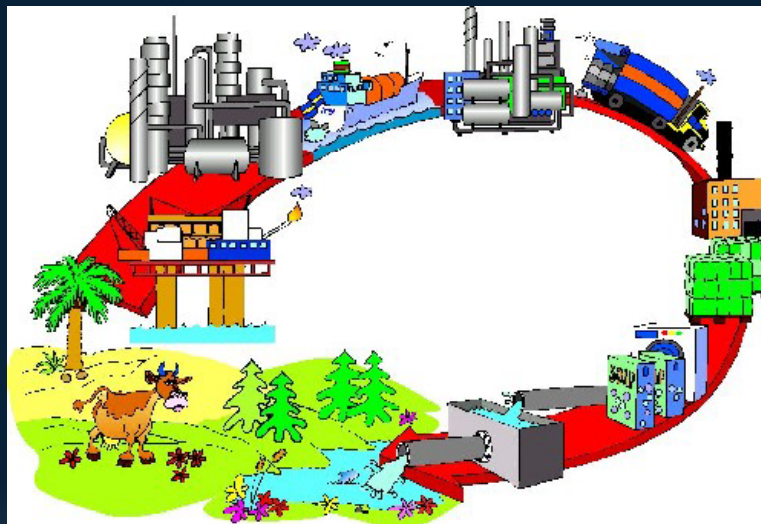
Task 4 Life Cycle Analysis (LCA) approach



Cost Benefit Analysis methodologies

Comparison with LCA in other renewables

Development of LCA for marine energy systems





Task 5 Environmental analysis of existing and future scenarios



- State of the art on EIA (including monitoring) and set the path to be followed for future ocean schemes
- **Include test sites:**
 - Wave Hub (South-West UK)
 - European Marine Energy Centre (Orkney, North UK)
 - Gallway bay (Ireland)
 - Pilot Zone (Portugal)
- **Include deployment sites: e.g Wave Dragon (Denmark)**
- **The applicability of Geographic Information Systems and other tools that can be applied to environmental assessments**
- **To design a strategy for international cooperation in monitoring programs**



Deliverables



D.6.1.1	Existing legislation, perspectives and evolution of other similar technologies	month 12	April 2009
D.6.3.1	Uncertainties regarding environmental impacts. A Draft	month 14	June 2009
D.6.5.1	Analysis of Case Studies and Useful Tools. A Draft	month 18	October 2009
D6.2.1	Scientific Guidelines. A draft	month 20	December 2009
D6.4.1	Draft Protocol on Life Cycle Analysis approach	month 22	February 2010
D6.2.2	Scientific Guidelines	month 32	December 2010
D6.3.2	Uncertainties and Road map	month 32	December 2010
D6.4.2	Protocol on How to proceed in Life Cycle Analysis of ocean renewable	month 32	December 2010
D6.5.2	Analysis of Case Studies and Useful Tools	month 32	December 2010

Equimar project:
<https://www.wiki.ed.ac.uk/display/EquiMarwiki/EquiMar>