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# Equitable Testing and Evaluation of Marine Energy Extraction Devices in terms of Performance, Cost and Environmental Impact

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EquiMar

# Deliverable D6.1.2
# Technical criteria for a common legislation

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## Technical criteria for a common legislation

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### Summary

The present report aims to discuss and recommend environmental technical criteria for the development of a harmonised legislation regarding the assessment of environmental impacts of wave and tidal energy developments.

**CONTENTS**

# 1 INTRODUCTION AND CONTEXT

An obvious barrier to the realisation of new technologies such as wave and tidal energy developments is the absence of a clear legal route by which a project is granted permission for construction. At present, environmental legislation requirements for ocean energy schemes are uncertain in some countries. Where regulation on ocean energy schemes has already been implemented, the legal requirements for a complete EIA may be less demanding, may not be required or, in some countries, required for some projects depending on their characteristics[1]. The development of a harmonised consent procedure is desirable but should only be beneficial if it is based in useable, streamlined and transparent criteria. According to the EC Directive 2001/77 Member States are obliged to reduce the regulatory and legislative framework for authorisation procedures (see Box 1) [1].

**BOX 1 – EC Directive 2001/77**

"Member States or the competent bodies appointed by the Member States shall evaluate the existing legislative and regulatory framework with regard to authorisation procedures or the other procedures laid down in Article 4 of Directive 96/92/EC, which are applicable to production plants for electricity produced from renewable energy sources, with a view to:

- Reducing the regulatory and non-regulatory barriers to the increase in electricity production from renewable energy sources,
- Streamlining and expediting procedures at the appropriate administrative level, and
- Ensuring that the rules are objective, transparent and non-discriminatory, and take fully into account the particularities of the various renewable energy source technologies."

The EU Directive on Environmental Impact Assessment (85/337/EEC; EIA Directive[2]) outlines which project categories shall be made subject to an EIA, which procedure shall be followed and the content of the assessment. Project categories are split between Annex I for which EIA is compulsory and Annex II for which EIA applicability is dependent on whether significant environmental effects may occur. Wave and tidal energy developments are listed in Annex II of the Directive as "Industrial installations for the production or electricity, steam and hot water (unless included in Annex I)". For projects listed in Annex II, Member States should set a number of thresholds or criteria to determine whether or not a project needs to be subjected to an Environmental Impact Assessment (see Box 2). The relevant criteria that shall be taken into account in a case-by-case analysis or considering the set of thresholds or criteria defined by the Member State are already set in the EIA Directive (Annex III; see Box 2). However, the quantification of each one of them still needs to be discussed and set in several countries.

**BOX 2 – EIA Directive 85/337/EEC**

*Article 3*

"The environmental impact assessment shall identify, describe and assess in an appropriate manner, in light of each individual case (...) the direct and indirect effects of a project on the following factors:

- Human beings, fauna and flora;
- Soil, water, air, climate and the landscape;
- Material assets and the cultural heritage;
- The interaction between the factors mentioned in the first, second and third indents."

*Article 4*

"2. (...) For projects listed in Annex II the Member States shall determine through (a) a case-by-case examination, or (b) thresholds or criteria set by the Member State whether the project shall be made subject to an assessment (...). Member States may decide to apply both procedures referred to in (a) and (b).

3. When a case-by-case examination is carried out or thresholds or criteria are set for the purpose of paragraph 2, the relevant selection criteria set out in Annex III shall be taken into account."

*Annex III*

Selection criteria referred to in Article 4 (3)

**1. Characteristics of projects**: The characteristics of projects must be considered having regard, in particular, to:

- The size of the project,
- The cumulation with other projects,
- The use of natural resources,
- The production of waste,
- Pollution and nuisances,
- The risk of accidents, having regard in particular to substances or technologies used.

**2. Location of projects**: The environmental sensitivity of geographical areas likely to be affected by projects must be considered, having regard, in particular, to:

- The existing land use,
- The relative abundance, quality and regenerative capacity of natural resources in the area,
- The absorption capacity of the natural environment, paying particular attention to the following areas:

[1] A review on the existing legislation regarding EIA in EU countries and some other outside Europe is made in D6.1.1.
[2] Amended by Directive 97/11/EC and Directive 2003/35/EC; a consolidated version is currently available on the EU website.

(a) Wetlands;
(b) Coastal zones;
(c) Mountain and forest areas;
(d) Nature reserves and parks;
(e) Areas classified or protected under Member States' legislation; special protection areas designated by Member States pursuant to Directive 79/409/EEC and 92/43/EEC;
(f) Areas in which the environment quality standards laid down in community legislation have already been exceeded;
(g) Densely populated areas;
(h) Landscapes of historical, cultural or archaeological significance.

**3. Characteristics of the potential impact**: The potential significant effects of projects must be considered in relation to criteria set out 1 and 2 above, and having regard in particular to:

- The extent of the impact (geographical area and size of the affected population),
- The transfrontier nature of the impact,
- The probability of the impact,
- The duration, frequency and reversibility of the impact.

The present report aims to discuss and recommend environmental technical criteria for the development of a harmonised legislation regarding the assessment of environmental impacts of wave and tidal energy developments.

# 2 THE CONSENTING PROCESS

The simplification of the licensing system can go through the introduction of a single point of access for licensing (one-stop-shop) for all planning applications and environmental impact assessments. This is crucial to encourage investors to consider participating in ocean renewable energy projects. The advantages of a one-stop-shop facility are savings in time, effort and cost, also ensuring the most appropriate use of data.

The Danish regulatory framework system is based on the "one-stop-shop" principle for off-shore wind and ocean energy, creating a simplified system for EIA and consent and a much lower degree of uncertainty [2]. In Scotland, a streamlined consenting process for marine renewable energy also introduces a single point of access for consents and licensing, the Marine Scotland's Licensing Operations Team (MS-LOT), which handles the whole process from initial queries (pre-screening) to the issuing of all permissions to deploy ([3], Figure 1).

It is recommended that the licensing / consenting process is streamlined in order to reduce the burden and help the industry to progress. The development of a common European marine renewable license / procedure has been discussed by this Equimar team as a possible contribution to the streamlining of the consenting procedure in the Member States. The implementation of the marine planning system along Europe will help to streamline the licensing process too. It will give direction on the nature of activities that may be permitted in a given location and this will provide greater certainty for licence applicants who will be able to refer to Marine Plans when considering whether to apply for a marine licence [5]. In future legislation development it is also essential to take into account all national and European legal instruments such EIA, SEA, Wild birds and Habitats Directives.

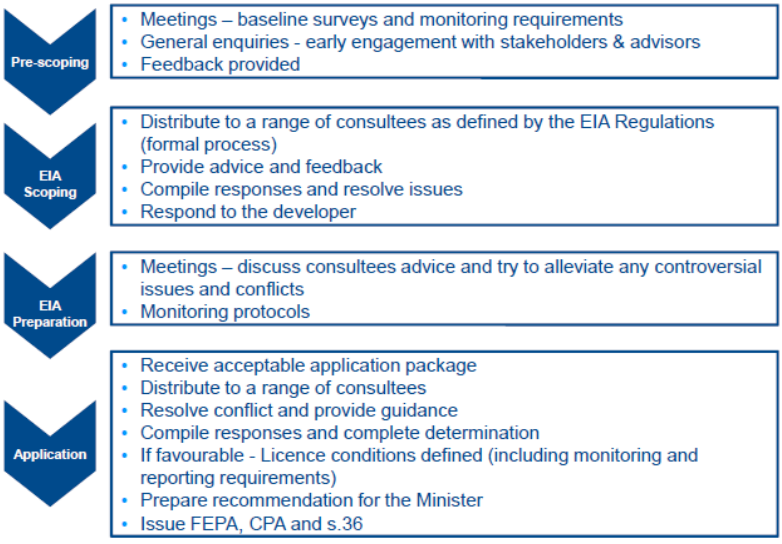


**Figure 1** Steps of the consenting process of marine renewables in Scotland (source: Marine Scotland).

# 3 EIA REQUIREMENT

As referred above, (according to the EIA Directive) the EIA requirement should be confirmed (or not) according to a case-by-case analysis or considering thresholds or criteria set by each Member State (or by the Competent Authority in each country). As a matter of transparency and process simplification, the criteria on whether or not an EIA is required for a given wave or tidal energy project should be defined by the competent authority in each country. As an example, in Scotland, all marine renewable developments with a generating capacity greater than 1MW shall be subject to an EIA process and an Environmental Statement has to be delivered to the Competent Authority (section 3.1, Electricity Act 1989); developments with a capacity of 1 MW or under are exempt but the developer will be advised if or what information / studies will be required to support consent applications ([3], [4]).

# 4 ENVIRONMENTAL LICENSING CRITERIA AND GUIDELINES

The objectivity and clarification of the EIA process, required environmental studies, and the contents of the Environmental Statement are important issues to be taken into account in the development of future legislation. The development of guidance on EIA steps, providing examples of best practices, can be very useful in helping regulators and developers during the consenting procedure. An example of such guidance document is provided by the Marine Scotland Licensing Operation's Team ([3] [4]).

Another important principle to take into account, when developing legislation for marine renewables, is the specificity of the technology / project and site location. This means that each technology / project and site has unique features and thus effects / potential impacts identification and assessment are likely to be specific. Therefore, no prescribed list of data that developers must gather and analyse can or should be previously established, instead, the project developers and other relevant parties should be encouraged to lead this process. However, there will be similarities among different renewable energy developments and several specialist studies deal with some of the general issues, which could help in the identification of environmental effects / potential impacts to be analysed. As an example, some of the key environmental issues that might be considered during the EIA process are presented in Table 1.

**Table 1** Example of the key environmental issues to be considered in the environmental assessment.

| Receptors | Stressors | Effects and / or ecological issues |
|---|---|---|
| Physical environment<br>Pelagic habitat<br>Benthic habitat<br>Fish and fisheries<br>Marine birds<br>Marine mammals<br>Humans (users) | Physical presence of the devices<br>Chemical effects<br>Lighting<br>Acoustics<br>Electromagnetic fields<br>Cumulative effects | • Alteration of currents and waves due to the energy extraction and or physical presence of the devices<br>• Alteration of substrates and sediment transport and deposition which may alter coastline processes and morphology<br>• Benthic habitat disturbance or destruction<br>• Changes to factors such as nutrients, temperature, light levels, turbidity (suspended sediments)<br>• Water contamination due to e.g. effluent or waste discharge, oil leaks<br>• Collision, strike, entrapment and entanglement of marine invertebrates, fish, mammals and birds with the equipment e.g. device, mooring lines<br>• Interference with animal movements and migration<br>• Displacement of marine species<br>• Noise disturbance<br>• Effects of electromagnetic fields in elasmobranchs fish (sharks, rays and skates) orientation and reproduction |

It is very important to assess and determine the site sensitivity[3] during the baseline characterization to inform of the environmental key issues to be taken into account, for that site, and to identify the relevant environmental studies needed. This can avoid unnecessary data collection which will only increase costs and consume time.

Another criterion that should be taken into account is the project phase (installation, operation and decommissioning) and scale (single device, array of devices or farm). Monitoring should be implemented to follow the project from installation to decommissioning and thus a specific monitoring plan has to be previously established in order to correct or implement mitigation measures if needed. Future legislation on EIA should also highlight the evaluation of cumulative effects of installation, operation and decommissioning of multiple devices.

Finally, it is essential to create legal mechanisms and / or to encourage developers to make available the environmental data and reports to the regulators, other developers and the public in order share lessons learnt and progress in impact prioritisation and assessment.

[3] A rational for the site sensitivity evaluation is presented in Equimar D6.2.2.

# 5 ADAPTIVE MANAGEMENT AND ENVIRONMENTAL LICENSING PROCEDURE

The initial lack of information regarding new technologies constrains the accurate assessment of environmental impacts. There is a need to learn from the device's operating experience in order to validate the predicted environmental effects of a project and adapt mitigation and/or monitoring strategies as knowledge progresses. This process of adaptive management centres on an iterative process used by resource managers to improve management decisions over time while environmental impacts are still uncertain.

Adaptive management is not a new concept and the steps for its application to wave and tidal energy projects have been proposed elsewhere and could be used as guidance for developers, regulators or managers (e.g. [6], [7], [8]). It is recommended that it should be employed at the project developers' level rather than mandated by a particular authority since its proper implementation requires ownership and regulatory management. For initial projects, the implementation of adaptive management plans may require a close liaison between developer and regulator. Therefore the appropriate training of regulators on adaptive management is important in order for it to be applied correctly and the results are taken full advantage of. A scheme on adaptive management is presented in Figure 2.

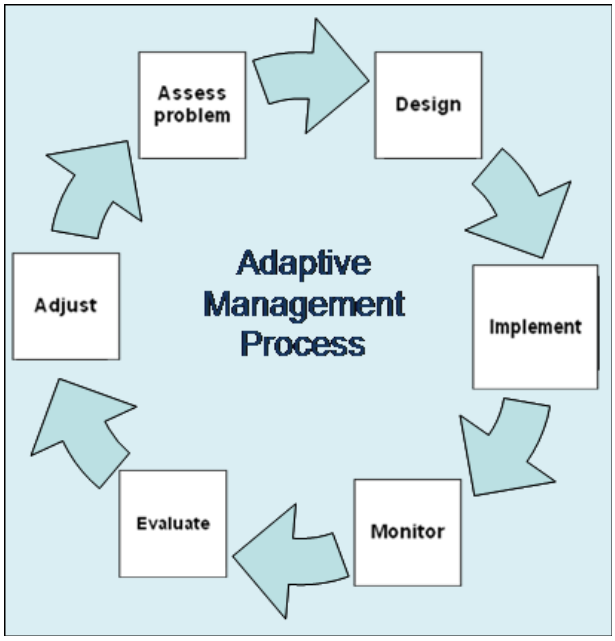


**Figure 2** Example scheme for an adaptive management process (from [9]).

# 6 CONCLUSIONS

It is recommended that competent authorities should clearly specify the information and other requirements that are needed for the consenting procedure. The exchange of knowledge of regulatory frameworks, consent regimes and procedures based on evaluation and experiences with applying these should continue in the future.

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