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Environmental Impact Assessment: Gathering experiences from wave energy test centres in Europe

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ABSTRACT

The wave energy industry is an emerging sector and a new user of maritime space that has potential to contribute significantly to the EU renewable energy goals. International and national regulatory frameworks necessitate Environmental Impact Assessments (EIA) that provide important data to inform development consent decisions. Here we have evaluated experience related to the assessment programmes at EU wave energy test centres combined with knowledge gained from EIA produced for other similar renewable energy developments. From this we have identified key receptors

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Environmental Impact Assessment
Receptors
Recommendations

of concern, as well as the type and magnitude of impacts which may be expected. The key environmental receptors of concern for wave energy EIA include the physical environment (e.g. morphology, waves and current) and flora and fauna¹ as represented by marine mammals, seabirds, benthos, fish and shellfish.

From a review of the EIAs performed at wave energy test centres, we identified several lessons regarding the wave energy EIA process. There is clear evidence that the receptors of primary interest are dependent on factors such as the local environmental characteristics, the presence/absence of protected species and the regulatory authority under which the EIA is performed. Furthermore, it is recommended that concerns relating to cumulative impacts, from an expanding level of wave energy development taking place in a background of growing utilisation of the marine environment, which are largely unknown at this early stage of the industry may be comprehensively addressed at the national level as part of a Strategic Environmental Assessment (EIA) and/or in Maritime Spatial Planning (MSP) and that it should be regularly reassessed.

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1. Introduction

The wave energy industry is an emerging sector and, in comparison with more established industries, is a new user of maritime space. The potential of wave energy to contribute towards EU renewable energy goals and climate change mitigation have long been discussed [7,11,4]. However, technical and non-technical barriers still need to be overcome in order for wave energy to become an established energy source.

A particular non-technical matter experienced across Europe by different device and site developers is the necessity of this new industry to abide by EU and national regulatory frameworks for planning and development consents. In particular, wave energy developers need to comply with the EU Environmental Impact Assessment (EIA) Directive and associated national legislation, which necessitates the collection and collation of environmental data in order to enable regulatory authorities to make an informed decision on the proposed project and its potential environmental impacts at an early stage.

In the EU, the EIA process is codified in Directive 2011/92/EU and amended by 2014/52/EU, which defines the framework for the EIA process. The Directive identifies the projects subject to mandatory EIA (Annex I), and those for which EIA can be requested at the discretion of the Member States (Annex II), whereby the national authorities have to decide whether or not an EIA is needed.

The EIA process requires developers to supply comprehensive environmental data relating to both baseline conditions and possible environmental impacts of device installation. Given the novelty of wave and tidal energy device deployments, many effects and impacts are unknown and have not been quantified as yet [26]. This has resulted in a number of gaps in the information, data and knowledge available to regulatory authorities and developers. One significant problem constraining wave energy project development is definition of the scope of the EIA, e.g. what kinds of data are collected, the resolution required for each type of data and the timescale of any subsequent monitoring programme [38]. These uncertainties can have a substantial impact on the cost of a project whilst also possibly causing delays to the project's development.

¹ The term 'flora and fauna' is used in the Environmental Impact Assessment (EIA) Directive (2011/92/EU consolidated version) – Article 3. The newly amended EIA Directive (2014/52/EU) entered into force on 15 May 2014 and uses the term 'biodiversity' as opposed to flora and fauna.

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