

Development of a Web-based Marine Spatial Planning Tool for Ocean Renewable Energy

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Abstract: Recently, there has been unprecedented interest from many quarters of the industrial world in Ocean Renewable Energy (ORE). This has manifested in the large number of extraction devices which have been, or are, in the process of being tested in waters all over the world. The number of research investments in developing technologies and in the fundamental understanding of this abundant energy source is also evident from the many published reports and publications which have appeared in open literatures over the last few years. One important aspect of any ORE-related project, be it device or power plant development, is the assessment of the available resource (resource assessment (RA)). The use of Geographic Information Systems (GIS) for assessing renewable energy potential has been in use for more than a decade now. Recent studies concerning offshore wind potential through GIS evaluations have been carried out for Europe and the USA.

GIS allows for the collection, storage, processing, analyses and display of geospatial data for informed decision-making. With the developments in WebGIS technology, GIS capabilities became more accessible to anyone through the Internet. This allows for easier information dissemination with geospatial analysis capabilities. Combining GIS tools with the resources of the web will enable better dissemination of ORE information, which may aid in planning and decision-making.

This paper presents the development of a webGIS-based marine spatial planning tool for ocean renewable energy. The prototype is able to host data layers such as bathymetry, location of fishing grounds, marine protected areas and other geospatial information, which can be uploaded and displayed to users. Other site-specific data such as energy density and current strength, if available, is also displayed. The proposed system should have a provision for integrating marine and other hydrodynamic models for real-time computation of energy potential in different areas depending on various ocean renewable energy conversion technologies available.

Keywords: Ocean Renewable Energy, Resource Assessment, WebGIS, Marine Spatial Planning Tool