



ORECCA WEBGIS



Table of contents

1. INTRODUCTION	3
2 .DESCRIPTION OF ORECCA WEBGIS	5
2.1 General Assumptions.....	5
2.2 Implemented Information	5
2.3 Description of User Functions	6
Aknowledgements	9
REFERENCES.....	9

1. INTRODUCTION

ORECCA (Off-shore Renewable Energy Conversion platforms – Coordination Action) has been a Coordination Action funded by EC in the frame of Seventh Framework Programme. It started in March 2010 and ended in August 2011.

The goals of the ORECCA project have been to create a framework for knowledge sharing and to develop a roadmap for research activities in the context of offshore renewable energy that are a relatively new and challenging field of interest. In particular, the project will stimulate collaboration in research activities leading towards innovative, cost efficient and environmentally benign offshore renewable energy conversion platforms for wind, wave and other ocean energy resources, for their combined use as well as for the complementary use such as aquaculture e.g. biomass and fishes and monitoring of the sea environment e.g. marine mammals, fish and bird life. The objectives of the ORECCA project are to:

1. improve the information exchange and promotion of specific research cooperation in this field between academia and industry, public and private actors;
2. create an efficient and focused framework for knowledge sharing;
3. involve and stimulate all the relevant stakeholder groups in Europe to define the framework for future exploitation of renewable energy sources in the offshore;
4. develop roadmap studies for the research, deployment and regulatory activities in the field of offshore renewable energy.

The Work Package (WP) 2 of ORECCA project has concerned the collection of information about resources.

Since the development of offshore renewable energy conversion platforms in Europe is expected to be different in different coastal areas different technologies, system approaches and time schedules of the future implementation of the offshore plants will be evaluated for the optimal use of the available resources. The indicative geographical partitions are:

1. Area 1: North Sea + Baltic Sea
2. Area 2: Atlantic Ocean
3. Area 3: Mediterranean Sea + Black Sea

The identification of suitable sites in the three geographical areas has been among the objectives of WP2. Sites have been identified on the base of the amount and type of renewable energy resource available and

on the sea characteristics, together with consideration of the infrastructure system. Where applicable, resource mapping based on GIS (Geographical Information System) tools has been applied. This allowed calculating resources for different technologies and structures and also for the combined use (multi purpose platforms). Possible scenarios of development and penetration of renewable energy platforms in each target area have been devised. Information has been collected at different scale: local, national, regional and over the all European waters. For the calculation process only information at European level has been considered. The detailed description of these activities and their results are reported in [1] and [2].

The GIS project developed in the frame of the ORECCA project has been furthermore implemented in a WEBGIS application. According to [3], WEBGIS is “a complex system with access to the Internet, for capturing, storing, integrating, manipulating, analyzing and displaying data related to locations without the need of having proprietary GIS software”.

The ORECCA WebGIS allows the sharing of information and the results of ORECCA project among the community and set up an example of “geographical platform” at European level.

RSE (Ricerca sul Sistema Energetico), that has been a partner of the ORECCA project, has supported the implementation of ORECCA WebGIS after the end of the project¹.

¹ This work has been financed by the Research Fund for the Italian Electrical System under the Contract Agreement between RSE (formerly known as ERSE) and the Ministry of Economic Development - General Directorate for Nuclear Energy, Renewable Energy and Energy Efficiency stipulated on July 29, 2009 in compliance with the Decree of March 19, 2009.

2 .DESCRIPTION OF ORECCA WEBGIS

2.1 General Assumptions

1. Only information at European level has been implemented.
2. Information has been implemented only within target areas boundaries.
3. Information has been implemented with one map for the overall area. Buttons for a focus on each geographical area have been implemented too. Zoom tool is present for the standard navigation in the maps.
4. Each map has been implemented at its own spatial resolution.
5. Geographical projection is EPSG 3035 ETRS89-LAEA² [3].

2.2 Implemented Information

Information has been gathered in seven main groups:

- Boundaries& Infrastructures
 - Countries map: EU-countries; EFTA countries; other countries
 - Countries map: EU-countries – high definition
 - EEZ – Exclusive Economic Zone map (source:Vliz)
 - Target Areas Boundaries map (source: ORECCA Project)
 - Ports – Draft database (source: RSE)
 - Ports – Offshore Installation database (source: IWES)
 - Cities - Population database
- Offshore Renewable Plants
 - Offshore Wind Farms (source: RSE, IWES, 4COffshorewind Farm Database)
 - Wave Plants Database (source: IWES)
 - Tidal Plants Database (source: IWES)
- Distance from shore
 - Buffer at 25, 50, 100, 150 and 200 km (source RSE)
- Sea depths

² NOTE: because of ORECCA calculations and results has been based on area measurements, the geographical projection for the whole Europe has been chosen in order to guarantee the conservation of the areas (linear measurements could not be preserved).

- Five sea depth classes map according to different foundation technologies (source: RSE)
- Resources
 - Wind resources: average annual wind maps (source: NASA QuikSCAT satellite; elaboration: DTU- Risoe and Norwegian Meteorological Institute)
 - Wave resources: average annual wave power map (source: Furgu OCEANOR database, RSE elaboration)
 - WERATLAS: average annual wave power database (source: INETI)
 - European tidal stream sites map (source: ITPower)
 - Tidal measured data (source: IWES)
- Scenarios
 - Wind scenario map (source: ORECCA Project)
 - Wave scenario map (source: ORECCA Project)
 - Combined Wind&Wave scenario map (source: ORECCA Project)

The detailed description of information can be found in [1] and [2].

2.3 Description of User Functions

User has available tools and commands to perform various operations of text and geographic search of information.



Zoom to full extent



Previous view (many levels)



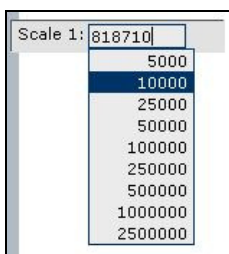
Forward view (many levels)



Zoom to selected features



Refresh the map



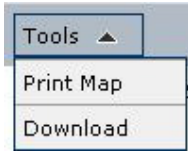
Change the zoom map to fixed scale ratio



Slider moving changes map scale

Search for Country name

Search tool. Insert in the text field the string corresponding to your query (search string even partial) and click on the button "Search", all features matching the query string will be selected and displayed in a new windows



Open the print map windows or download windows



Every click on the map increases the zoom level and if dragging defines the box zoom



Every click on the map decreases the zoom level and if dragging defines the box zoom



Move the map in the right direction keeping the current view scale - click and drag



Identifies elements of the current view by selecting the desired point of the map and displays the results of identify in a new window. User can select and zoom to feature row with zoom function using the left button.

Result																		
WIND (m/s) & WAVE (kW/m)																		
@	diss										area							
+	11										18701,27							
+	21										7148,75							
TIDAL Plants																		
@	N	OP	OP1	name	phase	state	sea	region	X	Y	MW	en	n_en_conv	minwd	maxwd	minwvel	maxwvel	
+	17,00		0,00	Skerries		United Kingdom	Irish Sea	off Anglesey	4,66	53,43		tidal	7,00				3,19	3,19
Countries																		
@	FIPS_CNTRY	GMI_CNTRY	CNTRY_NAME	SOVEREIGN	POP_CNTRY	SQKM_CNTRY	SQMI_CNTRY	CURR_TYPE	CURR_CODE	LANDLOC								
+	UK	GBR	United Kingdom	United Kingdom	56420180	243137,20	93875,27	Pound Sterling	GBP	N								

Figure 1 - Result table of identify operation



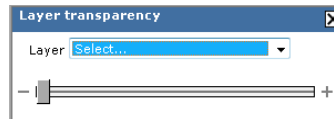
Select and identify features from the active layer of the current view by selecting the desired point of the map and displays the results of select in a new window. User can zoom to feature row or all the rows with zoom function using the left button.

Result				
Offshore installation ports (No. of transfers)				
	Port location	Turbine transfers	Foundation transfers	Total transfers
+	Esbjerg	225,00	225,00	450,00
+	Aarhus	10,00	10,00	20,00
+	Nyborg	210,00	210,00	420,00
+	Kalundborg	7,00	0,00	7,00
+	Munkebo	0,00	0,00	0,00
+	Havneby	0,00	0,00	0,00
Zoom to Selected Features				

Figure 2 - Result table of select operation



Activates layer transparency tool



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- Brigitte Furevik (Meteorologisk Institutt, Bergen, Norway) for providing the mean wind data from the QuikSCAT observations for the Mediterranean and Black Sea;
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