

## ENVIRONMENTAL EFFECTS METADATA SURVEY FORM

Name of person updating the form

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Project name: Companhia da Energia Oceânica SA (CEO) - Aguçadoura

Planned  In Operation  Completed

Project description:

*Project Developer:* Portuguese electricity utility, Enersis

*Technology Developer:* Pelamis Wave Power

*Technology type:* Attenuating line absorber

*Resource (wave, tidal):* Wave

*Project scale (test site, prototype, array, commercial):* Array

*Installed capacity (MW):* 2.25 MW (3X750 kW)

*Project Website:* <http://www.pelamiswave.com/our-projects/project/6/CEO-at-Agucadoura>

*Launch Date:* July 2008

*Additional Description:* Each machine was 120m long and 3.5m in diameter and comprised four tube sections linked by three, shorter, power conversion modules. Testing of this array proved the speedy installation concepts, developed team experience, maintained safe conditions, and that power generation and behaviour was matched with numerical models.

Location:

*Ocean/Water body:* Atlantic Ocean – Portuguese coast

*Closest city:* Póvoa do Varzim (Northern Portugal, west coast)

*Country:* Portugal

*Depth:* 50 meters

*Coordinates:* 41°27'67"N, 08°50'50"W

Process status: Three machines were installed and operated in July 2008, generating sustained power to the grid with close agreement to the Pelamis simulations. However, the project ended earlier than planned, with the three machines returning to harbour, due the financial collapse of Enersis's parent company, Babcock & Brown. The machines were operating from July to November 2008.

Licensing information (brief description): The licensing process of the small farm was concluded in 2006 and followed the existing national legislation (DL 254/99) for offshore operation license which had to be undersigned by 5 ministers. The process was relatively fast since the project was considered positively by the government. Although not explicitly demanded at that time, an EIA was done for the small park.

Key Environmental issues: An Environmental Impact Assessment has been carried out prior to the project installation. Monitoring activities have been performed during the operation period. Due to the short operation period the monitoring results were inconclusive regarding the devices' effects on the environment. Nevertheless, two years of environmental baseline studies have been carried out. The Environmental Impact Statement developed before the devices were installed pointed devices' noise, electromagnetic fields and habitat alteration as the main negative impacts and the "artificial reef" and "sanctuary" effects as positive ones.

Environmental webpage: <http://www.pelamiswave.com/environmental-impact>

<b>Baseline studies and project effects studies: Companhia da Energia Oceânica SA (CEO)</b>				
<b>General description</b>		About two years (from November 2007 to January 2010) of baseline studies. Three sampling stations, parallel to the coast line, were defined distancing each other about 2 km: the impacted zone (where the devices were supposed to be installed) and two control zones.		
<b>Receptor</b>	<b>Study description including question and/or objective (several can be listed per receptor)</b>	<b>Design and methods (brief description)</b>	<b>Results (brief description)</b>	<b>Status (planned, underway, completed, with dates)</b>
Benthos	Analysis of communities structure and composition.	Samples were collected each three months.	High biodiversity presenting a good level of conservation. High temporal variability.	Completed
Fish	Analysis of populations' structure and composition.	Samples were collected each two months.	High number of commercial species presenting a moderate level of conservation. High temporal variability.	Completed
Marine Mammals	Analysis of species composition and distribution.	Visual observations by boat.	Relevant area for marine mammals. Main species: common dolphin	Completed

			( <i>Delphinus delphis</i> ) and harbour porpoise ( <i>Phocoena phocoena</i> )	
<b>Reports or Papers</b>	N/A			
<b>Research Projects</b>	N/A			

<b>Monitoring and adaptive management: Companhia da Energia Oceânica SA (CEO)</b>				
<b>General description</b>	About three months of (from July to November 2008) of monitoring studies. Three sampling stations were defined: the impacted zone (where the devices were installed) and two control zones.			
<b>Receptor</b>	<b>Monitoring program description including question and/or objective</b> (several can be listed per receptor)	<b>Design and methods</b> (brief description)	<b>Results</b> (brief description)	<b>Status</b> (planned, underway, completed, with dates)
Benthos	Analysis of invertebrate colonisation on the equipment was analysed.	Samples were collected each three months.	Due to the short operation period the monitoring results were considered inconclusive regarding the devices' effects on the environment.	Completed
Fish	Pelagic fish aggregation around the devices was analysed.	Samples were collected each two months.		Completed
Marine Mammals	Visual observations by boat to analyse changes on marine mammal behaviour and distribution.	Visual observations by boat.		Completed
<b>Reports or Papers</b>	N/A			
<b>Research Projects</b>	N/A			