ENVIRONMENTAL EFFECTS METADATA SURVEY FORM

Name of person updating the form	Date submitted
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Project name: Mutriku Wave Power Plant

☐ Planned ☒ In Operation ☐Completed

Project description:

Project Developer: Basque Energy Agency

Technology Developer: Ente Vasco de la Energia

Technology type: Oscillating water column

Resource (wave, tidal): Wave

Project scale (test site, prototype, array, commercial): Commercial

Installed capacity (MW): 296 kW (16 turbines)

Project Website: http://www.eve.es/index.aspx

Launch Date: July 8, 2011

Additional Description: This grid-connected plant is integrated with an existing breakwater at Mukriku harbour. There are 16 air chambers that are 4.5m wide, 3.1m depth, and 10m high (above Maximum Equinoctial Spring Tide Low Water). A hole of 0.75m diameter leads to a wells turbine and electrical generator of 18.5 kW for each air chamber, yielding the total 296 kW.

Location:

Ocean/Water body: Bay of Biscay

Closest city: Mutriku, Spanish Basque Country

Country: Spain

Depth: Surface

Coordinates: 43.312643°, -2.377133°

Process status: The idea of adding a wave energy generating plant into the breakwater design began in 2002, just as the consenting procedure for the breakwater was on the verge of completion. In 2005, the breakwater was allocated with a design that did not include the wave energy generation. This design was later modified to include the wave energy generation in 2006. The project began construction in March 2009 at a cost of 2 million euros. It officially opened up in July 2011 and has been successfully operating since then.

Licensing information (brief description): For the legal processing of this plant, the procedure followed was the standard one for a renewable energy power generation plant. The only particularity in the procedure was the fact that the environmental impact of the plant was analysed by separating the civil works from the electromechanical equipment.

The processing of applications to obtain permits started in 2006 and finished in 2009 with the granting of the authorisation for using the public domain of the port. It was not possible to obtain the authorisation for the use of the port public domain before the civil works of the wave plant were completed and the breakwater had been owned by the Port Authority.

Key Environmental issues: There may be some environmental concerns regarding the existence of the breakwater and changes in sediment transport and flow dynamics, but the oscillating water columns as an extension of the breakwater does not cause any significant difference. Large amounts of noise were produced during a storm that were reportedly heard 3-10 km away, which concerned the local population and could cause potential harm to the local environment.

Environmental webpage: *link to project official environmental webpage (if available)*

Baseline studies and project effects studies: Mutriku Wave Power Plant				
General description				
Receptor	**Study description including question and/or objective** (several can be listed per receptor)	**Design and methods** (brief description)	**Results** (brief description)	**Status** (planned, underway, completed, with dates)
Physical environment				
Benthos				
Fish and fisheries				
Large vertebrates				
Birds				
Marine uses / users				
Other* (can be named)				
Reports or Papers	(Key papers on the areas addressed should be listed here; when possible the files themselves can be made available in downloadable PDF format, alternatively links to the files or project website can be provided when available e.g. SeaGen.)			
Research Projects	(past or on-going environmental research projects at the site)			

Monitoring and adaptive management: Mutriku Wave Power Plant				
General description				
Receptor	**Monitoring program description including question and/or objective** (several can be listed per receptor)	**Design and methods** (brief description)	**Results** (brief description)	**Status** (planned, underway, completed, with dates)
Acoustic Output	Monitor and reduce the sound levels from the turbines to meet emission standards.	A 'marine' attenuator was created to reduce the sound outputs.	N/A	Completed
Benthos				
Fish and fisheries				
Large vertebrates				
Birds				
Marine uses/ users				
Other* (can be named)				
Reports or Papers	• Mutriku Wave Power Plant: From the Thinking out to the Reality			
Research Projects	N/A			