

ENVIRONMENTAL EFFECTS METADATA SURVEY FORM

Name of person updating the form

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Project name: Kvalsund Tidal Turbine Prototype

Planned

In Operation

Completed

Project description:

Project Developer: Hammerfest Strøm AS

Technology Developer: Hammerfest Strøm AS

Technology type: Horizontal axis turbine

Resource (wave, tidal): Tidal

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

Installed capacity (MW): 0.3 MW

Project Website: <http://www.hammerfeststrom.com/research-and-development/testing/kvalsund/>

Launch Date: August 17, 2003

Additional Description: The Hammerfest Strøm tidal project is installed in Kvalund, Finnmark Norway at a 50m depth in the sound between Kvalsund and Kvaløya. The device was installed in 2003, and grid connected in 2004 which made it the world's first tidal turbine delivering to the grid. The horizontal axis turbine rotates at 7 rpm and has an installed capacity of 0.3 MW.

Location:

Ocean/Water body: Kvalsund, Finnmark

Closest city:

Country: Norway

Coordinates (please use Mercator): 70.510817°, 23.944177°

Depth: 50m

Process status: HS300 was installed at site in 2003, and became the world's first tidal turbine of its kind to deliver electricity to grid in 2004. It was designed for a 3 years test period, and was retrieved after about 4 years of testing. All general components were in good shape, and the turbine was reinstalled in 2009 for further testing. HS300 has shown 98% availability during reliability testing. The tidal turbine will be retrieved in 2012.

Licensing information (brief description): Hammerfest Strøm AS holds the consent to the site, given by the Norwegian Water Resource and Energy Directorate (NVE) for a 25 years period from 2001-2026. The trading license, hold by Hammerfest Strøm AS, was given in 2002 and need to be renewed every 4th year. The grid owner in the installation area is Hammerfest Energi AS.

Key Environmental issues: A third party has been involved in the project since 2001. The chosen contractor has done several studies in the area earlier and has good knowledge of the location. The first study of the site was undertaken in 2001, before the prototype was installed at the site. The Company engaged the contractor to evaluate the site a second time when the HS300 turbine was retrieved for verification and again when it was redeployed at the site.

The EIA covered the potential impact the tidal turbine has on the business activities, outdoor life, marine life and seabirds, where it among other tests has been done a noise measurement. The EIA concluded that the HS300 turbine has no or insignificant impact on the studied areas.

Environmental webpage: <http://www.hammerfeststrom.com/environment/kvalsund-eia/>

Baseline studies and project effects studies: Kvalsundet Hammerfest Strom Tidal Project				
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	Water Velocity Study	N/A	Max velocity 2.5 m/s	Completed 1997
	Marine Growth	N/A	N/A	Completed 2001
Benthos	Shore Study.	Which benthos is it close to shore and which algae and animals are typical for the area.	Not unique and is considered to have medium value.	Completed 2001, 2010
	Seabed Study.	Used ROV to film the seabed and map under water conditions in the area.	Gravel and stone. Not unique and is considered to have medium value.	Conducted in 2000
	Seabed survey, impact.	Used ROV to film the seabed and map under water conditions in the area.	No significant changes.	Conducted 2007 and 2009

	Acoustical measurements of seabed	Acoustical measurements.	Hard seabed (rock)	Completed in 2000
Fish and Fisheries	Potential impact on known species in the area.	Typical species behavior has been studied for areas like Kvalsundet.	Turbine not creating significant changes.	Completed 2001, 2010
Large Vertebrates	Potential impact on known species in the area.	N/A	No or insignificant impact.	Completed 2001, 2010
Birds	Species and behavior in the area	Earlier studies were used as source for the study	Both diving and non-diving seabirds are seen in the area.	Two reports: 2001 and 2010
Marine uses/users	Use of area, outdoor life and business activities	N/A	No or significant impact	Completed 2001, 2010
Reports or Papers	N/A			
Research Projects	N/A			

Monitoring and adaptive management: Kvalsundet Hammerfest Strom Tidal Project

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)
Benthos	Shore study	Observations	Not unique and is considered to have medium value.	Undertaken 2001
Large Vertebrates	Sea mammals	Observations	N/A	Undertaken 2008, 2009
Birds	Seabirds in the area	Observations	N/A	Undertaken 2008, 2009
Marine Uses/ Users	Business and outdoor activities.	Public meetings and discussions.	No negative impact.	Undertaken 2000
Other	Water velocity	Measurements during operation	Detailed information on tidal velocity	Completed 2003-2007, 2009-2011
	Marine growth	Measurements during retrieval of marine growth on blades.	N/A	Completed 2007

	Underwater sound measurements	Measure the radiated underwater noise from the turbine	Results give no concern	Undertaken 2009
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)			