

## ENVIRONMENTAL EFFECTS METADATA SURVEY FORM

Name

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Project name: Strangford Lough – MCT (SeaGen)

Planned  In Operation  Completed

Project description:

*Project Developer:* Sea Generation Ltd

*Device Manager:* Marine Current Turbines Ltd

*Technology type:* Twin turbine system

*Resource (wave, tidal):* Tidal

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

*Installed capacity (MW):* 1.2 MW

*Project Website:* [www.marineturbines.com](http://www.marineturbines.com)

*Launch Date:* December 2008

*Additional Description:* Seagen is a twin turbine system with a mobile cross arm on a single supporting pile 3m in diameter and 9m above the average sea level. The twin rotors have an 8m radius and will begin to generate electricity once the tide runs faster than 1m/s. At maximum speed the tips move at around 12m/s, approximately 1/3 of the average wind turbine speed.

Location: Strangford Lough, Northern Ireland, at 24 meters water depth.

*Coordinates (please use Mercator):* 54.364119°, -5.543969°

Process status: Royal Haskoning Ltd was appointed in early 2004 to provide support to the EIA process. The scoping consultation was completed in mid-2004, and the EIA commenced late 2004. The final EIA was submitted in July 2005, with the initial FEPA license being granted in December 2006. These were revised to accommodate necessary changes in installation methodology in February 2007, and again in February 2008.

Installation of the moorings for anchoring the SeaGen deployment vessel commenced in February 2008 and was completed in March 2008. The SeaGen structure was positioned on the seabed on April 2 2008 by the crane barge Rambiz. Drilling for the pin piles, grouting and completion of assembly was achieved using the crane barge Missing Link, which was on location from mid-April to late May 2008.

Commissioning of SeaGen commenced in July 2008, culminating in full 1.2MW power generation to the grid in December 2008. Operation is continuing within the constraints of the FEPA license with the environmental monitoring programme results contributing to an adaptive management strategy where findings are periodically reviewed and improvements to the application of the FEPA restrictions are proposed.

Licensing information (brief description): The final Environmental Impact Study was submitted to the regulatory authority, the Environment and Heritage Service (EHS) in Northern Ireland in June 2005. The FEPA license for the temporary installation for the SeaGen system for a five year duration was first issued in December 2005, revised in February 2007 and again in February 2008. Pre-installation environmental monitoring commenced in May 2004. A baseline report has been completed and was submitted to EHS in August 2006. The environmental impact of SeaGen will be continuously monitored by independent science team throughout the licensed 5 year installation period. The existing FEPA license covers the initial 5-year lease granted by the Crown Estate, which will result in SeaGen being decommissioned and removed in 2013.

Key Environmental issues: Strangford Lough has been identified as a site which supports internationally important examples of particular marine and coastal habitat and species features and has accordingly been given the dual status of a European Special Area of Conservation (SAC) and a European Special Protected Area (SPA). Three of the site features have been identified as potentially vulnerable to activities and impacts associated with the installation of the SeaGen turbine.

Environmental webpage: [www.seageneration.co.uk/environmental-aspects.asp](http://www.seageneration.co.uk/environmental-aspects.asp)

Baseline studies and project effects studies: Strangford Lough – MCT (Seagen)				
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	Alterations to Hydrodynamics	Desk based study, modelling and video footage.	The installation and operation of the SeaGen turbine will not impede or modify the flow dynamics, scour patterns or turbulence character of the Narrows in such a way that will cause a change to benthic community structure.	Completed
Benthic Communities	Potential impacts to Benthic Communities	Desk based study and diver surveys	The installation and operation of the SeaGen turbine will have no significant impact on the abundance, diversity and integrity of the benthic communities within the Strangford Narrows.	Completed
Cetaceans	Potential impact to Cetacean populations	Desk based study and Aerial surveys	The SeaGen turbine does not displace harbour porpoises from the Strangford Narrows and the adjacent Strangford Lough SAC. The SeaGen turbine does not present a barrier effect to the free passage of harbour porpoises through the Strangford Narrows. Cetaceans not excluded from important foraging habitat or social areas within the Strangford Narrows as a result of the installation and operation of the SeaGen turbine.	Completed
Large Vertebrates	Potential impacts to marine mammals (General)	Desk based study and Aerial surveys	No marine mortalities occur consequence of interaction with the turbine rotors. The turbine operates in such a way as to stop when marine mammals are within 50m from the rotors. Relative abundance of marine mammals in Strangford Narrows is not significantly modified by the operation of the SeaGen turbine.	Completed
Harbour Seals	Potential impact to Harbour Seals	Ariel Surveys, visual surveys, desk based study	The number of harbour seal adults and pups does not decrease significantly as a result of the installation and operation of the SeaGen turbine. The SeaGen turbine does not present a barrier effect to the free passage of harbour seals through the Strangford Narrows. Harbor seals are not excluded from important foraging habitat or social areas within the Strangford Narrows as a result of the installation and operation of the Seagen turbine.	Completed
Grey Seals	Potential impact of	Ariel surveys, visual surveys	The number of grey seal adults and pups does not decrease significantly as a result	Completed

	Seagen to Grey Seal populations	and desk based studies	of the installation and operation of the SeaGen turbine. The SeaGen turbine does not cause a significant change in the use of important grey seal haul out sites within the Strangford Lough SAC. The SeaGen turbine does not present a barrier effect to the free passage of grey seals through the Strangford Narrows. Grey seals are not excluded from important foraging habitat or social areas within the Strangford Narrows as a result of the installation and operation of the SeaGen turbine.	
<b>Reports or Papers</b>	Royal Haskoning. (2010). SeaGen Biannual EMP update. EMP update (Jan 2010). (Access Online: <a href="http://www.seageneration.co.uk/downloads/SeaGen%20biannual%20report%20April%202010.PDF">http://www.seageneration.co.uk/downloads/SeaGen%20biannual%20report%20April%202010.PDF</a> )			
<b>Research Projects</b>	N/A			

<b>Monitoring and adaptive management: Strangford Lough – MCT (Seagen)</b>				
<b>General description</b>				
<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)
Physical Environment	Seagen effect on surrounding Hydrodynamics	ADCP measurements and video surveys	Vessel- or bottom mounted ADCP measurement, as appropriate, of upstream and downstream flow character and turbulence signature.  Diver video survey for scours effects.	Ongoing
Benthic hard communities	Potential impact of Seagen to Benthic communities	Video Surveys and diver surveys	Benthic species abundance at re-locatable video sample stations at a range of distance intervals from the turbine installation.	Ongoing
Marine Mammals	Impact of Seagen on	Observations, sonar	Pile based marine mammal observations (ceased 21/08/09). Active sonar	Ongoing

	Marine Mammals (General)	operations, visual observations and seal telemetry studies	operations allowing targets to be observed moving passed the turbine during periods of operation.  Land based visual observations pre- and post-installation to examine any change in use of the area around the turbine.	
Marine Mammals	Impact of Seagen on Marine Mammals (General)	Post Mortem	Post mortem evaluation of carcass stranding and assessment of cause of death.	Ongoing
Harbor seals	Impact of Seagen on Harbor Seals	Ariel Surveys, Historical data, telemetry data and visual observations	Population estimates derived from aerial survey and set within the context of historical data.  Population distribution and haulout behaviour from telemetry data. (Number of harbour seals using the Lough based on boat counts from NIEA can also supplement these data)	Ongoing
Grey Seals	Impact of Seagen on Grey Seals	Aerial surveys, historical data and visual surveys	Population estimates derived from aerial survey and set within the context of historical data.  (Number of grey seals using the Lough based on boat counts from NIEA can also supplement these data). Haul out site seal numbers from aerial and boat-based survey. Sightings frequency over space and time (from Shore-based visual operation) in pre-operational and post-operational periods).	Ongoing
Birds	Potential impact of Seagen to seabirds	Visual observations	Sightings frequency of diving birds from shore- based visual surveys. Sightings frequency/hour watched of diving and rafting birds within the pile- mounted observational grid area.	Ongoing
<b>Reports or Papers</b>	Royal Haskoning. (2010). SeaGen Biannual EMP update. EMP update (Jan 2010). (Access Online: <a href="http://www.seageneration.co.uk/downloads/SeaGen%20biannual%20report%20April%202010.PDF">http://www.seageneration.co.uk/downloads/SeaGen%20biannual%20report%20April%202010.PDF</a> )			
<b>Research Projects</b>	N/A			