RAMSEY SOUND

Name of person filing the form	Date submitted
Rebecca Jones	June 3, 2013

Project name: Ramsey Sound

Project description:

Project Developer: Tidal Energy Ltd

Technology type: Axial flow turbines mounted to a triangular gravity foundation

Resource: MHK(tidal)

Project scale: Prototype

Installed capacity: 1.2MW

Additional Description: DeltaStream is a tidal energy conversion unit that generates electrical power. It is primarily designed to be located on the seabed in areas with high tidal stream flows, but could also be installed in suitable rivers and estuaries. When mounted in tidal areas it generates power during both the flow and ebb of the tide. AC power is brought onshore from the DeltaStream unit through a submarine cable to its onshore power conversion and SCADA (Supervisory Control And Data Acquisition) system. Major features include:

- Triangular steel main base frame with rock feet,
- Three independent, water turbine generators mounted horizontally and enclosed in Fibre Reinforced Plastic (FRP) nacelles,
- Automated hydraulic yaw system, one for each nacelle which controls the orientation of the water turbine generators in relation to the tidal flow,
- Electrical and control equipment mounted on the main base frame,
- Power conversion centre mounted onshore,
- Submarine cable to connect the DeltaStream unit to the power conversion centre.

Launch Date: Planned for 2013 or 2014

Project Website: http://www.tidalenergyltd.com/

Location:

Ramsey Sound was chosen as the best location for the project after an extensive site selection programme. Initially the investigation covered the whole of the UK and 24 potential sites were identified.

Ramsey Sound was finally chosen for a number of benefits that it brings for the deployment of a demonstration project:

- It is sheltered from prevailing wind and wave conditions
- It has good water depths close to the mainland
- It has fast tidal streams reaching up to 6 knots (3 m/s) on spring tides
- It has a suitable grid connection
- There are good port facilities and marine engineering capabilities nearby
- No trawling or commercial shipping passes through the Sound
- No obstructions are present – i.e.pipelines, telecoms cables or munitions sites

The DeltaStream device was originally conceived in Pembrokeshire and will be able to lead the way in combating climate change from the heart of West Wales, providing a viable and effective solution to meet global energy demands in an environmentally friendly way.

Coordinates: 51°52'40"N, 5°19'34"W

Process status:

From 2009 to 2012, a design team at Cranfield University tested the scale model of DeltaStream in France, with the support of the Carbon Trust. The results of these tests have been positive and the engineers have been able to validate the design of the device, enabling the project to get ready to begin construction.

Licensing information:

- Planning permission for the temporary on-shore works was granted by the Pembrokeshire Coast National Park Authority in October 2009.
- Since 2008 an extensive consultation process has been undertaken with statutory and non-statutory organizations and individuals. The results of these consultations led to the completion of the Environmental Impact Assessment (EIA) in 2009.
- The results of the EIA were submitted with the license applications to the regulatory Authorities (the Welsh Government (WG) and the Department for Energy and Climate Change (DECC)) in October 2009.
- Licenses were granted by DECC and WG in March 2011 and TEL plans to install the DeltaStream unit in 2013/14.
- The main funder and driving force behind Tidal Energy Ltd (TEL) is Eco2 Ltd, Wales' leading renewable energy company. TEL has also received funding from Carbon Connections UK Ltd, the Carbon Trust and a £6.4m EU grant through the European Regional Development Fund (ERDF) in 2011 and a further £1.6m in May 2013.

Key Environmental issues:

The proposed deployment site in Ramsey Sound is covered by the Pembrokeshire Marine SAC. The marine SAC covers an area of approximately 138,070ha, extending from the coast north of St David's around to Manorbier beach in the southeast and extends 1 to 4km offshore. As such it encompasses a wide range of the habitats and species of conservation significance. Those that have been identified for the designation of the region as a SAC are highlighted below:

Habitats (Annex I) and species (Annex II) present that are primary reason for site selection:

- Large Shallow inlets and Bays
- Estuaries
- Reefs
- Grey Seal (*Halicheorus grypus*)
- Shore dock (*Rumex rupestris*)

Habitats (Annex I) and species (Annex II) present as qualifying feature, but not a primary reason for site selection, are:

- Atlantic Salt Meadow
- Mud-Flats and Sand-Flats not covered by sea water at low tide
- Coastal Lagoons
- Submerged or partially submerged sea caves
- Sandbanks which are slightly covered by seawater all the time
- Allis shad (*Alosa alosa*)
- Twaite shad (*Alosa fallax*)
- River lamprey (*Lampetra fluviatilis*)
- Seal lamprey (*Petromyzon marinus*)
- Otter (*Lutra lutra*)

Ramsey Sound lies adjacent to a number of other environmentally sensitive areas. These include:

- St David's SAC
- Ramsey and St David's Special Protection Area (SPA)
- St David's Heritage Coast
- Ramsey Island Royal Society for the Protection of Birds (RSPB) Nature Reserve
- Pembrokeshire Coast National Park

In addition Pembrokeshire also has a Local Biodiversity Plan (LBAP), which has been set up to improve the status of habitats within the region. The following species/habitats, identified within the Pembrokeshire LBAP, are present in and around the proposed deployment site for the DeltaStream device.

- Grey Seal
- Harbour Porpoise
- Atlantic Puffin
- Common Guillemot

- European Shag
- Maritime Cliff and slope
- Northern Gannet
- Razorbill
- Common Scoter
- Commercial fish species
- Tidal Rapids

Environmental webpage:

http://www.tidalenergyltd.com/?page_id=646

Baseline and Project Effects Studies: Ramsey Sound				
General description: Studies and collection of data prior to installation of the turbines.				
Receptor	**Study description including question and/or objective**	**Design and Methods**	**Results**	**Status**
Oceanographic Environment	Possible effects on tidal flow, waves, sediment in the water, the area of seabed affects, and water quality.	Basic calculations and research.	Only 7 days for installation of one device and cable, resulting in small effects. Device base is about .00002% of Marine SAC.	Completed
Marine Mammals	Disturbance from installation/removal marine vessels.	Literature studies and review of data records.	Short installation period and slow speeds from barges would be or minor adverse significance.	Completed
	Noise disturbance and displacement from critical habitat.	Literature studies and review of data records.	Harbour Porpoise will hear the device from 280m; grey seals will hear the device from 150m. Location is far from main foraging areas and footprint is small, so a minor adverse effect is expected.	Completed
	Collision potential.	Literature studies and review of data records.	Noise will provide advance warning to avoid the device. The slack tidal phase is when porpoises are most likely to pass by the area, during which time the blade rotating speeds will be slow.	Completed
Birds	Species present and associated risks.	Land based survey between January and October 2009.	21 species identified, 4 were associated with adjacent SPA. Collision with the device and loss of foraging habitat are of little concern because of the low number of diving birds observed.	Completed

Intertidal and Subtidal Marine Ecology	Effects on marine animals living underwater on the seabed.	Literature studies and review of data records.	The small footprint of device and cables result in negligible effects.	Completed
Fish and Fisheries	Risk of collision or loss of habitat.	Literature studies and review of data records.	Strong tidal flow and rocky reefs do not support many commercial fish. Some crab and lobster potting, but not in direct vicinity of the project. Expected negligible to low significance impact.	Completed
Navigation	Classify potential risks to boats for all stages of development.	Literature studies and review of data records.	Ramsey Sound is a generally hazardous area for navigation due to strong flows and tidally submerged rocks. Commercial shipping traffic is routed away from the Sound; smaller boats are present during the summer season. A safety zone will be requested around the device during all stages.	Completed
Reports and Papers	• Ramsey Sound Tidal Energy Limited Scoping Report • Ramsey Sound Tidal Energy Limited Non-Technical Summary of the Environmental Statement			
Research Projects	N/A			

Monitoring and Adaptive Management: Ramsey Sound				
General Description: Monitoring studies completed after the installation of the turbines.				
Receptor	**Monitoring Program Description**	**Design and Methods**	**Results**	**Status**
Birds	Monitor changes in bird usage of Ramsey Sound.	TBD	N/A	Planned
Reports and Papers	N/A			
Research Projects	N/A			