



Ocean Current Power Generation: Example Orbital O2, UK



Sustainable Development Goals Addressed



<p>Organization, Institution or Company</p>
<p>Orbital Marine Power Ltd (formerly Scotrenewable Tidal Ltd) and EMEC European Marine Energy Center, Orkney</p>
<p>Location of project site, Country</p>
<p>Orkney Island, Scotland, UK</p>
<p>Brief narrative description of objective/project/activity/initiative</p>
<p>The world’s oceans offer great potential resources for renewable and sustainable tidal, ocean current, and ocean thermal energy. However, harnessing these ocean energy resources continues to pose considerable technical challenges. Many demonstration projects have been implemented over the years, but due to high costs and risks only some of the tidal energy projects have been realized. Some of the established projects in this category include the Rance Tidal Power Station in France, the Shiwa Lake Tidal Power Station in Republic of Korea, the JiangXia Tidal Power Station in China, The Swansea Tidal Bay Lagoon in Wales, and the MayGen Tidal Stream Project in Scotland.</p> <p>In terms of harnessing ocean current the Scotrenewables Tidal Power Ltd has distinguished itself in recent years by designing and constructing a number of floating devices with attached turbines harvesting energy of ocean currents in near Northern European shorelines. In 2012 the company achieved a world first success when it exported power to the UK grid from its 250kW floating scale model, the SR250, at a grid-connected tidal test site of the European Marine Energy Center. The 250kW device measured 33 m, was constructed at Harland & Wolff in Belfast in 2010 and weighed 100 tonnes.</p> <p>Building on the success of SR250, the company developed the SR2000, a larger 63 m, 500 tonne, 2 MW turbine potentially suited for a tidal array deployment. The SR2000 was first deployed at EMEC’s tidal test site in October 2016. It reportedly produced 116 MWh or around 7 per cent of Orkney’s electricity demand during its first week and generated 1 GWh in record time since being deployed.</p>
<p>Economic, environmental and climate benefits, challenges and lessons learned</p>
<p>In October 2018, Scotrenewables Tidal Power Co. Ltd was re-branded and re-named Orbital Marine Power Ltd, with its new name inspired by the orbital cycle of the moon around the earth, the reliable provider of tidal energy.</p> <p>The SR1-2000 was removed from site in September 2018 to be replaced by a larger and further optimised 2MW floating tidal turbine, the Orbital O2, to be fully operational at the EMEC site in 2020. The Orbital O2 turbine has a 73m-long floating superstructure,</p>

supporting two 1 MW turbines on either side. The turbine has an optimised superstructure design, 50 per cent greater energy capture through increased rotors, lower fabrication cost, better maintenance strategies, and compatibility with the local supply chain and infrastructure. Progress in the deployment of the O2 as the world's largest floating ocean current turbine is promising. The position of the turbine can change with the currents, and its capacity will be equivalent to powering 1,700 homes

The Orbital O2 project is supported by the Scottish Government (£ 3.4 million) and the European Commission (€ 7 million). Orbital is leading an industrial consortium comprising of the most experienced and committed commercial, industrial and research organisations involved in tidal energy today: DP Energy; Harland and Wolff Heavy Industries; the European Marine Energy Centre (EMEC); ABB Ltd; Eire Composites; Technology from Ideas; University College Cork; EDF Energy and SKF. If the O2 project produces good results and proves successful, ocean current technology may find applications in various parts of the world, in particular in the upper Northern and in the lower Southern where stronger ocean currents are more frequent.

Additional information: website addresses and contacts

Website of Orbital Marine Company Ltd: <https://orbitalmarine.com/>

Website of European Commission: www.flotectidal.eu



Photos by Orbital Marine Co.