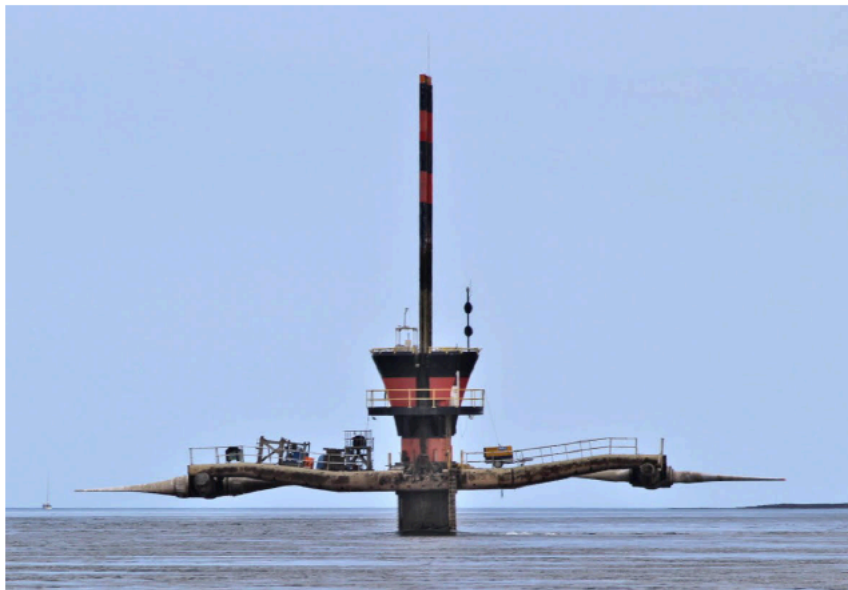


# *A wee bit of maritime history... 17*

**FREE**



## **The SeaGen Tidal Turbine**



Deriving energy from the tide in Strangford Lough is not new. The oldest excavated tide mill in the world dating from 619 (and its successor from 789 AD) is situated at Nendrum on Island Mahee near Comber at the lough's north end.

In recent times the drive for extracting energy from renewable sources has led to researchers looking again at the tide. The higher density of water relative to air means that a single generator can provide more power at low tide speeds than at similar wind speeds. Water speeds of nearly one-tenth that of wind provide the same power for the same size of turbine system <<https://www.sciencedirect.com/topics/engineering/tidal-stream-generator>>.

Marine Current Turbines (MCT) was founded in 2000 to explore ways of deriving energy from tidal currents. It started by installing a single turbine 300KW device, SeaFlow, in the Bristol Channel off the N. Devon coast in 2003.



MCT followed this in 2008 with a £12 million project to install the 1.2 MW SeaGen (two 600 kW turbines), the **first commercial scale tidal turbine in the world**, in the Narrows just south of Portaferry and Strangford. It had twin 16m diameter rotors, each attached to a generator supported on a cross-beam that could be raised and lowered on a central tubular structure, 3m (9.8ft) in diameter, with a control unit on top. The blades could be pitched through 180°, allowing operation during both incoming and outgoing tides. It rested on four

hollow legs, containing grout and concrete, which were eventually secured with pin piles, each approximately 1m in diameter, 14m long and drilled 9m down into the seabed. It was built in Belfast's Harland and Wolff shipyard. It generated energy when the tidal velocity exceeded 1m/sec. At maximum speed the rotor tips moved at 12m/sec (approximately one third of average wind turbine speed) and rotated at 14rpm.

Grid connection was in partnership with Northern Ireland Electricity and was via a cable that came ashore near Strangford. The power was bought by ESB Energy and sold to its customers in N. Ireland and the R.o.I..

The test site had a strong tidal stream and had the advantage of being in a sheltered location allowing easy access for servicing and grid connection. The typical spring tide velocity in the centre of the channel is 3.5 m/sec (7.8 mph), decreasing with depth.

An environmental monitoring plan and the putting in place of measures to reduce the turbine's impact in the area around the test site were requirements of the marine construction licence. An Environmental Impact Assessment commenced three years pre-installation (April 2005) and continued until three years afterwards (2011). It studied the impact on common/harbour seals, cetaceans (whales, dolphins and porpoises), diving and other seabirds and benthic communities (life on the seabed). The effects were found to be small and temporary. Sonar was used to detect seals upstream of the turbine and when one was detected the device was shut down.

SeaGen was installed in April 2008, connected to the grid in July 2008 and reached full generating capacity on 18<sup>th</sup> December 2008 once a software problem had been sorted out. It generated 1.2MW of electricity for between 18 and 20 hours per day. By 2012 it was producing up to 5GW/h since its commissioning, enough to power 1500 homes annually. Over the course of its working life it had generated 11.6GW.



Its place in the seascape was largely uneventful but, in June 2013, a sailing yacht, containing three men and a teenage boy, collided with it <[http://www.thedownrecorder.co.uk/pages/index.asp?title=Yacht crash sparks investigation](http://www.thedownrecorder.co.uk/pages/index.asp?title=Yacht%20crash%20sparks%20investigation)>. They were rescued by the RNLI. One of the men had been thrown into the water. There do not appear to have been any significant injuries. The yacht lost its mast. We do not have details of damage to SeaGen..



It fulfilled its research role and decommissioning commenced in May 2016 with the removal of the rotors and generators. The crossbeam and topsides were removed in August 2018 (see picture with control unit leaving the Narrows on 24<sup>th</sup> August) and the remaining tower and subsea structure later. It was taken to Swansea for breaking up and recycling with the control unit being taken to Yelland in N. Devon. In addition to generating electricity and being a vehicle for development, it had established Strangford Narrows' reputation as a good site for conducting tidal energy research and helped to shape MeyGen, the company's multi-megawatt tidal stream array, the world's largest, in the Pentland Firth off the north coast of Scotland.



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