

# Alderney – OpenHydro

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Project Name: OpenHydro Alderney

Company: OpenHydro

Project description:

Project Developer: Alderney Renewable Energy (ARE)

Technology Type: Tidal Turbine

Resource: Tidal

Project Scale: The first phase of this development will be a 285MW tidal array.

*Installed Capacity:* Potential for an array of devices upto 2MW in size.

*Additional Description:* The OpenHydro device generates electric power through the inflow and outflow of water at low and high tides. The turbine has a diameter of 6 metres. The igus E-Chain 4040 from the E4/4 series protects the deployed Chainflex motor and signal cables during the lifting and lowering movements of the turbine and also protects them against aggressive ambient conditions. The travel distance amounts to approx. 20 metres in vertical direction above and under water with the robust E-Chain guided in a steel trough. The robust E-Chain is thereby guided in a stainless steel trough. The vertical travel is transformed into a horizontal stroke by turning through 90 degrees. A plastic chain makes any kind of maintenance on the open sea superfluous and was the only eligible solution because a conventional metal chain would not have stood up to the combination of technical environment and mechanical demands.

The most logical export market for large scale tidal energy development is France. Exporting power to the UK would require a 100 km DC link, four times the distance to France.

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

Location: Alderney, Channel Islands. (Coordinates: 49°42'52"N\_2°12'19"W) water depth around 30m.

Process status: In December 2005 the States signed an Agreement with a local company Alderney Renewable Energy (ARE) granting it exclusive access to the Territorial Waters for a period of five years to research, survey and test marine devices for the purpose of electricity generation from Alderney's tidal and wave resources. Subject to ARE and its technology partner(s) meeting certain targets and to other conditions precedent, the Agreement provides

that ARE will be granted a Master Power Generation Licence giving it exclusive access to fifty percent of the Blocks for a minimum of fifty years. ARE is currently working on a commercial tidal power project with technology developer OpenHydro, using that company's open-centre turbine technology. To demonstrate the engineering and commercial viability of the technology ARE and OpenHydro plan to deploy three or four tidal turbines off the south coast of Alderney during 2009. This test deployment was originally planned for the Swinge, but that site was found to be less suitable due to the turbulence of the currents.

Licensing Information: Based in the Channel Islands, Alderney Renewable Energy Ltd. recently received an exclusive 65 year licence from the States of Alderney for the generation of renewable tidal and wave energy from Alderney's territorial waters. OpenHydro and Alderney Renewable Energy Ltd have worked together over the past three years in surveying Alderney's waters, preparing environmental studies and planning the development of commercial tidal farms in the waters around Alderney. This cooperation has culminated in OpenHydro acquiring a 20% shareholding in Alderney Renewable Energy Ltd.

In addition, this agreement places OpenHydro's Open-Centre Turbines as the preferred technology for the development. When fully developed the resource could contain up to 3,000 of its turbines which would represent a capital investment in excess of 3 billion in OpenHydro technology.

Environmental survey issues: Alderney, its adjacent islands, islets and surrounding coastal waters exhibits a diverse range of marine sublittoral, intertidal and terrestrial habitats. The rocky shores, including rock pools, kelp beds, and sandbars are locally important for fish and shell fish, such as ormers, crabs, lobsters, bass and plaice. Of notable importance are large bird colonies on the island of Burhou and rocky islets, which support large breeding colonies of northern gannet (*Morus bassanus*), Atlantic puffin (*Fratercula arctica*), and European storm-petrel (*Hydrobates pelagicus*). There is also a seal colony to the north of Burhou Island.

The conservation significance of Alderney's west coast and the Burhou Islands, has been recognised as an area of international importance. This has led to the designation of a Ramsar site in 2005. The designation places an obligation on the States of Alderney to develop a framework for the conservation of the Ramsar Site.

Sea birds are one of the key criteria for the Ramsar designation because of their abundance in nationally and internationally important populations. The designation also acknowledges the importance of shoreline, intertidal and sublittoral habitats and marine flora. These include a number of different habitats.

Among global priority habitats, seagrass beds occur at and below low-water mark; there is also a small area of dune slack wet-grasslands at Platte Saline. These form part of a rich complex of habitats, including vegetated shingle banks, sand dunes, dune and coastal grassland, soft cliffs, sandy, gravelly and rocky shores (including the offshore islands of Burhou, Les Etacs and Ortac).

Environmental webpage: See developers and companies websites for more information

**Baseline and project effects studies:**

**General description**

<b>Receptor</b>	<b>Study 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)
Seabirds	Potential impacts to Alderney seabirds	Literature review/previous studies on Openhydro at different locations.	There may be indirect effects on sea birds, if for example, their prey was disturbed due to construction, operations and maintenance.	Ongoing
Marine Mammals	Potential impacts to Alderneys Marine mammals	Literature review/previous studies on Openhydro at different locations.	Potentially marine mammals could collide with the OpenHydro device.	Ongoing
Fish	Potential impacts to fish stocks	Literature review/previous studies on Openhydro at different locations.	Fish stocks could be effected by electric magnetic fields (EMF).	Ongoing
Sediment	Potential impact to local sediments	Literature review/previous studies on Openhydro at different locations.	Disturbance could occur from vibrations and noise due to drilling.	Ongoing
Navigation	Potential impacts to shipping navigation	Literature review/previous studies on Openhydro at different locations.	Large bottom mounted devices possibly up to 2MW in size could be deployed in the Race in less than 40m depth. Devices of this size occupy up to 20m of water leaving less than 20m clearance above the device. This is potentially too shallow for large commercial vessels therefore a permanent exclusion zone	Ongoing

			would need to be applied.	
Tourism	Potential impact to tourism	Literature review/previous studies on Openhydro at different locations.	Tidal energy development could have some impact if a large substation was built on the island. However, if this facility was located in Mannez Quarry it would be largely concealed from the rest of the island.	Ongoing
Employment	Potential changes to current employment on the island	Desk based review	During construction of a large scale array an estimated 130 personnel could be directly involved in tidal energy development. Therefore creating jobs on the island.	Ongoing
Buildings and infrastructure	Impacts to buildings and infrastructure	Desk based review	Alderney is a small island of only 11 km <sup>2</sup> . Much of the land area has either protected conservation status or has specific land use designations which permit only limited development. Any new infrastructure on the island would, therefore, be subject to stringent planning requirements which may limit the extent of any land based facilities.	Ongoing

<b>Reports and papers</b>	AEA. (2008). Strategic Tidal Stream Assessment for Alderney. <i>Report to Alderney Commission for Renewable Energy.</i>			
<b>Research projects</b>	Past or on-going environmental research projects at the site			

### Monitoring and adaptive management

#### General description

Receptor	Monitoring program description including question and/or objective (several	Design and methods (brief description)	Results (brief description)	Status (planned, underway, completed, with dates)
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	can be listed per receptor)			
Physical environment				
Benthos				
Fish and fisheries				
Elasmobranchs				
Birds				
Marine uses/ users				
Other (can be named)				
<b>Reports and papers</b>	<ul style="list-style-type: none"> <li>- 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.</li> <li>- Key papers on the areas addressed should be listed here</li> </ul>			
<b>Research projects</b>	Past or on-going environmental research projects at the site			