

Tidal Energy Lagoon in Swansea Bay

Enhancing its value for biodiversity by creating an artificial reef

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Tidal Lagoon Swansea Bay Plc (TLSB) proposes to construct a tidal energy lagoon. The structure will enclose a 11.5 km² area. The lagoon wall will stretch for 9.5km and incorporate up to 16 underwater turbines which produce 400GWh on a net annual output basis. The nature of the project requires the building of rock armour protected seawalls which will be placed on top of the soft substratum of Swansea Bay. It will hence add to the existing rocky intertidal and subtidal habitat in the area.

The SEACAMS project at Swansea University and TLSB collaboratively explored options that would enhance the ecological value of the lagoon by incorporating artificial reef features into the wall, and by creating new habitat inside the enclosure. Designs were inspired by latest research on eco-engineering of coastal defence structures (URBANE project 2013*). They include hard and soft engineering solutions which affect building materials and the creation of biogenic features.

Manufacturing habitat diversity

The structural complexity of the building materials will play an important role for the diversity of animals and plants colonising the lagoon wall. Rocks of different sizes, roughness and porosity will be used. Pools and precast BIOBLOCKS will be integrated.



Herring spawning ground



Copying natural habitats

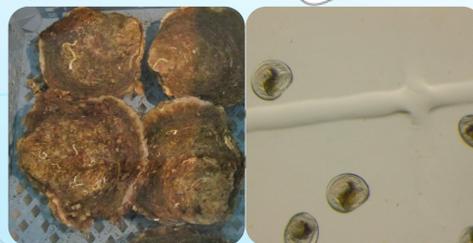
Natural rocky shore habitats around Swansea Bay are analysed for their contribution to the biodiversity in the area. Some habitat features can be copied and incorporated into the lagoon design.



Maritime grassland bordering saltmarsh

Saltmarsh creation

Coastal grassland and dune creation



Restoration of oyster reefs

The lagoon will be used to promote the recruitment of rudimentary native oyster stocks (*Ostrea edulis*), which used to be prolific in Swansea Bay. Oyster reefs would enrich the local biodiversity.

Seagrass area (TBC)



Reef habitat

Safeguarding Sabellaria reefs

Artificial coastal defence structures provide settlement substrate for Sabellaria similar to natural materials. TLSB plans to create habitats suitable for the colonisation of Sabellaria. Currently we are assessing the feasibility of translocating and rescuing Sabellaria aggregations that will be directly affected by construction work.

Creating seagrass meadows

SEACAMS and Salix Bioengineering Ltd are currently working on the potential to create and restore seagrass meadows in the UK. To date, this project has successfully harvested and stored seagrass seeds with a view to growing these in the laboratory for planting during 2014 and 2015. The lagoon provides an opportunity to create seagrass habitat in the future.



Kitiwake roosts (NE side of turbine housing)