

## The Journey to Transform the Production of Reliable Tidal Power Begins...

As an island nation, the UK has an untapped energy source with huge potential. The UK's coastline boasts one of the highest tidal ranges in the world, measuring between seven to twelve meters. This significant natural opportunity was referred to recently by the Prime Minister, who confirmed that the [UK is now the most attractive market in the world for marine renewables energy investment](#).

As proof of this, the world's first power generating Tidal Lagoon is to be built in Swansea Bay, UK, harnessing the powerful Atlantic Ocean tides. This exciting new project will consist of an 11.5 km<sup>2</sup> lagoon off the coastline of South Wales. It is expected to provide power for over 155,000 homes (equivalent to 90% of Swansea Bay's annual domestic electricity use), marking a global step change in the world's tidal power innovation.

Behind this massive and ambitious tidal project, technology is playing a key role in building confidence and enabling the vision to become reality.

Hydro technology brings many advantages in terms of competitiveness. The concept is somewhat similar to what you might find in a dam structure. Flow is created by gravity through the difference in head (or tidal height) between the inside and outside of the lagoon walls. The primary difference between previous applications and the tidal lagoon is the efficiency of electricity generation in both directions. This is due to the deployment of induction generators with variable drive systems and axial flow low-head bulb hydro-turbines. Powered by only 16 turbines to produce 320MW of electrical power, such power capacity would have required hundreds of turbines if tidal stream turbine technology in arrays had instead been adopted. With fewer turbines needed, the overall CAPEX & OPEX is also lower. What's more, the technology is designed to last, with the plant having an operational life expectancy of 120 years, with no major refurbishments needed for the first 50 years of operation.

At Swansea Bay, GE is involved in both power generation and transmission of power to the shore. At the heart of this work are GE's large induction generators and state-of-the-art Variable Speed Drives (VSD) based on its medium voltage drive technology and hydro turbine technology supplied by GE's partner Andritz Hydro. The equipment is well proven across multiple industrial and renewable energy applications such as onshore/offshore wind, mining, oil & gas and marine. It builds upon the previous experience with the UK Navy, where it has been successfully deployed in numerous vessels over the past 10 years.

The technology is exciting in its own right, but there is more to this story. The power generated at Swansea Bay will be clean power, saving [over 236,000 tons of CO<sub>2</sub> each year](#). This reliable, home-grown electricity will further strengthen the UK's energy security, as well as contributing to the nation's export potential. Most significantly, it will enable tidal energy to become an affordable energy resource, set to achieve the lowest generation cost of all electricity for 85 years following an ongoing investment program.

With new projects under development based on the same proven concept, tomorrow's tidal lagoon projects are predicted to be capable of reaching 3GW of installed capacity.

The future of tidal electricity generation is bright. Swansea Bay Tidal Lagoon, together with other significant ongoing projects, is transforming the way we generate energy for tomorrow. Enabled by technology as well as government funding, the journey to low cost electricity generated from tides has begun!