UK Tidal Wave Project Will Propel Renewables to New Levels

Source: breakingenergy.com

Published: July 7, 2016

By Richard Boud

Harnessing tidal power for clean energy has recently taken a huge step forward in the UK, the world's leading region for development of this important new renewable resource. The MeyGen Tidal Array Project is fast moving toward the final construction of its demonstration phase, which will be the first time that underwater turbines sited together in a full-scale array have been tested.

Situated in the Pentland Firth in Scotland, this ground-breaking test project is supported by £10 million funding from the UK's Department for Energy and Climate Change (DECC). It is expected to significantly advance the technology and knowledge of the marine energy sector, as well as provide clean power for up to 175,000 homes in Scotland when expanded and completed.

Black & Veatch is working on the project by administering the grant for DECC and serving as technical advisor for the other investors: The Crown Estate, the Scottish Executive, the Department of Energy and Climate Change, and Highlands and Islands Enterprise, which combined have invested approximately £40 million in this innovative project.

Tidal Power Innovation

Marine energy is in its infancy, and tidal power, in particular, is at a very early stage of development. Richard Boud, Black & Veatch's Renewable Energy Business Development Manager for Europe, said, "The way the renewable energy sector has been learning is by completing projects, and to date there is hardly anyone that has delivered more than one tidal energy project. The MeyGen project is high risk, but the potential benefits it can deliver are huge. This is a brand new energy resource that is not yet being used."

There are a myriad of benefits – advancing the knowledge of how tidal power works and how it can best be harnessed; providing very low carbon energy and contributing to decarbonizing the world's economies; availability all over the world once the technology is established; and, maybe most importantly, being predictable.

Unlike solar and wind power, which in many countries cannot be predicted with certainty in the long term, the tides have been studied for centuries, and mariners have a good understanding of what they do and when. This means that marine energy can be a reliable, commercial source that will work well with national grid organizations and utility companies, which need to know with a high degree of accuracy how much power they will have coming in and when.

Boud added, "What the MeyGen project is going to do is deepen our understanding of how tides behave under the waves. There are huge amounts of tidal stream power available worldwide, and this project is going to move the industry forward by leaps and bounds."

He added that it is important to understand the difference between tidal energy and wave energy. As the earth rotates around its axis, the gravitational forces of the sun and moon pull the ocean against the shores and drive the tides.

"Where these tides flow around headlands and through gaps in landmasses, they generate fast-moving tidal streams that contain considerable amounts of energy," Boud said. "Winds and waves, on the other hand, are independent of the tides and are driven by the sun heating and cooling our atmosphere. Tidal energy and wave energy therefore require different converters and technologies in order to generate electricity."

Four Turbines at the MeyGen Project

The Pentland Firth is a technically challenging location with very strong currents and large waves, but it provides a good test location that can be expanded to deliver commercial-scale marine energy. Although there are no guarantees in a demonstration project like this, confidence is high, as is shown by the investment levels.

Four 1.5 megawatt underwater turbines are being installed – one from Atlantis Resources, which is the majority project owner, and three from Andritz Hydro Hammerfest.

"Having two different turbine designs enables us to learn more," Boud said. "Pentland Firth is probably one of the most difficult sites there is, so if we can do it here, we can do it anywhere."

Construction progress is good, as the onshore substations have been built. Both the on and offshore cables have been installed. All that remains to be done is the building of the foundations for the turbines, expected in the summer of 2016, and then installing the turbines themselves. Once the project is functioning, one of the goals will be to achieve cost parity with other renewable energy sources.

“If the MeyGen project works as we expect it to, then what we have done here can be replicated around the world,” Boud said.

Other Global Tidal Power Projects

Some estimates have predicted that tidal power could someday provide as much as 10 per cent of the world’s energy needs, so the industry is waiting to see what MeyGen achieves. But in the meantime, there are exciting developments happening in other countries. Black & Veatch recently signed a Memorandum of Understanding with SBS Intl Ltd for the development of commercial-scale tidal current projects in Indonesia.

“We are actively looking at projects in Indonesia, which has been identified as an excellent growth area for tidal energy, as have Korea, France and Canada,” Boud said.

In Wales, Menter Môn is a third-sector enterprise established to deliver economic regeneration projects. It has been appointed as the third-party manager for the West Anglesey Demonstration Zone in North Wales along the coast of Holy Island. This zone is has been identified as being a suitable location for the installation of marine energy devices.

In Canada, a test center called FORCE has been established in Nova Scotia. It features multiple tidal turbines, which are connected to four subsea power cables, each 2 to 3 km in length. These cables transfer the power onto the Nova Scotia electricity grid.

So even though the tidal power industry is just starting out, the early developments show great promise for delivering clean power on a commercial scale.

“We are right at the start of this exciting new technology,” Boud said, “and we need these new renewables to support what we already have with solar, biomass and wind. MeyGen will help to advance the knowledge of what can be done with this brand new energy resource.”

Published originally on Black & Veatch Solutions.