



# Wave & Tidal Energy

NETWORK

COMMUNICATION HUB FOR THE WAVE & TIDAL ENERGY INDUSTRY

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# CAPRICORN MARINE TURBINE

**RENEWABLE DEVICES MARINE LTD IS PROUD TO ANNOUNCE THE DEVELOPMENT OF THE CAPRICORN MARINE TURBINE, THE WORLD'S MOST ENVIRONMENTALLY SENSITIVE TIDAL STREAM GENERATOR.**

## FUNDING

Renewable Devices Marine Ltd (the latest company to emerge from the successful Renewable Devices Group) has already secured a private funding package, as well as securing £100,000 worth of innovation funding from the Scottish Government.

Currently the cost of manufacture, maintenance, short lifespan and environmental impact of marine turbines makes their wide scale deployment un-economic when compared to existing forms of electricity generation.

## REDUCING COSTS

The UK Government's Technology Strategy Board has made the reduction of manufacture, installation and operation costs of the next generation of tidal device a highest priority. This invention will reduce the environmental impact, reduce cost of manufacture and increase the lifespan of tidal stream generation.

## UNIQUE TECHNOLOGIES

The development of the unique technologies in the Capricorn Marine Turbine are built on a wealth of intellectual property developed by their sister companies.

Building on this exceptional technology, Renewable Devices Marine Ltd has developed a unique tidal stream turbine, the Capricorn Marine Turbine, which has been designed to generate electricity from the high efficiency extraction of energy from tidal marine flows.

The current variant - Capricorn 125 - generates 1.25 MW of clean energy.

## CAPRICORN MARINE TURBINE - SPECIFICATIONS

The turbine has a horizontal axis, contra-rotating, twin rotor architecture. Each rotor has three blades, designed to be bi-directional in operation, thus negating the need for a yaw mechanism.

The turbine contains innovations relating to the following areas...

- The innovative Bk97 buoyancy control system allows for extremely simple and low cost deployment of the Capricorn turbine
- Extremely accurate and reliable buoyancy control using the Bk97 system allows the turbine to be floated out to its deployment site
- It provides a very controllable means of sinking the turbine on to its foundations and raising it for maintenance purposes, with minimal sub-sea intervention from divers or underwater vehicles being necessary

## NOISE IMPACT

The impact of sub-sea industry on marine life is well documented however the understanding of the effect on navigation by marine mammals is a new field of marine biology. Recent studies have shown that noise at certain low frequency ranges has a negative impact on the navigational abilities marine mammals causing stranding and sometimes resulting in the death of whole pods.

Studies have concluded that a single tidal flow turbine operates below these frequencies however the acoustic emissions from arrays of tidal stream turbines will enter into the spectrum that is known to interfere with the navigation of marine mammals.

In November 2012 SRM Projects Ltd was forced to withdraw its licence application for a turbine array in Blackney Passage, British Columbia due to the acoustic risk to marine mammals. The design of a turbine that can be deployed in sensitive areas will expand the global tidal stream resource benefiting the tidal stream industry as a whole. As the UK currently enjoys the market share of this emerging industry the benefits of this technology to the Scottish and UK economy will be substantial.

## COST OF DEPLOYMENT AND MAINTENANCE

Much of the cost of deployment and maintenance of tidal stream turbines concerns the lifting and retrieval of the units. All sub-sea systems, those which are physically attached to foundations (rather than floating devices tethered by chain, rod or cable) are transported using large vessels with the capacity and crainage to lift and deploy turbines in excess of 25 tonnes.

These vessels are expensive and the lifting relies upon favourable weather conditions. The Bk97 buoyancy system allows for the Capricorn Turbine to be towed to site as a barge and then sunk and lifted using small and medium sized vessels. This reduces the cost of maintenance and eliminates the risks associated with lifting at sea.

At full buoyancy the turbine floats and can be serviced at the deployment site, or towed to dock for replacement.

## LOWEST COST

The Capricorn Marine Turbine is designed to generate environmentally sound energy at the lowest cost per MWh of any other marine generation technology.

Within eighteen months, Renewable Devices Marine aims to have deployed the lowest cost, most reliable and most environmentally sound tidal stream generator commercially available anywhere in the world.

**Renewable Devices Marine Ltd**

