

Global Marine Energy Technologies – Status and Future Prospects

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Summary

Energy provision is one of the most fundamental components needed for society to develop and thrive. Currently finite resources are exploited to satisfy our needs, which are being depleted at an alarming rate due to the ever increasing global trends of consumption. The latter is likely to be unrelenting due to global future developmental needs and the increasing population. It is therefore imperative that we identify and exploit sustainable resources not only to satisfy current and future needs but also reduce pollution associated with the present utilisation of fossil fuels. In essence, what the global society requires are concerted efforts through worldwide policies to exploit and enhance the use of non-polluting natural sources that are geared to satisfy our current and future energy needs in a secure and sustainable framework.

Globally, the utilisation of oceans resources, such as wind, waves and marine currents (or tides) is gathering pace and their exploitation offer one of the appropriate routes for the production of sustainable electrical power. This paper will focus on marine energy side covering wave and tidal energy exploitation. It will highlight activities in research and development that are augmented by large scale converter prototypes deployment at test sites and the open sea. In addition there are now tangible plans for multi converter deployment in farms or arrays. Many sites around the world have been identified as appropriate for wave and marine current energy conversion technologies deployment. A notable announcement was the plan to deploy over 1.6GW multi-megawatt mix technology farms and arrays in the Pentland Firth in the UK by 2020. This target represents projected investment of over £4.3 billion (-US\$7.0bn) and if successful is likely to propel the implemented technologies onto a higher platform for a truly global industry at scale.

However, the marine energy industry and its associated research and development activities face many challenges. These mainly stem from lack of large scale operational experience in the sea and funding for both projects and coherent research and development programmes. The paper will additionally convey the current status of wave and marine current energy conversion technologies addressing issues related to their infancy as compared to others such as offshore wind. Discussions of the financial mechanisms available as well as examination of future prospects for marine energy technologies are also given in the paper.