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Marine Renewable Energy Seascape

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Abstract

ABSTRACT Energy production based on fossil fuel reserves is largely responsible for carbon emissions, and hence global warming. The planet needs concerted action to reduce fossil fuel usage and to implement carbon mitigation measures. Ocean energy has huge potential, but there are major interdisciplinary problems to be overcome regarding technology, cost reduction, investment, environmental impact, governance, and so forth. This article briefly reviews ocean energy production from offshore wind, tidal stream, ocean current, tidal range, wave, thermal, salinity gradients, and biomass sources. Future areas of research and development are outlined that could make exploitation of the marine renewable energy (MRE) seascape a viable proposition; these areas include energy storage, advanced materials, robotics, and informatics. The article concludes with a sustainability perspective on the MRE seascape encompassing ethics, legislation, the regulatory environment, governance and consenting, economic, social, and environmental constraints. A new generation of engineers is needed with the ingenuity and spirit of adventure to meet the global challenge posed by MRE.

Keywords: marine renewable energy, ocean energy, offshore wind energy, tidal stream energy, ocean current ener

Full text

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