

Ocean energy in Indian coasts and islands for sustainability— A roadmap for future

Saha Dauji^{*1,2}

¹NRB Office, Bhabha Atomic Research Centre, Mumbai 400094, India

²Homi Bhabha National Institute, Mumbai 400094, India

(Received February 1, 2018, Revised October 8, 2018, Accepted October 11, 2018)

Abstract. Limited quantity and non-uniform distribution of fossil fuel over the world, along with the environmental concerns of increasing CO₂ emissions, indicate that gradual and planned switchover to the sustainable energy sources is the need of the day. Ocean energy is well-distributed over the coasts, abundant, renewable and available in the form of wave energy, tidal energy and thermal energy. India has gathered precious experience from the pilot plants utilizing these methods over the last few years. One of the main constraints is deemed to be the grid connectivity. Time has come to transform this limitation into opportunity. Ocean power can be a very suitable option for the coastal belts and the islands. Implementation of this concept would require large-scale industry participation along with favourable government policies in the coming years. This article attempts a review of the ocean energy initiatives in India and proposes a roadmap for the future.

Keywords: ocean energy; sustainable; renewable; wave energy; tidal energy; ocean thermal energy converter

1. Introduction

Over the last century, the ever increasing population and the rapid exploitation of the fossil fuels have resulted in primary energy consumption rate of around 15 trillion watts of power worldwide (Armaroli and Balzani 2011). Though other sources like hydropower, solar and wind power and nuclear power have been used in many countries to different extents, the global trend of the energy supply and consumption have been predominantly fossil fuel based and generally unsustainable. The gap between the industrialized and the developing nations need to be bridged which would require more energy. The trend in of energy consumption as depicted in Fig. 1 is rising quite steeply (India falls under 'Non-OECD Asia'; 'Non-OECD Asia' excludes China). However, the aggressive consumption of fossil fuels in the forms of coal, oil and natural gas, have to be moderated due to their depleting reserves, increasing cost and most importantly, the environmental concerns (CO₂ emissions).

*Corresponding author, Scientific Officer, Lecturer,
E-mail: acad.dauji@gmail.com or dauji_saha@yahoo.com

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