



Investigation and Feasibility Study of Extracting Wave Power in Northern and Southern Sea Waters of Iran

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Abstract

Oceans are of important sources of energy. Each country, in case of having access to vast water resources and utilizing them efficiently, could have part of its demanded energy gained from seas.

In this study, the average extractable power from waves in Iranian shores are estimated to be $20 \frac{KW}{m}$ of which $6 \frac{KW}{m}$ is extractable from northern and $14 \frac{KW}{m}$ from southern coasts and a comparison is done between extractable energy amount of Iran and that of Turkey. Also the conformity of estimated amounts with the estimation of energy levels distribution around the world has been taken as a proof for the validity of results.

In this article, wave energy density is calculated for 10 coastal areas of Iran and the best locations for installation of convertors are proposed. In addition, through calculation and comparison of density for both wave and wind energy in these areas, the advantage of using wave energy over other sources, like wind, is investigated.

Finally, to utilize these big energy sources, we propose convertors for different areas considering wave specification, water depth and other important parameters in each location.

Introduction

The ever increasing need for energy in the world and the dangers of further use of fossil fuels have put a focus on renewable energy technologies. Among different sources, ocean waves are known for a long time as important sources of energy. [1] The study of wave power is said to have started hundreds of years ago, and the first patent was registered in 1799.[2] Yoshio Masuda, an engineer from Japan, in 1947 tried for the first time to use wave energy for commercial applications.[3]

Waves are formed due to effect of wind over the sea surface, so are subsequently considered as a form of solar energy. Although wave energy is only a small portion of solar and wind energy, sea waves offer the highest energy density among these three energy sources and are much more persistent.[4]

One the main benefits of wave power over solar and wind power is higher density of the energy over the unit area. For example, at a latitude of 15 N (Northeast trades), the solar