Abstract

Renewable energy is becoming increasingly important as energy prices and air pollution increase globally. Wind and solar power have become more affordable and efficient. However, current renewable energy production cannot bear the weight of the world's growing need for energy unless we can effectively tap the world's greatest source of energy: the ocean. Wave energy converters are technologies designed to harness the energy from the ocean waves. This study aims to help energy resource planners identify the most efficient locations for wave farms near the coast of Southern California. Current studies with the similar goals either only used wave data as the variables during the decision making process or considered other variables but omitted the wave data. Few were found to include both, yet those too are lacking in the full scope.

In this study, wave power data as well as environmental and legal limiting factors were included in wave farm site selection. These limiting factors, along with the wave data, consisted of seven individual layers that were each given weights according to their importance in regards to a PowerBuoy™ wave farm and then combined together using a weighted overlay. The results of this overlay were used to select five areas with the most potential as a suitable location for a wave farm. A simple cost comparison was then conducted to determine which site was the most suitable. It was determined that a site roughly 25 kilometers due south from Point Conception was the best candidate. However, the conditions in the sea off the coast of Southern California are less than ideal for wave farms with the current state of wave energy conversion technology due to a relatively low level of wave power caused by the complex geography of the region.