



Wave energy conversion systems: optimal localization offshore Italian coastlines

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A method for evaluating renewable energy technologies in terms of costs and engineering solutions has been implemented on the Italian coastlines, in order to achieve the optimal localization and choose the best wave energy conversion technology avoiding the transfer of systems suitable for more energetic seas.

The Italian coastal wave climate was studied in detail. The study used four years of wave data from 14 sites offshore the Italian coastlines, of which six offshore the coastlines of Sicily and Sardinia, four offshore the Thyrrenian Sea and four offshore the Adriatic Sea. The study resulted in scatter diagrams, and a mapping of the energy flux in each coastal area. The average energy flux was higher for the coastlines of Sardinia and Sicily, lower for the coastlines of the Thyrrenian Sea and even lower for the coastlines of the Adriatic Sea.

A comparison between wave energy and offshore wind energy conversion systems was performed in terms of initial cost, maintainance cost and performance, resulting in pay back time between 4 and 8 years depending on the systems. The wave energy farms exhibit a higher load factor than the offshore wind farms (although higher than the land wind plants). Besides, in a number of Italian regions (like Sardinia) offshore wind plants have been banned for their visual impact. On the other hand, the costs of wave power plants are higher and have not yet reached a mature stage, so that they have not yet shown all possible inconveniences.

More comprehensive studies have to be performed in order to optimize the mooring technology, the energy transfer on the main land and/or conservation on site, which is an important feature for isles, for which the wave conversion systems seem to be particularly attractive.