

Preliminary study for the implementation of the “Wave Dragon” in Gran Canaria, Canary Islands, Spain.

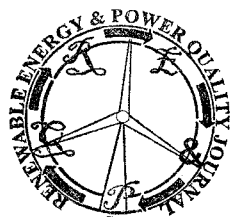
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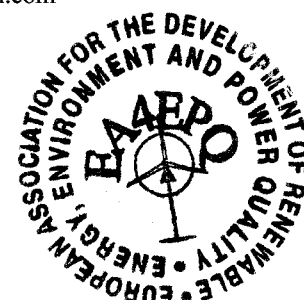
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Abstract. The island of Gran Canaria offers extraordinary weather conditions for the exploitation of renewable energy. But it has also an isolated power system that is vulnerable and has low inertia. This fact limits the penetration of this energy on the network. Both wind energy and photovoltaics have an important development in the island, but both have clear disadvantages for its exploitation, due to its unstable generation curves, its lack of predictability, the fact that this type of energy can't be generated continuously, and consequently, the problems due to its difficult management. In addition, talking about wind energy, should be noted that Gran Canaria is an ecological paradise, full of natural protected areas, and also it has a high population density. That's why the space for future energetic installations is very limited. However, the Canary Islands are surrounded by an unlimited ocean. The swell is able to supply part of the insular consumption through wave energy. This study analyze the energetic situation of Gran Canaria, the nature of its waves, and the different mechanisms and techniques for the exploitation of this energetic resource, giving an added value to those that allow to obtain quality energy to be poured into the network.

Key words

Renewable energy, wave energy, energetic generation, ocean, isolated system.

1. Introduction

Fighting against climate change and protecting the environment are a priority, not only globally, but also in Gran Canaria, where renewable energies –like photovoltaic or wind energy– are widespread and well developed.

Despite this, the island has a small power system, and it's not connected to any other –as it happens with continental networks. For this reason, there are many disadvantages for the penetration on the network of the renewable energies.

Major problems of this kind of networks are:

- A) Lack of predictability of renewable energy sources.
- B) Management problems.
- C) Lack of continuous generation and disponibility –24 hours a day and 365 days a year.
- D) Derived from previous, unstable generation curves.
- E) Lack of physical space for full development, due to the high population density and the large number of protected natural areas, because of its biological and landscape richness.

To mitigate the above drawbacks, it's very important, first, to choose those technologies that allow the right management of the generated energy, in order to it can be poured quality energy into the network. Second of all, to prepare a multi-generation system dependent on different renewable energy resources –solar, wind, tidal, wave energy...– that limit the energy dependence of the island of each of these resources separately, reducing the risk of absolute peaks or valleys of generation.

There are experts like Mariusz Malinowski, belonging to the Warsaw University of Technology in Poland, who argue that wave energy could provide the same amount of energy than wind energy. However, its level of