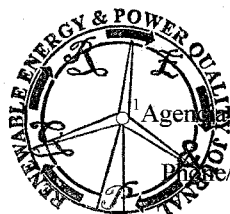


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Pilot scheme for the use of low power wind turbines for electricity generation in the Municipality of Las Palmas de Gran Canaria



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Abstract. An existing renewable energy source within our territory which has not been massively introduced is the low power wind energy. This kind of installations has only been used for electricity generation in off-grid systems. This paper describes a pilot scheme in which five 5kW wind turbines will be installed in the Municipality of Las Palmas de Gran Canaria. The first stage has consisted on the determination of the wind potential within the Municipality of Las Palmas de Gran Canaria, which has been determined taking as a reference the data from the study performed by the AEMET (Spanish Meteorological Agency) and the data comprised in the Canary Islands Wind Resource Cartography. Once this has been done, a study of physical variables related to the wind flux over the Canaries has been performed by taking data generated by a computer simulation of weather conditions in the course of a year. After the calculation of the eolic data and after the selection and location of the five turbines has been determined, a description of the turbines to be installed is given along with an overview on the territorial legal framework applicable to this type of installations.

Key words

Renewable energy, Wind resource, Low-power wind turbines.

1. Introduction

Wind turbines are devices which convert wind energy into electricity. These installations can fall into different categories depending on, for instance, values such as the power –low power, medium power wind turbines, etc.[1]. A classification attending to the electrical connection would consist on stating the differences between off-grid and grid- connected wind turbines.

With the proposed configuration the generated electricity will be injected into the grid, so that the turbines must generate alternating current at the same **frequency and tension** as the grid into which the electricity is going to be fed into. Attending to the power of the turbine, there are two big categories:

Medium- and high-power wind turbines: are turbines in a range from 100 kilowatts (kW) to megawatts (MW). The connection of these machines to the grid requires that these installations meet several conditions and standards.

Low-power wind turbines: are turbines which do normally not affect the grid stability and are in a range up to 100 kilowatts (kW). The connection of these devices is carried out in low tension [2], [3].

This paper will focus on grid-connected low power wind turbines. A pilot scheme to install low-power wind turbines will be performed in the Municipality of Las Palmas de Gran Canaria and will involve five 5kW wind turbines aimed at the promotion and building awareness among citizens on this kind of renewable energy source.

2. Eolic potential

In this section the origin of the data used for the estimation of the eolic potential is showed as well as the applied mathematical treatment. Finally the resulting information is displayed in a graphic showing the eolic potential in the Municipality of Las Palmas de Gran Canaria [4].

Initially, the origin data has been extracted from the numerical values comprising the Canary Islands Wind Resource Cartography.

This information consists of a description of the main features of the wind resource i.e. wind speed, direction and other parameters, for specific coordinates within the