



Optimizing wind pumps system for crop irrigation based on wind data processing

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Crop irrigation is a major consumer of energy that can be resolved with renewable ones, such as wind, which has experienced recent developments in the area of power generation. Therefore, wind power can play an interesting role in irrigation projects in different areas [1]. A simple methodology has been developed in previous papers for technical evaluation of windmills for irrigation water pumping [2]. This methodology can determine the feasibility of the technology and the levels of daily irrigation demand satisfied by windmills.

The present work compared the possibilities of this methodology adjusting the three-hourly wind velocity to the Weibull II distribution function, without considering the time sequence [2], or processing wind data using time series analysis. The study was applied to practical cases of wind pumps for irrigation of crops, both in the outside (corn) and inside greenhouses (tomato).

The analysis showed that the use of three hourly time series analysis supplied a more realistic modelling of the situation with a better optimization of the water storage tank of the wind pump facility taking into account the risk of calm periods in which the pumping is null. A factor to consider in this study is available precision of the wind sampling rate.

References

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