



## **Analysis of the solar/wind resources in Southern Spain for optimal sizing of hybrid solar-wind power generation systems**

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A drawback common to the solar and wind energy systems is their unpredictable nature and dependence on weather and climate on a wide range of time scales. In addition, the variation of the energy output may not match with the time distribution of the load demand. This can partially be solved by the use of batteries for energy storage in stand-alone systems. The problem caused by the variable nature of the solar and wind resources can be partially overcome by the use of energy systems that uses both renewable resources in a combined manner, that is, hybrid wind-solar systems. Since both resources can show complementary characteristics in certain location, the independent use of solar or wind systems results in considerable over sizing of the batteries system compared to the use of hybrid solar-wind systems. Nevertheless, to the day, there is no single recognized method for properly sizing these hybrid wind-solar systems. In this work, we present a method for sizing wind-solar hybrid systems in southern Spain. The method is based on the analysis of the wind and solar resources on daily scale, particularly, its temporal complementary characteristics. The method aims to minimize the size of the energy storage systems, trying to provide the most reliable supply.