ID de la contribución : **349** Tipo : **Oral parallel contribution**

Optimal spatial distribution of solar and wind power plants over the Iberian Peninsula and complementary energy systems

lunes, 17 de julio de 2017 17:45 (30)

The introduction of massive renewable power in the energy system of a country needs to be treated carefully. Renewable energies (RE) such as solar and wind have an strong dependence on the meteorological conditions. This leads to a large temporal variance. Therefore there should be some other complementary systems to fit the energy production (EP) to the demand (ED).

It is a challenge try to minimize the costs associated to the growth of renewable power systems. In this work we propose different possibilities to face this problem.
The first approach consists of distributing solar and wind farms in a smart way, trying not only to get maximum capacity factor, but to minimize the temporal variance of the production respect to the energy demand. This problem has been already presented for the Iberian Peninsula at monthly time scales [1]. In this work we applied the same methodology at daily time scale.
The method is applied to a database of solar and wind power potential generation constructed from the outputs of regional climate models runs (hindcast data) with a spatial resolution of 10km over the Iberian Peninsula. The quality of this data has been extensively proved [2]
In spite of the strong reduction of the variance by applying this methodology, there still exists importat differences respect the energy demand . When RE is larger that ED the energy should be stored. In this work we only deal with pumped-storage hydroelectricity. The most storage we need the higher the associated costs will be. On the other hand if storage is insufficient some energy will be lost. When RE is smaller other systems should be switch on. If there is energy stored previously this should be used. If not, we need some extra energy power systems. Therefore it is necessary to reach a compromise between our RE installed power, pumped-storage capacity and extra systems in order to minimize the costs assciated.
In this work we present an study of the configuration that the whole power system (electricity) should have in order to minimize costs and maximize the use of RE. This estimation has been obtained for the current (mean of last 5 years) ED in Spain and Portugal.

Primary author(s) : Dr. MONTAVEZ, Juan Pedro (Departamento de Física, Universidad de Murcia)

Co-author(s) : Dr. SARSA, Antonio (Universidad de Cordoba); Dr. RUIZ-MARTINEZ, Jesús (Universidad de Murcia); Dr. JEREZ, Sonia (Universidad de Lisboa)

Presenter(s) : Dr. MONTAVEZ, Juan Pedro (Departamento de Física, Universidad de Murcia)

Clasificación de la sesión : Energy and Sustainability I

Clasificación de temáticas : Energy and Sustainability