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Designing a renewable energy system for the Iberian Peninsula.

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Wind and Solar energies are usually shown as the best energy alternatives for the future when considering both resource limitations and environmental impacts. However, the dependence of these energies on wheater conditions makes neccesary other controlable energy resources. Among them, hydro-power production is the best option.

This work shows how it is possible to desing a large spatial scale energy system able to cover the full energy demand for the Iberian Peninsula based on these three kinds of renewable energy. Fisrtly, it has been developed a methodology that permits to stablish the places and kind of energy plants (solar and wind power) that minimizes the temporal variations and maximizes the total energy production. The method uses sintetic energy production coming from the outputs of a regional climate model. Second, in order to get a perfect fit between energy demand and production, it is designed a hydro-pumping system. This can permit to desing a full system that guarantee the neccesary energy under a given level of confidence.

Finally, it is discussed from a economic point of view the advantages and disadvantages of including other non-renewable plants in the energy system, overdimension of renewable plants and the consequent energy loss, as well as to reduce the level of confidence, i.e, to increase the probability that energy production does not reach the energy demand.