

# Economic and environmental analysis of a residential PV system: A profitable contribution to the Paris agreement

Arcos-Vargas A.

Cansino J.M.

Román-Collado R.

The aim of this paper is to analyze the economic and environmental aspects of installing PV facilities for residential electricity users. This paper explores, in a conservative approach, the installation of a PV capacity to compensate the consumption with the production for each moment, never feeding electricity into the utility network and without storage. The approach proposed is illustrated by applying different power PV capacities in alternative locations (Marseille, Madrid and Seville), using the hourly demand provided for the smart meters. Combining the load curve of each user, the irradiation and PV production of each location, the cost of equipments, the hourly emission in the whole market, the variable price of electricity for residential users and the energy needs to build a PV facility. The model calculates, for each individual the optimal PV power to install and the emissions avoided. The results show that, with the current cost of the PV facilities and variable prices of electricity, the PV are, from an economic and environmental point of view, profitable in all the locations analyzed. This initiative will be more profitable for private investors and, additionally, for the environment in the next three years. A massive installation of these facilities in Spain and France will contribute to achieving their Nationally Determined Contribution (NDC) of the Paris agreement (COP-21), fulfilling, in Spain, the current legal restrictions. © 2018 Elsevier Ltd

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