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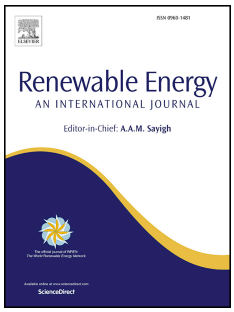

A solar irradiation GIS as decision support tool for the Province of Salta, Argentina

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Title: A Solar Irradiation GIS as Decision Support Tool for the Province of Salta, Argentina

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Abstract: The province of Salta is characterized by its solar energy high potential. The use of solar resource would improve living conditions in the area, diversify the energy matrix, promote more sustainable production systems and reduce greenhouse gases emissions. However, there are only a few studies that describe in high spatial resolution the variability of the solar resource in Argentina. Multidimensional tools, that consider the environment and the socio-economic situation, have to be considered for adequate support decision-making, such as solar collector location assessment and photovoltaic potential. In this sense, a deep evaluation of the solar resource is needed first, as solar irradiation is an essential input variable for the design and evaluation of solar application systems.

In this paper, we detail the methodology used to elaborate a GIS tool to support decisions related to renewable energy policies and solar technology design. A comparison between global solar irradiation measurements in situ, empirical models, and data provided by Land Surface Analysis Satellite Applications Facility (LSA-SAF), is performed in daily, monthly and annual basis for a seven-year period. This analysis validates the use of this satellite data for the determination of solar irradiation in the region.

Keywords: *Solar Irradiation GIS, LSA-SAF, Satellite imagery, Decision Support Tool.*

1. Introduction

The energy system of a country is a strategic factor to boost its economic growth and to enable its social development. In this sense, the possibility of increasing the energy supply based on renewable sources also contributes to the production and the environment, resulting in a decisive input in the production process and ensuring a low impact on the environment. The use of solar resources would improve living conditions in the area, diversify the energy matrix, promote more sustainable production systems and give answers to environmental issues [1] such as: strong pressure on renewable natural resources (e.g. firewood, forests), undisclosed use of conventional energy resources (fossil fuels), and pollution by emission of carbon dioxide (with consequences in global warming).

However, the lack or inadequate planning of renewable energy projects has left a long list of difficulties in economic, social, environmental and institutional aspects. In Argentina, the main remarkable difficulty is that the energy problem has not been solved yet, both macro and local scale. Despite the fact that there is legislation [2] and there are numerous efforts to implement solar energy technology [3,4], the main remarkable difficulty of Argentina is that the energy problem has not been solved yet, both at macro scale (non-diversified energy matrix) and at local level (unsatisfied basic needs, solar equipment without use, cost overruns for the implementation of

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