

# **Solar cooling economic considerations: Centralized versus decentralized options**

X. García Casals

## **Abstract-**

**In Spain, as in other Mediterranean and low-latitude countries, cooling loads of the same order of magnitude or even higher than heating loads coexist with high solar radiation resources. Cooling loads in most of these countries have, thus far, not been completely incorporated into the building sector energy demand because they arise after that DHW (domestic hot water) and heating loads have been satisfied and the living standard of the population reaches a given threshold. The increasing comfort demand in the cooling season from a population living in buildings that were developed without taking into account these considerations are bringing about a strong increase in the installation of domestic vapor compression air conditioning units, aimed to partially fulfil the thermal comfort demand in few rooms of these dwellings. This has a significant impact on the environment and the electricity distribution system, in a moment when strong environmental constraints are being imposed on the energy system to fulfil international agreements as the Kyoto protocol. Solar absorption cooling emerges as an interesting alternative to satisfy this growing energy demand for cooling applications with synergies with solar energy use for heating and DHW purposes. However, solar absorption cooling has been there already, for decades, without having a significant development, and still today presents some limitations that prevent its widespread application. Other solar cooling alternatives, such as the use of commercial vapor compression air conditioning equipment fed with electricity from centralized solar power plants could, in short, become available in these countries. In this paper, based on the experienced gained with the simulation of the most recent installations of absorption cooling installations in Spain, we perform a cost comparison between decentralized and centralized solar cooling options to give some insight into the development requirements and possibilities from both solar cooling options.**

**Index Terms-** Solar cooling, absorption, levelized costs, solar power plants

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