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Author: Elisa Viñas, Roberto Best, Sergio Lugo

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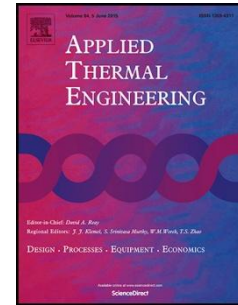
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# Simulation of Solar Air Conditioning Systems in Coastal Zones of Mexico

Elisa Viñas<sup>1</sup>, Roberto Best<sup>2\*</sup> and Sergio Lugo<sup>2</sup>

<sup>1</sup> Facultad de Ingeniería, Universidad Nacional Autónoma de México, Av. Universidad 3000, Ciudad Universitaria, CP 04510, Coyoacán, México D. F. (México).

<sup>2</sup> Instituto de Energías Renovables, Universidad Nacional Autónoma de México, Privada Xochicalco S/N, Col. Centro, CP 62580, Temixco, Morelos (México).

\*rbb@ier.unam.mx

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## Highlights:

- A parametric studio using TRNSYS of the solar absorption cooling system in coastal zones is presented.
- A technical-economic study of the solar cooling system is presented.
- Comfort condition are obtained in 8 houses grouped in two duplex houses and connected to a single SACS.
- A COP solar combined value of 0.33 was obtained.

## Abstract

The objective of the present study is to simulate and evaluate a H<sub>2</sub>O-LiBr absorption cooling system driven with solar energy, and liquefied petroleum gas (LPG), to air condition low income houses in coastal areas of Mexico. To this end, an analysis of the behavior of the solar absorption cooling systems (SACS) was made using TRNSYS 17 with the purpose of obtaining an integrated system that meets the needs of air conditioning, with the smallest area of solar collection, and greater than 50% solar fraction. Two representative places of the predominant climates of the Mexican coast were selected for the study. These are the cities of Campeche and Acapulco. The results show that the SACS favors the air conditioning requirements of eight low-income households, generating favorable climate conditions between comfortable and slightly warm in extreme conditions, according to the standard norm ISO 7730 (2005). This is achieved through the use of a solar field of evacuated tube collectors with an area ranging from 207 to 220 m<sup>2</sup> according to the climatic region concerned (warm and dry vs. warm and humid climate), providing 60% of the power required by the system. This solar contribution was determined based on the results of the economic evaluation. Even though the area available on the roof of the houses allows a larger area of collection, the economic parameters as well as the return of investment period and the cost-benefit ratio, favored this proposal. Providing the houses with the service of hot water for sanitary use is also being considered, which makes the project more profitable.

**Keywords:** solar energy, absorption cooling, coastal zones, simulation.

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