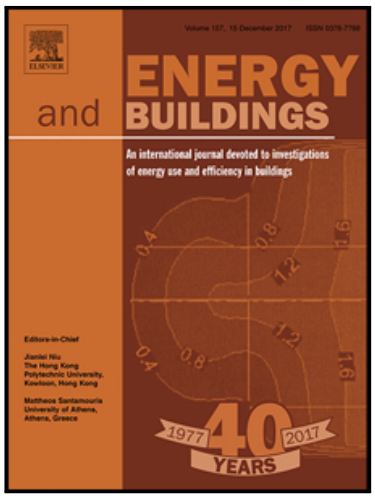

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Annual Dynamic Thermal Performance of Solar Water Heaters:

A Case Study in China's Jiangsu Province

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Abstract: In our search for a better socioeconomic path for water heater usage in China, we studied and compared the annual dynamic thermal performance of solar water heaters (SWHs) in the Jiangsu province. Experiments are conducted in two cities within Jiangsu—Nanjing and Lianyungang—spanning two climate zones. The results show that SWHs have good thermal performance in Jiangsu. The SWHs in Lianyungang show better thermal performance than in Nanjing, because they receive greater solar radiant energy. Also, from a thermal perspective, vacuum tube solar water heaters (VTSWHs) perform better throughout the year than flat-plate solar water heaters (FPSWHs). Meanwhile, taking socioeconomics into account, gas-assisted flat-plate solar water heaters (GA-VTSWHs) have better performance compared to other types of water heaters. Based on these results, the implications for developing and applying SWHs are derived. This study can be used to optimize operation of the household hot water supply system and use it more efficiently.

Keywords: Solar water heater, thermal performance, China, utilization efficiency