

عنوان مقاله:

Technical and Economic Analysis of Solar Water Heaters with Heat Pipe Glass Tube Absorbers and Comparison with Flat Plate Collectors

محل انتشار:

دومین کنفرانس بین المللی پیشرفت های اخیر در مهندسی، نوآوری و تکنولوژی (سال: 1402)

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خلاصه مقاله:

In this paper, the technical and economic performance of a natural circulation solar water heating system with vacuum glass tube absorbers, known as heat pipes, was investigated and compared to a similar system with flat plate collectors in ۱۲ cities in Iran with different climatic conditions. The efficiency of the systems was evaluated by considering the geographical specifications of the cities, the optimal angle of incidence, and the calculation of solar radiation under identical capacity, consumption, and environmental conditions. Additionally, the economic evaluation of the systems was conducted by studying their prices in the Iranian market. It is predicted that this paper can serve as a suitable criterion for selecting a solar water heater with higher efficiency in each of the target cities from both technical and economic perspectives. It is shown that the heat pipe solar water heater has better performance compared to the flat plate collector, especially in cold regions and low radiation areas, in terms of solar energy absorption, the share of solar energy consumption, return on investment, and auxiliary fuel consumption. Finally, the consumer can select the appropriate type of solar water heater system based on its efficiency, solar energy absorption, energy saving, and return on investment, according to their place of residence in each of the solar radiation zones, which is available in the map

کلمات کلیدی:

Flat plate collector, Heat pipe collector, Solar energy share, Return on investment

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