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Experimental Evaluation of Stand Alone Solar Driven Membrane Distillation System

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Abstract : Many places worldwide, especially arid and semi-arid remote regions, are suffering from the lack of drinkable water and the situation will be aggravated in the near future. Furthermore, remote areas are characterised by lack of conventional energy sources, skilled personnel and maintenance facilities. Therefore, the development of small to medium size, stand-alone and robust solar desalination systems is needed to provide independent fresh water supply in remote areas. This paper is focused on experimental studies on compact membrane distillation (MD) solar desalination prototype located at the Mechanical Engineering Department site, Kairouan University, Kairouan, Tunisia. The pilot system is designed and manufactured as a part of a research and development project funded by the MESRS/BMBF. The pilot system is totally autonomous. The electrical energy required to operate the unit is generated through a field of 4 m^2 of photovoltaic panels, and the heating of feed water is provided by a field of 6 m^2 of solar collectors. The Kairouan plant performance of the first few months of operation is presented. The highest freshwater production of 150 L/d is obtained on a sunny day in July of 633 W/m^2d.

Keywords : experimental, membrane distillation, solar desalination, Permeat gap
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