

## Modeling and simulation of a new design of the SMCEC desalination unit using solar energy

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### ABSTRACT

This paper deals with modeling and simulation of a new design of the solar multiple condensation evaporation cycle (SMCEC) desalination unit using solar energy. The newly designed system is basically composed of a flat plate solar air collector, a flat plate solar water collector, a humidifier, an evaporation tower and a condensation tower. A mathematical model based on heat and mass transfers in each component of the unit is developed and simulated using C++ software in a steady state regime. The numerical model is used to investigate the steady state behavior of each component of the unit exposed to a variation of the entrance parameters and meteorological conditions. This theoretical model is expected to help in predicting the behavior of the unit in various operating and climatic conditions. Besides, it would be useful in enhancing the performance of such unit.

*Keywords:* Solar energy; Water desalination; Steady state; Modeling; Simulation

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