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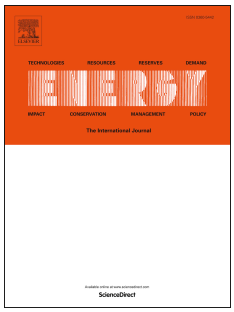

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Optimum Exergoeconomic Modelling of Novel Hybrid Desalination System (MEDAD+RO)

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Highlights

- A novel hybrid MEDAD-RO system presentation
- Accurate economic analysis by total revenue requirement method
- Thermoeconomic analysis of the novel system
- Multi-objective optimization of the system

Abstract

The mathematical model for the prediction of a novel hybrid desalination system was presented. The Hybridization of thermal and membrane desalination systems was investigated, and the efficient and appropriate arrangements were introduced. Multi-effect distillation, reverse osmosis and adsorption desalination systems were the major constituents of the novel hybrid system (MEDAD+RO). The thermodynamic and exergetic analysis was done. For economic analysis, the total revenue requirement method was used, and the thermoeconomic analysis was performed. Produced water price resulting from the thermoeconomic analysis, was $ 1.3 per cubic meter. The permeate water production in the novel system has increased to more than twice. The multi-objective optimization with genetic algorithm tool was used to obtain the optimum point of the system. The determination of best tradeoff between the permeate flow rate, price and exergetic

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