

Assessment of Annual Yield of Fresh Water from A Hybrid Desalination Scheme Utilizing Solar Parabolic Trough Collector Augmented by Fuel

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Abstract

The annual production of fresh water that results from desalination of seawater in a hybrid scheme using fuel and concentrated solar energy captured by parabolic trough collector was assessed. Three months; January, March and June, were considered as representative of the scheme annual performance. The results are obtained utilizing in-house developed computer models to solve the conservation equations by the finite difference methods. When considering the production in the month of June as the desired annual production, the investigation reveals that the production of fresh water drops for the months of March and January to nearly half and to 20%; respectively, compared to that of June. The low yield in the month of January is mainly attributed to the low altitude solar angle. The low yield in the cold and mild seasons may be augmented by the naturally occurring rainfall as well as by tradition fuel. It is shown that for mild weather only 28% of fuel energy compared to the total incident solar energy is required to bring production to full capacity, thus indicating the plausibility of the scheme for desalination. The aim of this study is to assist in the implementation of renewable energy resources in the field of seawater desalination.