

# **Sustainable Energy for Electricity and Water Production in Rural Communities**

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The provision of freshwater and energy is an essential requirement for sustaining rural populations and remote communities. Given the current global warming, pollution concerns, and water scarcity, renewable energies are believed to play a crucial role, especially in non-urbanized areas, for the supply of both electricity and water. This research project proposes the design and simulation of a cost-effective solar powered system for the production of electricity and fresh water in a rural community. The optimal design will be determined via ordinal optimization, which is particularly suited to problems in which a specific design can be accurately evaluated only via simulation; additionally, the dependence of the optimal design on the energy management system (EMS) will be studied. The effect of the solar power intermittency on the operation of the optimal design will be then quantified, and appropriate mitigation strategies via robust optimization will be proposed.