



Solar-Powered Water Supply Systems in Somali Villages: A Technological Assessment for Sustainable Access to Clean Water

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Abstract

Solar-powered water supply systems are a critical technology for providing sustainable access to clean water in rural communities, especially in areas with limited conventional energy sources. A mixed-methods approach was employed, combining quantitative data from system efficiency tests with qualitative feedback from village residents regarding usability and maintenance needs. Solar panels generated an average of 8 hours of daily electricity, sufficient to power the water supply systems effectively. User surveys indicated a high level of satisfaction (95%) with the system's reliability and ease of operation. The solar-powered water supply systems demonstrated robust performance in Somali villages, meeting user needs for clean drinking water reliably and sustainably. Communities should be supported in maintaining and repairing their own systems to ensure long-term sustainability. Further research is needed to explore potential improvements and broader implementation strategies. The maintenance outcome was modelled as $Y = \beta_0 + \beta_1 X + u + \varepsilon$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: Solar Panels, Geothermal Energy, Biomimicry, Hydropower, Microgrids, Renewable Energy Integration, Sustainable Development Goals

ABSTRACT-ONLY PUBLICATION

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