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Design of a PV power system for grid-connected Facilities energy retrofitting: A case study of 15 SAI Battalion, Limpopo Province in South Africa

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With global threats to energy security, the need for diverse energy sources is becoming increasingly important. Nations, communities, and individual energy consumers need more locally available and accessible renewable energy sources to form part of diverse energy sources mix for a sustainable supply of their local energy demand. A country like South Africa, overwhelmed with demand against dwindling power supply, which has led to the implementation of load shedding, can only put its hopes to a decentralised distributed generation where individual consumers generate power onsite to cover their needs partially or wholly. Besides serving local consumers with an uninterrupted energy supply, distributed local renewable energy generation contributes to easing pressure on the electricity grid and reducing greenhouse gas emissions. This study comprehensively analyses the calculation of an optimally designed grid-connected photovoltaic (PV) system's energy output. Monthly solar radiation data was assessed, and average sunshine hours were generated to design the 15 SAI Battalion sick bay electric power supply connected to the grid. Individual rooms appliances inventory with electric parameters and time of use data was done for all rooms for energy use audit. Due to the high total load power and financial constraints, the power systems were designed to cover part of the load of the building. PVSyst and HOMER software were used to design and optimise the system dispatch. The analysis of this study highlights the potential benefits of grid-connected PV systems, underlining their role in improving local energy supplies and relieving the electricity grid's burden.

Apply to be considered for a student ; award (Yes / No)?

No

Level for award;(Hons, MSc, PhD, N/A)?

N/A

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