

FEASIBILITY EVALUATION OF SOLAR REFRIGERATION SYSTEM: A CASE STUDY

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ABSTRACT

A brief description of the photovoltaic operated vapour compression refrigeration system and procedure for designing of photovoltaic systems are presented. To minimize environmental impacts associated with refrigeration system operation, it is reasonable to evaluate the prospects of a clean source of energy. The components of solar refrigeration system included DC vapour compression refrigerator, solar panel, solar charge controller and Lead acid battery. The appropriate sizing and configuration of these components was necessary for getting efficient performance of the refrigerator. Solar photovoltaic power for refrigerators has great potential for vaccine preservation in remote areas. The paper summarizes performance evaluation of system in terms of photovoltaic conversion efficiency and exergy efficiency. The required conditions for the storage of vaccine in term of the temperature and the other related parameters have been studied in the investigation. The investigation reported that average photovoltaic conversion efficiency and exergy efficiency of refrigerator found nearer to 12.05% and 14.20% on full load condition in winter. It has been observed that refrigerator with full load condition has no impact on performance of solar powered refrigerator in terms of energy and exergy efficiency.

KEYWORDS: Solar Energy, Clean Power, PV, Vapour Compression Refrigerator, Energy Requirement, Efficiencies