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Omar, M.A., Mahmoud, M.M.

Grid connected PV- home systems in Palestine: A review on technical performance, effects and economic feasibility

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An-Najah National University, Electrical Eng. Department, P.O. Box 721, Nablus, West Bank, Palestine

Abstract

Utilizing of grid connected PV systems on roofs of residential houses started to spread in Palestine since six years due to decreasing the PV price and creation of governmental regulations supporting the use of renewable energy. A number of schools, municipality buildings and private firms have also built such PV systems. Three of these PV home systems, have been operating since three years ago, were selected for technical and economical evaluation. Each of these PV is rated at 5 kW. Analyzing the measurements of these systems for two years of operation, has resulted an average daily yield of 4.81 kWh/kWp which corresponds to an annual yield of 1756 kWh/kWp. The results of economic analyses are encouraging to intensify the use of such PV home systems since the payback period of such a system is 4.9 years, the cost of kWh produced is 0.43 NIS (0.115 US \$) and the internal rate of return is 25%. Besides these results, this paper presents also the impacts of PV home systems on the electric grid represented in decreasing the losses, raising the voltage level and decreasing the power factor. It presents also the effect of PV systems on the environment and a simulation supported method for improving the annual energy production of such PV home systems at no additional cost. © 2017 Elsevier Ltd

Author Keywords

Economic feasibility of grid connected PV home systems; Effects of connecting PV systems with the electric grid; Grid connected PV home systems; Optimal PV array tilt angle

Index Keywords

Cost benefit analysis, Costs, Earnings, Economic analysis, Electric losses, Investments, Photovoltaic cells; Annual energy productions, Electric grids, Governmental regulations, Grid connected PV system, Grid-connected PV, Internal rate of return, Tilt angle, Use of renewable energies; Electric power transmission networks

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