Abstract

This paper presents a comparative study using new approach for optimum design of rooftop grid connected PV system installation on an institutional building at Minia University, Egypt. The new approach demonstrated in this paper based on optimal configuration of PV modules along with inverters according to not only MPP voltage range but also maximum DC input currents of the inverter. Five different brands of commercially available PV modules and inverters have been conducted in this study. Many different configurations of rooftop grid connected PV systems have been investigated and a comparative study among these configurations has been carried out taking into account PV modules and inverters specifications. Energy production aptitudes, cost of energy, simple payback time and GHG emissions have been appraised for each configuration using proposed MATLAB computer approach. Simulation results show that, annual energy production of about 258.8 MWh, COE of about 0.5482 $/kWh, payback period equal 6.95 years and total annual GHG emissions reduction of about 180.9 tons.
A Comparative Study for Optimum Design of Grid Connected PV System based on Actual System Specifications


**Index Terms**

Computer Science  
Information Sciences

**Keywords**

Sizing PV system  
Rooftop grid-connected  
MPP voltage range  
On-grid  
Greenhouse Gas  
MATLAB.