Abstract

The energy demand is growing rapidly and thus the need for a renewable source that will not pollute the environment is of prime importance. Some projections state that by 2050 the energy demand will be around 13 terawatts (TW). Yet majority of the energy requirements are satisfied by fossil fuels where as the use of renewable energy resources could help in meeting the energy demands and also in reducing the pollution. Solar energy is one of the most readily available renewable energy resources. The solar energy is non pollutant and maintenance free. Photovoltaic (PV) is a method of generating electrical power by converting solar radiation into direct current electricity using semiconductors that exhibit the photovoltaic effect. To reduce the manufacturing cost of the solar panel, I-V and P-V characteristics and various parameters that affect the solar panel should be customized before the fabrication of solar panel. Here, MATLAB software tool is used to simulate the characteristics (I-V & P-V) of solar panel. The main objective of this work is to study the influence of the irradiance, the ambient temperature and the no of series and parallel cells that are connected in the panel to achieve the global efficiency. The overall performance of solar cell varies with varying Irradiance, Temperature and no of series and parallel cells that are connected in solar panel. With the change in the time of the day the irradiance received from the sun by the PV panel changes. Not only irradiance, temperature also changes. Due to the change in the temperature, the current
density changes hence there is a change in efficiency as well as Fill factor. There another factor that affecting the solar panel efficiency is the no of series and parallel cells that are connected in the solar panel.

References


Index Terms
Keywords

Efficiency  Fill Factor  Irradiance  no of series Solar cells  no of parallel solar cells

Temperature

Photovoltaic Device.