

The uncertainty in the potential of electricity generation, due to the natural variation of solar radiation as daily changes, is one of the important challenges for the photovoltaic technology. This paper presents a stochastic modeling and analysis of the measured electrical parameters of a photovoltaic system, irradiance and the power generation under a spring day at Boumerdes location (Algeria). A comparison study between the sunny day and cloudy day is introduced to show the effect of the variation of irradiance and the temperature on the energy conversion. Stochastic modeling and analysis are made using mixed Weibull distribution, its parameters are estimated based on the maximum likelihood method. The obtained results in this work are; the estimated mean values of the irradiance, the power generation of the PV system, and the cumulative probability function of the energy conversion. The main objective is to predict a generated power, for the adequate design and sizing of the PV array.