

## **Working Title: Estimating the Power Output of Photovoltaics in Kuwait Using a Monte Carlo Approach**

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**Abstract :** The power generated from photovoltaic (PV) modules is non-dispatchable on demand due to the stochastic nature of solar radiation. The random variations in the measured intensity of solar irradiance are due to clouds and, in the case of arid regions, dust storms which decrease the intensity of intensity of solar irradiance. Therefore, modeling PV power output using average, maximum, or minimum solar irradiance values is inefficient to predict power generation reliably. The overall objective of this paper is to predict the power output of PV modules using Monte Carlo approach based the weather and solar conditions measured in Kuwait. Given the 250 Wp PV module used in study, the average daily power output is 1021 Wh/day. The maximum power was generated in April and the minimum power was generated in January 1187 Wh/day and 823 Wh/day respectively. The certainty of the daily predictions varies seasonally and according to the weather conditions. The output predictions were far more certain in the summer months, for example, the 80% certainty range for August is 89 Wh/day, whereas the 80% certainty range for April is 250 Wh/day.

**Keywords :** Monte Carlo, solar energy, variable renewable energy, Kuwait

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