

**A STUDY ON THE EFFECTS OF SOLAR FLUX ON THE
PERFORMANCE OF PHOTOVOLTAIC ENERGY SYSTEM
: A CASE OF 100 kWp PV STATION**

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ABSTRACT

A study on the effects of solar flux on the performance of photovoltaic (PV) energy system in the case of a 100 kWp photovoltaic power generation system has been done in Marak Parak village, Sabah. Five criteria of solar flux were used to find out the effects of solar flux to the performance of the PV energy system by applying the computer analytical method. The overall PV energy system analyses were based on daily data inputs integrated throughout the year. The results of this research show that approximately 71.4 percent of the total solar irradiance per year at the PV site is mostly clear day with some partial clouds cover the sky. Solar flux with a pattern of sunny in the morning and cloudy in the afternoon is suitable for the photovoltaic energy system as well. It has contributed 25.3 percent of the total solar irradiance per year. Solar flux, with a pattern of cloudy in the morning and sunny in the afternoon has rarely occurred at the PV site as well as the solar flux with a pattern of completely cloudy day with no direct sun at the PV site, which both contributed only 1.7 percent and 1.6 percent of the total solar irradiance per year respectively. The most significant effect of the solar flux on the performance of the PV energy system is solar flux with a pattern of completely cloudy day with no direct sun at the PV site. Fortunately the occurrence of this kind of solar flux has rarely occurred in four consecutive days during the whole duration of this research. Therefore the capacity of the storage batteries can be reduced about 26.8 percent of its initial value to 600 kWh. The PV energy system can maintain its energy supplement to the village of Marak Parak daily without any problem if the villagers know how to use the energy efficiently especially at the time of inadequate sunlight to recharge the storage batteries. The researcher has suggested that the results of this research be used as a guideline to install a central PV energy system for remote areas or rural villages with a comprehensive energy development plan from the government.

