Optimization of a photovoltaic power plant in indonesia with proper tilt angle and photovoltaic type using a system advisor model

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Abstrak

As a tropical country, Indonesia has great solar energy potential, with an average solar radiation intensity of 4.8 kWh/m2/d. Consequently, the optimization of solar power plants in Indonesia is necessary. The objective of this paper is to investigate solar panel optimization in Indonesia using system advisor model (SAM) software. Optimization focuses on two main concerns, choice of photovoltaic (PV) type and optimum PV tilt angle. Research is conducted in three different cities in Indonesia. The annual energy production simulation is conducted on 5 kWDC PV on-grid systems with different PV types and slope angles. According to simulation results, Indonesia has a relatively low proper PV tilt angle, with a value of 11o, 11o and 6o for Jakarta, Makassar and Jayapura, respectively. It can also be derived that when compared to crystalline PV modules, thin film PV modules have better performance, with the highest annual energy production due to its temperature coefficient characteristics.