Anucha Phowan 2011: Performance Analysis of Polycrystalline Silicon and Thin Film Amorphous Silicon Solar Cells Installed in Thailand by Using Simulation Software. Master of Engineering (Electrical Engineering), Major Field: Electrical Engineering, Department of Electrical Engineering. Thesis Advisor: Assistant Professor Patamaporn Sripadungtham, Ph.D. 79 pages.

This paper presented performance analysis of solar cells from experiment data and from PVSYST 5.31 simulation software of polycrystalline silicon and thin film amorphous silicon solar cells under Thailand meteorological conditions.

The results indicated that performance result based on IEC 61724 standards (Photovoltaic System Performance Monitoring-Guidelines for Measurement, Data Exchange and Analysis) found in 2008 from 7:00 a.m. – 5 p.m. the average net energy from array ($E_{A,\tau}$) was 11.23 kWh/day. The array yield (Y_A) was 4.36 h/d and the performance ratio (PR) was 92.54% for poly-Si solar cells. And the average net energy from array was 4.22 kWh/day. The array yield was 4.65 h/d and the performance ratio was 105% for a-Si solar cells.

When compared the simulated and measured values of the electrical power, the percentage error were 4.22% and 17.54% for polycrystalline silicon and thin film amorphous silicon solar cells, respectively. As for the thin film amorphous silicon solar cells, the correction factor was applied and the error value was reduced to 10.60%.

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