

Solar Power System Installation Scheme of PEFP

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1. Introduction

Because solar power system does not adopt conversion process of electrical energy mechanical and chemical reactions; it is a safe and environmentally friendly power generation systems. There are grid-connected solar systems and Stand-Along solar systems.

2. Methods and Results

Grid connected solar power system uses inverter to convert direct current to alternate current. Because grid connected solar power system is directly connected to the electric power system, battery storage system is not required. Additionally, we established monitoring system of solar power system to observe electric power generation in real time.

2.1 Solar Module

Solar cell module consists of solar cells and base plate. It converts sunlight directly into electric energy. To generate more electricity from solar power system, more solar cells should be installed. Nowadays, solar power generation capabilities tend to be enlarged by installing more solar cells. In proton accelerator research center of PEFP, 250W solar cell is introduced.

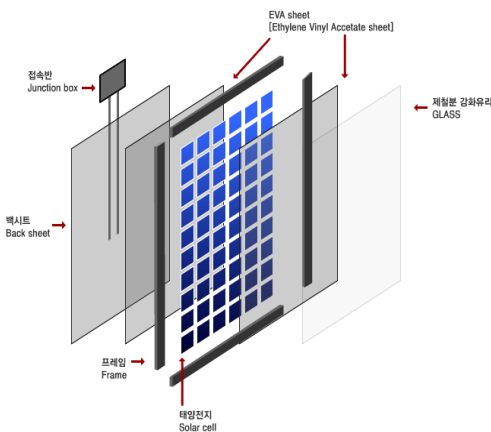


Fig 1. Component of Solar Module

2.2 Inverter

Power inverter converts the solar power generation device; it generated from the solar array DC power into AC power frequency and voltage. In Proton Accelerator

Research Center of PEFP, 2 110kW-inverter will be installed.

2.3 Monitoring System

Purpose of the monitoring system of solar power generation system is to real-time monitoring of electricity output to economic operation. It also can monitor operation status of solar power generation system. It can store historical data by day/month/year basis.



Fig 2. Monitoring System of Solar Power System

2.4 Annual solar power generation of PEFP

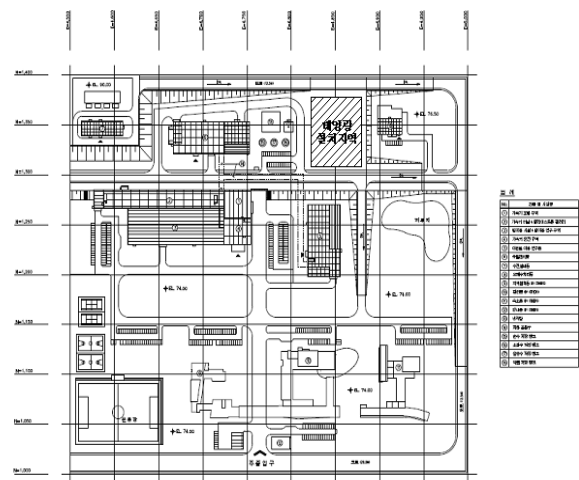


Fig 3. Install Area of Solar Generator.

Total solar power system capacity of PEFP is 210kW. According to the capacity, 840 cells are required.

No of cell = 250W/1cell x 840 EA
= 210kW

Assuming possible solar power generation duration in Korea is about 3.8hr, annual electric power generation is;

3.8h/day x 210kW x 365 = 291,270kWh

Electric power from solar power system can be utilized various electric loads such as lighting, cooling/heating facilities.

3. Conclusions

In this paper, we described grid connected solar power system of PEFP. Because we established grid connected solar power system, its composition is simple; therefore easy maintenance and long lifetime (20~30 year). Additionally, total electric power generation from solar power system is about 300,000kWh, extra power generation can be transferred to the Korea Power Electric Corporation (KEPCO).

REFERENCES

- [1] "Radiation Protection for particle Accelerator Facilities." NCRP Report No.144, published by National council on Radiation Protection and Measurements, 2003.