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ANALYSIS THE PERFORMANCE OF 15kW SPV Plant AT PEC

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Abstract— *This paper deals with the analysis of 15KW solar power plant installed in Priyadarshini Engineering College, Vaniyambadi. This solar panel consist of 60 solar PV each one panel produce 250 Watts, 12V capacity. In this project the solar plant can be noted for every one hour from 9.00AM to 4.30PM for 3 days a week. The graph is plotted at between Generated power vs consumed power. The performance can be controlled by MPPT controller. This generation can be stored in battery for storage and taken to the required load by the conversion of DC power into AC by inverter.*

Keywords- *Solar Pannel, MPPT, Battery, Inverter.*

1. INTRODUCTION

The Sun light is the main source of solar energy power generation which have the emission of electromagnetic radiation from the sun to the earth surface. Solar energy radiated which is from the sun and reaches to the earth surface and to the solar panel. The wave length range of sun is about 0.2 to 4.0 μm solar energy which reaching the top of the solar array. When the light energy can be taken from the sun some of the light energy is absorbed by the solar array and electric energy can be produced by the doping in the solar array due to the collision of electron and holes in the PV cells. Thus it produce the DC power and the energy produced can be stored in battery and by using inverter it can converted to AC and taken to the required load. This power produced can be plotted in graph as power generation vs consumption. These graphical representation can be represented in per day, per week, per month and also three month.

2. STRUCTURE OF MICRO-GRID

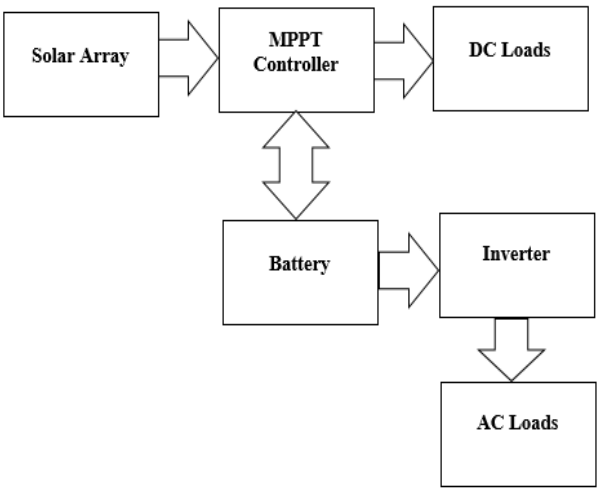

Fig.1. General block diagram

3. Principle

It is based on the principle of photovoltaic effect. When light falls on the surface of metals array electrons are released. When sunlight falls on a PV cell it is converted from light energy to electrical energy.

4. PV Cell origin

It is a semiconductor device consists of P and N junction produces a voltage. PV cells is the main source of solar array for the produce of electric power. Each solar cells can have only produce a very small amount of power about 0.5V. But it have large number of cells and also array for the produce of large amount of power. Thus the voltage can be increases with the intensity of light falling on the semiconductor junction of this PV cell. The PV cell consist of a semiconductor material which is bonded between the metal plates. Thus the Doped can be occurs at P & N materials for the collusion of electrons and power can be produced in solar cells.

3. Construction and working of solar cell

Solar cell which is 60 in numbers having the semiconductor device which can be used to converts sunlight of light energy to the electrical energy by doping. Hence it is also called photovoltaic cell. The amount of electricity generation is mainly depends on intensity of the solar cell due to climatic condition and also the certain angle of light falls on the array. Solar cells have front contact of the semiconductor material for the produce of electric power by doping.

This electric energy produce can be stored in the battery for the storage device and during the discharge it can be taken to the inverter for the conversion of AC source and taken to the required load.

4 . MPPT

MPPT is Maximum Power Point Tracking for the convertion of DC to DC converter in the power produce from the solar arrays and also the battery bank for the system. These are also called as Maximum Power Point Trackers. It is the control of the output for the panel from the charging of battery. Normally the efficiency of panel is 20 to 45% power gain but by using the MPPT it is increase the efficiency is around 93-97%. It produce the light as input from the solar panels and can change as high frequency AC and convert it to different DC source to the batteries. Thus it is called as high frequency DC to DC converter. This is most effective in Low battery charge, Long wire transmission system.

5. Junction Boxes

Junction box is a long transmission line for solar power power transmission system. It can be connected between the solar array and the battery. There junctions boxes containing the long wire which is enclosed in an rated howling box in PV systems. This can have the thin flim of conducting material can be closed with the insulation material.

6 .Inverter/Power Conditioning Unit (PCU)

It is placed between the interface of solar PV module and load. The PCU consists of bi-directional inverter and also consists of charge controller for the continuous supply of power to the load. When solar array can produce the DC power by the doping of PN junction and this power can be converted to the AC load by using the inverter.

7. Batteries

Batteries is the back bone of the energy storage system in solar PV systems. This can be used for charging and refilling of electric power. Batteries are used to store as electric energy to chemical energy as a storage system. During the discharge it is converted as chemical energy the electric energy to the required load. Batteries is the charge storage tanks for the energy storage system. The filling of electrical energy in batteries is known as charging and discharge of electric power to load is called discharging.

8) Performance of 15kw Spv Plant

Following graphs of 15KW SPV plant is to represent the graphical representation of power generation vs power consumption for month wise and week wise manner.

1) Unit Generation and consumption per day

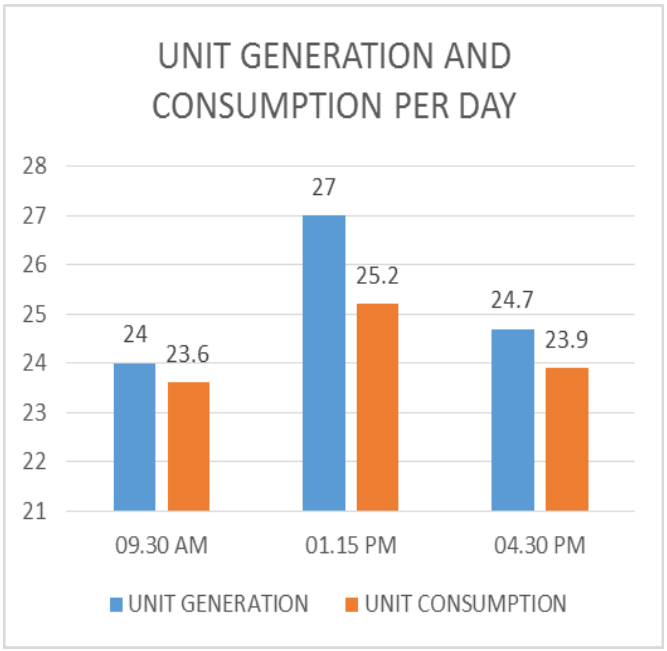

Fig. 2 Unit Generation and Consumption Per Day

2) Unit Generation and consumption for three day (per week)

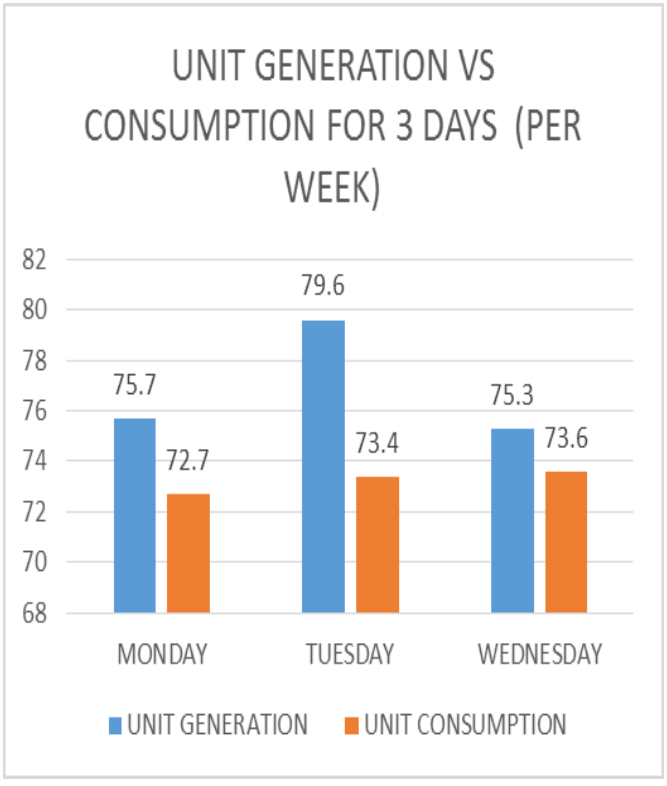

Fig. 3 Unit Generation and Consumption for three days a week

3) Unit generation and consumption per month

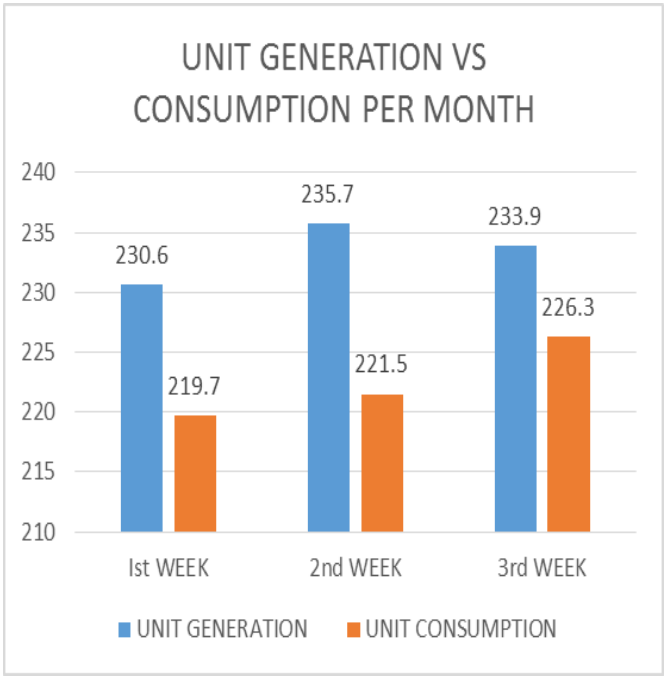

Fig. 4 Unit Generation and Consumption for a month

4) Unit generation and consumption for Three month

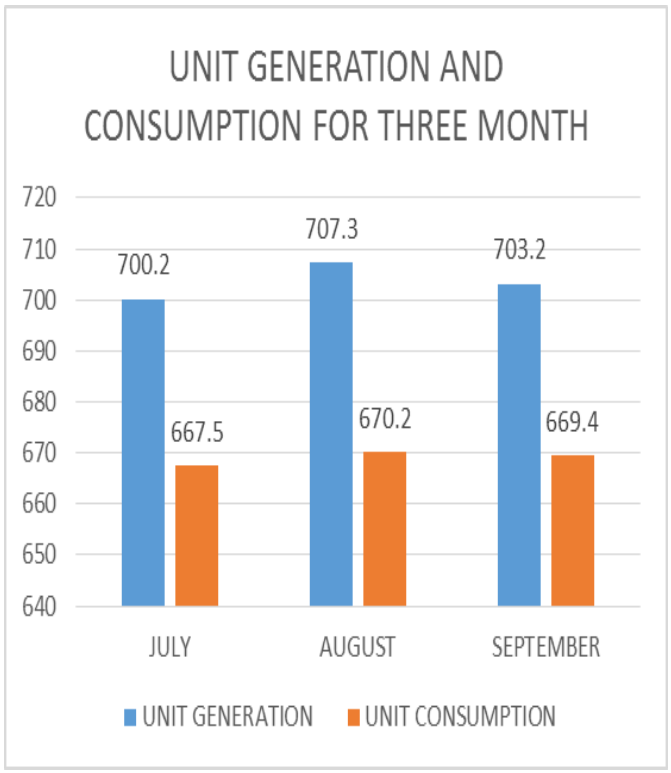

Fig. 5 Unit Generation and Consumption for three month

9) Conclusion

Analysis the performance of 15KW SPV plant has been presented. The analysis determines has been plotted in load generated and consumed for week wise and month wise manner for three days a week. In future the performance can be analysis for 5 days and also find the efficiency.

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