SOLAR POWER GENERATION USING NET METERING

Patil Sharyu, Pawar Ashwini, Shirke Ashwini

ABSTRACT

Net Metering is generally a consumer based incentive for renewable source such as solar power system also referred to as cogeneration .Most of the solar photovoltaic installation are connected to distribution networks.Net-Metering is a service available for an electric customer who also own a generating unit by using net metering service the energy produced which is not instantaneously consumed can be delivered to the local distribution network. In residential solar system the objectives are technical, net-metering policy and financial payback. This paper is divided into two sections first the technical factor such as geographical location, Tilt angle of the solar system.

Keyword:-Solar system, net metering, financial payback.

I. INTRODUCTION

Solar energy is the renewable and pollution free energy. The number of countries such as Germany, Japan, U.S are installation of grid connected solar system .Customers are allowed to store their extra electricity on the grid and use it later using both net metering and time of use policy(TOV).

The needs for residents to have vision of hoe they benefit financially as well as environmentally when using PV solar system for their homes. Then discusses the effect on net metering on the designing the electrical infrastructure.

Solar energy principles –

The first for solar users is" How much of the available solar energy can be converted to electricity in my location". They are number of factors are depended

1) Geographical location –Energy output of PV panels is highly dependent to their location.

2) Tilt angle:-For a fixed PV array the angle form horizontal of the inclination of the PV array is called the tilt angle. The following to adduct the tilt angle.(3)

a) Latitude minus 15 degree in the summer.

b) Latitude plus 15 degree in the winter.

Net metering –Net metering is the concept which records between export of generated energy and import of Discom energy for billing month.   Net metered customers generally credited for the electricity they sell to the grid with their electric meter essentially spinning backwards to provide a credit a against the electricity that these customs must buy fromtheir electric utility at night or during other periods when their electricity use exceeds their system output.(2)

Financial payback:-Financial payback is the most important parameter of the business protocol. Annual utility inflation rate ,system maintenance fee and cost of inverter rate (5%),system maintenance fee and cost of an inverter change after 20 year are taken into consideration.(1)

city	Solar radiation Kwh/m2/day	AC energy (Kwh)	Cost of electricity (Kwh)	Energy value
Charleston WV	4.35	3760	6.2	233.12
Long Island NY	4.56	4047	14.5	586.82
Phoenix AZ	6.75	5358	8.5	455.43

II. BLOCK DIAGRAM
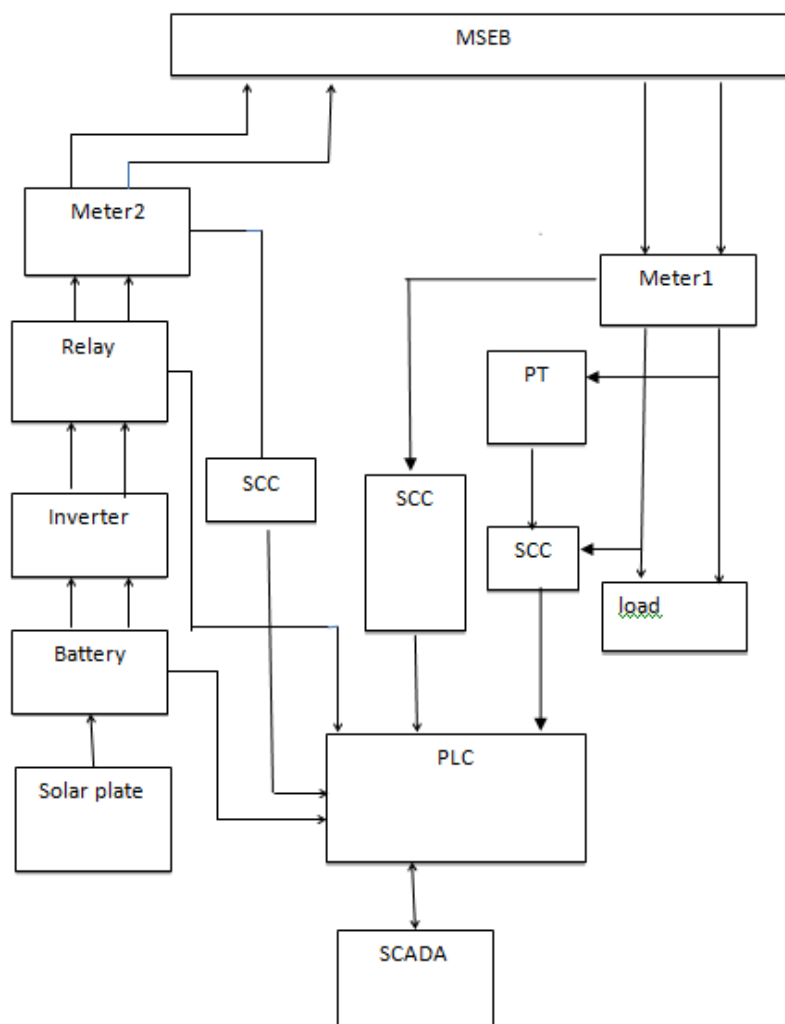
Solar Plate

Input – Heat, In the form of Sun Rays.

Output – Electricity, In the form of DC

Principle-Solar plate is heat energy is converted into electric energy that is electricity. Solar cell is fundamentally semiconductor P- type and N-type. Semiconductor or highly purified silicon- boron, phosphorous used to create the P and N type. When P and N type semiconductor material is placed together on internal voltage is created as the junction when light photons hit type the N type region one of the two things heat is generated. 1. light photon energizes the electron and travel through the top plate and these is collected by the conductive plate move to the load. 2. At the same time holes are created by the electron moving up the top plate. Pushed down toward the bottom conductive plates and hence on electric current.

Inverter:-

Input – In the form of DC, that is square wave.

Output – In the form of AC, that is sine wave.

Principle- The main function of the inverter DC to AC and step up transformer is used to create the main voltage from resulting AC. Battery supply is given to the MOSFET driver. Where it will convert DC to AC and running AC is given to the step up transformer from the step up transformer we will get the original voltage.

Relay:-

Input – In the form of voltage

Output – In the form of On-Off condition.

Principle-Relay works on the principle of electromagnetic induction when the electromagnet is applied the with some current it induces magnetic field wound it. It is used to the ON-OFF condition.

Meter:-

Input – Electric energy in the AC voltage.

Output – Units (Watts/Hour)

Principle- An electric meter as device that measure the amount of electric energy consumed by residence, a business or an electrically powered device. Electric utilize use electric meters installed at customers Premises to measure electric energy delivered to their customers for billing purpose. In this project two meters are used. Then one for utilized the energy and second for how many used energy.

Signal Conditioning Circuit :-

Input –AC in the form of current

Output –In the form of voltage

Principle-Signal conditioning that device that converts one type of electronics signal into another type in performing this conversion a no. of function may take place and AC supply is detected.

PLC :-

Input - 230 volt in the form of AC

Output - 24 volt in the form of DC

Principle- The PLC is programmed using a specialty programmer or software on a computer that can loadand change the logic inside. Most modern PLCs are programmed using software on a PC or laptop computer. Older systems used a custom programming device.

Potential Transformer :-

Input- 0 to 10 volt in the form of DC.

Output- 0 to 10 volt in the form of DC.

Principle- Incoming signal are detected and inform to the PLC.

III. CONCLUSION

Net metering and time of use billing policy are combined resulting in great saving. Solar energy is reduction in electricity consumption from the grid. Utility companies can benefit from net metering while customers produce extra energy during peak times.

REFERENCES

1. Residential solar systems :Technology ,net-metering, and Financial payback,Kourosh,Sedghisigarchi,Electrical and computer engineering Department, west Virginia University Institute of technology, Montgomery,WV, USA

2. M.Aachiq, T. Oozeki, Y .Iwafune and J.G.FonsecaJr.”Reduction of PV Reverse Power Flow through the uses of EV's battery with consideration on the Demand and Solar Radiation Forecast", InProc IEEE Electrical Vehicle Conferanse, 2013

3. Gim Green "Net Metering" Energy Efficiency and Reneable Energy, Web Copy at US Department of Energy www.eere.energy.gov 3 pages.

4. Renewable Energy "Net Metering" Ontario Ministry of Energy, web copy at www.energy.gov.ca 4 pages.