

A Review of Net Metering with Ongrid Inverter

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Abstract— With the increase in implement of solar PV in India, a net metering policy is need of ours. Solar energy is clean, inexhaustible and environment-friendly resource among all renewable energy options. In this paper, concept of net metering through solar system and analysis of data carried out is explored for the beneficial of consumers for studying the feasibility of net metering in India. Also it is found that simple net metering policy is unable to accommodate various categories of consumers. So, making a net metering, which is more scalable, feasible and financially viable is challenge. According to consumers' classifications net metering is a billing mechanism that credits solar energy system owners for the electricity they add to the grid.

Keywords—: Net metering, Cost and Area requirement of net meter, Advantages.

I. INTRODUCTION

Electrical energy is considered to be an important commodity for development of any country. The world's economic growth is placing enormous demand on its energy sources. The energy gap between generation and demand has to be balanced by using renewable power generation to an existing conventional power generation. The technological innovation and environmental incentives are changing the face of electricity generation as well as transmission. Centralized generating facilities are giving way to smaller, more distributed generation partially due to the loss of traditional economics. Micro turbines, photovoltaic, fuel cells and wind energy conversion system have lower emissions have the potential to have lower cost negating traditional economies of scale. Renewable power generation has become very important in recent years. The recent reports said that, we have already used almost 2/3 of our carbon budget and at the current projected rate; this entire budget will be used by the year 2030. So it is essential that we move rapidly towards a renewable energy. The solar photovoltaic (PV) generation is becoming more important as it offers many advantages such as no fuel cost, no noise, no pollution less maintenance and cheap in cost. Net energy metering requires the meter to measure two quantities, (1) Energy delivered by the Electric Distribution Company to the consumer (Imported electrical energy) and (2) Energy delivered by the consumer to the Electric Distribution Company (Exported electrical energy). In this paper, bidirectional net meter is developed to display the difference between imported and exported energy.

II.NET METERING – A BASIC CONCEPT

Net metering (or net energy metering) allows the consumers who generate some or all of their own electricity to use that electricity anytime, instead of when it is

generated. This is particularly important with the wind and solar. Monthly net metering allows consumers to use solar power generated during the day at night. Annual net metering rolls over a net kilowatt credit to the given month, allowing solar power that was generated in July to be used in December. The Net metering policies can vary significantly by country and by state or province it includes: if there is net metering available, if and how long banked credits can be retained, and how much the credits are worth. Most net metering laws involve monthly rollover of kWh credits, a small monthly connection bill, require monthly payment of deficits (i.e. normal electric bill), and annual settlement of any residual credit. Unlike a feed-in tariff (FIT), which requires two meters, net metering uses a single, bi-directional net meter and can measure current flowing in two directions. Net metering can be implemented solely as an accounting procedure, and requires no special metering, or even any prior arrangement or notification. Fig. 1 shows block diagram of net meter.

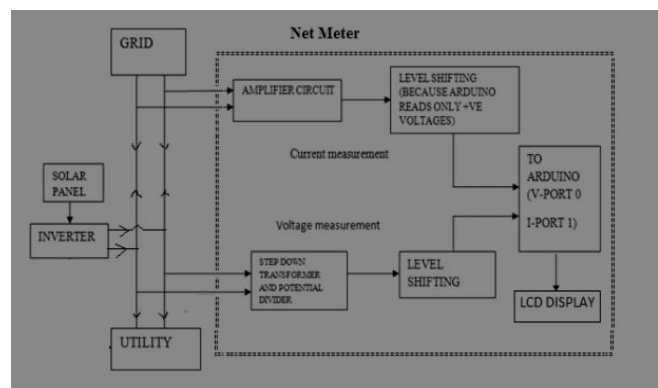


FIG.1 block diagram

III. LITERATURE REVIEW

There are two different types of metering arrangements used for development of rooftop solar

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photovoltaic (PV) systems: gross and net metering. Net metering is a service to an electric consumer under which electric energy generated by the electric consumer from an on-site generating facility and delivered to the local distribution facilities, may be used to offset electric energy provided by the electric company to the electric consumer during the applicable billing period. Government of India launched the Jawaharlal Nehru National Solar Mission in 2009 to increase share of solar energy. As of June 2015 ten states in India (Gujarat, Andhra Pradesh, Uttarakhand, Tamil Nadu, West Bengal, Karnataka, Kerala, Delhi, Punjab, Telangana) have released a final distributed net metering policy regulatory framework.

Indian Net-metering Guidelines

- 1) Proposed limit for commercial settlement of electricity generation as 90% of the total consumption in a financial year.
- 2) Excess injection (above 90%) at the end of financial year to be considered as free energy.
- 3) No carry forward of energy allowed to next financial year.
- 4) Table.1 shows the reference case for energy accounting under Indian net metering.

Table 1: Energy accounting under Indian net metering

Month	Generation	Consumption	Net Electricity	Effective Bill
April	150	160	10	10
May	150	180	30	30
June	150	20	-130	-130
July	150	260	110	-20
Aug	150	100	-50	-70
Sep	150	160	110	40
Oct	150	140	-50	-10
Nov	150	200	50	40
Dec	150	220	70	70
Jan	150	100	-50	-50
Feb	150	200	50	0
Mar	150	0	-150	-150
Total	1800	1840	40	40

IV COST AND AREA REQUIREMENT OF NET METER

The average potential roof-space requirement for a typical 1 KW solar PV power plant will be 80 sq-ft (approx) shade free area and similarly proportionately higher area for higher capacity system. The tentative cost of grid-interactive 1 KWp rooftop solar PV plant will be Rs. 1.2 to Rs 1.3 lacs (approx). Similarly, 1 KWp off-grid system with minimum battery back-up shall require Rs. 1.5 lacs to 1.8 Lacs (approx). In addition that all such systems, 30% subsidy shall be availed from Ministry of New and Renewable

Energy (MNRE) Government of India, through state nodal agencies. Fig.2 shows actual photograph of project.

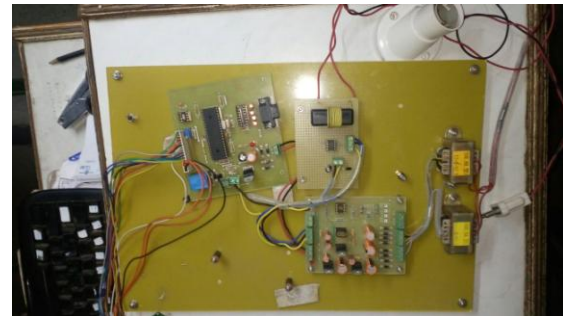


FIG. 2 Photograph of project

IV. ADVANTAGES OF THE DESIGNED SYSTEM

- ◆ The system is easy and cheap in cost. It enables people to get real value for the electrical energy they produce, without having to install a second meter as well as an expensive [battery](#) storage system.
- ◆ It allows homeowners and businesses to produce electrical energy, which takes some of the pressure off the grid, especially during periods of peak hours consumption.
- ◆ Each home can potentially feed power to two or three other homes. If enough homes in a neighborhood use renewable energy and net metering systems, the neighborhood could potentially become self-reliant.
- ◆ It encourages energy consumers to play an active role in alternative energy production, which both protects the environment as well as helps preserve natural energy resources.
- ◆ Homes and industries that use net metering tend to be more aware of, and therefore more careful about their energy consumption.
- ◆ It saves utility companies money on meter installation, reading and billing costs etc.

VI. CONCLUSION

In this paper, the configuration of net meter in grid connected solar PV system for domestic energy consumers has been designed as well as calculate the energy accounting of Indian net metering. This proposed model is clean to build with good accuracy.

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