ENERGY METER FOR NET METERING

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ABSTRACT

Electricity is most important in our day to day life there are two ways of the electricity generation either by conventional energy sources or by non conventional energy sources. Now electrical energy demand is increasing day by day so we use the PV cell for energy generation, now days the smart home concept such a technology is vulnerable to various security threats so to use of the net metering concept is very essential. the net metering concept in which consumer meter which is a bidirectional energy meter for measuring the quanta of electricity flowing in opposite and the net quantum of electricity either consumed by the consumer or injected into the distribution system of the licensee in kHz which shall be an integral part of the net metering system . Energy meter means a consumer meter for measuring, indicating and recording the net quantum of electricity either injected to distribution system or imported by the consumers is derived by arithmetical means and because of this we give name for project is as "Energy Meter For Net Metering System".

Keyword : *-Microcontroller1, Analog to Digital controller2, Display3, and Power flow direction sensing device4 etc….*

1. INTRODUCTION-

1.1 Problem Definition:

Due to many advantages use of renewable energy sources increases and they may supply power to home as well as grid also. Many consumers installs their own renewable energy plant. Extra produced energy is exported to the grid and if load requirement is large energy is imported from grid. For billing of this imported and exported energy numbers of methods are used. One of the method is two energy metering. In that method two separate energy meters are used, Where one energy meter is used to measure energy imported from grid and other is used to measure energy exported from solar panel to the grid. Total billing of energy is done by taking separate reading of both meters then calculation of total energy imported or exported and then according to tariff rate billing is done.

Bidirectional energy meters are used for net metering. In that energy meter imported electrical energy and exported electrical energy is displayed separately or displayed one by one. At the time of total calculation of energy separate reading are need to be take, and then calculation is done. To overcome this disadvantages energy meter for net metering is introduced.

1.2 Solution and Effect

As total energy imported or exported is need to display we make this project. In this project we have design energy meter in such way that meter directly displays the units. When power is taken from MSEB that time direction of the current is incoming. When power is taken from solar panel, then direction current is outgoing. According to the total energy is displayed which may be imported or exported. If imported energy is more than exported then meter will display positive unit output. And when exported energy is more than imported energy then it will display negative unit output.

1.3 Proposed Work

The block diagram for "Energy Meter For Net Metering System" is given in fig (1).AC output of PT is converted into DC by using a rectifier, then it will pass to the ADC (0808) the ADC is used here to convert the analog signal into digital signal. Similarly output of CT is given ti ADC through rectifier. This digital signal is then given to the micro-controller 8052. Power flow direction sensing block used to find direction of power flow. Output of this is given to microcontroller through optocoupler. According to the direction of power flow total unit output is displayed. If energy is flows from MSEB to house then meter will display incoming. And if energy is flow from Solar to MSEB then meter will display outgoing.

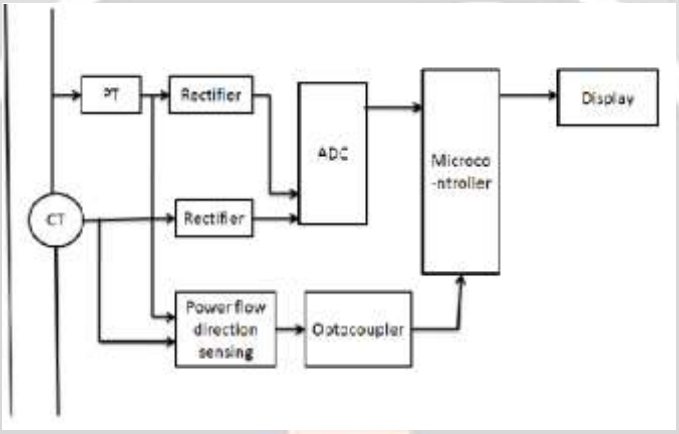

Fig. 1 (Block Diagram)

2.HARDWARE AND SOFTWARE-

2.1 Hardware Implementation

Hardware model is as shown in below figure. Two potential are used in this model. One is used to create a constant supply voltage for operation of different IC's. For calculation of energy consumed or absorbed Output of current transformer and output of potential transformer given to the microcontroller 80c52 through rectifier and ADC 0808.

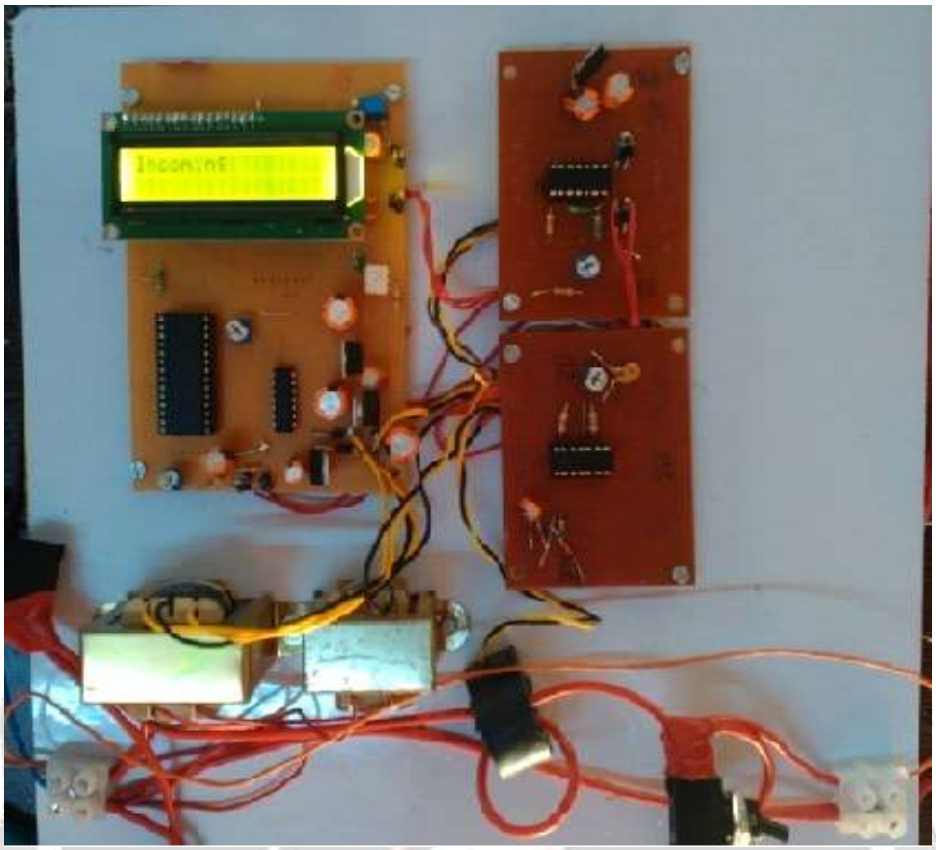

Fig 2: Hardware model.

This rectifier converts AC signals into the Dc signal and ADC 0808 converts analog signal into digital signal, microcontroller reads only digital signal. Different IC's and electronic components are used to find direction of power flow. Depending upon the signal getting at output terminal of power flow sensing device energy is measured, calculated, display and stored. When energy is taken from MSEB to home then energy is considered as incoming and calculated as positive energy. When energy is flow from solar pv panel to MSEB then energy is considered as outgoing energy. And this energy is calculated as negative energy. In microcontroller total energy is calculated as outgoing energy is subtracted from Incoming energy and then finally total units are displayed. When display shows positive value then incoming energy is more than outgoing energy. And when Display shows negative value then outgoing energy is more than incoming energy.

2.2 Software Implementation

The simulation is done using the proteus software and different IC's which are used in this simulation model are burn into the keil software. Result of software are shown in following figures.

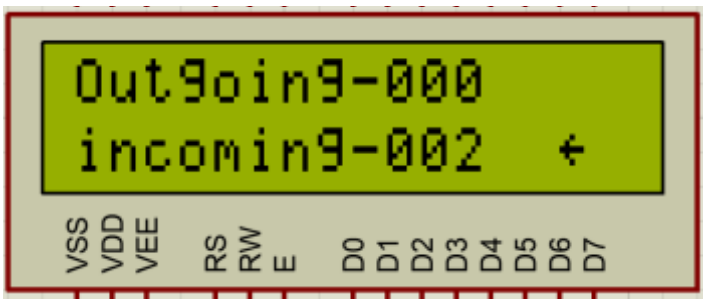

Fig 3: Simulation result

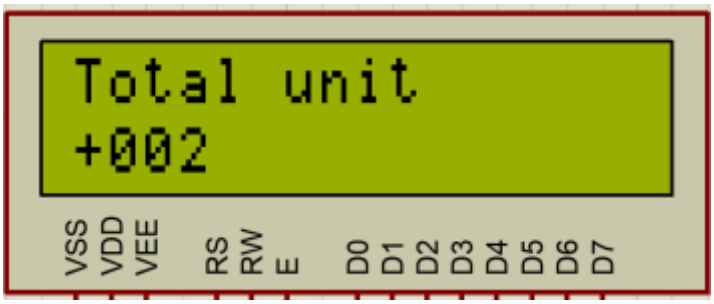

Fig 4: Simulation result

2.3 Hardware Result

Following table shows the output result of energy meter for net metering system. Two different results are shown for different power flows in system.

Sr. No.	Flow of supply	Voltage in volt	Current in amp	Power in kw	Energy in kwh	LCD Display
1	MSEB to home	210	6	1.26	3	INCOMING
2	Solar to MSEB	220	5	1.1	1	OUTGOING

Table 1

4. CONCLUSIONS

As a day by day the use of electrical energy increases, which tends to use of renewable energy sources. That is increasing use of solar energy source so the Net metering concept is arises. The present system suffer from the following shortcomings

- All calculations for billing are done manually.
- Take lots of time
- Possibility of human mistake in calculation.

But this energy meter is best solution to overcome this all issues and also the viable choice from the economical point of view. Moreover, while dealing with this net meter we conclude that:

- It encourages us to save power using 'Time of Use ' and other unique features present in modern net-meter
- It reduces the pressure on the grid.
- It reduces transmission losses.
- The time required for the billing calculation is reduced.
- Human mistakes in calculations are totally eliminated.
- Display the direct reading of unit.

5. REFERENCES

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