SOLAR PHOTOVOLTAIC POWER GENERATING SYSTEM

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Abstract— **This paper presents that the interfacing of solar power with grid taking frequency into consideration. Synchronization is achieved for solar output frequency and grid frequency. Power is delivered to the grid by manual breaker. Microcontroller is used to check the frequency of grid and solar. And also detects zero crossing of the sine wave to drive the circuit. Unfluctuated load with synchronized frequency is been delivered to the grid.**

Index Terms— **Grid, Unfluctuated Power, Synchronized frequency**

I. INTRODUCTION

While research on the element technologies have been studied well, studies on energy management with renewable energy are not relatively developed. In case of on-grid photovoltaic systems connected to commercial electricity grids directly through inverters. Power consumption can be decreased in buildings or homes, but there could also be energy loss when power consumption is very low or electricity price are cheap, and vice versa. We are interfacing solar energy with grid. There are many types of renewable energy such as solar, wind, tidal etc., in our project we proposes solar energy since it is convenience for us.
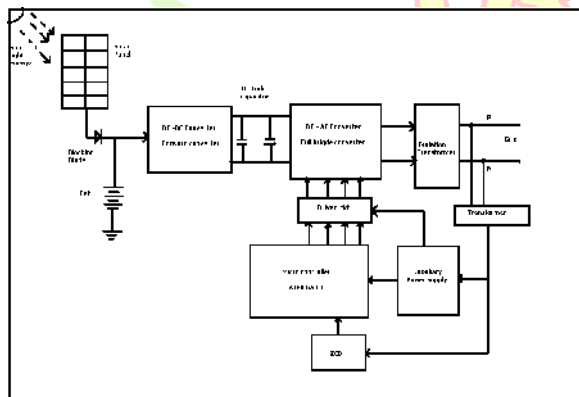
II. PROPOSED SYSTEM
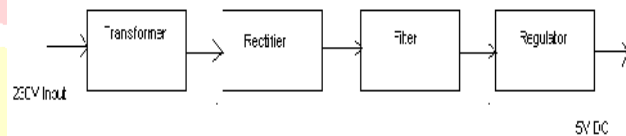

Fig.1. Block Diagram of Proposed System

Fig.2. Block Diagram of Power Supply

All electronic circuits' works in low voltage, so we need a power supply unit to provide the appropriate voltage supply for their proper functioning. This consists of step down transformer, rectifier, and filter, regulator. AC voltage or typically 230V is connected to transformer voltage down to the level to the desired ac voltage.

A diode rectifier that provides the full wave rectified voltage but also remains the same dc even the dc voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation. A regulator circuit can use this dc input to provide dc voltage that not only much less ripple voltage varies somewhat, or the load connected to the output dc voltage changes.

Solar power is the conversion of sunlight into electricity, either directly using Photovoltaic (PV) or indirectly using Concentrated Solar Power (CSP). Concentrated solar power systems use lenses or mirrors and tracking systems to focus a large area of sunlight into a small beam. Photovoltaic convert light into electric current using the photoelectric effect.

A transformer is a static piece of which electric power in one circuit is transformed into electric power of the same frequency in another circuit. It can raise or lower voltage in the circuit, but with a corresponding decrease or increase in current. It works with the principle of mutual induction. In our project we are using a step down transformer to provide a necessary supply for the electric circuits. Here we step down a 230V ac into 12V ac.

A DC-to-DC converter is an electronic circuit which converts a source of direct current (DC) from one voltage level to another. It is a class of power converter. This helps to increase voltage levels from 12V to 24.6V.

An inverter, is an electrical power converter that changes direct current (DC) to alternating current (AC); the converted AC can be at any required voltage and frequency with the use of appropriate switching, and control circuits.

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Solid-state inverters have no moving parts and are used in a wide range of applications, from small switching power supplies in computers, to large electric utility high-voltage direct current applications that transport bulk power. Inverters are commonly used to supply AC power from DC sources such as solar panels or batteries

The ATmega8L is a low-power CMOS 8-bit microcontroller based on the AVR RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega8 achieves throughputs approaching 1 MIPS per MHz, allowing the system designed to optimize power consumption versus processing speed.
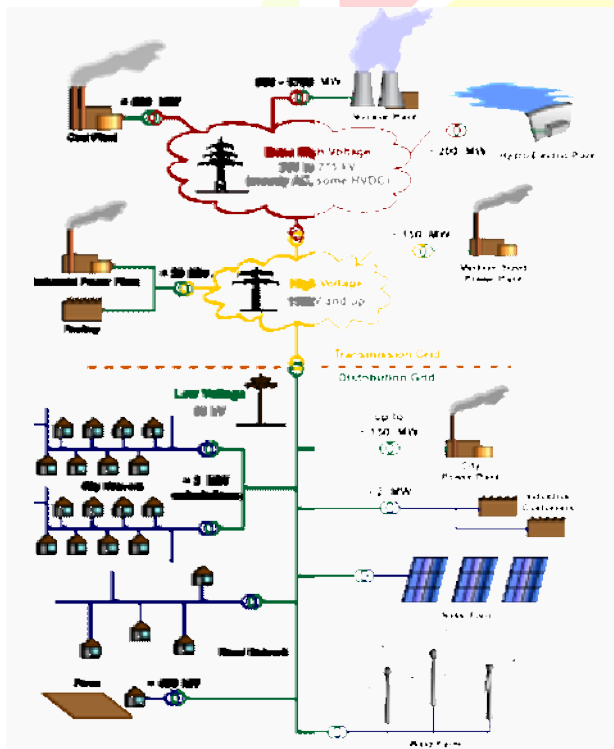
III. GRID IMPLEMENTATION

Fig.3. Grid connection

Voltages and depictions of electrical lines are typical for Germany and other European systems.

An electrical grid interconnected network for delivering electricity from suppliers to consumers. It consists of generating stations that produce electrical power, high-voltage transmission lines that carry power from distant sources to
demand centers, and distribution lines that connect individual customers.

Power stations may be located near a fuel source, at a dam site, or to take advantage of renewable energy sources, and are often located away from heavily populated areas. They are usually quite large to take advantage of the economies of scale. The electric power which is generated

is stepped up to a higher voltage-at which it connects to the transmission network.

The transmission network will move the power long distances, sometimes across international boundaries, until it reaches its wholesale customer (usually the company that owns the local distribution network).

On arrival at a substation, the power will be stepped down from a transmission level voltage to a distribution level voltage. As it exits the substation, it enters the distribution wiring. Finally, upon arrival at the service location, the power is stepped down again from the distribution voltage to the required service voltage.

A town is only said to have achieved grid connection when it is connected to several redundant sources, generally involving long-distance transmission.

This redundancy is limited. Existing national or regional grids simply provide the interconnection of facilities to utilize whatever redundancy is available. The exact stage of development at which the supply structure becomes a grid is arbitrary. Similarly, the term national grid is something of an anachronism in many parts of the world, as transmission cables now frequently cross national boundaries. The terms distribution grid for local connections and transmission grid for long-distance transmissions are therefore preferred, but national grid is often still used for the overall structure.

IV. CONCLUSION

This paper presents that the interfacing of solar power with grid taking frequency into consideration. Synchronization is achieved for solar output frequency and grid frequency. Power is delivered to the grid by manual breaker. Microcontroller is used to check the frequency of grid and solar. And also detects zero crossing of the sine wave to drive the circuit. Unfluctuated load with synchronized frequency is been delivered to the grid.

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