

# Standalone solar photovoltaic charging station

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**Abstract-** This Thesis deals with monitoring and diagnostic and function of the solar photovoltaic technology and system Also as continuous plays a major role in generation of power by solar power the construction features include the main part of the solar PV array and standard inverter system also have the desired direct current battery system with single pole switch system and charge controller system ,india has launched Jawaharlal Nehru national soar mission with ambitious target of installing 20,000 MW. That promote solar PV system installation stand alone solar PV system or off grid PV system this will contains working on solar PV system for design installation troubleshooting and PV system in future scope , The energy we used must come from somewhere normally the energy we used supplied to us in the form of petrol, diesel, LPG, CNG and electricity , this source of energy are finite in nature and caused environmental pollution so to overcome this shortage the developed a such good amount of enough generation of power by Solar photovoltaic technology and system.

## 1. INTRODUCTION

The expanding request for renewable vitality sources has driven to the broad selection of sun oriented control. In any case, one of the most challenges the utilization of sun powered vitality is the discontinuous nature of sun oriented control era, which can comes about changes in vitality supply. To address this challenge, vitality capacity framework are basic to store vitality for utilize amid periods of moo or no sun oriented control generation, This proposal proposes a Off lattice vitality capacity framework for sun oriented ranches that combines the preferences of batteries and sun based inverter framework. The point of this inquire about is to advancement of solid and productive vitality capacity arrangement that can upgrade the solidness and unwavering quality of renewable vitality generation.

1.1 This investigate incorporates a comprehensive investigation of the proposed decentralized framework, counting a comparison with routine battery based energy capacity framework, to assess the framework effectiveness, fetched adequacy and execution completely different scenarios. The result is this investigate can give profitable experiences into the advancement and optimization of crossover vitality capacity framework for sun based ranches, contributing to the progression of renewable vitality .

## 2. LIST OF COMPONENTS:

In our we have used solar photovoltaic, Battery storage system , wire, inverter , charge controller circuit , base board.

### 2.1 SOLAR PHOTOVOLTAIC

Sun based boards, moreover known as photovoltaic (PV) boards, are gadgets that change over daylight into power through the photovoltaic impact. They're composed of different sun based cells made of semiconductor materials, ordinarily silicon. These cells assimilate photons from daylight, producing an electric current as a result of the interaction between the photons and the semiconductor material.

PV cells are made of materials that create energized electrons when uncovered to light. The electrons stream through a circuit and create coordinate current (DC) power, which can be utilized to control different gadgets or be put away in batteries. Sun oriented boards are too known as sun oriented cell boards, sun oriented electric boards, or PV modules.

The photons that hit the sun powered cell lose electrons from their particles, and the entire can be transformed into an electrical circuit with the correct connection of conductors on the positive and negative sides of a cell.

### 2.2 CHARGE CONTROLLER CIRCUIT

A sun oriented charge controller is on a very basic level a voltage or current controller to charge the battery and keep electric cells from cheating. It coordinates the voltage and current hailing from the sun powered boards setting off to the electric cell. By and large, 12V boards/panels put out within the ballpark of 16 to 20V, so in the event that there's no direction the electric cells will harm from cheating. For the most part, electric storage devices require around 14 to 14.5V to induce totally charged. The sun powered charge controllers are accessible in all highlights, costs, and sizes. The run of charge controllers is from 4.5A and up to 60 to 80A.

### 2.3 BATTERY

In Sun oriented Control Vitality Producing Framework we are utilizing Lithium Particle Batteries. Lithium-ion batteries control the lives of millions of individuals each day. From portable workstations and cell phones to half breeds and

electric cars, this innovation is developing in ubiquity due to its light weight, tall vitality thickness, and capacity to revive. A battery is made up of an anode, cathode, separator, electrolyte, and two current collectors (positive and negative). The anode and cathode store the lithium. The electrolyte carries emphatically charged lithium particles from the anode to the cathode and bad habit versa through the separator. The development of the lithium particles makes free- electrons within the anode which makes a charge at the positive current collector. The electrical current at that point streams from the current collector through a gadget being fueled (cell phone, computer, etc.) to the negative current collector. The separator pieces the stream of electrons interior the battery.

## 2.4 INVERTER

An inverter is an electric device that changes coordinate current (DC) to rotating current (AC). It isn't the same thing as an alternator, which changes over mechanical vitality (e.g. development) into substituting current coordinate. current is made by gadgets such as batteries and sun oriented boards. When associated, an inverter permits these gadgets to supply electric control for little family gadgets. The inverter does this through a complex handle of electrical alteration. From this handle, AC electric control is created. This frame of power can be utilized to control an electric light, a microwave broiler, or a few other electric machine.

## 3. BLOCK DIAGRAM AND CONNECTION

The daylight falling on the soil is essentially the bundles of photons or bundles of little vitality. 2. Each photon in a bundle includes a limited sum of vitality. In sun oriented range, there are numerous photons of distinctive vitality. For era of - power, photons must be retained by sun powered cell. 3. The retention of photon depends upon the vitality of photon and the band-gap vitality of semiconductor fabric of a sun oriented cell. 4. The photon vitality and the band-gap vitality of semiconductor is communicated in terms of Electron-volt (eV).

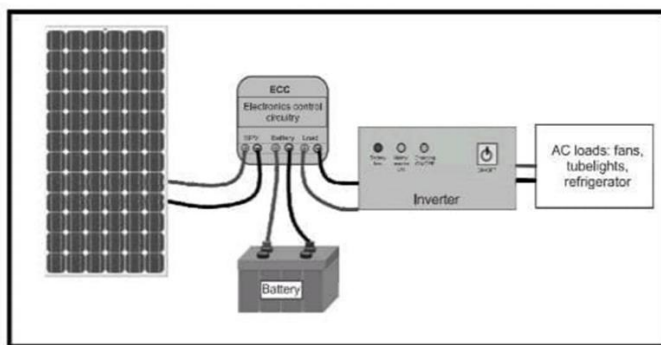


Fig: Block diagram of standalone solar system

## 3.1 WORKING PRINCIPLE

We can understand the working of this standalone model in three steps -

1. When this is self sufficient model to fulfill load requirement of consumer.
2. It is single power unit and that not grid connected so large amount of consumer solar power plant need to installation.
3. It also applicable for direct current load as with alternating current , variation of load provided by this system.

## 4. WORKING OF STANDALONE SYSTEM

1. The Photons within the daylight falling on the sun powered cell's front confront are retained by semiconducting materials.
2. Free electron-hole sets are created. Electrons are considered as negative charge and gaps are considered as positive charge.
3. Voltage created at the terminals of a sun oriented modules is utilized to drive the current within the circuit. The current within the circuit will be coordinate current or DC current.
4. The sun oriented cell with day light falling on it can specifically drive DC electrical machines.
5. The sum of power created is relative to the sum of light falling. So, the sum of power produced all through the day isn't steady.
6. Yield terminal of the modules is straightforwardly associated to a charge controlling circuit.
7. Charge control unit is have whole association from the battery , inverter , cluster.
8. Yield dc control from cluster is handle by the charge controller circuit .

9. Battery association to the BMS charge controller circuit.
10. Offer assistance battery to store control for when sunlight isn't accessible period.
11. It advance the standalone sun powered photovoltaic framework.
12. Ought to plan a control framework, sun oriented PV modules will be as it were source of the control supply.

## 5.FUTURE SCOPE

Long-standing Time Situation of Sun based Control Charging Station is likely to be more progressed and advanced with the appearance of unused innovations and strategies. Here are a few conceivable advancements that might be anticipated:

**5.1** Rising concerns almost climate alter, the health effects of discuss contamination, vitality security and vitality get to, in conjunction with oil costs in later decades, have driven to the have to be and utilize elective, low-carbon innovation choices such as renewables.

**5.2** the long run sun powered and wind innovation looks promising, much appreciated to the headways in vitality capacity and savvy lattice advances. Sun powered and wind vitality can be fundamental in diminishing nursery gas emanations and combating climate alter.

**5.3** Sun based PV FOR OFF-GRID Arrangements: Off-grid (or stand-alone) applications are ordinarily utilized where there's no electric lattice or when the taken a toll of interfacing to the network is tall. Applications are regularly littler than other framework sorts and are regularly utilized for small-scale ventures in rustic region.

## 6. CONCLUSION

In conclusion, the implementation of a solar power charging station represents a significant leap towards sustainable energy practices and environmental responsibility. The utilization of solar energy not only addresses the growing concerns of depleting fossil fuels but also contributes to the reduction of greenhouse gas emissions. The long-term benefits of such a station are evident, providing a clean and renewable source of power for various electronic devices and vehicles. The investment in solar technology not only promotes energy independence but also positions us on the path to a greener and more resilient future. As we continue to embrace innovative solutions for our energy needs, the integration of solar power charging stations stands as a beacon of hope, showcasing the possibilities of harnessing the abundant and clean energy from the sun to power our modern lives. It is not just a technological advancement; it is a commitment to a sustainable and eco-friendly tomorrow.

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