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Modelling and Analysis of Three Phase Grid Photo Voltic System for Electric Vehicle

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Abstract: ***Renewable energy systems area unit seemingly to become wide spread within the future thanks to adverse environmental impacts and step-up in energy prices connected with the exercise of established energy sources. Solar and grid energy resources area unit various to every different which can have the particular potential to satisfy the load quandary to a point. However, such solutions any time researched severally aren't entirely trustworthy thanks to their impact of unstable nature. During this perspective, autonomous electrical phenomenon and grid hybrid energy systems are found to be a lot of economically viable various to meet the energy demands of diverse isolated shoppers worldwide. Conservation of energy is extremely traditional these days however management of energy is extremely essential issue to figure on the idea of change to energy generation devices for continuous provide of dc storage conjointly demand of electricity is increasing day by day however accessible wattage plants aren't ready to provide electricity as per the strain wants. The main objective of the project is to supply a framework for promotion of enormous grid connected grid - solar PV hybrid system for optimum and economical utilization of transmission infrastructure and land. Project conjointly aims to encourage new technologies, ways and way-outs involving military operation of grid and solar PV plants. Battery storage could also be other to the hybrid project to cut back the variability of output power from grid solar hybrid plant, for providing higher energy output for a given capability at delivery purpose, by putting in further capability of grid and solar energy in an exceedingly grid solar hybrid plant and making certain handiness of firm power for a specific amount.***
Keywords: Electric vehicle, solar power, vehicle-to-grid, management of power.

I. INTRODUCTION

As we know, that demand of renewable energy has been increasing day-by-day due to increase in population, urbanization and industrialization. The world's fossil fuel supply like coal, petroleum and natural gas will be depleted in a few hundred years. The rate of energy consumption is increasing; supply is depleting resulting in energy shortage. Today, with rising fuel costs, increasing concerns for global climate change, a growing worldwide demand for electricity, utilizing renewable sources such as solar and grid power becomes necessary rather than a luxury.

Electricity plays an important role in human life. Conventional and non- conventional energy sources are used for electrical power generation. Due to the continuous use of conventional sources, they are going to vanish from the earth and the main draw backs are the contribution to air pollution and global warming, the search for the other sources of energy ends with nonconventional sources of energy. Some of the nature friendly renewable energy sources like solar and grid energy are widely used for electrical power generation because they are complimentary in nature. In sunny days grid is calm and in cloudy days grid is strong, therefore the hybrid operation of grid- solar energy conversion system is popular. Uninterrupted power generation can be done irrespective of the weather condition aims to hybrid operation.

In the future, combining solar power and grid power is the most potential form among the area of renewable power resource. Because single energy is susceptible to seasonal climate and regional environment, the power supply stability of the system is poor, so the solar grid energy hybrid generation system can make up disadvantages and achieve stable power supplying.

The aim of this project is to provide continuous energy supply. The main focus is on providing energy at reasonable price. To provide a framework for promotion of large grid connected solar grid hybrid system for optimal and efficient utilization of transmission, reducing variability in renewable power generation and achieving better grid stability. In the initial stage of power energy system development, the electricity is supplied to the users in a type of bulk electric transmission system. Due to the technology of power system is improved, the traditional type of power system.

II. PROPOSED WORK

Conservation of energy is very normal nowadays but management of energy is very essential factor to work on the basis of switching to energy generation devices for continuous supply of DC storage also demand of electricity is increasing day by day but available electrical power plants are not able to supply electricity as per the demands needs. The power will be get generated with the help of PV solar panel, output obtain is in DC (direct current) with the help of solar charge controller the DC (direct current) output is given to the “DC” to “DC” converter. It is an electronic circuit or electrotechnical device that convert a source of DC (direct current) from one voltage level to alternative. It is a type of electric power converter. Power level range from very

low (small batteries) to very high (high-voltage power transmission). The maximum power point tracking (MPPT) system or sometimes just power point tracking, is a technique used with variable power sources to maximise energy extraction as conditions vary with this technique, most commonly used with photovoltaic (PV) solar system. This DC (direct current) power is used for different DC loads, with the help of inverter the DC (direct current) will get converted into AC (alternating current). It is well known that DC (direct current) is a relatively stable and positive voltage source, while AC (alternating current) oscillates around a nominal 0 v level, usually in a square or sinusoidal waveform. The output AC (alternating current) power is given to the AC loads and grid.

III. BLOCK DIAGRAM AND COMPONENT DETAIL

- Block Diagram

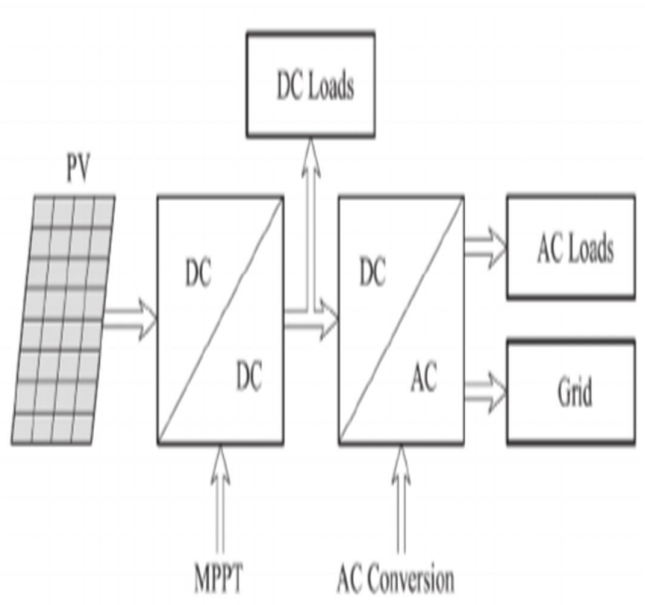


Fig-1: Block Diagram of “Solar PV-grid Hybrid Energy Generation System”.

A. Photo Voltic (PV) Panel

Photovoltaic (PV) cell is a device which convert light energy into electrical energy. Electricity is created without noise, in a clean way and without any harmful by-products. An array of solar cells converts solar energy into a usable amount of direct current (DC) electricity. Solar cells are connected in series increase the output voltage. Series connected cells form what is called as solar PV modules.

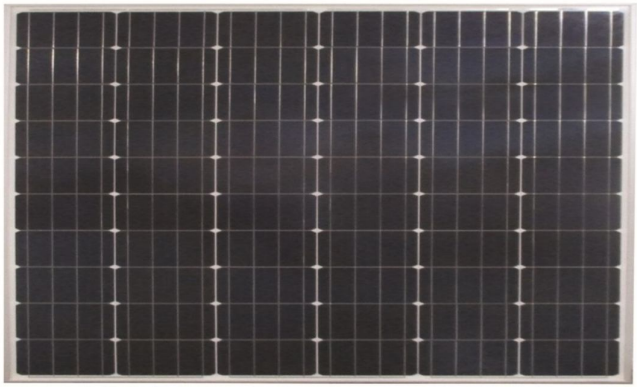


Fig-A: Photo Voltic (PV) panel

B. DC to DC Converter

It simplifies the power supply systems in the circuit and provides isolation in the primary and secondary circuits from each other. It will give a technique to extend potential (voltage) as required and available as a hybrid circuit with all elements in a single chip. Also used in the regulation and control of DC voltage. The output is well organized as positive or negative. The space of battery be reduced by using a converter.

Fig-B: DC to DC converter

C. MPPT

A maximum power point tracking (MPPT) system is the charge controller embedded with MPPT algorithm to maximise the amount of current going into the battery from PV module. MPPT is DC to DC converter which operates by taking DC input from PV module, changing it to AC and converting it back to a different DC voltage and current to exactly match the PV module to the battery.

Fig-C: MPPT

D. DC to AC Inverter

The DC-to-AC Converters are used to charge the batteries in the vehicles. These circuits are mainly used for driving low-power AC motors and are used in a solar power system. The DC to AC converters can be used in dc transmission lines for transmitting power to loads.

Fig-D: DC to AC inverter

E. Grid

The electrical grid is the electrical power system network comprised of the generating plant, the transmission lines, the substation, transformers, the distribution lines and the consumer. Traditionally, electricity generation facilities have been developed in locations far from consumption centres with the electric grid connecting the two.

Fig-E: Grid

F. Electric Vehicle

A hybrid electric vehicle (HEV) is a type of hybrid vehicle that combines a conventional internal combustion engine (ICE) system with an electric propulsion system (hybrid vehicle drivetrain). The presence of the electric powertrain is intended to achieve either better fuel economy than a conventional vehicle or better performance. There is a variety of HEV types and the degree to which each function as an electric vehicle (EV) also varies. The most common form of HEV is the hybrid electric car, although hybrid electric trucks (pickups and tractors), buses, boats and aircraft also exist.

Fig-F: Electric Vehicle

IV. CONNECTION DIAGRAM AND DETAIL WITH FLOWCHART

Photo Voltic cell is mounted on the roof of the electric vehicle (car). Partial shielding help to maintain the maximum level of power generation. The output power is taken by the load which is electric vehicle (car) and remaining power is delivered to the grid. The diesel generator is use for backup power generation.

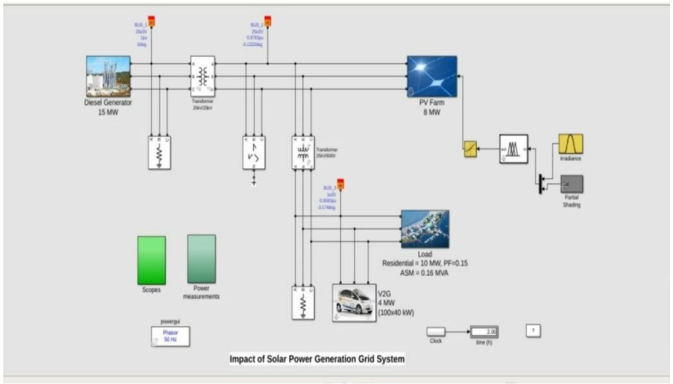
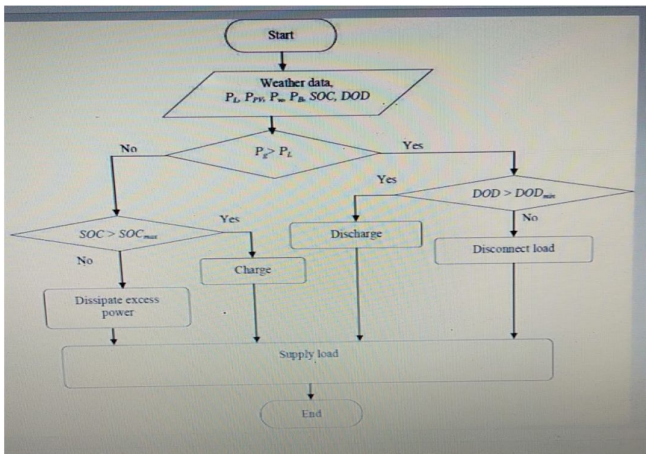


Fig. 2. Connection Diagram



Flowchart

V. ADVANTAGE

Unlike the conventionally fueled vehicles, solar vehicles have no fuel costs and a low cost of maintenance.

Driving Comfort: Having aluminum and lightweight components, the solar-powered cars run faster and more smoothly than petrol and diesel engine vehicles. Renewable solar panels produce electricity by transforming the continuous flow of energy from the sun to electricity.

CO_2-free. No harmful emissions are released into the air when electricity is produced by solar panels. Low operating costs.

VI. RESULTS

The system was simulated using MATLAB / Simulation model to verify the given proposed method. Modelling and analysis of three phase grid photo Voltic system for electric vehicle is presented to get the output power.

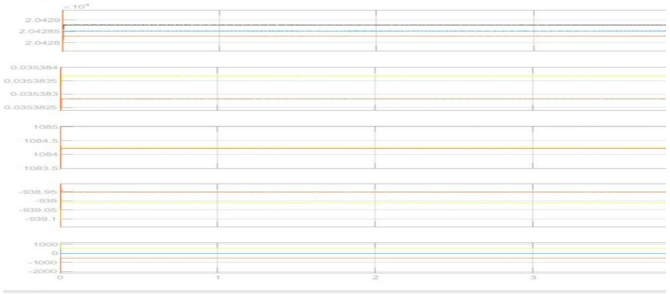


Fig.3. Photo Voltic Farm

Documentation of the energy yield of a large photovoltaic (PV) system over an evaluation with virtually zero deviation from the verified results.

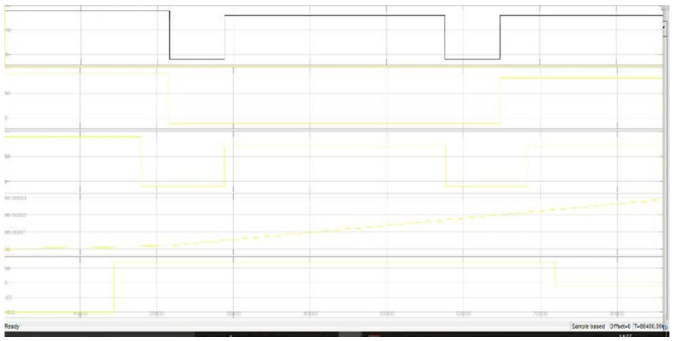


Fig:4- State of Charge

An overview of new and current developments in state of charge estimating methods for battery is given where the focus lies upon mathematical methods.

Fig:5- Total Power Generate

The power output is defined in terms of an integral of the acoustic intensity over a surface completely enclosing the structure.

VII. CONCLUSION

Design via simulation allows studying different options, considering various influence parameters and effectively fulfils the system / user requirements.

The FLC is mainly, designed to overcome the nonlinearity and the associated parameters variation of the components therefore yielding better system response at both transient and steady state conditions.

When there is no sunlight and it's cloudy, the load is supplied only with batteries. When the batteries are empty, the loads will have no energy supply. To prevent this situation, a diesel generator can be added to the system or the system can be supplied with energy by the main network.

The obtained simulation results indicate that the response of the load power in case of using the FLC is better and faster than that obtained in case of using the PI controller at all atmospheric conditions.

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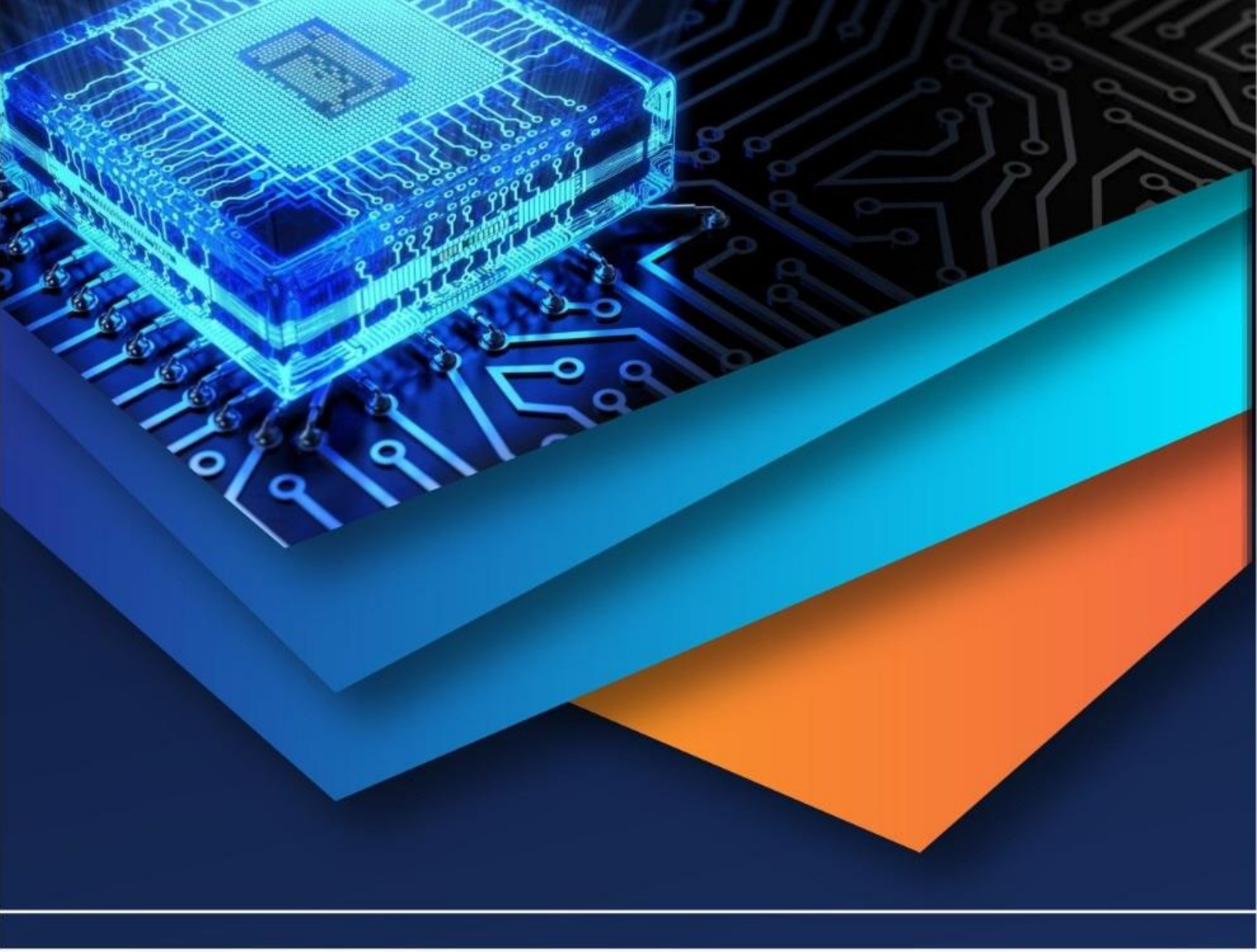

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