

A Review Paper on Solar Power Station

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ABSTRACT: *Electric cars operate on the concept of a supercharger, and thus need battery charging, which has resulted in the formation of solar power stations in different locations. The solar power station is intended to charge the batteries of electric cars and other electrical equipment. The sun is a good source of electrical energy production; the sun produces solar energy, which is a renewable energy resource; and a never-ending source of energy that is environmentally friendly; the sun diverse enough energy on earth every hour and throughout the year to meet the world's energy demand for a year; the sun diverse enough energy on earth every hour and throughout the year to meet the world's energy demand for a year; the sun diverse enough energy on earth every hour and throughout the year to In today's world, everyone need power for various purposes at all times in order to meet their energy requirements. Solar energy is also utilized to generate electricity at a low level. Solar energy is produced for commercial, industrial, and household purposes. It can immediately convert or utilize solar energy to turn it into electrical energy, making it highly efficient and non-polluting to the environment. This article addressed the future of solar energy, its benefits and drawbacks, as well as the uses and future scope of solar cells and solar energy. It also covered how solar cells operate, various kinds of solar panels, and numerous ways to boost solar usage in each nation.*

KEYWORDS: *Photovoltaic, Solar Panel, Solar Module, Solar System, Solar Charging.*

1. INTRODUCTION

In order to enhance the efficiency of solar power panels, the panels and types of materials used to produce them, as well as the coating on their panels, need all be improved. Solar tracking has improved solar energy efficiency. In this project, we will utilize solar energy to power an outdoor charging station for electrical devices. Design constraints were discussed; different technologies have been used to make solar panels, and that technology is known as solar panel technology; solar trackers are used to track the maximum light intensity coming from the sun; and various types of motors, such as induction motors, have been used in solar panels to control their motion. The purpose of a solar-powered charging station is to allow electrical gadgets to charge without polluting the environment. Solar power stations are built to convert solar energy to electricity, which is transformed to DC.

However, since most equipment in the industry are ac, the absorbed dc power is then converted to ac using an inverter. Solar energy is converted and stored in a battery bank, which is subsequently charged using a solar power station. Many controllers have been used to control the process of electrical vehicles and in various industries. Some controllers, such as Arduino, AVR, and others, have been used to control the charging of batteries, microcontrollers connected to solar power stations have been used to control the charging of batteries connected to vehicles. Microcontrollers are also utilized to control the charging process of an electric car. In recent years, several energy saving improvements have been completed on the Weber State University campus. This is a fantastic accomplishment. The solar charging station was addressed in this article. Fig. 1 shows circuit diagram of electric vehicle. The photoelectric effect, shown in Fig. 1, is effective in producing electric current when electrons are present. When energy or electromagnetic radiation such as light or heat passes through or heats the surface of metals, the metal plate begins to move. Solar energy is a renewable form of energy that is utilized to turn light into electricity. It functions on the basis of photoelectric effects. The photoelectric effect has been used since 1990, followed by solar cells [1]. The solar panels are oriented in such a manner that they can absorb the most energy, and various nations have varied sunrise and sunset times, thus solar panels provide their optimum output according to their dawn and sunset times. Contains DC and AC power, a DC/AC converter, and an electricity meter, as well as a grid linked to the tower and another grid connected to the tower.

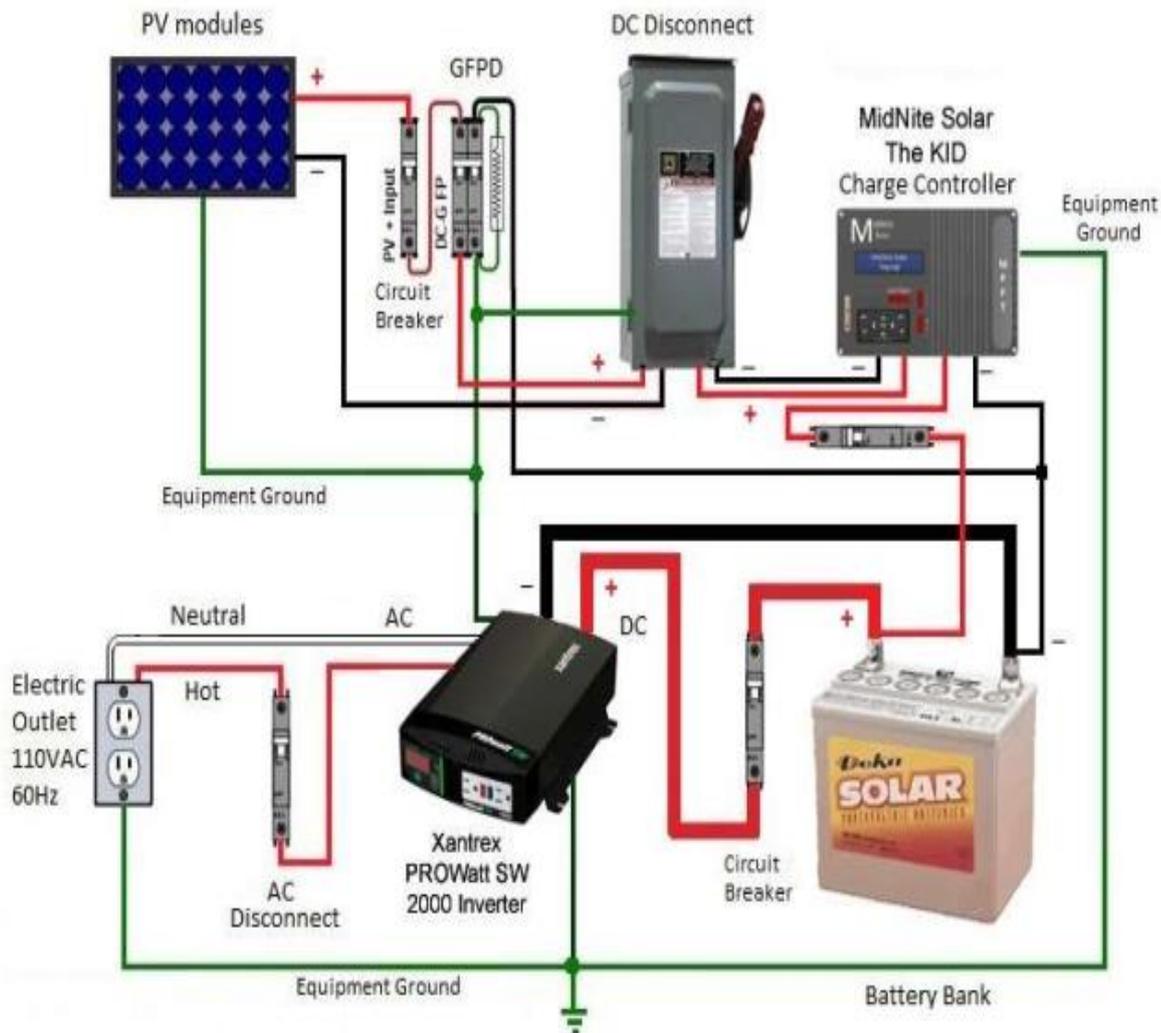


Fig. 1: Circuit Diagram of electric Vehicle

1.1. Photoelectric effect:

When sunlight falls on metals' surfaces, heat causes metal bonds to break and unpaired electrons to move throughout the surface, causing current to flow. This is known as the photoelectric effect, and the photovoltaic effect is the current produced when charge particles are contained within the surface. Because the charge particles in a solar panel do not come out to the surface, it operates on the photovoltaic effect [2]. Solar panels are made up of a number of cells that are electrically connected to each other and absorb light energy before converting it to electrical energy, which is then stored in a battery before being converted to AC by an inverter. The amount of energy produced is then calculated by an energy meter, and two wires from the energy meter, one for grid electricity and the other for green solar electricity, pass to the tower [3]. Varying towers have different ratings, and they are all linked to a substation that distributes power to industrial, commercial, and residential areas. Solar panels offer a number of advantages, including the ability to conserve energy and up to 20% on energy expenses, making them a cost-effective option [4]. Solar power plants may be utilized in a variety of settings, including urban and rural regions, as well as distant locales. Installing a solar power plant requires a significant amount of room for plants with higher power ratings, but it is simple since no cables, cords, or other components are needed. Rooftop or terrace may also be adequate for the installation of various solar power plant ratings, implying that it does not need new or big area and can be handled in a small space [5]. Fig. 2 shows solar charging tool station.

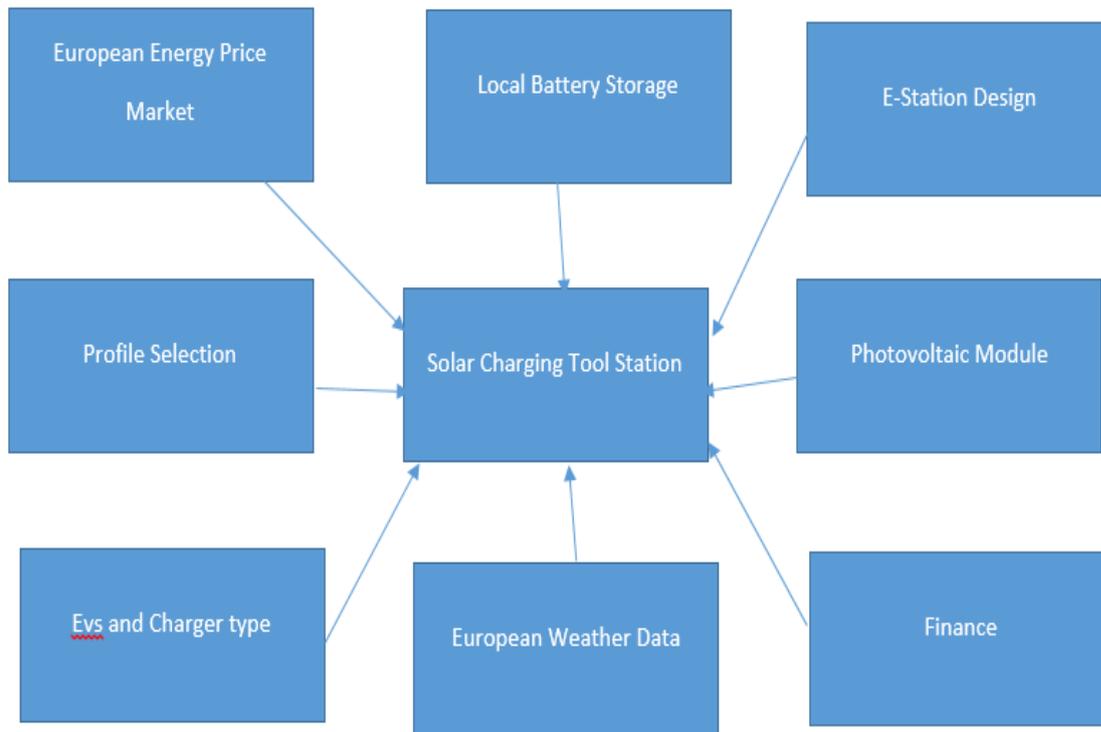


Fig. 2: Solar Charging Tool Station

As a result, power plants may be installed anywhere for residential and industrial usage, and they can create or produce their own power or electricity. In addition, sunshine is a free, environmentally beneficial, and renewable resource. There are no moving parts in the solar power plant, therefore no extra fuel is required. For electric energy generation, only sunshine is required; the solar power plant does not need any fuel or water. It has the ability to run on its own. A solar power plant is made up of a bank or group of solar panels that receive sunlight and convert it into DC electricity using the photovoltaic (PV) effect generated by the PV cells in the panels. This DC electricity is supplied into a battery, which stores it [6].

2. LITERATURE REVIEW

A study titled Solar Powered Charging Station by Kondracki, Ryan; Collins, Courtney; Habbab, Khalid addressed the purpose of solar energy, which is a technology that has been growing in popularity as it is further developed. The panels and kinds of materials used to manufacture panels, as well as the coating on their panels, should all be improved in order to increase the efficiency of solar power panels. Solar tracking has increased the efficiency of solar energy. We will use solar energy to power an outside charging station for electronic gadgets in this project. Discussed design constraints; different technologies have been used to make solar panels, and that technology is known as solar panel technology; solar trackers play an important role in the field of solar energy; solar trackers are used to track the maximum light intensity coming from the sun; and various types of motors have been used in solar panels to control their motion, such as induction motors.

Charge controller is an important part of a solar vehicle that is controlled by a microcontroller and is used to check and control the charging of batteries connected to the solar panel. This paper explains that a charge controller is a switching device that plays an important role in the field of solar vehicles, charge controller is used to build and break a connection between the charger and the battery, and it is used to check and control the charging of batteries connected to the solar panel. This will prevent overcharging of the batteries and control the electricity flowing from the solar panels to the batteries. Inverters and batteries are used in solar panels, thus this article discusses the usage of inverters and batteries in the area of solar, as well as the life of batteries and their materials. In this article, a 12 volt battery is utilized to power solar panels, and battery and solar panel efficiency power are calculated [7]. Simon Steinschaden 1 and José Baptista 2 published a research paper titled Development of an Efficient Tool for Solar Charging Station Management for Electric Vehicles, which discussed various methods previously used in electrical vehicles and also explained the method used to conduct this research paper. Explains the e-station load demand, as well as the graphical depiction of batteries and their life. In order to feed the load requirements of customers, excellent batteries should be included in solar power plants.

This article also described the charging and driving behavior of consumers, as well as graphical representations of energy demand owing to stochastic and non-stochastic profiles[8].

(a) Demand for non-stochastic produced energy; (b) Demand for stochastic generated energy. Every process should include important components or equipment, and this article describes the essential components of a solar charging station. Discussed design constraints; different technologies have been used to make solar panels, and that technology is known as solar panel technology; solar trackers play an important role in the field of solar energy; solar trackers are used to track the maximum light intensity coming from the sun; and various types of motors have been used in solar panels to control their motion, such as induction motors. This article also discusses the photovoltaic module, including its block diagram and features, as well as a mathematical formula linked to the pv module. In addition, this article addressed solar charging station tools, various kinds of charging stations, and a case study. The battery's driving and charging behavior has been examined, as well as its one-day energy performance. This article has demonstrated charging modes (a) based on maximum available power load, and (b) based on PV performed charging method. ure 17. Explanation of Grid-Connected and Stand-Alone PV Solar Charging Systems Energy balance for 34 km/day driving distances: (a) Off-grid charging station; (b) Off-grid charging station with stated decreased energy loss. The topics of energy balance and amortization, as well as various power battery ranges, have been addressed [9].

A research paper titled Solar Charging Station for Education and Research by Dr. Fred Chiou, Electronics Engineering Technology at Weber State University discussed system design and components and solar charging stations for electric bikes. In this paper components of solar power station and their quantity and use has been explained in this paper, pv module has been discussed in this paper, ground fault protection device has been discussed in this paper, also explained dc disconnect and ac disconnect, dc series fusing and charge controller has been discussed in this paper. In this article, the use of a battery bank and an inverter has been explored and described. This article also addressed equipment ground, electric outlet, safety procedures, and Solar Charging Station 2 for electric motorbikes, which describes the load required at the e-station and also displays and discusses the graphical depiction of batteries and their life. In order to feed the load requirements of customers, excellent batteries should be included in solar power plants. This article also described the charging and driving behavior of consumers, as well as graphical representations of energy demand owing to stochastic and non-stochastic profiles. (a) Demand for non-stochastic produced energy; (b) Demand for stochastic generated energy. Every process should include important components or equipment, and this article describes the essential components of a solar charging station. Discussed design constraints; different technologies have been used to make solar panels, and that technology is known as solar panel technology; solar trackers play an important role in the field of solar energy; solar trackers are used to track the maximum light intensity coming from the sun; and various types of motors have been used in solar panels to control their motion, such as induction motors. This article also discusses the photovoltaic module, including its block diagram and features, as well as a mathematical formula linked to the PV module [10].

3. DISCUSSION

This paper discusses about the panels and kinds of materials used to make them, as well as the coating on their panels, all need to be improved in order to increase the efficiency of solar power panels. Solar tracking has increased the efficiency of solar energy. We will use solar energy to power an outside charging station for electrical gadgets in this project. Solar trackers are used to monitor the greatest light intensity coming from the sun; and various kinds of motors, such as induction motors, have been employed in solar panels to regulate their motion. Solar energy extracted by the sun is in huge amounts and to store this energy and convert the energy into power or electricity is a big process in which a rectifier, battery, DC/AC inverter and energy meters are used. Energy extracted from the sun is in heat form and this is direct current and that direct current store in battery after that inverter used to convert DC into AC because more of the appliance is used to run by AC supply. Inverter and rectifier used as a power converting device but both have opposite operation as rectifier used to convert AC to DC and inverter used to convert DC to AC. According to the demand of solar panels in every country the country has a very bright future scope.

Nowadays, due to the decreasing amount of renewable energy resources, the last ten years become more important for per watt cost of solar energy device. It is definitely set to become economical in the coming years and growing as better technology in terms of both cost and applications. Everyday earth receives

sunlight above (1366W approx.) This is an unlimited source of energy which is available at no cost. The major benefit of solar energy over other conventional power generators is that the sunlight can be directly converted into solar energy with the use of smallest photovoltaic (PV) solar cells. There have been a large amount of research activities to combine the Sun's energy process by developing solar cells/panels/module with high converting form. the most advantages of solar energy is that it is free reachable to common people and available in large quantities of supply compared to that of the price of various fossil fuels and oils in the past ten years. Moreover, solar energy requires considerably lower manpower expenses over conventional energy production technology. Most of the people are aware about non-renewable energy resources. Solar energy has become increase more popular due to their economic benefits. By on Battery Backup, Solar Energy can even provide Electricity 24x7, even on cloudy days and at night. This also used with inter-grid System with Continuously Power supply. It has more benefits compared to other forms of energy like fossils fuels and petroleum deposits. It is an alternative which is promise and consistent to meet the high energy demand. Research on solar cell and solar energy is promise has a future worldwide.

4. CONCLUSION

In India and many countries they are aware about the non-renewable energy resources like wind, thermal, solar, geothermal and hydroelectric energy. In these renewable energy resources solar energy becomes the most popular and interesting topic in the research field due to its benefit in economics. Also it looks fancy. Electric energy produced from solar is very reliable because it has battery backup it can supply energy 24x7 even in cloudy days and at night also. Solar power plants use an inter grid circuit or system which helps it to supply power in a continuous manner, also when it comes to profit or benefit from solar energy there is very much advantage of solar energy instead of other energy sources like fossils fuels and petroleum. According to the demand of solar panels in every country it has a very bright future scope.

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