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Energy Production from Solar Power Station

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ABSTRACT: Electrical vehicles work on the principle of supercharger, electric vehicles need charging of batteries due to which at various places solar power stations have formed. Solar power station designed in such a way that it can charge the batteries of electrical vehicles and electrical devices. A solar powered charging station is designed so that electrical devices can charge without any surrounding pollution. Solar power station is formed to convert solar energy to electricity and converted energy is dc but mostly devices used in the industry are ac so absorbed dc power is then converted into ac by using an inverter. Converted solar energy is then stored in the battery bank and that battery bank is charged using solar power station. There has been many controller used to control the process of electrical vehicle and in different industry, some controllers such as Arduino, AVR, and many more these microcontroller used to control the charging of battery, microcontroller connected with solar power station used to control the charging of battery connected with vehicle. Also microcontrollers used to control the process of charge of an electric vehicle.

KEYWORDS: Photovoltaic; solar panel; solar module; solar system; solar PV system; electric bike; Electric motorcycle; solar charging

I. INTRODUCTION

For enhancing the efficiency of solar power panels there should be improvement in the panels and types of materials used to make panels and coating on their panels. Solar tracking have made solar energy more efficient. In this project, we will be utilizing solar energy to provide the supply for an outdoor charging station for devices. Discussed the design constraints, there has been different technology used to make solar panel and that technology called solar panel technology, there is an important role of solar tracker in the field of solar energy, solar tracker used to track the maximum light intensity coming from solar, also there have been various types of motor used in solar panel to control its motion, such as induction motor, permanent magnet brushless dc motor, permanent magnet brushed dc motor, and stepper motor[1].

What is the photoelectric effect?

At the metal plate start moving when energy or electromagnetic radiation such as light or heat pass or hit in the surface of metals. Solar is a renewable energy resource which is used to convert energy from light to electric energy. It works on the principle of photoelectric effects. Photoelectric effect has been in use from 1990 and solar cells come after that. On the surface of metals when sunlight drops off different radiation then due to heat metals bonds start breaking and unpaired electrons start moving throughout the surface of metals which cause current production on the surface this effect is known as photoelectric effect and photovoltaic effect is the current produced when charge particles are contained within the surface. Solar panel works on photovoltaic effect because its charge particles do not come out to the surface[2].

Shows the solar panels, solar panels aligned in such a way that it can absorb maximum energy and different countries have their different sunrise and sunset timing so according to their sunrise and sunset timing solar panels give their best output. Consists of DC electricity and AC electricity DC/AC inverter and electricity meter a grid connected with tower

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another grid connected to tower. Solar panels has number of cells which are connected electrically with each other and it absorbs light energy and convert that light energy into electrical energy and that electric energy stored in battery then inverter used to convert DC to AC, amount of energy produced is then calculated by energy meter and two wire from energy meter a grid electricity and green solar electricity passes to tower[3]. Different tower is of different rating and it connected with substation and passes electricity to industrial area, commercial area and for houses. Solar panels have their advantage because of which it is in high use producing energy from solar power plants can save energy and saves up to 20% of energy costs so it is cost beneficial also[4].

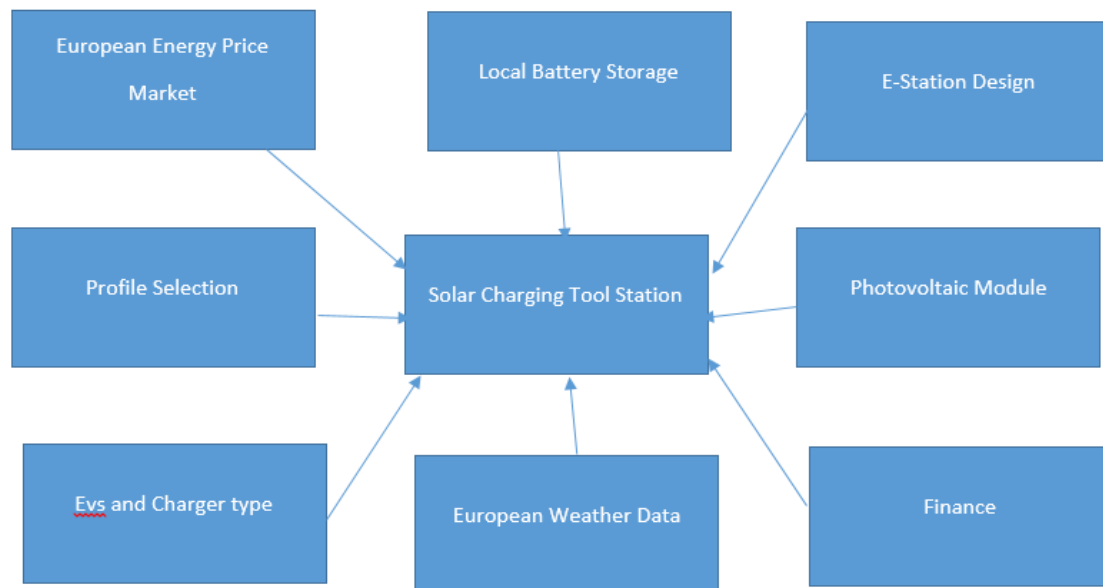


Figure 1: Solar Charging Tool Station

Solar power plants can be used at various places such as in urban areas and rural areas also in remote locations. Installing a solar power plant requires large space for more power rating plants but installation of solar power plants is easy because it does not require not required any wires, cords etc. Rooftop or terrace can also be sufficient for the installation of different ratings of solar power plants means it does not require new or large space it can work for smaller ratings and can be managed in small space. So installation of power plants at any place for domestic and industrial use can be possible and they can generate or produce their own power or electricity[3]. Also sunlight is free of cost, eco-friendly, renewable resource. Every part of the solar power plant is stationary, no moving part and not needed any additional fuel. Only sunlight is sufficient for electric energy production, there is no need for fuel or water to run the solar power plant. It can operate automatically. Basically the operation of a solar power plant consists of a bank or group of solar panels for receiving sun energy which is converted into DC electric power by photovoltaic (PV) effect produced by the PV cells in the panels. This DC electric power is fed to a battery which stores the energy[5].

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II. LITERATURE REVIEW

There has been many paper published in the field of electric vehicle and electric vehicle power station charging, among all these paper a paper titled Solar Powered Charging Station by Kondracki, Ryan; Collins, Courtney; Habbab, Khalid discussed the purpose of solar energy which is solar energy is a technology that has been increasing in popularity as it is further developed. For enhancing the efficiency of solar power panels there should be improvement in the panels and types of materials used to make panels and coating on their panels. Solar tracking have made solar energy more efficient. In this project, we will be utilizing solar energy to provide the supply for an outdoor charging station for devices. Discussed the design constraints, there has been different technology used to make solar panel and that technology called solar panel technology, there is an important role of solar tracker in the field of solar energy, solar tracker used to track the maximum light intensity coming from solar, also there have been various types of motor used in solar panel to control its motion, such as induction motor, permanent magnet brushless dc motor, permanent magnet brushed dc motor, and stepper motor.

Charge controller is an important part of solar vehicle which is controlled by microcontroller and used to check and control the charging of batteries connected with solar panel, in this paper explains the charge controller is a switching device which plays very important role in the field of solar vehicle, charge controller used to build and break a connection between the charger and battery, it controls over charging and to stop charging at the threshold voltage. This will protect the batteries from damage from over-charging and regulate the power going from the solar panels to the batteries. There has been use of inverter and battery in solar panels, so in this paper use of inverter and battery in the field of solar has been discussed and life of battery and its material has been discussed in this paper. In this paper a 12 volt battery is used to operate solar panels and calculation of batteries and solar panel efficiency power[6].

A research paper titled Development of an Efficient Tool for Solar Charging Station Management for Electric Vehicles by Simon Steinschaden 1 and José Baptista 2, discussed different methods which earlier used in electrical vehicles, also explained the method used to perform this research paper. Explains the load requirement at e-station, also shows and explains the graphical representation of batteries and its life. There should be good battery presents in solar power stations to feed the load requirement of customers so in this paper also explained the charging and driving behaviour of customers, also via graphical it shows the Energy demand due to stochastic and non-stochastic profiles: (a) Non-stochastic generated energy demand, (b) Stochastic generated energy demand. For every process there should be relevant components or equipment required so in this paper explains the solar charging station relevant components. Discussed the design constraints, there has been different technology used to make solar panel and that technology called solar panel technology, there is an important role of solar tracker in the field of solar energy, solar tracker used to track the maximum light intensity coming from solar, also there have been various types of motor used in solar panel to control its motion, such as induction motor, permanent magnet brushless dc motor, permanent magnet brushed dc motor, and stepper motor. Photovoltaic module and its block diagram and characteristics also have been discussed in this paper, and a mathematical formula related to the pv module has been shown. This paper also discussed solar charging station tools, there are different types of charging stations and discussed different types of charging stations and case study also discussed in this paper. Driving and charging behavior of battery has been discussed, e 13. One-day energy performance. (a) According to max available power load, (b) according to PV performed charging mode has been shown in this paper. Explanation of Grid-Connected and Stand-Alone Operating PV Solar Charging Systems. Energy balance for driven distances of 34 km/day: (a) off-grid charging station; (b) off-grid charging station with reduced energy loss explained. Energy Balance and Amortization and different ranges of power batteries has been discussed[7][8].

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III. 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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