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Solar-Based Electric Vehicle Charging Station

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ABSTRACT –

This paper discusses the planning and designing of a solar-powered charge for electric vehicles that is a solution to the high cost and harmful of gasoline.

The total number of countries the electric vehicles are used now is approximately 170 countries. The conclusion is that the electric vehicle will help alleviate poor economy, safety, and health in people's lives.

The object is making solar to be a charging system that eliminates the high gasoline price problem. As we all know, The sun, also known as Sol, is the star at the center of the Solar System. It is a nearly perfect sphere a yellow star, approximately 1.3 million kilometers in diameter. Due to its amazing features.

According to the same calculations, the total cost of the project is estimated at 15,000,000. Therefore contribute to this project that the sun shines on the building rooftop every day. So instantly means electricity will generated and stored on a battery. When opening the app to drive the window in an electric vehicle, immediately convert unused and unrequited energy to electric vehicle power directly or transfer it into power lines.

KEYWORDS: *Solar-Based Electric Vehicle Charging Station¹(SECS), Energy², Solar Energy³,Envoirment⁴, ,Electric Cars⁵,Green Energy⁶*

1. INTRODUCTION -

At a time of changing 'green' technology and increasing needs for renewable energy, solar-based electric charging stations are increasingly more relevant than ever before. This project report evaluates the importance of this new kind of technology and explores it possibilities of transformation in the world of electric vehicle (EV) charging devices all over the world. With the increasing alert to the risk of Environmental damage as well as the inadequate utilization of fossil resources, an alternative way of energy is necessary. Renewable energy resources are considered to be the positive proposal for this time. Solar energy is one of the cleanest energies around the world with plentiful amounts and permanence. Converting sunlight to electricity is a sustainable way to save the energy supply on Earth. The technological field of the world has arrived at a point where the development of the Environment as a future sector is in process. Due to global climate change, the entire world is transforming to a more eco-friendly transportation industry expecting to overcome the situation and fully conquer the transition to eco-friendly technology. With that in mind, today we going to discuss a topic related to solar energy and electric vehicle charging that could pave the path to green technology in the future, which is now rapidly developing in the world in the background of climate change. This report is focusing on the effectiveness, advantages, disadvantages, and implementation procedures of using solar energy for electric car charging. This project, through explaining the technology, social, economic, environmental impacts, and benefits of such a project, aims to illustrate the huge potential and power of the future of large-scale generation solar energy to EV charging infrastructures. In this project, a detailed analysis and explanation of the current global trend of generating power using solar energy, the advantages, and disadvantages of using solar energy as a future resource will be given in order to enlighten the readers and potentially modify their current perceptions and mindsets. Drawing from my knowledge, this report encourages people, policymakers and companies to invest in this future power usage trend in order to rewrite the narratives of the way we use current power for transportation and other miscellaneous purposes.

1.1 BACKGROUND –

Using electric cars is key to cutting down on global warming and our need for oil and gas. But, there are big walls in the way of making these cars common, mainly because we need places to charge them. Often, the power for these chargers comes from the grid, which might still use dirty energy sources.

1.2 OBJECTIVE –

1. Promote energy self-sufficiency and self-sufficiency: Solar-powered generators enable communities and individuals to generate their own electricity for charging vehicles electricity costs, reducing reliance on external power sources and improving energy efficiency.
2. Improves air quality and public health: By reducing reliance on fossil fuels, solar facilities help improve air quality and reduce respiratory health problems associated with air pollution.
3. Enhance user experience and convenience: Solar-powered charging systems can be installed in public areas, offices, and residential neighborhoods, and have provided electric car owners with flexible rental rates.

2 METHODOLOGY –



Figure 1. Hardware model

2.1 COMPONENT -

S. N	Name of components	Specification	Quantity
	ESP32		1
	Capacitor		1
	Voltage Regulator		1
	Coils	Copper	3
	Wire		
	Transistor	NPN	1
	Switch		
	LCD	Green Jumbo	
9	Battery	4V	2

3. WORKING –

solar-powered electricity The electromagnetic induction theory underlies the operation of vehicle autonomous charging stations. When electricity flows through the primary coil of the ground transmission unit, which is mounted on the surface of the charging station, magnetic flux is produced vertically from the ground. Electricity is delivered from the first coil to the second one (electromagnetic induction) and electrical pressure is produced by overlapping with the secondary coil in the vehicle's receiver unit. With this special technique, 80–90% charging efficiency is reached, which is comparable to cable charging..

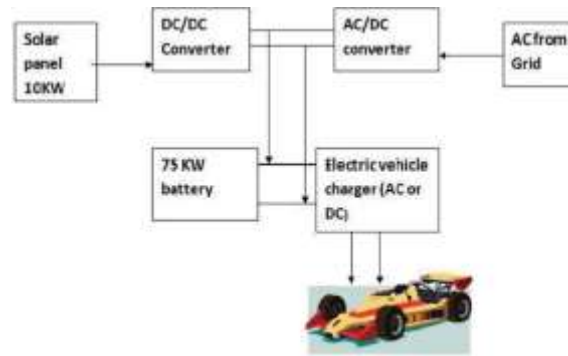


Figure 2. Circuit Diagram

4. RESULT –

There are many advantages to installing a solar-powered electric vehicle charging station, such as lower running expenses and decreased carbon emissions. The charging station may run independently of the grid and provide electric cars with reliable power by utilizing solar energy. Moreover, incorporating smart technologies may effectively control energy usage and maximize charge durations. All things considered, the project encourages the use of renewable energy sources and creates a greener transportation ecosystem.

5. CONCLUSION & FUTURE SCOPE –

The resolution of the above problem seems to be given by the use of electric charging stations powered by the Sun. Photovoltaic cells present an efficient and eco-friendly technique to convert solar energy into electricity, which is applied in charging electric vehicles (EVs) through three main methods: classic chargers, EM (Electromagnetic) charging, and battery swapping. It will be showed that each of the three methods has advantages and disadvantages which needs careful consideration if we strive to achieve the best solution based on actual demands.

Conventional chargers are a simple way to introduce solar power and ECCs because they provide the most affordable and common-across-cars option. They bring the direct current electricity generated by the solar panels onto the batteries of the EVs for a direct charge. With this technique, there is less debris and, therefore, less cleaning required. This makes this method practical and economically sensible. Though conventional chargers have their own disadvantages compared to other methods, such as the same being slower and the need for additional infrastructure to accommodate varying power levels and charging protocols, they however seem to be the most charging system convenient most drivers.

Electromagnetic charging technology, also known as wireless charging, dispenses with cords in charging vehicles ev and at the same time offers a convenient and quick way for EV charging. Solar panels create power which is then converted into a magnetic flux, that is transmitted to the EV's coil. Cable-less circuitry eliminates the need for each component to be individually wired together, which leads to greater consumer satisfaction as well as posing less risk of electrical shock. Nevertheless, electromagnetic charging has been comparatively less efficient due to the use of traditional systems and it can also necessitate high cost pieces of equipment.

Designed by an innovative mind the battery switching station imply a switch to solar-based energy EV charging Used batteries are no longer directly charging the cars' battery, instead, they are being replaced with fresh batteries loaded with electricity. Adopting this method allows to shorten the charging process and to have a relaxed attitude to the range. Besides battery exchange spots could be designed as certain place the battery can be managed and recycled. Nevertheless, as battery swapping needs commonality between EV manufactures as well as a swapping station setting, standardized infrastructure alongside a guarantee to the customers about being supplied with the original batteries is the only way to power the fast and truly widespread adoption of this technology.

At last, what really matters is that EV charging in science is best performed based on relevant demands and requirements. Conventional chargers offer proven solution and cost-effective system, electromagnetic charging eliminates the hassles of plugging in and contactless charging supports, and battery swapping clears range anxiety and revamps battery management. The continuous improvement of EV charging technology becomes solar-powered, it gets imperative to contemplate which sort of method is best applied at which point in conducting the overall transition to a sustainable transportation system (EV).

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