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Sol-Charge-Eat-Corner

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ABSTRACT: The Sol-Charge-Eat-Corner is an innovative solar-based smart table designed to serve as a multifunctional space for people to sit, relax, eat, and conveniently charge their mobile devices using clean and renewable solar energy. In today's modern lifestyle, mobile phones and portable electronic gadgets have become essential, yet access to reliable charging facilities in public places remains limited. This project provides a sustainable solution to this problem by utilizing solar power an abundant, renewable, and eco-friendly source of energy.

The system operates on a simple but efficient principle. A solar photovoltaic (PV) panel captures sunlight and converts it into direct current (DC) electricity. The generated power is regulated and stored in a rechargeable battery through a solar charge controller, which ensures controlled charging, prevents overcharging, and protects the battery from deep discharge. The stored DC energy is then supplied to USB output modules, which convert the 12-volt supply to a stable 5-volt DC output suitable for mobile phone charging. Multiple USB ports are provided so that more than one device can be charged simultaneously.

The physical design of the project integrates the complete solar-charging system into a table structure, allowing users to utilize the space for eating or resting while their devices charge. This design makes the Sol-Charge-Eat-Corner highly suitable for installation in college campuses, parks, bus stops, food courts, and other outdoor areas where power outlets are not readily available. The project promotes the concept of green energy by reducing dependency on grid electricity and encouraging sustainable infrastructure in public spaces.

The Sol-Charge-Eat-Corner not only demonstrates the efficient use of renewable energy but also enhances user convenience through practical design. It serves as a step toward smart, sustainable urban development and offers great potential for future improvements such as wireless charging, lighting, and IoT-based monitoring. In essence, this project is a small but impactful example of how solar energy can be effectively integrated into everyday life.

KEYWORDS: Solar energy, Charge controller, Battery storage, USB Charging Module

I. INTRODUCTION

In the present era of rapid technological advancement, electricity has become one of the most essential needs of human life. People depend heavily on electronic devices such as mobile phones, tablets, and other gadgets for communication, education, and work. However, finding a convenient and eco-friendly place to charge these devices in public areas is often a major challenge. To overcome this issue, our project titled "Sol-Charge-Eat-Corner" has been designed as an innovative solar-powered charging table that provides both comfort and sustainability.

The Sol-Charge-Eat-Corner is a multipurpose system that combines renewable solar energy with practical daily use. The system consists of a solar panel mounted above a table, a solar charge controller, a rechargeable battery, and dual USB output ports for charging mobile devices. The solar panel converts sunlight into electrical energy, which is stored in the battery and supplied through the USB ports for safe and efficient charging. This setup eliminates the need for grid electricity, making it a clean, green, and self-sufficient energy solution.

One of the major advantages of this project is its easy installation and flexibility. The system can be conveniently installed in various public or private locations such as college grounds, building terraces, cafés, gardens, and walking streets. These are places where people often spend time relaxing, studying, eating, or socializing. The Sol-Charge-Eat Corner provides them with a comfortable table to sit at, enjoy their food, and simultaneously charge their phones or gadgets without any hassle. This makes the table not only functional but also a user-friendly and community-oriented innovation.

The project also supports the concept of sustainable development by encouraging the use of renewable energy sources. By utilizing solar power, the system reduces the dependency on conventional energy, helps lower electricity costs, and contributes to the reduction of carbon emissions. Moreover, it serves as an educational model to promote awareness about solar technology among students and the general public.

Technically, the design includes high-efficiency solar panels, a smart charge controller to prevent overcharging, and a durable structure built with strong, weather-resistant materials suitable for outdoor conditions. The table is designed to be stable, lightweight, and easy to transport or assemble, making it ideal for both temporary and permanent setups.

In conclusion, the Sol-Charge-Eat-Corner project demonstrates how engineering innovation can be applied to create practical solutions for everyday needs. It combines solar technology with comfort and social interaction, allowing people to eat, relax, and charge their devices in an eco-friendly way. This project contributes to promoting renewable energy usage and aims to inspire future sustainable engineering designs for a cleaner and greener world.

II. FEATURES OF SOL-CHARGE-EAT-CORNER

1. Solar-Powered Operation:

The system runs entirely on solar energy using a high-efficiency photovoltaic panel that converts sunlight into electrical energy for phone and gadget charging.

2. Dual USB Charging Ports:

Equipped with two USB output ports that allow users to charge multiple mobile phones or small electronic devices simultaneously.

3. Rechargeable Battery Backup:

A built-in rechargeable battery stores solar energy during the day and provides power for charging even at night or in cloudy weather conditions.

4. Smart Solar Charge Controller:

The system includes a charge controller that regulates the power flow between the solar panel, battery, and USB ports to prevent overcharging, short circuits, or battery damage.

5. Easy Installation and Portability:

The table is lightweight, modular, and easy to install in different places such as college grounds, building terraces, cafés, gardens, and walking streets.

6. User-Friendly Table Design:

The setup provides a comfortable space for users to sit, eat, study, or relax while charging their devices — making it both practical and social in nature.

7. Weather-Resistant Construction:

The table and solar mount are made from durable, corrosion-resistant materials suitable for outdoor environments and long-term use.

8. Eco-Friendly and Cost-Effective:

Uses renewable solar energy, reducing dependence on conventional electricity and lowering power costs while promoting green energy awareness.

9. Low Maintenance Requirement:

The design ensures minimal maintenance — only periodic cleaning of the solar panel and inspection of electrical connections are needed.

10. Educational and Demonstrative Use:

Serves as a live example of solar energy utilization, ideal for educational institutions to demonstrate renewable energy applications.

III. CONCEPT

The concept of Sol-Charge-Eat-Corner is based on the idea of integrating renewable solar energy with a comfortable and social space where people can relax, eat, and charge their electronic devices at the same time. The main purpose of this project is to provide a self-sustainable, eco-friendly, and user-friendly charging solution that operates completely on solar power, without depending on grid electricity.

In this system, a solar panel mounted above the table captures sunlight and converts it into electrical energy. This energy is then passed through a solar charge controller, which regulates and manages the power flow to the battery for storage. The stored energy can later be used to charge mobile phones or other small electronic gadgets through USB output ports provided on the table.

The table is designed in such a way that it can be easily installed in public or private areas such as college campuses, cafés, gardens, building terraces, or walking streets, where people naturally gather. Users can sit around the table to rest, eat, or work while their devices charge using clean, renewable energy.

The Sol-Charge-Eat-Corner represents a smart combination of technology, comfort, and sustainability. It not only helps reduce electricity usage and carbon emissions but also promotes awareness of solar energy applications in everyday life. This concept supports the vision of a greener and smarter environment through simple yet impactful engineering design.

IV. OVERALL WORKING OF THE SYSTEM

1. Sunlight falls on the solar panel, generating DC electricity.
2. The charge controller receives the current and regulates voltage to charge the battery safely.
3. The battery stores this DC power.
4. The USB converter module converts the stored 12 V DC from the battery to 5 V DC.
5. Users plug in their phones via the USB port to charge them directly from clean solar energy.
6. Wires and connectors link all parts together, ensuring safe and efficient operation.

V. FUTURE SCOPE OF SOL-CHARGE-EAT-CORNER

The Sol-Charge-Eat-Corner project has wide potential for future development and real-world applications. With continuous improvements in solar technology and smart electronics, the system can be upgraded to become even more efficient, user-friendly, and multifunctional.

In the future, the following advancements can be implemented:

1. Smart Energy Monitoring System:

The system can be integrated with IoT (Internet of Things) technology to monitor power generation, battery level, and energy consumption in real time using a mobile app.

2. Wireless Charging System:

Future versions can include wireless charging pads, allowing users to charge their phones without cables, enhancing user convenience and modern design.

3. Nighttime Lighting System:

LED lights powered by the battery can be added to provide illumination at night, making it useful in public parks,

streets, and college campuses after dark.

4. Rain and Weather Protection:

Incorporating waterproof materials and protective covers will make the system more durable and suitable for all weather use.

5. Multiple Device Charging:

Higher capacity solar panels and batteries can be used to charge multiple phones or small gadgets simultaneously.

6. Public Information or Advertisement Display:

The table can feature a digital display powered by solar energy, showing information, advertisements, or awareness messages about renewable energy.

7. Expansion to Rural Areas:

The system can be installed in rural and remote regions where electricity supply is limited, providing free and clean energy access to the community.

8. Use of Advanced Batteries:

Replacing traditional batteries with lithium-ion or LiFePO₄ batteries will increase storage efficiency, reduce maintenance, and enhance lifespan.

VI. CONCLUSION

The future of Sol-Charge-Eat-Corner lies in creating smart, sustainable public spaces powered by renewable energy. By integrating new technologies, the system can become a part of smart city development — promoting clean energy, digital convenience, and a green environment for all.

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