

Smart Solar Bus Stand with Digital Registration System

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Abstract—The rapid growth of transportation infrastructure requires sustainable, energy-efficient, and technologically advanced solutions. This project presents a Solar-Powered Smart Bus Stop with EV Charging Hub integrated with a Smart Web-Based Transportation Management System. The proposed facility is designed for Madgyal Village and occupies an area of approximately 16,000 sq.ft. The project incorporates solar photovoltaic panels, passenger waiting areas, EV charging stations, administrative facilities, and a digital platform for transportation management. The developed website enables online ticket booking, passenger support, route management, and smart transportation services. The integration of civil infrastructure, renewable energy systems, and digital technologies creates a sustainable and intelligent transportation hub. The project contributes toward clean energy utilization, improved passenger comfort, reduced carbon emissions, and promotion of electric mobility.

Index Terms—Solar Energy, Smart Bus Stop, EV Charging Hub, Sustainable Transportation, Renewable Energy, Smart Infrastructure, Website Development.

I. INTRODUCTION

Transportation infrastructure plays a significant role in social and economic development. Rural regions often face challenges such as inadequate bus stop facilities, lack of passenger amenities, poor lighting, and absence of EV charging infrastructure. With the increasing adoption of electric vehicles and renewable energy technologies, there is a need for sustainable transportation facilities.

The proposed Solar-Powered Smart Bus Stop with EV Charging Hub aims to address these challenges by integrating solar energy generation, electric vehicle charging infrastructure, and a web-based transportation management system. The project provides a modern transportation facility while supporting environmental sustainability and digital transformation.

II. OBJECTIVE

1. To design a smart and sustainable solar-powered bus stand.
2. To provide a safe and comfortable waiting area for passengers.
3. To utilize renewable solar energy for lighting and charging facilities.
4. To develop a website for passenger registration and management.
5. To create a mobile application for easy access to transportation services.
6. To improve passenger safety through smart monitoring systems

III. FUTURE SCOPE

- a. Mobile Application Development.
- b. Real-Time Bus Tracking.
- c. AI-Based Transportation Management.
- d. IoT Monitoring Systems.
- e. Smart Ticketing Solutions.
- f. Public Wi-Fi Services.

IV. METHODOLOGY

A. Blueprint Design

The blueprint includes seating arrangements, solar panel placement, charging stations, lighting systems, and passenger facilities.

B. Website Development

The website provides registration, information updates, and feedback collection services.

C. Mobile Application Development

The application allows passengers to access services, receive notifications, and interact with the system.

V. SYSTEM ARCHITECTURE

- Solar Energy Module
- Website Management Module
- Mobile Application Module
- Security Monitoring Module
- Passenger Information Module

VI. FEATURES OF THE PROPOSED SYSTEM

- * Solar-powered lighting
- * Mobile charging facilities
- * Website registration portal
- * Mobile application support
- * Digital display board
- * CCTV surveillance

VII. WEBSITE MODULES

- Module 1: User Registration
Passengers can register and create accounts.
- Module 2: Ticket Booking
Users can search buses and reserve seats.
- Module 3: Route Information
Provides travel schedules and route details.
- Module 4: Customer Support
24×7 assistance for passengers.
- Module 5: Safety Information
Displays safety ratings and travel guidelines.
- Module 6: Future EV Charging Booking
Allows reservation of EV charging slots.

Figure 1: Home Page of Solar Bus Station Website
(Insert Website Screenshot)

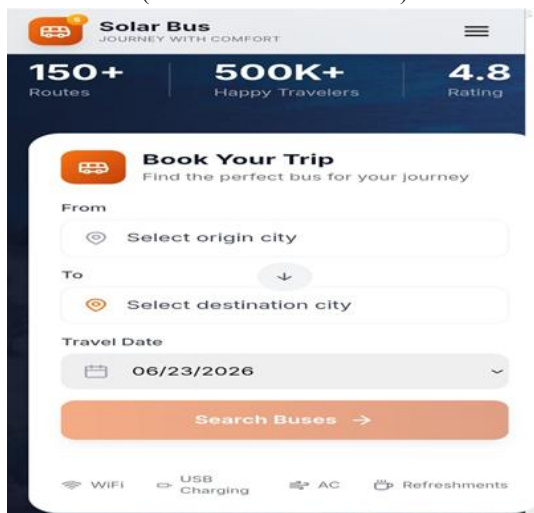
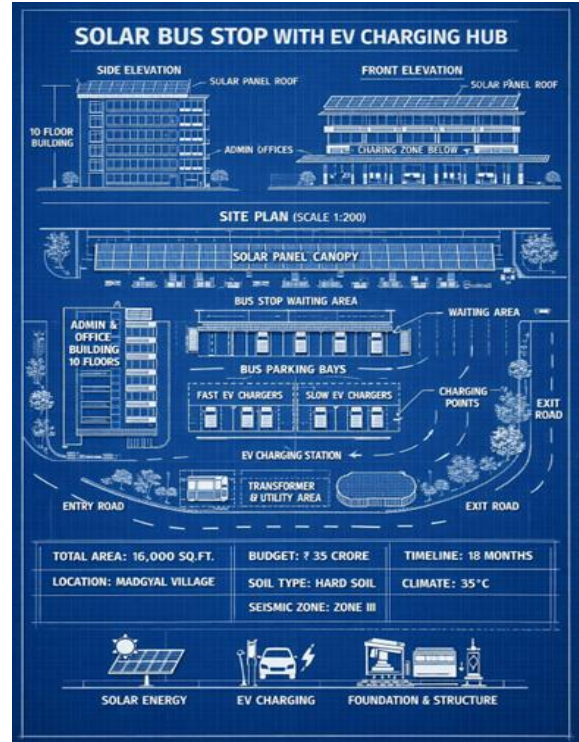
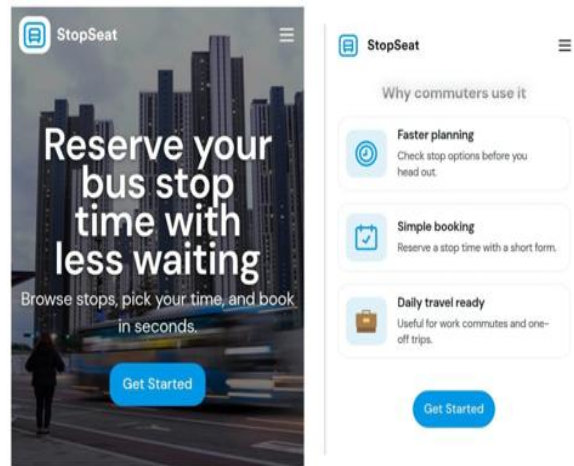


Figure 2: Blueprint of the Proposed Solar-Powered Smart Bus Stop with EV Charging Hub



<https://www.jotform.com/app/261731290037452>



VIII. CONCLUSION

The Smart Solar Bus Stand with Integrated Website and Mobile Application is an innovative and sustainable infrastructure project that addresses the need for modern public transportation facilities. By integrating solar energy, smart civil engineering

design, a passenger registration website, and a mobile application, the project enhances passenger comfort, safety, accessibility, and operational efficiency. The use of renewable energy reduces environmental impact and operating costs, while the digital platform improves service management and user interaction. The project demonstrates the effective integration of engineering and digital technologies to develop a practical, eco-friendly, and scalable solution that can be implemented in rural and urban areas, contributing to future smart transportation and sustainable development initiatives.

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