



Web Application for Solar Storage Design

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ABSTRACT

The increasing demand for renewable energy has highlighted the importance of efficient solar power systems with proper energy storage design. Solar storage systems help store excess solar energy for use during low sunlight periods. However, designing solar storage systems manually is complex and time-consuming. This project presents a Web Application for Solar Storage Design that assists users in planning and calculating solar panel and battery requirements. The application takes inputs such as load demand, sunlight availability, and system efficiency. It automatically computes panel size, inverter capacity, and battery storage requirements. The web-based platform ensures accessibility and ease of use. The system reduces design errors and improves accuracy. It supports both residential and

small commercial users. The application helps promote clean energy adoption. By automating solar storage calculations, the system simplifies renewable energy system design.

KEY WORDS

Solar Energy, Energy Storage Design, Web Application, Battery Sizing, Renewable Energy

INTRODUCTION

Solar energy is one of the most sustainable and eco-friendly power sources. Energy storage is essential for maximizing solar power utilization. Improper storage design leads to energy loss and inefficiency. Traditional design methods rely on manual calculations. These methods require expert knowledge. Errors can result in system failure or increased cost. Web applications provide an interactive solution. Users can

design solar storage systems online. The proposed system simplifies technical calculations. It supports decision-making for solar installations. The application provides instant results. It improves design efficiency and reliability. The system is user-friendly and accessible. It helps users understand energy requirements. This project focuses on automation of solar storage design. It supports renewable energy initiatives.

LITERATURE SURVEY

Research studies highlight the importance of energy storage in solar systems. Battery sizing techniques are widely discussed. Studies focus on lead-acid and lithium-ion batteries. Load estimation methods are crucial. Solar irradiation data influences design accuracy. Software tools like HOMER are commonly referenced. Cloud-based energy management systems are explored. Some studies discuss web-based renewable energy tools. However, many tools are complex. Research emphasizes ease of use. Optimization algorithms improve storage efficiency. Cost analysis is also discussed. However, user-friendly web tools are limited. Data visualization improves understanding. Literature supports automated design solutions.

RELATED WORK

Several tools assist in solar system design. Desktop applications require installation.

Some online calculators offer basic sizing. Advanced tools are expensive. Most tools are designed for experts. Academic projects focus on theoretical models. Few provide interactive web interfaces. Many systems lack storage optimization. Integration with real-time data is limited. Visualization features are minimal. User input flexibility is restricted. Some systems focus only on panel sizing. Battery design is often overlooked. The proposed system improves accessibility and usability. It provides complete solar storage design support.

EXISTING SYSTEM

The existing solar storage design process is manual. Designers use spreadsheets or calculators. Technical expertise is required. Manual methods are error prone. System optimization is difficult. Changes require recalculation. Existing tools lack automation. Visualization is limited. Cost estimation is not integrated. Accessibility is limited. Users depend on professionals. Small users face challenges. Existing systems are time-consuming. Data management is poor. These limitations reduce efficiency.

PROPOSED SYSTEM

The proposed system is a web-based solar storage design application. Users enter load details and location. The system calculates solar panel capacity. Battery storage requirements are computed automatically.

Inverter sizing is included. Results are displayed instantly. The application supports different battery types. Efficiency losses are considered. The system reduces design complexity. It improves accuracy. Users can modify inputs easily. Visualization improves understanding. The system supports scalability. It is cost effective. It promotes renewable energy adoption.

SYSTEM ARCHITECTURE

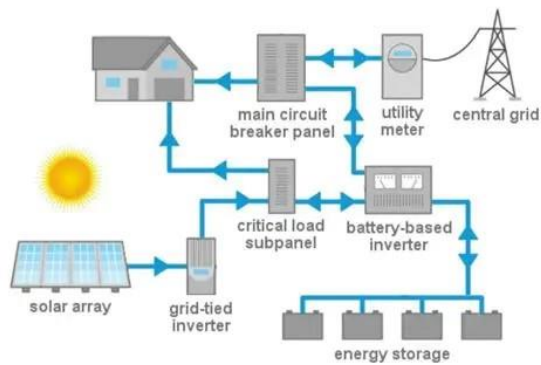


Fig 1: System Architecture

METHODOLOGY DESCRIPTION

User requirements are collected. The system architecture is designed. Load calculation algorithms are implemented. Solar radiation data is applied. Battery sizing formulas are used. Inverter capacity is calculated. Efficiency factors are included. The web interface is developed. Backend logic handles calculations. Results are validated. Testing ensures accuracy. Performance testing is conducted. User feedback is considered. Deployment

completes the process. Maintenance plans are defined.

RESULTS AND DISCUSSION



Fig 2: Home Page

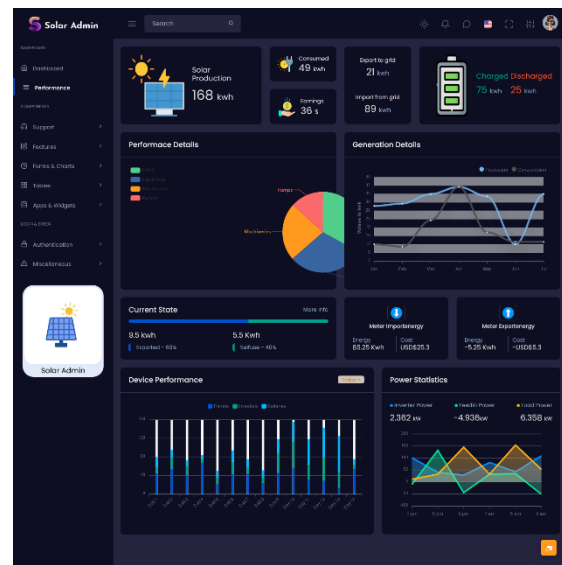


Fig 3: User Input & Load Analysis Page

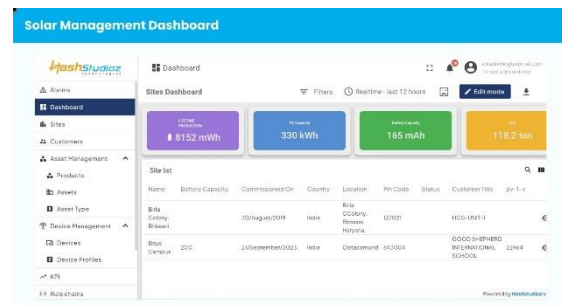


Fig 4: Solar Panel Sizing Page

CONCLUSION

The Web Application for Solar Storage Design provides an efficient solution for planning solar energy systems. It automates complex calculations. Users benefit from accurate and instant results. The system

reduces dependency on experts. It supports renewable energy adoption. User-friendly design improves accessibility. The application is scalable and reliable. Future enhancements include real-time data integration. Cost optimization can be added. Mobile access can be supported. The project demonstrates the role of web technology in renewable energy. It contributes to sustainable development.

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