TOP STUDENT PROJECTS

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PROJECT TITLE

SMART SOLAR ENERGY MONITOR WITH WIRELESS DASHBOARD



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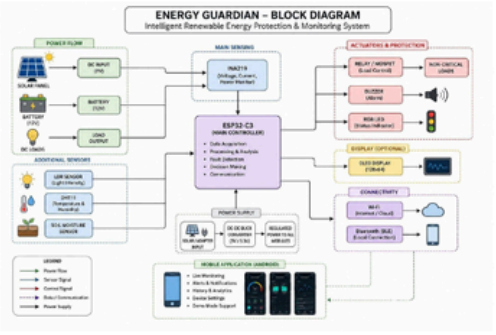
PROBLEM STATEMENT

Design a wireless, internet-free system to monitor solar generation, battery health, and environmental conditions in real-time with automatic load management. The system continuously displays solar power generation, battery status, and environmental parameters such as temperature and humidity on a local display without requiring an internet connection.

SOLUTION

We propose a dual-node ESP32 architecture using ESP-NOW for local, zero-infrastructure wireless communication. The Field Unit handles sensing and relay control, while the Hub Unit serves as a dedicated LCD dashboard, bridging the gap for offline, real-time monitoring. The Hub Unit receives real-time data from the Field Unit and displays solar generation, battery health, and environmental conditions on an LCD screen without requiring internet connectivity. The system also performs automatic load management based on battery status and power availability, ensuring efficient energy usage and reliable operation.





SCAN ME

Technology stacks:

- Arduino IDE 2.x
- ESP-NOW Protocol API
- C++ embedded firmware
- DHT Sensor Library
- WI-FI LIBRARY
- SQL
- hd44780 (LCD Auto-Detect)