How Smart O&M Unlocks Profitability for Remote ESS Plant

Against the backdrop of the global energy transition, energy storage power stations in remote areas have become critical pillars of power supply. However, challenges such as high altitude, rugged terrain, volatile climates, and limited communications have consistently driven up operation and maintenance (O&M) costs. Drawing on project experience in over 95+ countries worldwide, ATESS combines intelligent O&M technology with localized service support to help clients reduce costs and improve efficiency across the entire project lifecycle.

1. Four Major Pain Points in O&M of Remote Energy Storage Power Stations

1.1 High Manual Inspection Costs

Traditional O&M relies on periodic on-site inspections, which incur significantly higher transportation and labor costs in remote areas.

1.2 Slow Fault Response

Grid fluctuations and equipment malfunctions are difficult to diagnose in real time, increasing the risk of battery thermal runaway under extreme conditions.

1.3 Data Silos and Energy Losses

Incompatibility among device protocols prevents dynamic optimization of charging and discharging strategies, leading to solar curtailment rates of up to 15%.

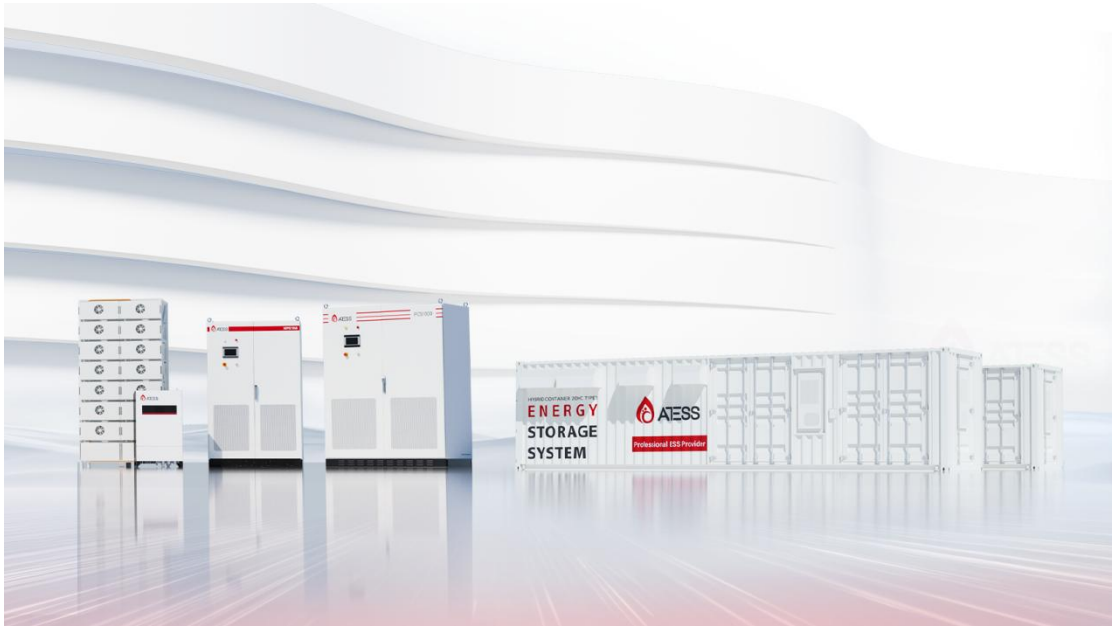
1.4 Long Spare Parts Supply Chains

Reliance on imported spare parts results in downtime lasting several weeks, adversely affecting power station revenue.

2. ATESS Solutions: Implementing remote maintenance with intelligent technology

2.1 Hardware: High-Reliability Equipment

- PCS with Seamless Grid Transition: Supports 8MW seamless switching between on-grid and off-grid modes, equipped with self-diagnostic functions that reduce on-site commissioning by 70%.
- Flexible Liquid- and Air-Cooled Battery Options: Liquid-cooled systems maintain a temperature differential within 2.5℃ and operate in environments from -30℃ to 60℃; air-cooled batteries use a modular design for swift replacement of individual units.
- MPPT Adaptive Algorithms: PBD250/SMC200 modules support both low and high-voltage PV arrays, improving photovoltaic energy harvesting efficiency by 12%.



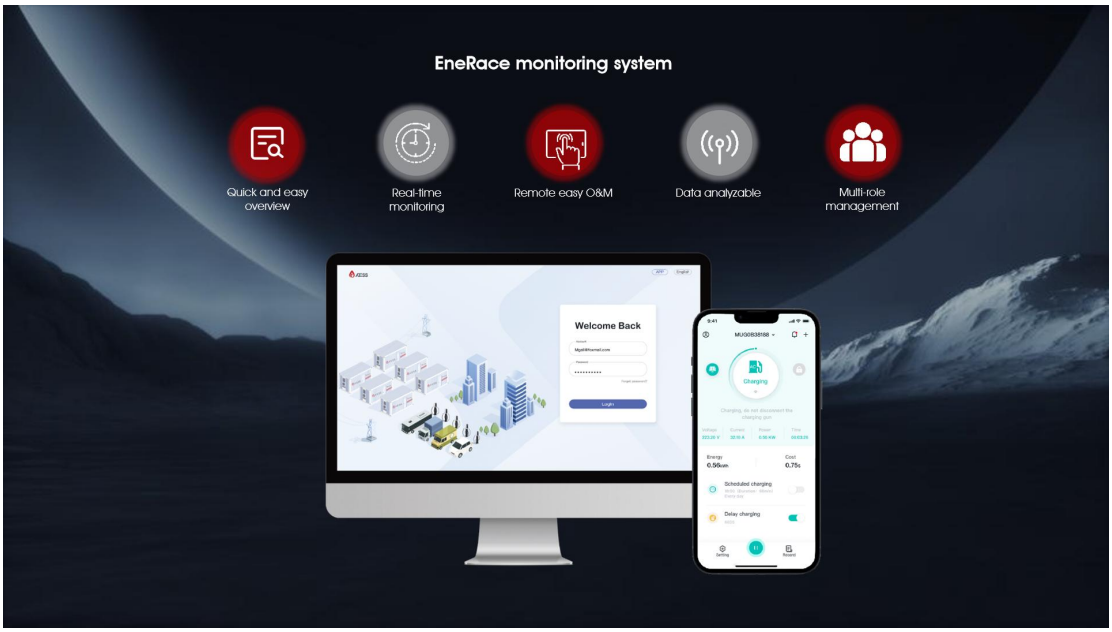
ATESS energy storage system

2.2 Data: Real time monitoring+ local analysis

- Enerlog/WiFi/4G Data Collectors: Integrate wired and wireless communications including RS485, Ethernet, WiFi, and 4G, supporting Modbus RTU/CAN protocols for real-time synchronization of data from PCS, BMS, and environmental sensors.
- High-Density Data Collection: Ensures frequent updates from multiple sources, capturing the latest system status in near real-time.

2.3 Platform: Predictive Maintenance and Strategy Optimization

- Enerclo Cloud Platform:
  - Health Monitoring: Estimates remaining useful life of equipment based on battery state of health (SOH) and PCS efficiency degradation models.
  - PV-Storage Coordination: Dynamically adjusts charge and discharge thresholds using electricity price curves and weather forecasts, increasing peak-valley arbitrage revenue by 18%.
- Enerview Mobile App: Provides remote after-sales guidance, enabling on-site personnel to quickly resolve 80% of common issues.



ATESS Monitoring Platforms

2.4 Service: Localized Support and Rapid Repair

- Regional Spare Parts Hubs: Strategically located in Europe and Africa to enable fast delivery of key components.
- Training and Certification System: Technical training is offered either locally or at ATESS's Shenzhen headquarters, equipping engineers to handle 90% of O&M scenarios.

Conclusion

Through seamless integration across equipment, data, platforms, and services, ATESS reduces the annual O&M cost of remote energy storage power stations to $15/MWh—50% lower than the industry average. No matter where your project is located, from the Sahara Desert to the Andes Mountains, our technology breaks down geographical barriers, delivering simpler and more cost-effective clean energy operation and maintenance.