

Remote Monitoring Solution for Hybrid Energy Systems in Senegal

Article Overview

Hybrid energy systems in Senegal are being monitored and controlled using advanced Energy Management Systems (EMS) and SCADA platforms, enabling real-time optimization of PV-diesel microgrids and energy storage.

DHYBRID PV-Diesel Hybrid Systems

In Senegal, DHYBRID is deploying seven PV-diesel hybrid systems in remote locations with a total output of 2 MW and 2 MWh of energy storage . These systems are equipped with:

- o Universal Power Platform (UPP): A modular, manufacturer-independent EMS that manages energy flows between diesel generators, PV inverters, and lithium-ion storage systems .
- o SCADA Solution: Provides real-time monitoring, control, and automation to optimize electricity costs and reduce CO2 emissions .
- o Containerized Lithium-Ion Storage: Ensures reliable energy supply and smooth integration of intermittent solar power .
- o Automatic Generator Controllers and Distribution Panels: Facilitate seamless operation and load management in isolated areas . These hybrid systems are distributed across the Saloum Islands, Thies, Tambakounda, and Kolda regions, providing electricity to very isolated communities and supporting Senegal's energy diversification goals .

Remote Monitoring of the National Grid

Beyond hybrid microgrids, nLine is implementing a remote monitoring solution for Senegal's medium voltage distribution network under the Senegal Power Compact . Key features include:

- o Deployment of 175 sensors across 49 communities to measure power quality, voltage stability, and service interruptions .
- o Real-time data collection and KPI generation to evaluate the impact of grid improvements on technical losses and outage frequency .
- o Longitudinal monitoring over four years to assess the effectiveness of investments in grid reinforcement and reliability . This approach demonstrates how remote sensing and data analytics can complement EMS and SCADA systems to improve energy access and operational efficiency.

Benefits of EMS and Remote Monitoring

Energy Management Systems and remote monitoring solutions provide several advantages for hybrid energy

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systems:

- o Optimized Energy Use: Balances generation, storage, and consumption in real time .
- o Reduced Diesel Dependence: Prioritizes renewable energy sources when available .
- o Lower Operational Costs: Minimizes fuel consumption and maintenance expenses .
- o Improved Reliability: Detects faults and manages load transitions automatically .
- o Environmental Impact: Reduces CO2 emissions by integrating solar and storage effectively .

Conclusion

For hybrid energy systems in Senegal, combining EMS, SCADA, and remote monitoring technologies enables efficient, reliable, and sustainable power delivery to remote and rural areas. Projects like DHYBRID's PV-diesel microgrids and nLine's grid monitoring illustrate how real-time data, automation, and energy storage integration can enhance system performance, reduce costs, and support national energy access goals.

At 101 Solutions, we provide smart monitoring and control solutions that allow you to easily manage the entire hybrid installation,

Omexom will install eight solar power plants in Senegal in 10 months, of which seven are hybrid plants designed to

The Communication Circuits and Systems (CIRCUIT) research group has developed a

Abstract This paper addresses the smart management and control of an independent hybrid system based on

German hybrid specialist DHYBRID will supply seven PV-diesel hybrid systems in remote Senegalese locations with sophisticated

The large majority of this underserved population lives in Sub-Saharan Africa. Mini grids systems play a central role to

Abstract This study presents a comprehensive review of state-of-the-art energy systems and spatially explicit modelling

This paper provides a comprehensive review of hybrid energy systems (HESs), focusing on their challenges,

The study examines a system combining renewable energy sources, batteries, and diesel generators to optimize

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As a leading provider of smart energy management solutions, we offer a range of modern and innovative products for hybrid

Herewith, the proposed IoT-based SCADA method for RESs has been presented in the paper to emphasize its key

With the global demand for sustainable energy solutions rising, hybrid renewable energy sources (HRES) are gaining popularity due

New sustainability targets and the complexities of the energy market present challenges in remote locations with limited or inefficient

In Senegal, the remote monitoring market is projected to reach significant growth by 2025, driven by increased demand for real-time

The potential benefits of an energy management system that integrates solar power forecasting, demand-side

The funds will enable Senegal to leverage hydrocarbon revenues to finance sustainable economic growth, mitigate the impact of

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