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Remote Monitoring Solution for Danish Hybrid Energy Systems



Overview

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Key Takeaways

Hybrid energy systems in Denmark can be effectively monitored and optimized using IoT-enabled Energy Management Systems, digital twins, and intelligent electrical panels for real-time control and efficiency.Key Technologies for Remote Monitoring

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1. Energy Management Systems (EMS) EMS platforms, such as those offered by ComAp, provide intelligent control over hybrid energy systems by monitoring, optimizing, and coordinating energy generation, storage, and consumption in real time. They integrate multiple energy sources, including solar, wind, battery storage, and conventional generators, ensuring efficient energy use, reduced emissions, and cost savings. EMS platforms also support hybrid microgrids, enabling smooth transitions between energy sources and automatic responses to load changes or outages, which is critical for mission-critical operations and remote locations . 2. Intelligent Electrical Panels Hybird offers source-level monitoring of electricity usage, allowing businesses to identify energy drains and inefficiencies. These panels provide real-time preventive maintenance, remote monitoring, and automated compliance reporting, which can reduce operational costs and CO2 emissions. Hybird's system integrates with AI tools like ChatGPT to provide actionable insights for energy optimization, making it suitable for Danish offices and industrial sites aiming for sustainability goals . 3. Digital Twin and IoT Integration Digital twin technology, combined with IoT devices, creates a bi-directional communication framework between physical hybrid energy systems and their digital models. This approach allows real-time monitoring, predictive maintenance, and performance optimization. For example, standalone photovoltaic systems can be managed using MATLAB Simulink environments that unify IoT data and digital replicas, improving energy efficiency and reliability . 4. Hybrid Plant Control Platforms Siemens Omnivise Hybrid Control (OHC) integrates EMS, SCADA, and dispatch optimization to manage hybrid power plants combining renewable and conventional generation with energy storage. OHC ensures grid stability, optimizes energy flows, and supports modular deployment for projects of any size. It is particularly useful for remote or islanded grids, industrial sites, and microgrids, providing centralized supervision and real-time control .

Danish Context and Infrastructure

Denmark is advancing its hybrid energy monitoring capabilities through Digital Energy Lab projects and collaborations with institutions like DTU and GreenLab Skive. These initiatives aim to create open-access digital infrastructure for real-time data collection and integration, supporting the development of a flexible, market-based, and renewable-heavy energy system. Such infrastructure enables experimental testing, optimization, and scaling of hybrid energy solutions across the Danish energy landscape .

Benefits of Remote Monitoring Solutions

• Enhanced Efficiency: Real-time monitoring and EMS optimization reduce energy waste and operational costs.

• Sustainability: Source-level transparency and predictive maintenance lower CO2 emissions and support ESG compliance.

• Reliability: Hybrid control platforms ensure stable power delivery and smooth transitions between energy sources.

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• Scalability: Modular solutions like Omnivise and Hybird can be adapted to various project sizes, from office buildings to industrial microgrids.

• Innovation Support: Integration with digital twins and IoT enables advanced analytics, predictive maintenance, and AI-driven decision-making.
Conclusion

For Danish hybrid energy systems, a combination of EMS, intelligent electrical panels, digital twins, and hybrid plant control platforms provides a robust remote monitoring solution. These technologies enable real-time optimization, predictive maintenance, and sustainable energy management, aligning with Denmark's goals for a flexible, renewable-integrated energy system. By leveraging these solutions, operators can achieve cost savings, reduce emissions, and ensure reliable energy delivery across diverse hybrid energy setups.

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The technologies used in these systems are constantly evolving but their current maturity level already makes it

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

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