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Case Study: Streamlining Solar Asset Monitoring with American Green Solutions

Client Background: Our client, a solar developer, operates a portfolio of solar assets in India with a total capacity of 160 MW spread across five plants. The portfolio covers a total area of 804 acres and consists of 491,732 solar modules connected to 93 central inverters. The plants are equipped with 889 sensor level/string monitoring box (SMB) sensors and 12 weather monitoring system (WMS) sensors. The plants have a configuration of single-axis and seasonal trackers.

Challenges Faced:

1. Diverse Data Sources: Each plant in the portfolio had a different layout, topology, and capacity, along with three different SCADA vendors. As a result, the operating data from the solar plants was stored in different databases with custom schema formats corresponding to each plant's architecture and SCADA setup. This created challenges in handling and reporting plant performance data.
2. Manual Data Processing: Due to the varied data structures, the team had to run custom scripts for each plant and generation report. This resulted in increased operating costs, resource wastage, and risks of error. It also made it difficult for management to visualize real-time unified portfolio performance.
3. Lack of Insights and Visibility: The siloed data and lack of a centralized monitoring platform made it challenging to gain valuable analytical insights and have a comprehensive view of the portfolio's performance. This led to inefficient operations management and financial downsides.

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Solution Provided by American Green Solutions: American Green Solutions offered a comprehensive solution to address the client's challenges and streamline their solar asset monitoring process. The key features of the solution included:

1. Centralized Data Monitoring Platform: The implementation of a massive data platform allowed for real-time data visualization and analysis of the entire portfolio. The data from different sources were structured and standardized based on real-time data, providing reliable insights for performance analytics.
2. Standardized Schema and Open Architecture Integration: American Green Solutions implemented a single standardized schema and offered an open architecture integration with public APIs. This ensured zero synchronization issues and facilitated seamless data flow across the portfolio.
3. AI-Driven Predictive O&M Guidance: The platform leveraged AI to issue predictive O&M guidance based on revenue impact. This streamlined O&M activities, minimized downtime, and optimized operating costs. Data-driven decision making helped maximize profitability and ensure information symmetry.
4. Real-Time Monitoring and Reporting: The AI-powered real-time monitoring and reporting capabilities allowed for the identification and analysis of various loss factors, including leakage losses, outages, structural issues, soiling, and temporal maintenance needs. The end-to-end visibility provided comprehensive insights and intuitive dashboards for efficient decision making.

Results and Benefits: The implementation of American Green Solutions' monitoring platform brought several benefits to the client:

1. Enhanced Performance Monitoring: Field teams gained reliable data to pinpoint underperformance in any plant, enabling them to address issues promptly and optimize plant yields across the portfolio.
2. Best Practice Sharing: Standardized processes and best practices could be shared across plants, enabling yield optimization and operational efficiency improvements throughout the portfolio.
3. Improved Management Visibility: The management gained 360-degree visibility into portfolio performance with benchmarked key performance indicators (KPIs) based on reliable data. This facilitated better decision making and operational planning.
4. Streamlined Data Management: The platform streamlined data management processes, ensuring real-time data availability, automated reporting, and eliminating the need for manual data juggling in Excel for the finance team.

By partnering with American Green Solutions, the solar developer overcame the complexities associated with operating a diverse solar asset portfolio. The centralized monitoring platform, AI-driven analytics, and standardized data management processes provided actionable insights, improved performance, and optimized operational efficiency across the entire portfolio.

Title: Harnessing the Power of AI: Unlocking Value in Solar Monitoring and Controls

1. Introduction
   * Understanding the significance of solar monitoring and controls
   * Evolution of the M&C technology market for solar and storage assets
2. Optimizing Commercial and Utility-Scale Projects
   * Exploring the challenges in maximizing value from solar projects
   * The role of advanced M&C solutions in performance optimization
   * Uncovering new value streams over the project lifespan
3. Reducing Asset Risk through Advanced M&C Technologies
   * Proactive risk mitigation through real-time monitoring and analysis
   * Leveraging AI-driven tools for remote diagnosis and high-priority alerts
   * Enhancing asset longevity and minimizing downtime
4. The Advantages of AI-Driven Solutions
   * The transformative impact of artificial intelligence in solar monitoring
   * Harnessing AI for automated diagnosis and historical performance analysis
   * Empowering rapid human intervention and service confirmation
5. Real-World Case Studies: Demonstrating Value
   * Examining successful implementations of AI-driven M&C solutions
   * Quantifiable benefits in improved workflows and actionable insights
   * A focus on addressing snow, temporary soiling, and other high-priority issues
6. Best Practices for Effective Implementation
   * Key considerations for integrating AI-driven monitoring and controls systems
   * Overcoming challenges in data integration, security, and privacy
   * Leveraging AI as a catalyst for innovation and competitive advantage
7. Future Outlook and Opportunities
   * Anticipated trends and advancements in solar monitoring technology
   * Opportunities for collaboration and industry-wide adoption
   * The potential impact on the renewable energy landscape

This white paper, sponsored by Stem and authored by Guidehouse Insights, explores the transformative potential of AI-driven monitoring and controls technology in the solar industry. By delving into the evolution of M&C solutions, the research emphasizes the importance of optimizing solar and storage assets, creating new value streams, and reducing asset risk. Real-world case studies showcase the tangible benefits of AI-driven solutions, while best practices offer guidance for successful implementation. As the solar industry embraces AI, stakeholders can unlock greater value, streamline workflows, and contribute to a sustainable and efficient energy future.

Title: Clean Energy Microgrids for the Commercial & Industrial Sector: A Case Study

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1. Introduction
   * Growing corporate adoption of renewable energy targets
   * The role of microgrids in enabling sustainable energy solutions
2. Microgrid Management with Advanced Control System
   * Overview of the Energy Advanced Control System
   * Balancing power supply from renewable and fossil fuel sources
   * Seamless transition between grid-connected and island mode operations
3. PowerStore Battery Energy Storage System
   * Function and purpose of the PowerStore BESS
   * Stabilizing power systems against frequency and voltage fluctuations
   * Addressing production interruptions caused by voltage dips in the distribution grid
4. Integration of Virtual Generator Mode Capabilities
   * Enabling efficient utilization of renewable and diesel generators
   * Reduction in diesel generator usage through virtual generator mode
   * Seamless transition from grid-connected to island mode during grid outages
5. Cloud-Based Monitoring System
   * Remote operation and maintenance of the microgrid
   * Leveraging Hitachi Energy's Industrial Internet of Things approach
   * Real-time data monitoring and analysis for proactive decision-making
6. API Release for Enhanced Data Access
   * Introduction to Clir's API for data access
   * Facilitating easy integration with third-party software providers
   * Benefits of leveraging enriched portfolio data and market intelligence
7. Five Lessons from Clir Renewables' First Five Years a. Lesson 1: Understand the problem and be passionate about the solution b. Lesson 2: Hire people better than you c. Lesson 3: Embrace continuous learning and improvement d. Lesson 4: Build strong partnerships and collaborate with industry experts e. Lesson 5: Adapt and innovate in a rapidly evolving CleanTech landscape
8. Conclusion
   * The success of clean energy microgrids for the commercial and industrial sector
   * Leveraging advanced technologies and data-driven solutions for sustainability
   * The importance of continuous improvement and collaboration in the industry

This case study highlights the implementation of a clean energy microgrid solution in the commercial and industrial sector. The study focuses on the management of the microgrid using an advanced control system, the integration of a battery energy storage system for stabilization, and the benefits of virtual generator mode capabilities. Additionally, it discusses the advantages of a cloud-based monitoring system and the release of an API for enhanced data access. Drawing insights from Clir Renewables' experiences, the study concludes with lessons learned and the importance of embracing innovation and collaboration in the CleanTech industry.