

The Avathon Autonomy Platform

Next-Generation Operational Excellence for Renewables

The global renewable energy sector is experiencing unprecedented growth driven by a combination of rapidly evolving technological advancements and a growing societal focus on clean, efficient power generation. But the sector also faces powerful headwinds in the form of uncertain political support combined with skills availability and supply chain uncertainty. This rapid expansion, while critical to addressing climate change and growing resource constraints, only magnifies the inherent complexities of effectively managing a distributed renewable energy portfolio that includes such diverse elements as solar panels, wind turbines, battery energy storage systems (BESS), and even hydroelectric assets.

This white paper presents a new paradigm for optimizing renewable energy management: Avathon's Autonomy Platform, a sophisticated decision science tool designed to integrate seamlessly with existing data systems and platforms like SCADA and AVEVA PI. The Autonomy Platform takes the next step beyond basic asset management, providing an intelligent new capability set that automates complex processes, optimizes work schedules, and delivers accurate generation/consumption forecasts. This powerful new capability set enables asset owners/operators to capitalize on favorable market conditions, achieve unparalleled operating efficiency, significantly reduce costs, and maximize revenue in an uncertain policy-driven world.

A World of Evolving Energy Needs

In March of 2025, fossil fuel electricity generation in the US fell below 50% for the first time, propelled by rapid growth in the renewables sector. The same dramatic growth has been achieved in Europe in recent years, and global growth in the sector has only accelerated with near-daily advances in technology. The renewable energy sector is no longer a niche market; it is a global economic and political imperative. Governments worldwide are enacting ambitious policies—such as production tax credits, renewable portfolio standards, and carbon pricing—that create a highly favorable environment for innovation and investment. To truly capitalize on these tailwinds, asset owners/operators must move beyond simple asset monitoring to embrace a more intelligent, integrated, and dynamic approach to operations.

The rapid growth of renewable generation presents two key challenges:

Accelerating Complexity: A geographically distributed and technologically diverse portfolio of thousands of assets (solar panels, wind turbines, batteries, plus a host of ancillary equipment) generates a flood of disparate data. Extracting meaningful, actionable insights from this data, at this scale, is beyond human capability alone.

The Data Silo Problem: Critical operational data is often isolated in legacy systems and proprietary databases (like AVEVA PI, SCADA, and data historian libraries), creating fragmented workflows, delaying performance improvement actions, and preventing a holistic, big picture view of portfolio performance.

An effective solution must not only make use of all available performance data to provide intelligent actionable solutions but also integrate seamlessly with the existing enterprise systems and device data infrastructure that operators have invested in for decades.

A Comprehensive, Integrated Capability Set

The Avathon Autonomy Platform is built on a foundation of proprietary machine learning models that integrate seamlessly with existing data systems. But unlike other solutions, the Autonomy Platform is designed to take intelligent automated action without human intervention, leading to a new paradigm in dynamic operational performance optimization.

Autonomous Operations: The system takes direct action to optimize asset performance, including, for example, proactive generation curtailment when necessary to avoid grid congestion and dynamic system adjustments to maximize profitability.

Intelligent Work Orchestration: The platform predicts component failures then; automatically generates work orders, creates and error-checks invoices, and intelligently schedules and dispatches maintenance personnel based on real-time data, skills, and parts availability.

Hyper-accurate Forecasting: By analyzing a vast array of data points, the platform provides precise forecasts of energy output and maintenance needs, enabling strategic and tactical planning and reducing revenue volatility. By leveraging a data-agnostic approach, the platform ensures rapid deployment and immediate value for asset owners/operators, helping them to capitalize on favorable policy environments and accelerate the global energy transition.

Worker Health, Safety, and Security Management: By autonomously inspecting camera feeds (static or drone-mounted) and property/perimeter sensor outputs, automated alerts can be generated that avoid workplace accidents (or provide life-saving alerts if an accident does occur), provide rapid warnings of fires or other dangerous conditions, and eliminate property theft or damage.



The Autonomy Platform is a full-stack, end-to-end performance optimization solution that provides a powerful layer of AI decision science on top of your existing data infrastructure. It is designed to be data-agnostic, ensuring rapid deployment and value realization without requiring a costly data migration. At its core, the platform operates on six integrated pillars:

Data Ingestion & Digital Twin: The Autonomy Platform connects directly to your existing data sources—including AVEVA PI, SCADA, IoT sensors, weather data, and market signals—to construct a comprehensive, real-time digital twin of each asset. This digital twin is the foundational single source of truth for all subsequent intelligence and actions.

Predictive Analytics & Anomaly Detection: Our proprietary machine learning models analyze this data to predict potential component failures, identify performance anomalies, and forecast energy output. These capabilities transform the traditional, reactive maintenance model into a proactive, predictive one.

Autonomous Operations & Work Orchestration: This is the core differentiator. Based on insights from our predictive models, the Autonomy Platform takes intelligent, automated actions, serving as a conductor for your entire operational ecosystem.

Automated Processes: The platform eliminates manual bottlenecks by automating routine tasks, such as generating invoices and compliance reports and initiating troubleshooting protocols, freeing up human operators to focus on higher-value activities.

Dynamic Work Scheduling: The platform intelligently creates and optimizes work orders. It assesses the severity of a predicted issue, checks technician availability and skill sets, reviews part inventory, and optimizes travel routes—all autonomously. The system ensures that the right person, with the right parts/tools, is dispatched to the right location at the optimal time.

Generation Forecasting: The platform provides dynamic, multi-dimensional generation/consumption forecasts. It predicts asset-specific energy outputs with unprecedented accuracy, forecasts the probability of maintenance events, and even models future spare parts consumption. These capabilities enable data-driven strategic planning and resource allocation.

Efficiency, Cost Reduction, and Revenue Enhancement

Avathon's Autonomy Platform delivers tangible, measurable benefits across the entire lifecycle of your renewable energy portfolio, beginning on day one.



Operational Efficiency

Process Automation: The platform eliminates manual bottlenecks by automating routine tasks, freeing up human operators to focus on more complex, strategic initiatives.

Proactive Maintenance: By predicting failures before they occur and automatically scheduling maintenance and parts availability, the platform drastically reduces unplanned downtime.

Intelligent Workflows: The system streamlines the entire operational workflow, from automated fault detection to work order completion, ensuring a seamless and efficient process.



Cost Reduction

Lower Maintenance and Administrative Costs: Autonomous scheduling and predictive maintenance reduce the cost of emergency repairs and unnecessary inspections. Integrated predictive maintenance planning also allows multiple tasks to be completed simultaneously, saving money on unnecessary crane callouts and other redundant expenses. Automated invoicing, inventory management, and other routine administrative tasks free up worker time and improve process accuracy.

Optimized Resource Allocation: The platform ensures maintenance teams are deployed exactly when and where they are needed, with needed parts and tools, minimizing labor hours and travel time.

Improved Inventory Management: By accurately forecasting spare parts consumption, the platform optimizes inventory levels, reducing carrying costs and ensuring critical components are always in stock in the right place.

Reduced Penalties: The platform helps asset owners/operators avoid costly grid-related penalties by intelligently managing output and providing accurate forecasts.



Revenue Enhancement

Maximized Energy Production: By ensuring individual assets are always performing optimally, the platform maximizes the amount of energy generated and sold.

Strategic Market Participation: The platform's ability to forecast energy prices and grid conditions allows for autonomous, profit-maximizing decisions on when to sell energy or adjust output.

Optimized Invoicing: By automating the invoicing process and checking for errors and processing efficiency, the platform ensures timely payments and revenue realization.

Proven Impact

In a recent pilot program, Avathon's Autonomy Platform delivered:

20% ↓

unplanned downtime

25% ↓

operational costs

18% ↑

annual revenue (100 MW solar farm)

The Time for Operational Excellence in Renewables is Now

Avathon first introduced its asset performance management (APM) system nearly a decade ago and has, since then, been instrumental in contributing to the growth of the worldwide renewable energy sector. Continuing advances in this sector now demand a more comprehensive solution, one that includes not only asset management, but also an end-to-end focus on operational process optimization. Avathon's Autonomy Platform is that solution, available today to take your renewable portfolio to the next level of operational performance.

“The renewable energy industry is at a critical inflection point, with rapid growth creating immense operational complexity. Our Autonomy AI Platform is the answer. We’re not just providing a dashboard; we’re providing a fully automated intelligent system that makes real-time decisions, transforming how assets are managed from the ground up. We believe that the future of clean energy is autonomous.”

— Pervinder Johar, CEO



The future of renewable energy is not just about generating more power; it’s about managing and optimizing the entire operational value chain with intelligence and precision. Avathon’s Autonomy Platform is the critical next step in the evolution of the clean energy industry. By providing a platform that can autonomously manage assets, automate processes, schedule work, and provide hyper-accurate invoices, forecasts, and other operational processes, we are not only improving the profitability of renewable energy projects but also building a more resilient, efficient, and sustainable global energy infrastructure. The era of autonomous energy is here, and it promises to reshape our world for the better.

About Avathon

Avathon develops cutting-edge software solutions to accelerate the global energy transition. Our mission is to empower renewable energy stakeholders with the tools they need to collaborate, automate critical workflows, and make more informed decisions that maximize asset returns while combating climate change.