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DATA SHEET

Azure C3 AI Process Optimization

Improve Production Processes and Outcomes with AI

Azure C3 AI® Process Optimization helps enterprises optimize production yield, costs, and energy efficiency with AI-driven continuous monitoring and dynamic process control recommendations.

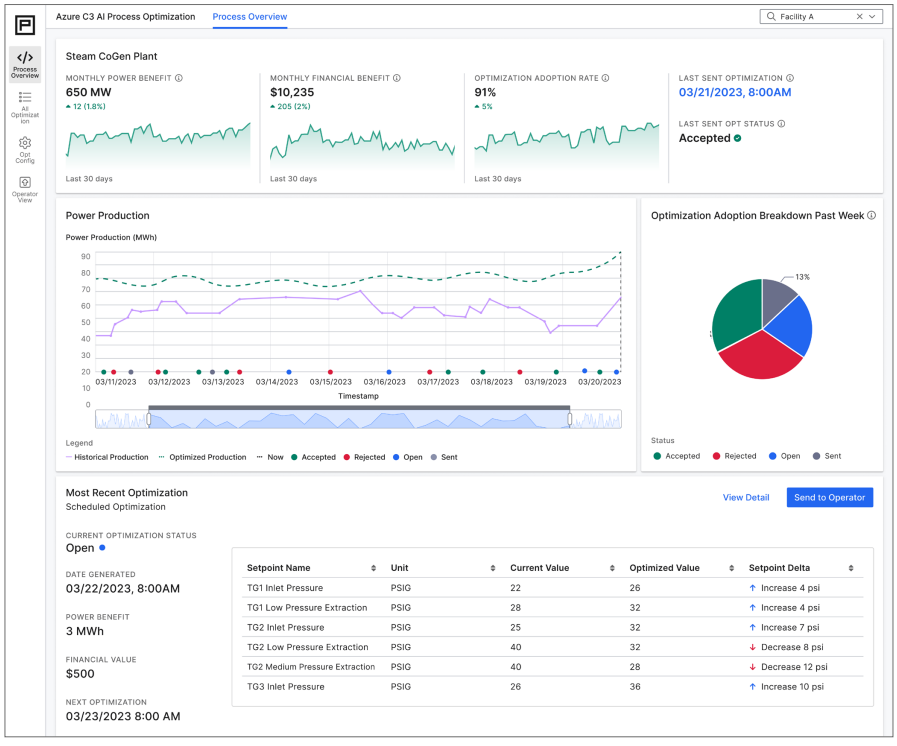
2%
increase in production yield via optimal process operating conditions

30-50%
reduction in off-spec product with AI-recommended control setpoints

95%
reduction in time to detect off-spec product with near real-time visibility to product quality

Today, manufacturers rely on heuristics or rules-based control logic to operate process equipment. However, existing approaches cannot flexibly account for the complexities of dynamic conditions and incorporate multivariate analysis across a variety of data sources. These limitations lead to suboptimal production outcomes - e.g., yield, costs, energy efficiency, and product quality.

Azure C3 AI Process Optimization unifies data from process simulators, operational systems (e.g., sensor data, control setpoints), ERP systems (e.g., lab test results, materials movement), asset management systems (e.g., equipment data, process step configuration), and environmental systems (e.g., weather). The application data model provides a virtual asset hierarchy that contextualizes data and provides a unified view of manufacturing and asset operations.



Feature Summary

- **Near real-time process monitoring** – Gain visibility of production processes across process lines, equipment, and facilities by unifying data across systems.
- **Optimized control setpoints** – Allow process engineers to configure, run, and manage optimization models to generate recommended setpoint values to achieve production rate, yield, quality, and cost goals.
- **Action-centric prioritization** – Enable streamlined troubleshooting and intervention with AI-driven prioritization, insights, and investigative workflow.
- **Collaborative workflow** – Support communication and collaboration between process and production engineers with an end-to-end workflow to review and align on process recommendations.
- **Ad-hoc analysis** – Enable flexible experimentation and scenario analyses by adjusting process variables, constraints, and objectives to determine optimal operating settings.
- **Unified process modeling** – Leverage comprehensive modeling of processes and integrate process simulators and best-in-class optimization frameworks.

Figure 1. *Azure C3 AI Process Optimization provides insights and real-time setpoint recommendations to process and production engineers.*

Azure C3 AI Applications deliver transformative value for customers and are fully integrated with Microsoft Azure. Each application leverages Microsoft Azure solutions and services, including Azure AI services, infrastructure services, data services and more, enabling accelerated deployment.

Azure C3 AI Process Optimization applies advanced machine learning and optimization techniques to continuously optimize manufacturing outcomes and recommend process control parameters. The application integrates with advanced process control (APC) systems to serve as an AI-powered advisory layer. Process engineers can flexibly configure of the optimization formulation, where constraints and objectives can be added and adjusted to represent the end use cases, including maximizing production yield from input materials, maintaining high product quality, and optimizing energy efficiency.

The application provides an integrated end-to-end workflow for process engineers to review and investigate AI-driven recommendations before submitting control setpoint recommendations to production engineers. By providing a single platform for collaboration and communication, Azure C3 AI Process Optimization allows process and production engineers to drive continuous improvements and operate assets at optimal levels.

Azure C3 AI Process Optimization supports discrete, continuous, batch, and semi-batch production processes, delivering benefits across manufacturing, energy, chemicals, food and agriculture, pharmaceuticals, automotive, and other industries.

Feature Summary (cont.)

- **Outcome mapping** – Capture process outcomes over time horizons that span multiple unit shutdowns, revamps, and configuration changes to drive continuous improvement.
- **Configurable KPIs** – Prioritize relevant production and process efficiency performance metrics to track progress against production goals.
- **Codified domain expertise** – Embed process expertise from engineers and subject matter experts into data-driven optimizations.

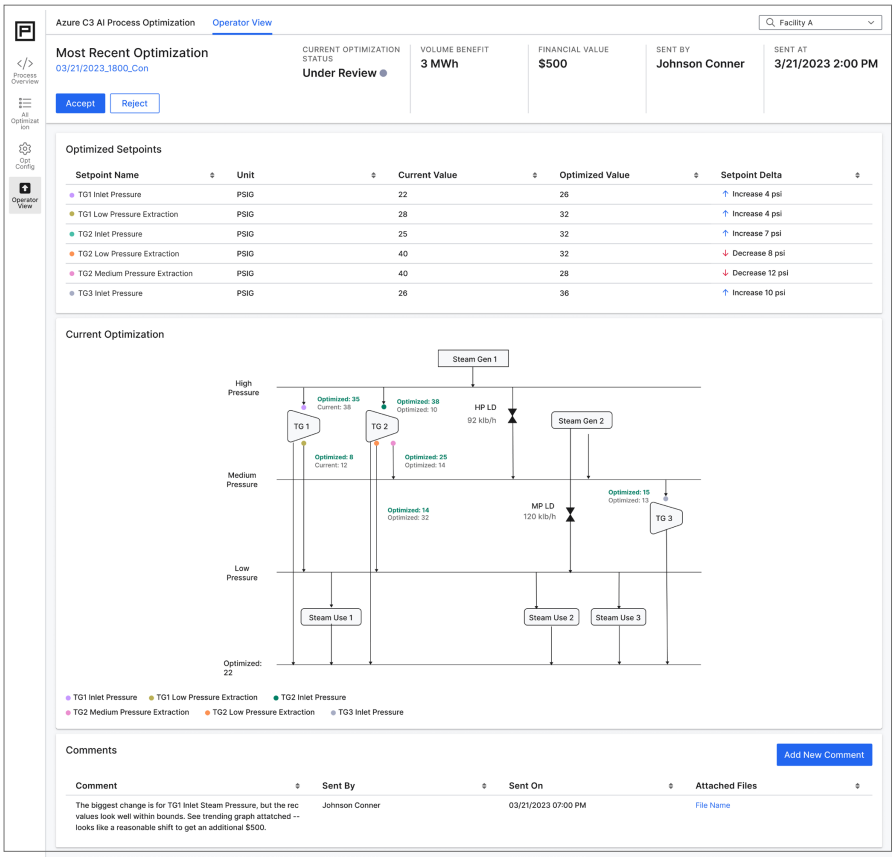


Figure 2. *Azure C3 AI Process Optimization is an application for process and production engineers to collaborate and implement control setpoint recommendations to improve yield, costs, and energy efficiency.*

Proven Results in 6-Month Pilot

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