C3 AI Process Optimization

Increase Production Process Efficiency with Machine Learning

C3 AI® Process Optimization helps improve production rate, yield, energy efficiency, product quality, and overall production visibility with AI-based continuous monitoring and dynamic process control recommendations.

1%
increase in production output

30-50%
reduction in off-spec product

95%
improvement in off-spec product detection time

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 rate, yield, energy efficiency, and product quality.

C3 AI Process Optimization unifies data from process simulators, operational systems (e.g., DCS, SCADA, Historian), ERP systems (e.g., material movements, lab test results), 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.

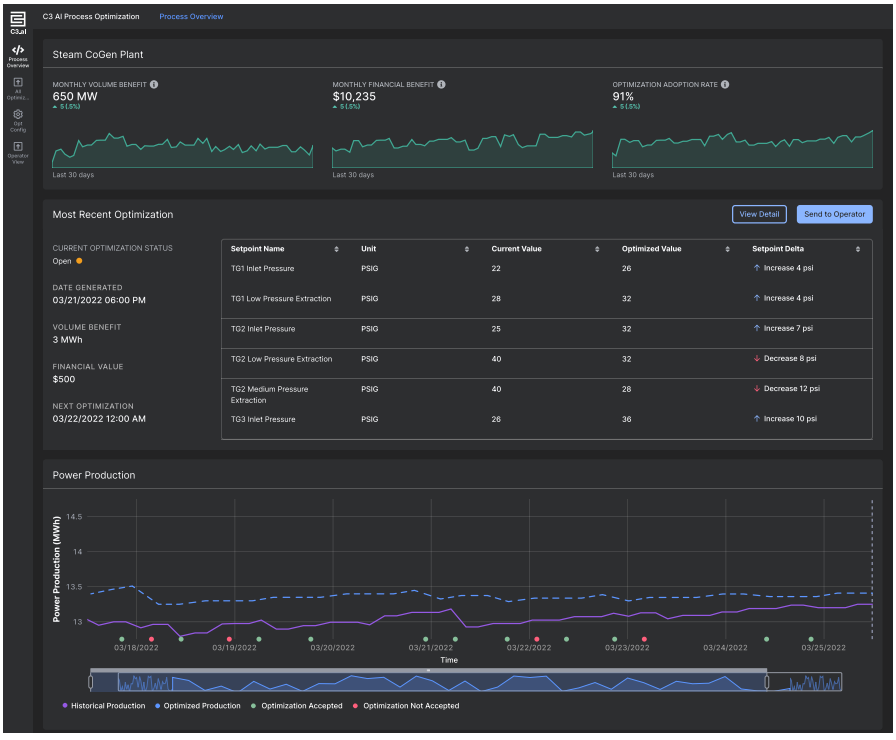

Figure 1. *C3 AI Process Optimization provides insights and real-time setpoint recommendations to operators.*

Feature Summary

- **Near real-time process optimization** – Allow process engineers to configure, run, and manage optimization models to find optimal process operating conditions on a single platform
- **Optimize production output and manufacturing inputs** – Maximize production rate and yield, optimize product quality and minimize supplied materials and energy input in the process
- **Maintain an archive of process configurations** – Enable tracking of process outcomes over time horizons that span multiple unit shutdowns, revamps, and configuration changes
- **Optimize setpoint handles** – Apply optimization based on actual plant operations to recommend setpoint handles to achieve production cost, production rate, and quality goals
- **Monitor KPIs** – Configure relevant production and process efficiency performance metrics to track value
- **Operator-centric view** – Prioritize issues based on AI analysis and deliver streamlined insights to support intervention
- **Case workflow** – Support feedback exchange between process engineers & operators to align on process change

C3 AI Process Optimization applies advanced machine learning and optimization techniques to continuously optimize manufacturing outcomes and recommend process control parameters. The application enables flexible configuration of the optimization problem, where constraints and objectives can be added and adjusted to represent the end use cases, including maximizing production rate and yield, maintaining high product quality, and optimizing energy efficiency.

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

Feature Summary (cont.)

- **Unified process modeling** – Leverage comprehensive modeling of processes and integrate process simulators and best-in-class optimization frameworks
- **Ad-hoc analysis** – Enable flexible experimentation and scenario analyses via adjusting optimization configurations and setpoint values

Pinpoint Process Inefficiencies and Accelerate Analysis-to-Action

- **Receive real-time process set point recommendations** that optimize the industrial process for a desired objective
- **Identify trouble areas** using machine learning and focus on the most urgent priorities with human-understandable insights
- **Quickly compare actual performance relative to optimized performance** over time for any performance objective
- **Perform near real-time process optimization** by modeling various scenarios, and adjusting process variables, constraints, and objectives, to quickly determine optimal operating settings
- **Smoothly hand-off process recommendations and feedback** in an end-to-end collaborative workflow
- **Unify process monitoring** by aligning process engineers and operators on the same insights with configured dashboards
- **Create a unified data image** by integrating operational systems (e.g., SCADA, DCS) with enterprise systems (e.g., asset management, labs, and maintenance) to enable a comprehensive view of operations
- **Codify domain process expertise** and embed physics-based models into data-driven optimizations
- **Inform analyses with actual process unit configurations over time** by capturing configuration changes and input accurate conditions for machine learning algorithm development
- **Optimize energy utilization** and reduce production costs by minimizing energy consumption across entire process
- **Increase team efficiency** by reducing time and effort spent on data aggregation and improving the accuracy of optimization analyses
- **Improve data quality** by merging data with varying granularity, alerts on data issues, and advanced data cleansing

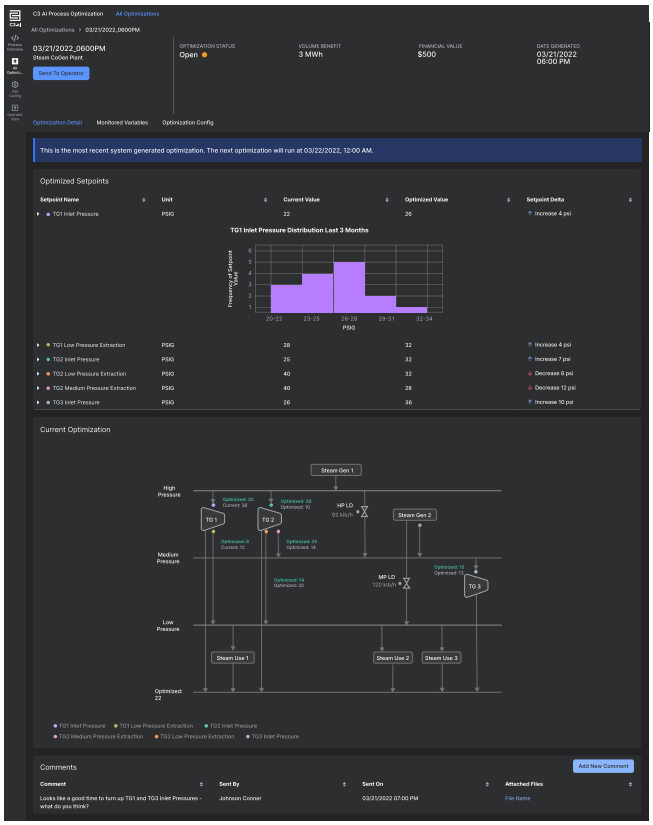

Figure 2. *C3 AI Process Optimization streamlines data aggregation while enabling process engineers to track production KPIs, document optimization activities, and investigate process efficiency opportunities in one centralized application.*

Proven Results in 8-12 Weeks | **Visit C3.ai/get-started**