

Case Study ENERGY OPTIMIZATION TO IMPROVE OPERATIONAL EFFICIENCY AND SUSTAINABILITY

Canvass AI in partnership with a leading global ingredients provider implemented and scaled solutions to enhance operational efficiency and improve sustainability for natural gas turbines. The company has implemented Canvass AI solutions through optimization, prediction, collection of real-time data and automation. The project successfully achieved a 5.09% gain in thermal efficiency, which translates to 9M lbs/yr. reduction of CO2 emissions and US \$330,000+ in annual energy cost savings.

CANVASS



Who is Canvass

Canvas Analytics Inc. is building AI platforms specifically for the Industrial sector, catered to leading oil and gas, chemicals and manufacturing companies to unleash the value of data to increase their operational performance, outperform their competitors, and set new sustainability benchmarks.

Introduction

A leading global ingredients provider, wants to grow its business while improving sustainability and operational efficiency. It uses natural gas turbines to produce electricity and excess heat is fed to downstream boilers to meet steam demand for evaporation processes.

Due to the complex nature of operating interconnected assets to meet a fluctuating steam and electricity demand, the existing control system and process resulted in higher gas consumption and excess wear on equipment to meet demand. The energy cost to the plant is more than US \$10 million per year. Existing engineering models were limited to unit models and were unable to optimize the entire process which was required to reduce CO2 emissions and energy costs.

Challenges

The main challenge was to establish the right team and organization to succeed with the AI effort. Engineering and operations personnel needed to develop confidence with the Canvass AI Platform to mitigate any biases they may have developed from past AI experiences.

By having the right sponsor and committed leaders from operations helped to accelerate the project through each phase. However, the group did face technical challenges. Mechanisms were required to monitor plant floor sensor data to ensure that quality data was fed live to the AI model to deliver accurate predictions.

https://www.canvass.io



Application Brief:

Industrial AI for real-time optimization of natural gas consumption across turbines to meet electricity production targets and steam demand from downstream boilers. The application reduced carbon emissions and operating costs, extended asset life, while consistently meeting steam demand.

Enablers

The project was motivated by executive desire to reduce carbon emissions by 10% while reducing operating costs. Adoption of AI within the organization was a top priority for senior leaders.

Critical to the success was the early engagement from managers to operators – whose confidence was needed to implement AI beyond just a pilot. The team was able to narrow the use case using Canvass' five criterion to ensure the application ROI was supported by data availability and was repeatable and scalable to other processes.

The Canvass AI Platform ensured that engineers could lead the project by providing a user interface that didn't require the engineers to have coding or data science expertise. This put engineers in control of their data which garnered the group's confidence in the process.

Solution

The Canvass AI Platform was used to optimize energy intake for electricity and steam production.

Using the pre-built AI solution templates in the Canvass AI Platform, engineers were able to analyze thermal efficiencies and ambient conditions in addition to plant data to optimize the whole process and meet demand at lowest energy costs and reduced asset wear. The solution quickly and accurately calculated set points for fuel intake on multiple lines to meet fluctuating demand for electricity and steam. With Canvass AI Live, real-time calculations automated control with no intervention from plant operators.

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Implementation

The implementation was a multi-step journey, starting with:

- 1. Offline optimization to prove potential savings and inform operator action;
- 2. Refining prediction schedules, including business, design and operating constraints, and applying safety rules to improve setpoint calculations; and
- 3. Canvass AI Live for real-time data connection with secure data protocols and automated closed loop control for best results.

The implementation had strong organization support and an exceptional sponsor in charge of meeting the KPIs of the organization. Next steps would be to expand applications to other processes and units to further improve savings.

AI Solution Architecture:

The Canvass Al Platform was used to prepare the dataset, which included plant, ambient and log data, and cross reference outliers, such as scheduled downtime or maintenance, with the operating log. The operations team validated the features and clarified corresponding events to contextualize the data. By empowering operators to conduct their own data preparation ensured that context to the data was provided ahead of training the Al models.

Multiple AI solutions were architected to forecast and optimize energy costs, boiler simulation, optimal controls parameters and fuel consumption. This simplified the application and helped scale the AI solution across assets.

Impact

Since deployment, natural gas input is now being controlled for each turbine's individual efficiency performance and the effect of ambient conditions. To date, the plant has achieved a 5.09% gain in thermal efficiency, which translates to 9M lbs/yr. reduction of CO2 emissions and US \$330,000+ in annual energy cost savings. OEE has improved too.

For the operations team, the automation of boiler optimization has become embedded as business-as-usual because of their confidence in the predictions being provided. "At any time that we need to take the Canvass platform offline for maintenance, the operations teams are eager to get it back online as soon as possible."

Are you Ready to Reduce your Emissions?

Reducing emissions and increasing efficiency throughout digitization will positively enhance Canadian manufacturing company's competitive advantage. Is your company ready to take the next step? Learn more today by connecting with the Canvass AI team.

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