CUSTOMER CASE STUDY

Drax keeps renewable electricity flowing with AVEVA™ PI System™ and CONNECT fueling predictive analytics

Drax - www.drax.com
Industry - Power Generation, Bioenergy

Goals

- Implement a connected industrial data platform to better facilitate Drax's data science teams

- Prevent or clear blockages in pellet pipes by monitoring pressure readings

Challenges

- Data retrieval was performed manually and took a minimum of 30 minutes

- Data was raw, unprocessed, and of too great volume as a data set for Excel

- Data scientists had no tools at their disposal to work with live data

Results

- Removed errors from the raw data, making 10+ times more data points accessible

- Engineers now have near-real-time data to prevent blockages and enable more use cases in the future

- Fewer outages expected, as repairs now are scheduled and anticipated

- Potential large savings for each day that generator downtime was prevented.

- Significant number of assets de-risked through analytics-driven alarms and an improved dome scheduling

Solutions

- AVEVA PI System

- CONNECT

Companies have more urgency than ever to achieve net-zero carbon emissions after COP26 and subsequent climate change conferences, with countries pledging goals and activists pleading for even faster change. As the world transitions to renewable energy sources, biomass production and renewable electricity are two important solutions to help drive sustainability. Drax, the UK's largest provider of renewable electricity, operates a global bioenergy supply business with manufacturing facilities at 13 sites in the United States and Canada. While the firm was leading the way toward a sustainable future, a data problem was costing the organization significant resources every day.

The high price of slow data extraction

Drax relies on data shared across its organization to manage its biomass production and renewable energy productions efficiently. However, the sheer volume of Drax's data was overwhelming—far more than could fit into a traditional Excel spreadsheet. The company was using a series of remote desktops and CSVs to manually pull raw data and input it into Databricks, a process that took as many as six steps and a minimum of half an hour to perform. Extracting actionable information was a difficult and time-consuming process because data required significant pre-processing before it could be analyzed.

This was problematic for Drax not just because of the time it took to extract data, but also because the data was coming from large numbers of sensors at the company's biomass plant. The time that engineers had to wait for this data was time when they couldn't carry out essential asset maintenance. The longer engineers had to wait, the more likely that they could face unplanned machine downtime.

An interesting challenge that was initially addressed in a lighthouse project, was that the plant's generators were prone to developing liquid coolant leaks as they aged, eroding conductor bars and allowing hydrogen gas to seep in. Drax was able to implement advanced data science models on top of live data, proving that the CONNECT platform approach would better enable the data science team. Although this project has not yet made it into production, it did pave the way for other use cases.

The first real solution used in production today focuses on the biomass pellets Drax employs as a sustainable energy source, which often get blocked in the fuel pipes. If a generator unit goes offline, it can cost Drax considerable amounts of money per day—and pipeline blockages certainly reduce the amount of electricity the company can generate. To provide a sense of scale, generator downtime can cost power companies like Drax hundreds of thousands of GBP per day.

With substantial costs at stake and data slow and unreliable, Drax agreed to test AVEVA PI System with CONNECT to see how it could improve its operations.

Eliminating manual processes with AVEVA PI System and CONNECT

Drax needed to drastically reduce the amount of time it takes to extract and clean data to facilitate predictive maintenance for its pipelines and generators. If it could send near-real-time data to its engineers, it could prevent millions of GBP in cost from blockages, repairs, and downtime.

After implementing AVEVA PI System with CONNECT, the company's data science team could access AVEVA PI System data from the cloud with almost no latency from its Databricks platform, eliminating a manual, multistep process. CONNECT also filtered irrelevant data, enabling Drax to extract predictive patterns, such as anomalies in air pressure or breaks in periodicity.

Armed with this information, the data science team was able to alert Drax engineers to potential infrastructural issues in near-real time and over time, calculating lead time predictions and anticipating maintenance needs using historical data analytics. This capability allowed engineers to plan for outages, spread out intervals between service times, and schedule repairs more efficiently.

Creating a predictive analytics model for enterprise-wide savings

Using AVEVA PI System with CONNECT, Drax dramatically reduced data errors, which increased relevant, available data points tenfold, from one million to 10 million per month. Combining near-real-time and historical data with predictive analytics, Drax is projecting millions of GBP in savings.

"AVEVA PI System with CONNECT increased the amount of data we could pull by a factor of about 10 times, so it went from a few million records every month to tens of millions of records, which is massively helpful in building a predictive model."

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Alex Hegarty
Data Science Analyst

"And it's allowed us to respond quicker to requests from our engineers."

With data being pulled within two minutes of being logged and hundreds of additional data streams, Drax anticipates avoiding outages with efficient, planned repairs. It also sees the leakage and blockage tests as use cases for further applications, leading to even greater business value. After implementing an automated data flow, Drax was able to significantly de-risk assets already using predictive analytics to set alarms and improve dome scheduling.

Resolving data issues and operating more efficiently has gone a long way to help ensure DRAX keeps renewable energy flowing. As it continues to deploy AVEVA PI System and CONNECT for other uses throughout its operations, greater savings are on the horizon thanks to scalability and improved data science capabilities.

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