

CASE STUDY

TRANSFORMING ENERGY RETAIL WITH MACHINE LEARNING

“Inawisdom’s hard and inspirational work over the last month signals the value you will continue to add.”

Bjoern Reinke
Retail Smart Director
Drax Power

INAWISDOM



Our Customer



Drax Power Station is the biggest single site renewable generator in the UK and the largest decarbonisation project in Europe. It supplies 6% of the country's electricity needs, including 11% of its renewable power, and a host of system support services.

Drax Retail includes Haven Power and Opus Energy, with a strategy that includes innovating to enhance the customer proposition and differentiating within the market by inspiring change in energy use.

Their Challenge

Across a portfolio of thousands of customers and millions of half-hourly data points, manually detecting consumption pattern changes and anomalous activity is difficult and time consuming. For example; the time taken to identify events that indicate faulty meters, safety issues, energy theft and changes of tenancy results in inefficiencies and debt recovery challenges.

As these events develop, they cause significant operational impact the longer they go undetected, often with weeks or months passing before they are spotted, resulting in significant additional cost to the business.

Drax engaged AI (Artificial Intelligence) and ML (Machine Learning) specialists, Inawisdom, to quickly and efficiently find a way to automatically detect these errors; identifying patterns and indicators in Drax data in order for immediate mitigating action to be taken.

↑ Revenue

↑ Customer
Retention

↑ Profitability

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“We believe in data and insight, and your skills and approach will help us... Well done and thanks.”

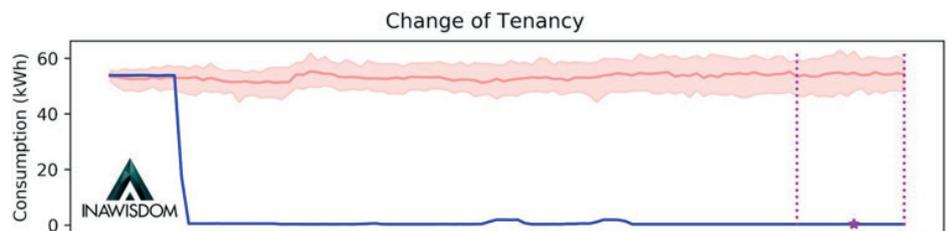
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Our Solution

Inawisdom initially deployed their proven four-week Discovery-as-a-Service (DaaS) accelerator approach, consisting of one week to outline the opportunity for a machine learning solution, to agree success measures and to assess data availability and quality. The remaining three weeks were then committed to implementing machine learning models against the data and presenting the results.

The raw dataset used consisted of millions of half-hourly energy consumption readings, with years of data per customer. Usage patterns for the customer base were grouped by business type, enabling accurate predictive and anomaly detection models to be built against this data. The results were impressive and Drax progressed the project to productionise the solution. In order to truly embed the solution in to the business, Inawisdom first created forecasts for electricity consumption using Amazon SageMaker's built-in model DeepAR. From the created forecasts, anomalies for the previous week could be detected using another Amazon SageMaker built-in model—RandomCutForest (RCF) - on the differences from observed usage to predicted usage.

Example output from the solution



This is perhaps one of the most important business anomaly type that needs to be identified. The longer time period that's passed since a customer moved out of the premises, the less likely the contact details, held by Haven Power for the customer, are up to date. Consequently, this means a lower chance of recovering the customer's outstanding debt.

With the data science proven, Inawisdom used their own delivery capability, with Cloud and Data architects working within Drax's AWS Retail platform, to deliver an automated solution. This allowed stakeholders at Drax to view the output of the machine learning model (anomalies) on a weekly basis and take action based on the results.

The Process

Using the data ingested into Drax's AWS Retail platform from Haven Power's systems (capturing half-hourly data), a series of functions were built to deliver the output. Scheduled to run on a weekly basis, the functions co-ordinate the processing and transformation of the data required for use by the Machine Learning model. Once the data has

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been processed the functions orchestrate the forecasting and anomaly detection output using the SageMaker models.

The project was built with repeatable deployments using TerraForm across multiple AWS accounts. Testing the code and processing in a development account before promoting to other accounts following best practice standards. This was done leveraging Amazon's serverless technologies including Athena, Step functions, Lambda and S3. Furthermore, Inawisdom is iterating on existing designs to further scale, using ECS, Docker and Fargate.

The Result

Inawisdom implemented Machine Learning to investigate normal energy consumption patterns across groups of Drax customers and then identify changes using anomaly detection to accurately pinpoint unusual activity for a particular business type or peer group. Inawisdom proved that it was possible to automatically detect and classify anomalous events as soon as they occurred.

Visualising the usage and anomalies, as part of a set of figures produced on a weekly automated run, was a key requirement from the business stakeholders. This allows the team at Drax to quickly identify customer and site usage and be able to have a dialogue with their customers on their energy consumption and any unusual activity. Having this solution and output automated was key to the success.

The result has proved the business case and is reducing the hundreds of hours spent by the operations teams investigating cases, with a significantly higher opportunity of debt recovery, improved customer service, retention and sales.

About Inawisdom

Inawisdom is an AI specialist and AWS Machine Learning Competency Partner. We enable customers to rapidly discover business differentiation from their data assets.



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