

ELECTRICITY DEMAND FORECASTING AND NOTIFICATION SYSTEM

Noesis developed a **data ingestion system for forecasting the energy consumption** of B2B customers of a major electricity utility company.



Sector:
Energy & Utilities

Business Unit:
Data Analytics & AI

Solution:
Forecast System



85%

Confidence level on predictions



100%

Customized solution



THE CHALLENGE

The **management of energy consumption is essential** for the competitiveness of companies. Being able to monitor these consumptions allows better control and management of costs. In this context, a major player in energy distributor approached Noesis to go beyond, by developing an energy consumption analysis and **forecasting system** for its B2B customers.

The proposed challenge then went on to **build a predictive system to analyze all points of energy consumption** for each customer and generate isolated forecasts for each point of consumption, i.e., all entry points existing in spaces such as machines, refrigerators, sockets, etc.

GOALS

The main objective of the project was the creation of a **data ingestion system developed by Noesis**, capable of **analyzing the real-time consumption** of several indicators and **generating isolated forecasts** for each consumption point, having as main requirements:

- › **Collection, staging, storage and modeling** of the electricity demand datasets;
- › Creation of a **training and forecasting predictive model**;
- › Management and **monitoring platform**;
- › Sending **notifications** when real consumption is outside forecast standards;
- › Deliver **suggestions for behavior and actions**.

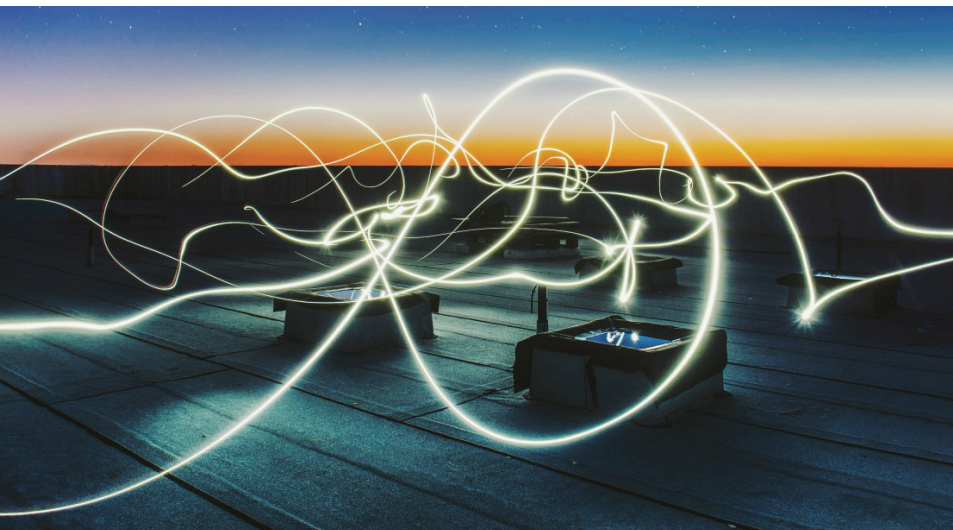
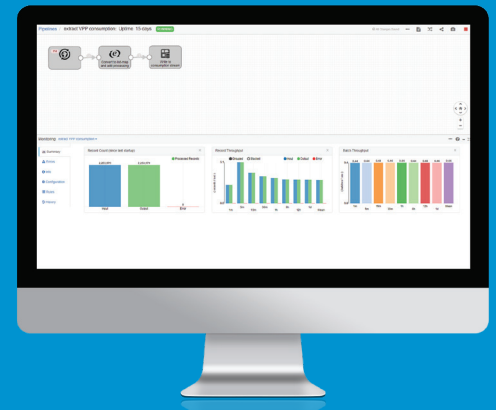
SOLUTION

The developed electricity demand forecasting system works sequentially to forecast, the expected electricity demand, for each client and respective installation. This system contains the following three main subsystems:

- **Data pipelines and data staging:** Extraction, transformation and loading operations, involving the collection, staging, storage and modeling of the electricity demand datasets;
- **Data processing and analysis:** The next step involving model training and forecasting;
- **Applications:** Notifications application, based on forecasts, versus observed

These consumption forecasts are **generated daily** and the models are trained according to the degradation of the evaluation metrics of those same models. As an action to the forecast results, a system for sending notifications was built that **sends alerts** whenever the actual values observed at each moment exceed a threshold defined by the energy supplier.

Notifications are received by an end-point that will forward this same alert to different systems so that they act accordingly. For this solution, the Noesis team developed a data pipeline using **Streamsets** technology, with the intake service allocated on the Azure VM's with the different tables necessary to feed the forecast model. This data is written to the Azure Blob Storage, and so, be made available on other Azure services.



THE RESULT

This solution provides the energy company a predictive communication to their clients on non-standard behaviors and alert them to abnormal consumption situations, thus **helping to achieve levels of excellence in terms of energy optimization**. With a data ingestion system, the advantages are notorious in terms of:

- **Customer Experience:** Sharing goals and improving the relationship with customers;
- **Possibility of developing parallel solutions:** Add an anomaly detection model in assets;
- **Behavioral patterns:** the study of the behavior of deviations between forecasts and real consumption;
- **Data Trustability:** The solution guarantees from the outset a Root Mean Square Error (RMSE) of 15%, and in 60% of the forecasts, the **confidence rate of the predictions, reaches 90% to 95%;**
- **The ability to forecast the energy consumption** of its customers, allows the energy retailer to make **better bidding decisions in the electricity trading market.**



Founded in 1995, Noesis is an international tech consulting company offering services and solutions to support clients in digital transformation and the development of their businesses. In order to obtain sustained value that is transversal to all sectors, Noesis is focused on infrastructures, software, quality and people.



Azure is a hybrid cloud platform from Microsoft that allows users to access all organization's information, regardless the location or circumstance, with the scalability and security needed to support the business growth. Developing on or migrating to Azure is a guarantee of successful outcomes, with adaptable testing and short migration times. With Noesis, this process is sustained on years of experience in Microsoft technologies.



StreamSets developed the first DataOps platform and the only one that allows organizations to build, operate and protect data between different devices, tools and clouds, facilitating the management of pipelines. The partnership with StreamSets allows Noesis to design new solutions geared to the needs of customers, focusing on the best practices of DataOps.