Scale-up of an organic waste treatment plant by combining process simulation and ML

Leveraging Simulations and Machine Learning (ML) for Predictive Insights and Operational Excellence.

INDUSTRIAL DATA ANALYTICS

This is the process of collecting, analyzing and using plant data to harness the hidden value. Tools like e-DAP are capable of modelling a physical phenomenon on the basis of data collected over time. The insight gained helps improve operational efficiency, optimize process, and plan maintenance ahead of time.

SITUATION & CHALLENGE

- A company has designed an innovative biowaste treatment process, currently undergoing testing in a pilot facility.
- The ultimate goal is for the process to operate on a boat, managing the vessel's waste.
- As the company aims to scale up the prototype, questions arise about how the system will behave with increasing flow and yield process.

SERVICE & APPROACH

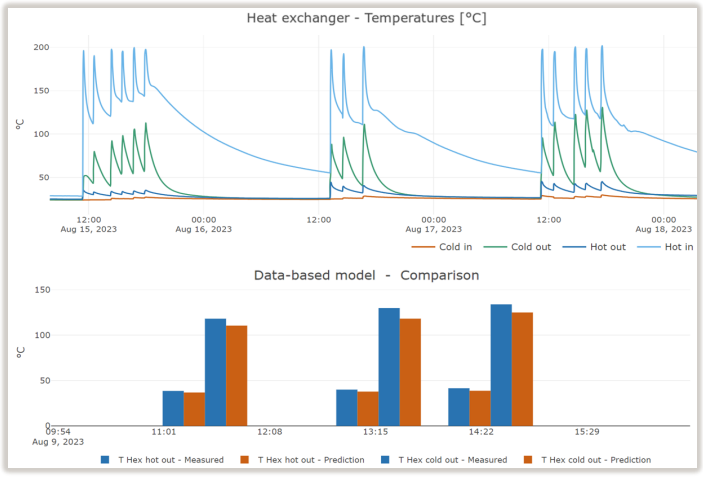
- Initiated by creating a process simulation using DWSIM, exploring various input parameters like flow, reactor temperature, and cooking time.
- This simulation data were then ingested into e-DAP where a machine learning model was developed and trained to generate a comprehensive model.
- With sensors installed on the pilot facility, a data-based model was also developed to predict outputs similar to the process simulation model, enabling a comparison between the two approaches.

E-DAP: the *end-to-end* data platform

A cloud-hosted infrastructure for the treatment of plant data: from IoT sensing, through engineering, dashboarding, ML/AI, digital twinning, to insight

IMPACT & ADDED VALUE

- The company can now anticipate the behavior of the hydrotreat process as they scale it up.
- Anomalies in the process can be swiftly identified by contrasting measured values with predicted ones, ensuring operational efficiency and safety.
- This hybrid-model approach not only provides a roadmap for scale-up, but also instills confidence in the process's reliability and effectiveness.



Contact

Djamel Lakehal
Business Development Manager
+41 76 356 22 23

AFRY Switzerland Ltd
afry.ch

Advanced Modelling & Simulation: Link