visplore

User Success Story:

How an energy consultancy helped a system operator to troubleshoot their complex energy system.

Problem: Troubleshooting operation of systems that are increasingly complex & interconnected

An energy technology consultancy (ETC) was called to troubleshoot a large, innovative energy system providing heat and electric power for multiple apartment buildings. As it was not performing as planned, the operation had to be analyzed. With the approaching end of the heating season, the ETC had to act fast to fix and validate the correct operation.

As a result of the amount of acquired data and system complexity, troubleshooting required to dive in deep quickly. These deep dives were usually done through static Python plots. However, due to the highly dynamic process of generating insights and adjusting the plots, this process became increasingly inefficient and slow.

Highlights

- **Explored system operations at a glance**
- **Gained operational insights interactively**
- **Enjoyed high performance even with large data**

Need: Plausible data and a good understanding of the customer's energy system

The ETC had to check and fix the monitoring data to gain a good understanding of the energy system for further analysis. Therefore, a dataset containing six months of data with a selection of 105 time series in a 2-minute resolution had to be screened for completeness and plausibility.

An essential aspect of this screening was to interactively inspect, label, and discuss occurring data anomalies or patterns with the customer. In previous projects, this was a particularly time-consuming task and therefore, offered a lot of potential for further optimization.

Benefits

- **Reduced time for validating the dataset and generating first insights by 60%**
- **Accelerated project execution by 30% leading to increased margins**
- **Gained higher confidence in insights and deeper understanding of operation**

Solution: Turned large, messy data into insights and improved operation with confidence

The ETC decided to use Visplore for analyzing this large set of monitoring data. Visplore enabled highly interactive troubleshooting, allowing to efficiently discuss findings with the customer. Visplore provided an overview of the data quality (availability, range) and was used to enrich the data by calculating energy balances, expected operating conditions, and KPIs such as component efficiencies.

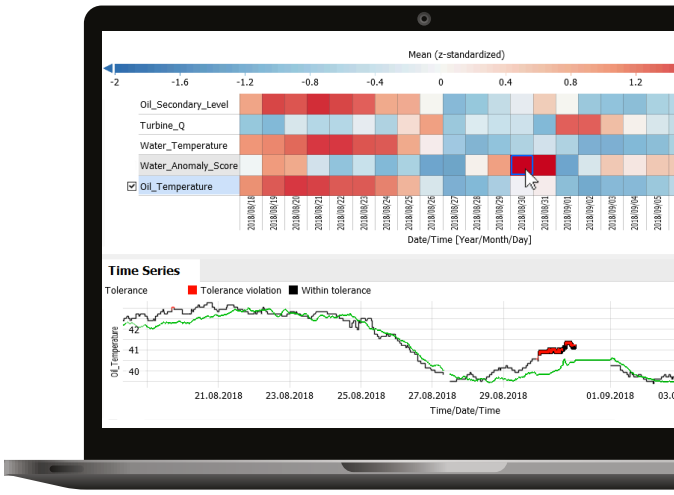
Consequently, the ETC performed a deep dive. They detected periods of unexpected operational behavior, and investigated its potential causes. As it turned out, a faulty control at a large heat exchanger resulted in too high return temperatures that in turn violated the operating conditions of the heat pump. Python is still used for repetitive tasks. It plays seamlessly with the analysis and case-based processing in Visplore thanks to its tight integration.

> *"Visplore allows for a much easier investigation of relevant patterns and structures. Our downstream analysis becomes much more efficient and we gain more confidence in the results."*
>
> **Main Data Scientist, Hydropower Provider**

Result: Accelerated successful troubleshooting of a complex project by 30%

Visplore and its interplay with Python accelerated the process from validating and enhancing the data set to generating first insights from an average of two weeks to less than a week. Due to the interactive analysis, the ETC was able to identify the problems of the energy system in only four sessions together with the customer.

The specific component that triggered a chain of adverse events was identified, replaced, and parameterized. Eventually, this accelerated the total project execution by approximately 30% as compared to projects of similar magnitudes. Thus, the margin and competitiveness of the ETC increased significantly.



visplore – Fast visual analytics for energy experts

- Monitoring Plant Operation
- Start-up and Ramp-up Optimization
- Building Physically Plausible Digital Twins
- Modelling for Condition-Based Monitoring
- **Troubleshooting of Complex Energy Systems**

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