iSCAN and iDashboards

Overview

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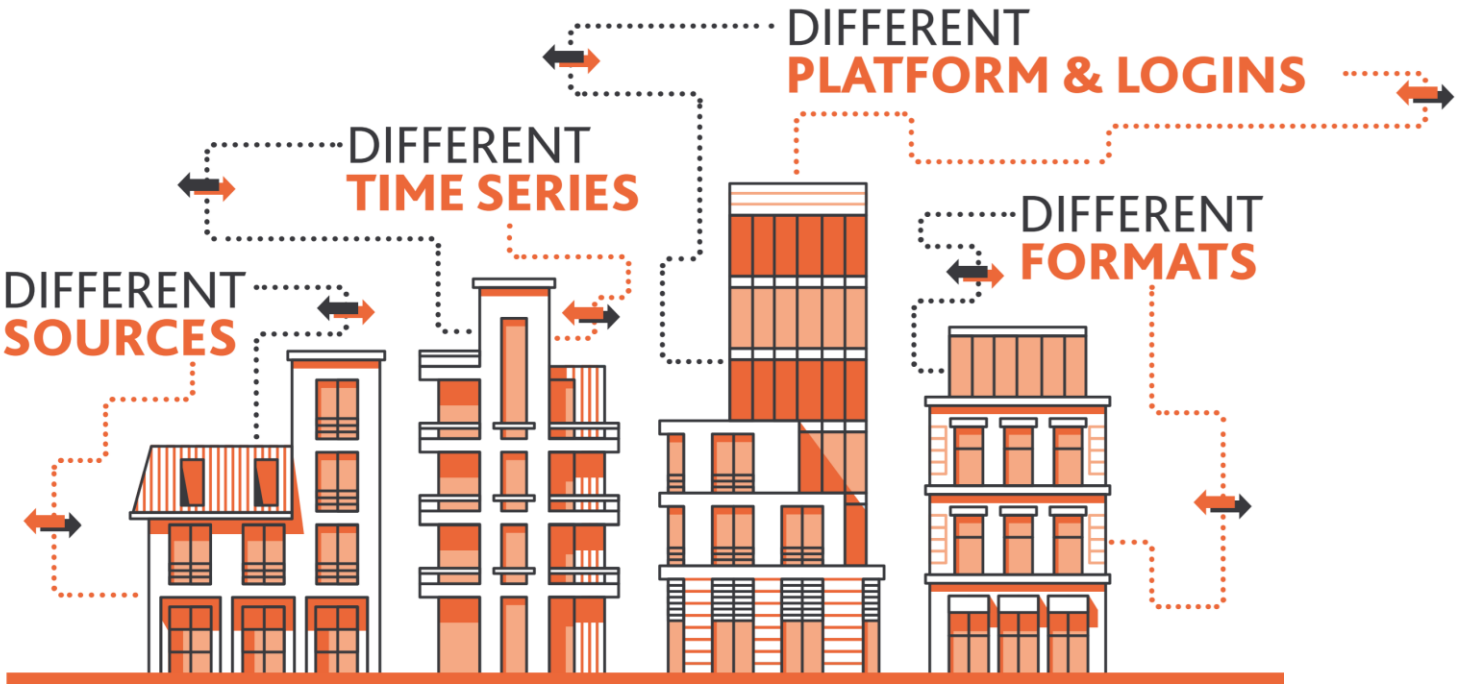
Workshop part 1 - Overview

iSCAN & iDashboard solution overview

Workshop part 1 - Content

- The problem
- The iSCAN & iDashboard solution
  - Data manipulation
  - Data analysis
  - Dashboards
  - Access & privacy
- Examples

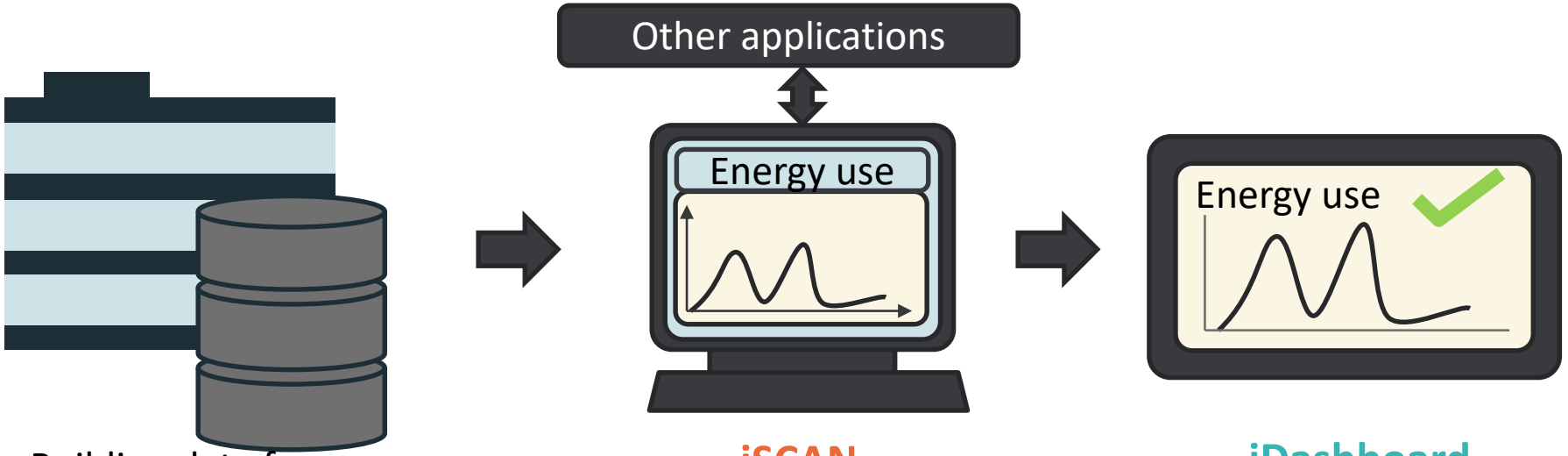
The problem


DIFFERENT
PLATFORM & LOGINS
DIFFERENT
TIME SERIES
DIFFERENT
FORMATS
DIFFERENT
SOURCES

The problem

- Traditional BMS systems:
  - Little interaction with plots;
  - Difficult access;
  - Limited flexibility;
  - Non-customisable alarms;
  - Only interacts with local data.

The iSCAN & iDashboard solution



Building data from:

- Smart Meters
- Building Management Systems (BMS)

iSCAN

Data management:

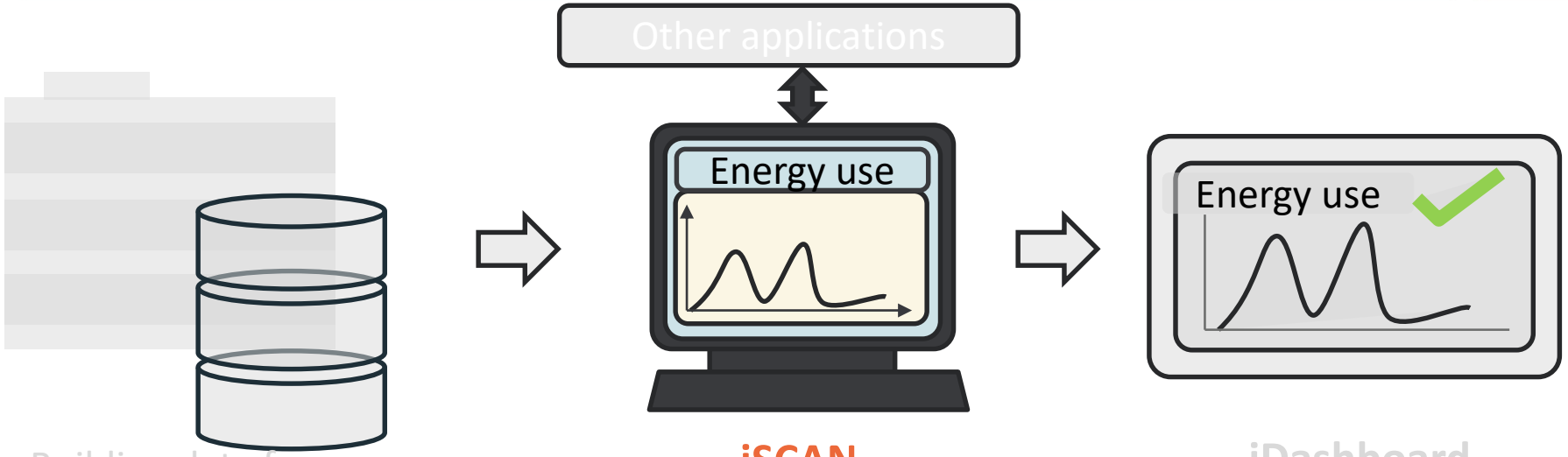
- Combine sources
- Analyse data
- Generate data
- Weather data
- Create bespoke alerts.

iDashboard

Data visualisation:

- KPIs
- Observe trends
- Present recent data

The iSCAN & iDashboard solution



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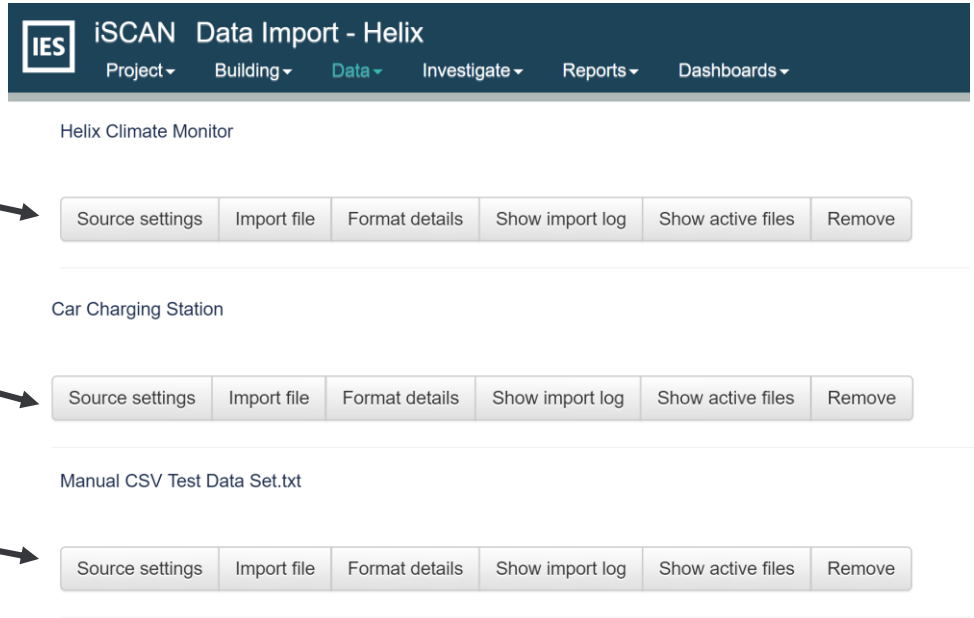
The iSCAN & iDashboard solution

- Import data from various sources

On site weather station

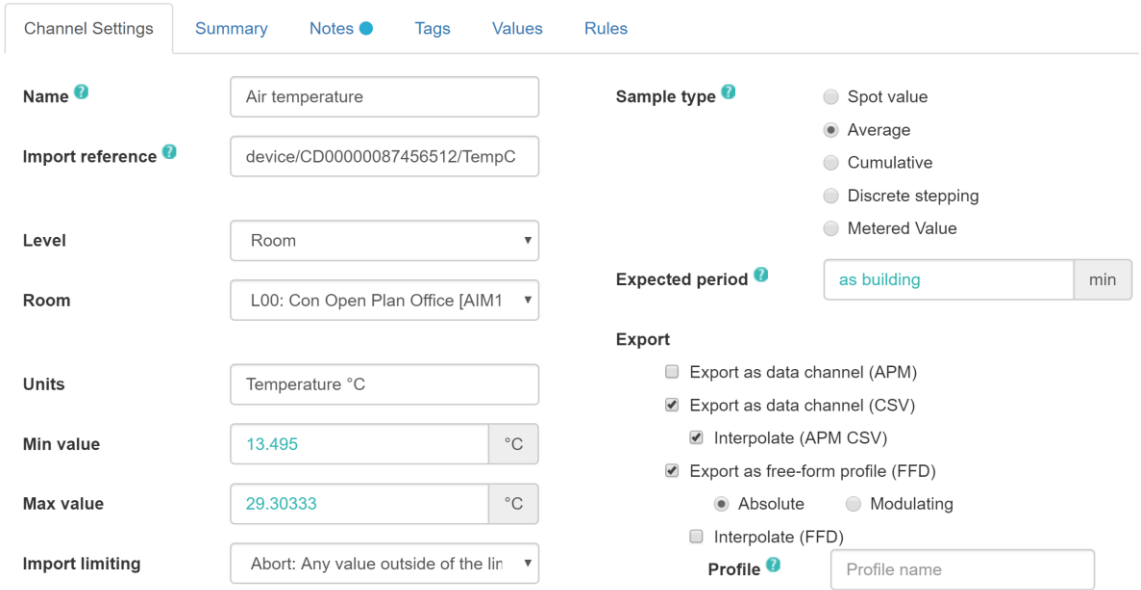
EV charging station

Manual data uploads



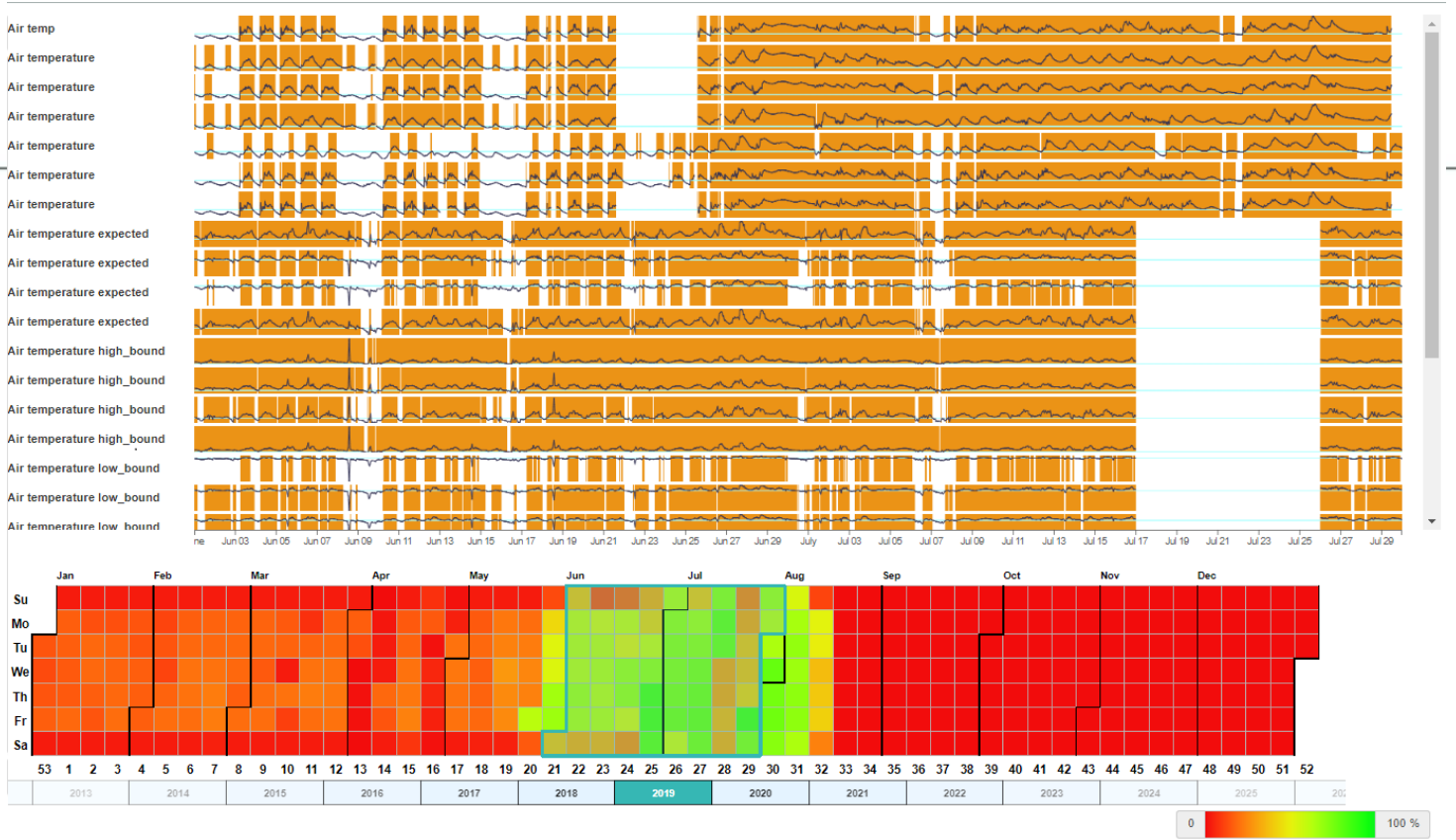
The iSCAN & iDashboard solution

- Add context to data



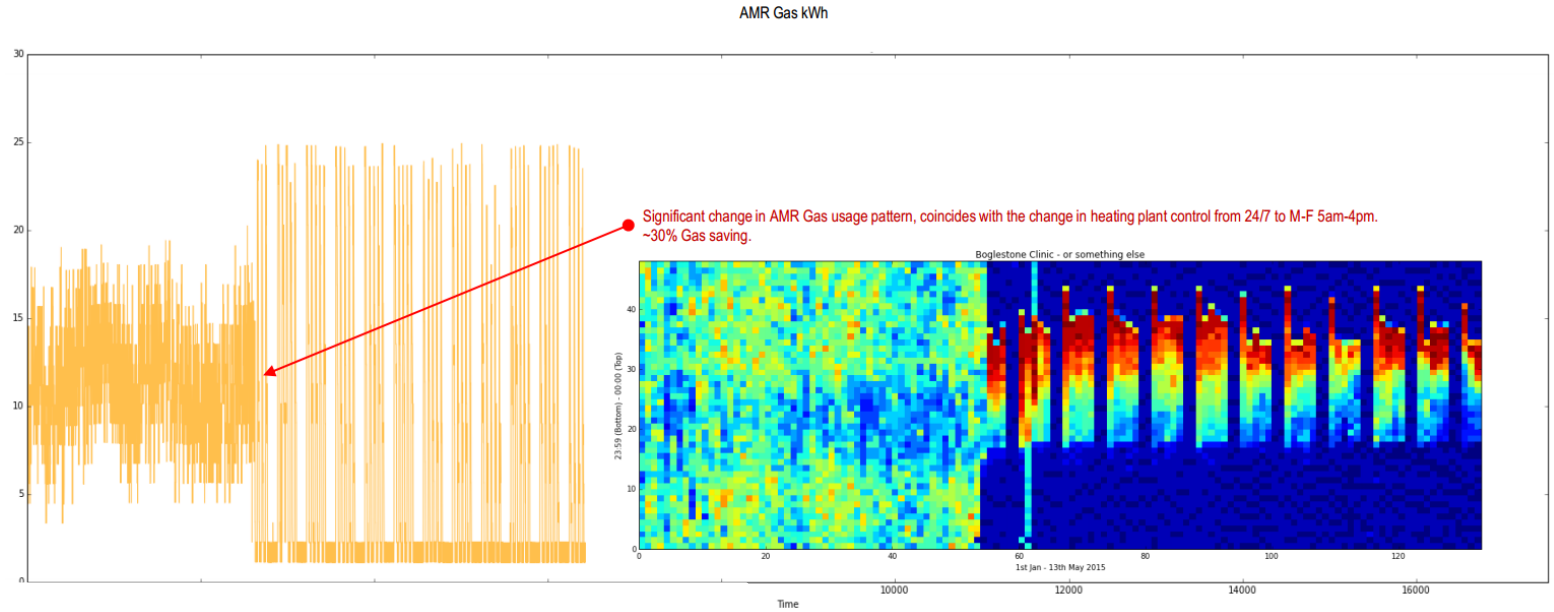
The iSCAN & iDashboard solution

- Data exploration



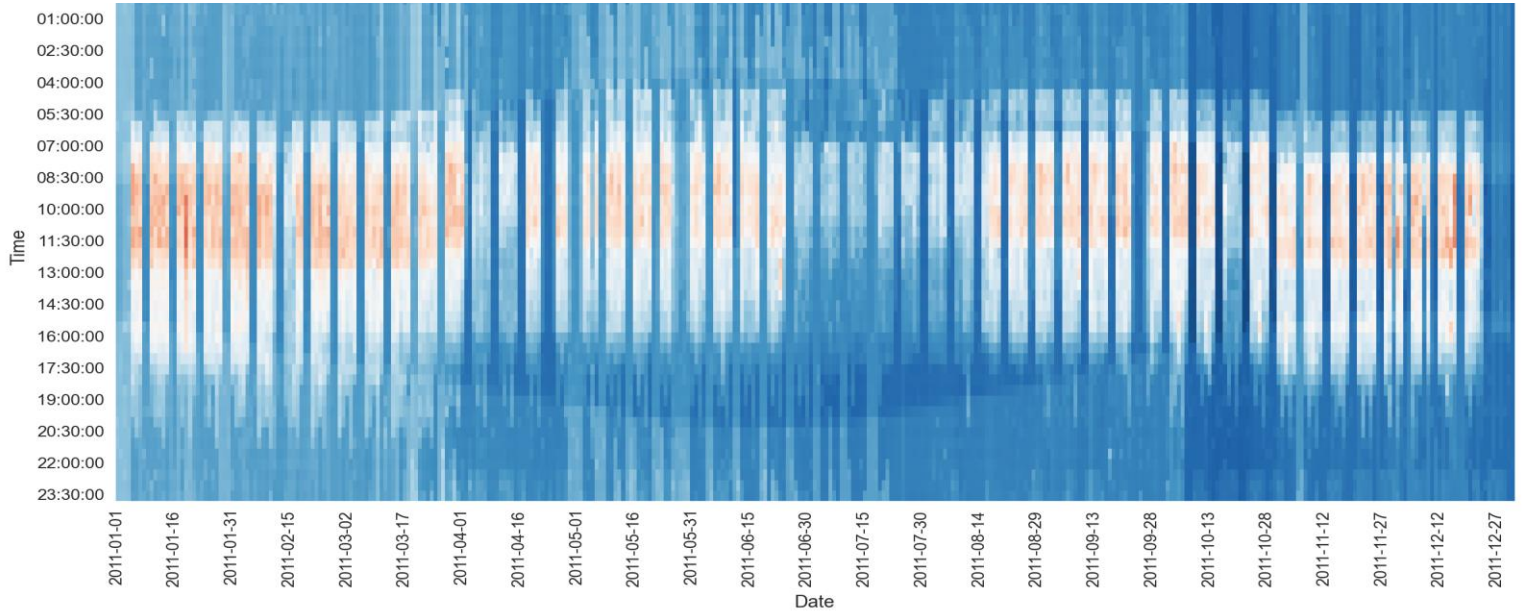
- Data Quality trend lines used to track data quality of all measured points
- Rogue controllers can be identified and fixed/replaced

Data exploration



- 6-months performance tracking of LTHW boiler flow temperature – varying start/stop times observed

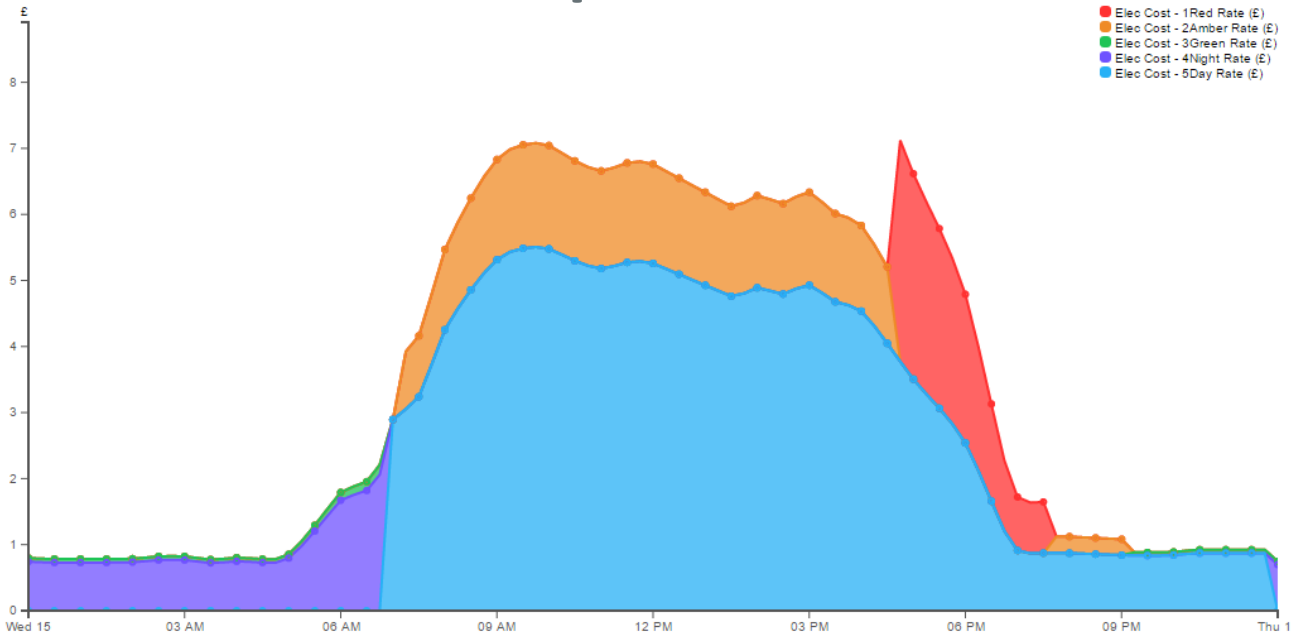
Data exploration



- Heatmap plots used to visualise annual performance at 30-min resolution
- Changing patterns of energy use observed – indicating performance drift

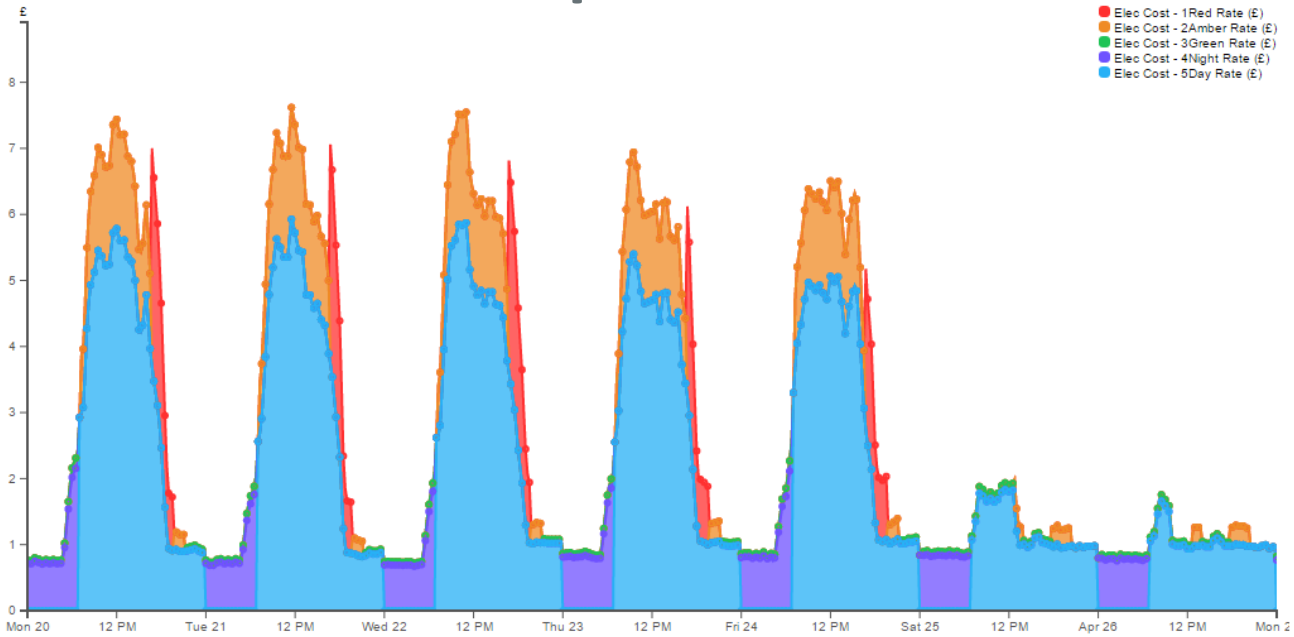
IES INTEGRATED ENVIRONMENTAL SOLUTIONS

Data exploration



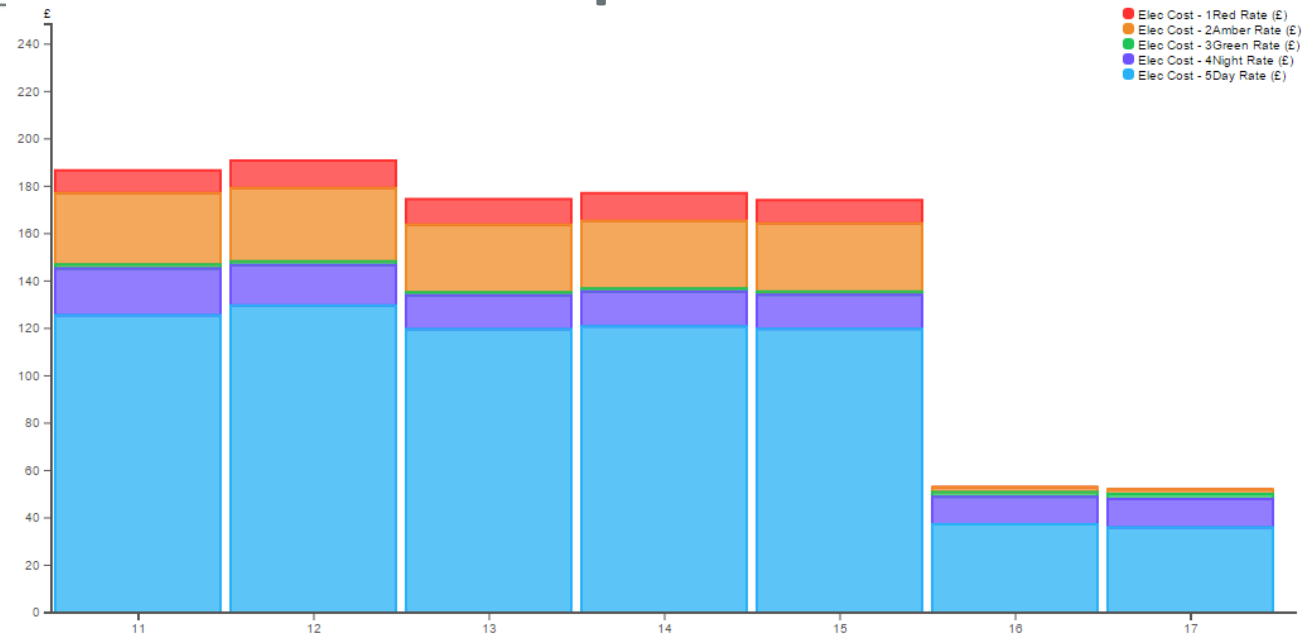
- Red-Amber-Green Tarriff Analysis – late afternoon power spike observed
- Spike consistently occurs every weekday between 5-7pm

Data exploration



- Red tariff spike does not occur at weekends – as observed in 7-day power profile

Data exploration



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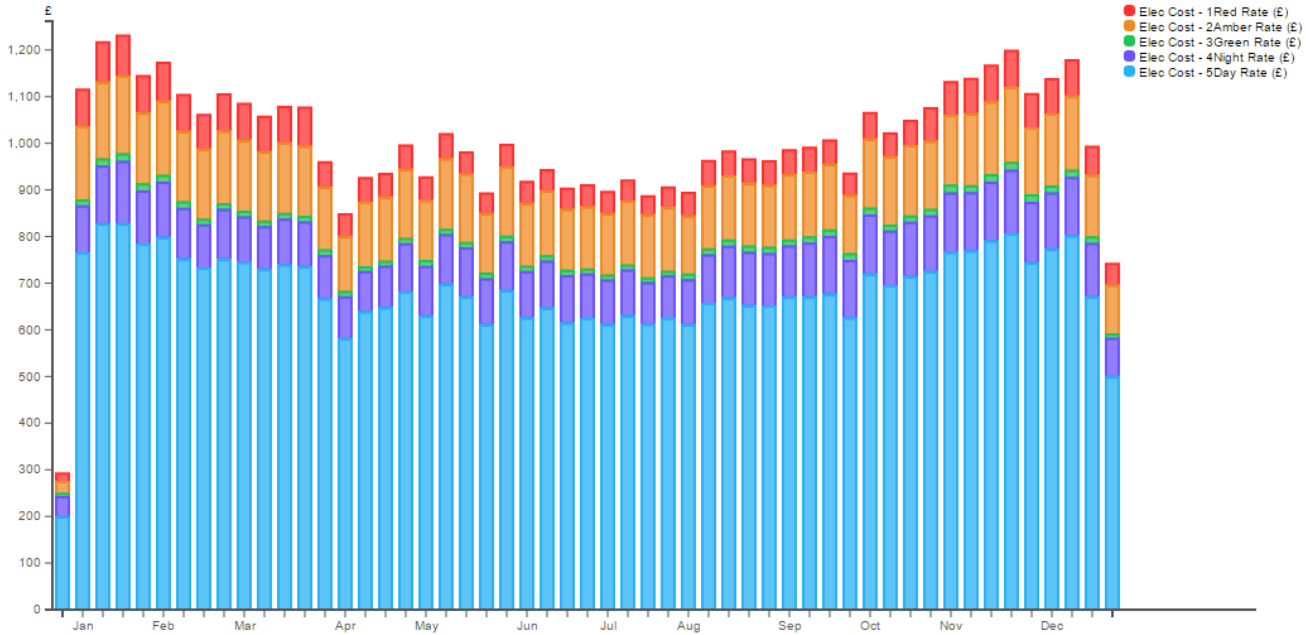
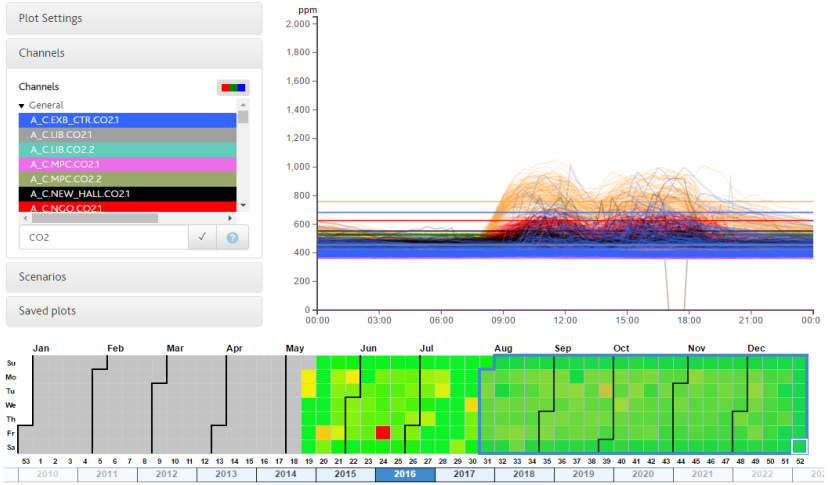
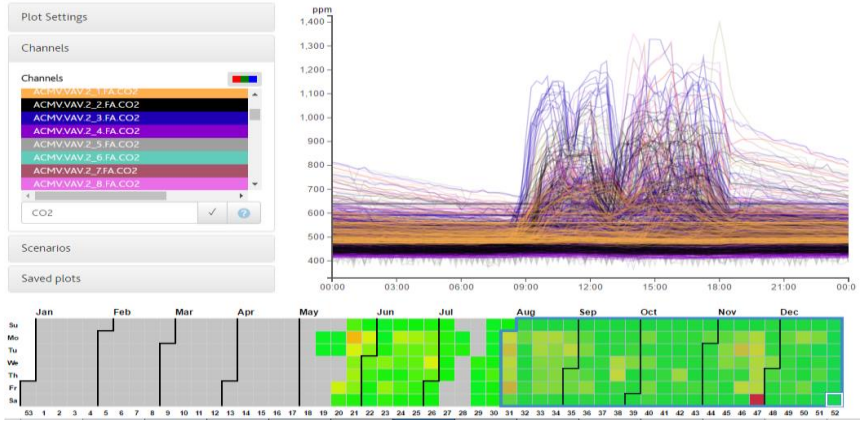


- Total power usage drops through summer as less heating and lighting are needed
- But red tariff charge is consistent throughout full calendar year
- Opportunity for implementation of a demand response strategy

Data exploration

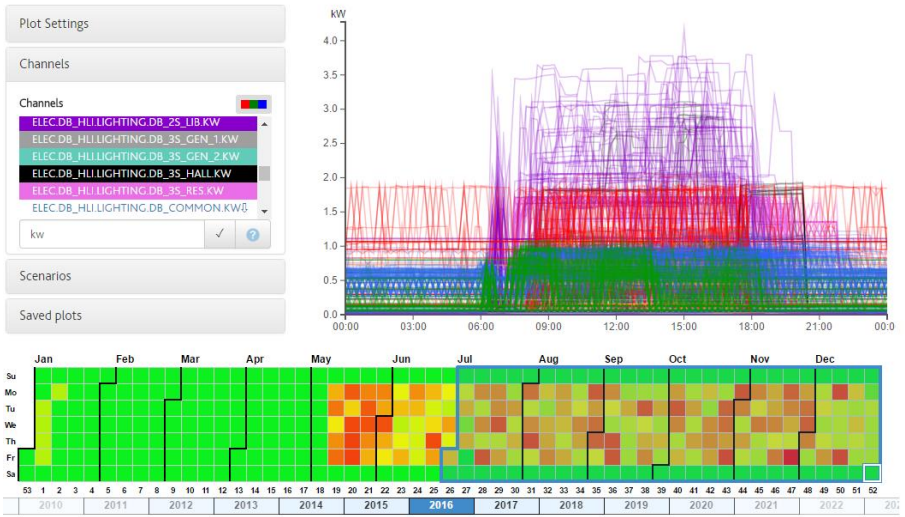


Potential CO2 sensor issues (straight lines)

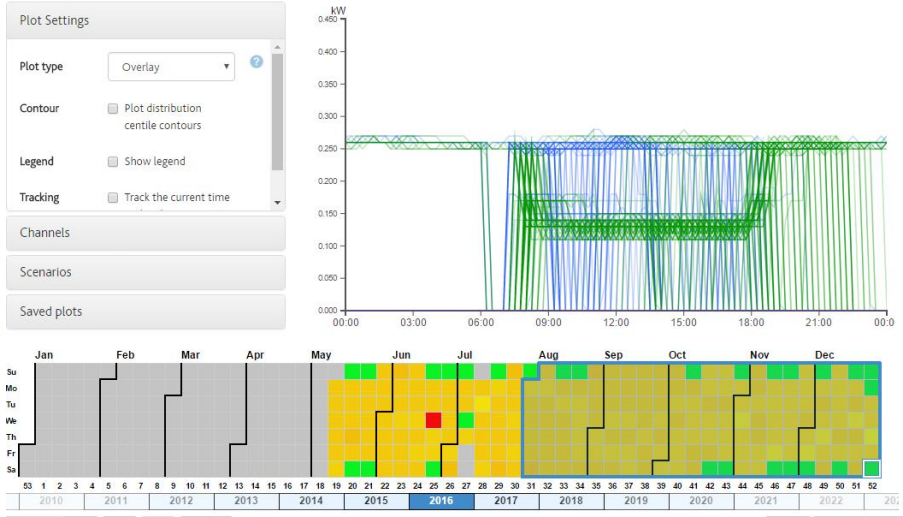


CO2 values exceeding 900 ppm in some areas. Additional ventilation would improve air quality.

Data exploration



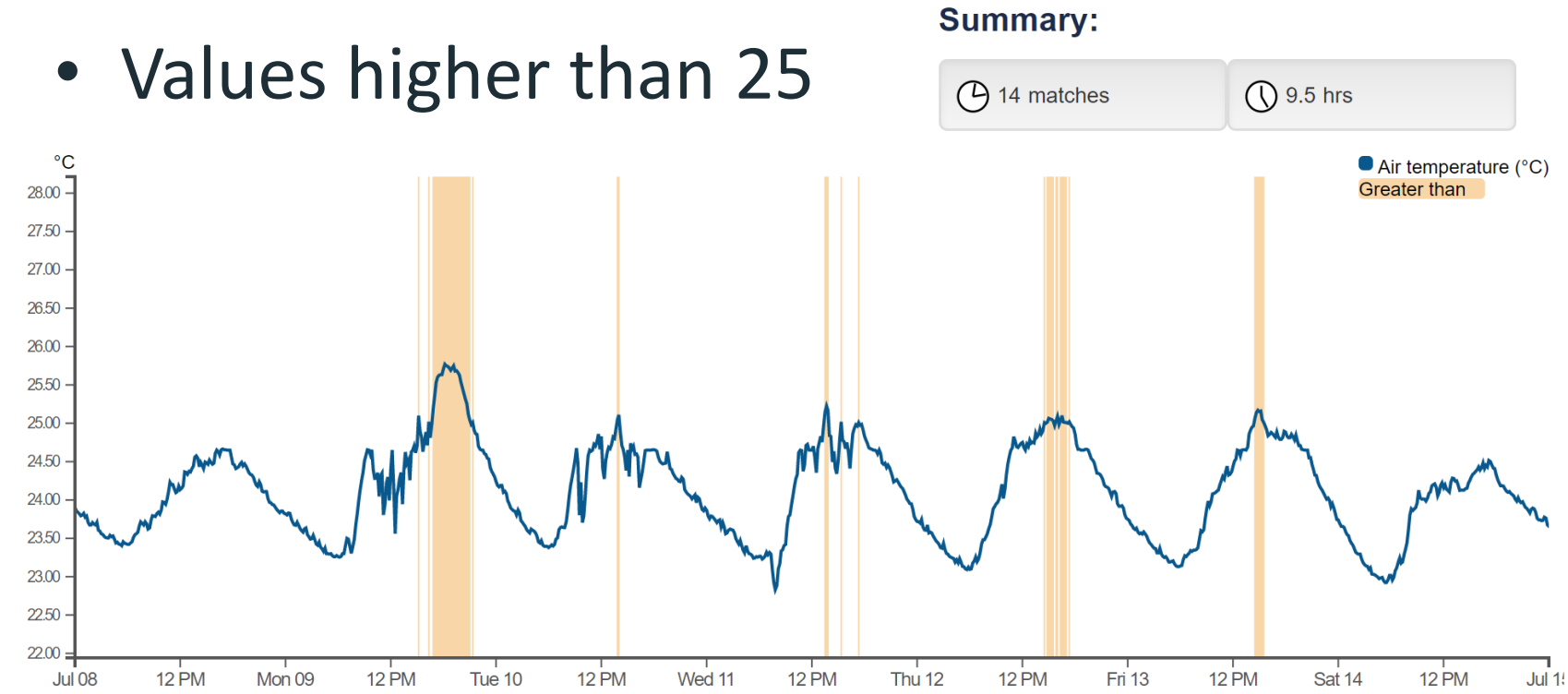
Night-time lighting identified, outside of operating hours



FCU's operating regularly outside operating hours when the chiller is off

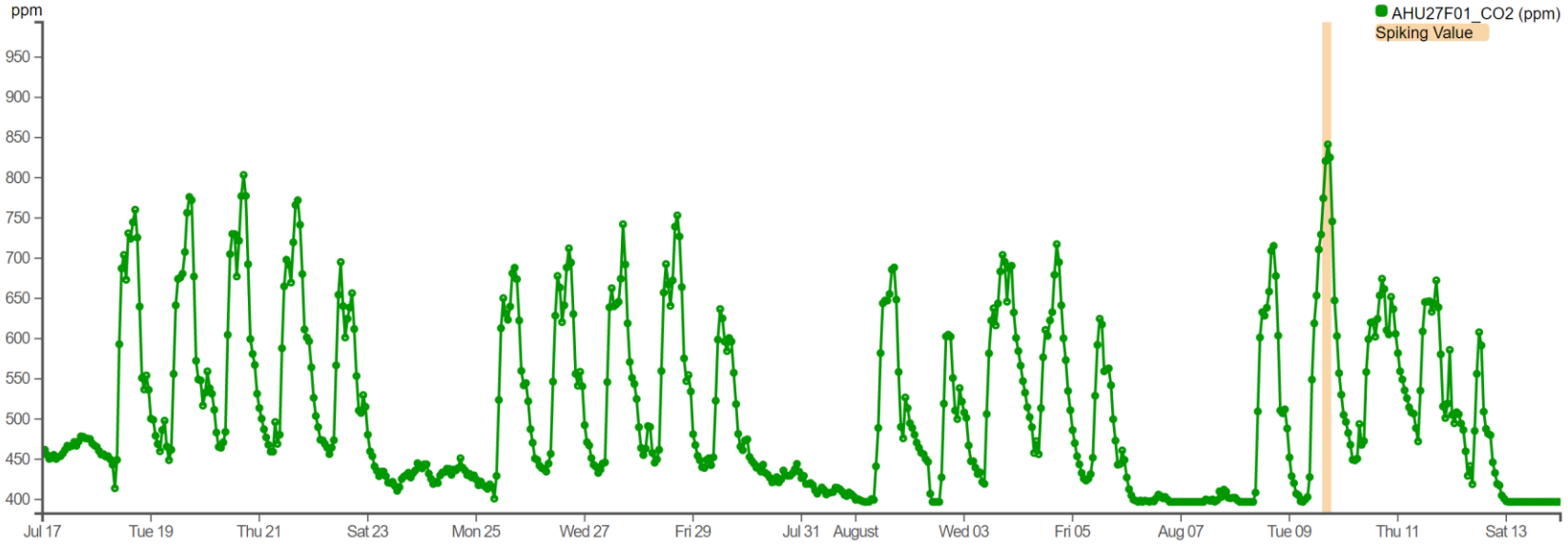
Data exploration

- Values higher than 25



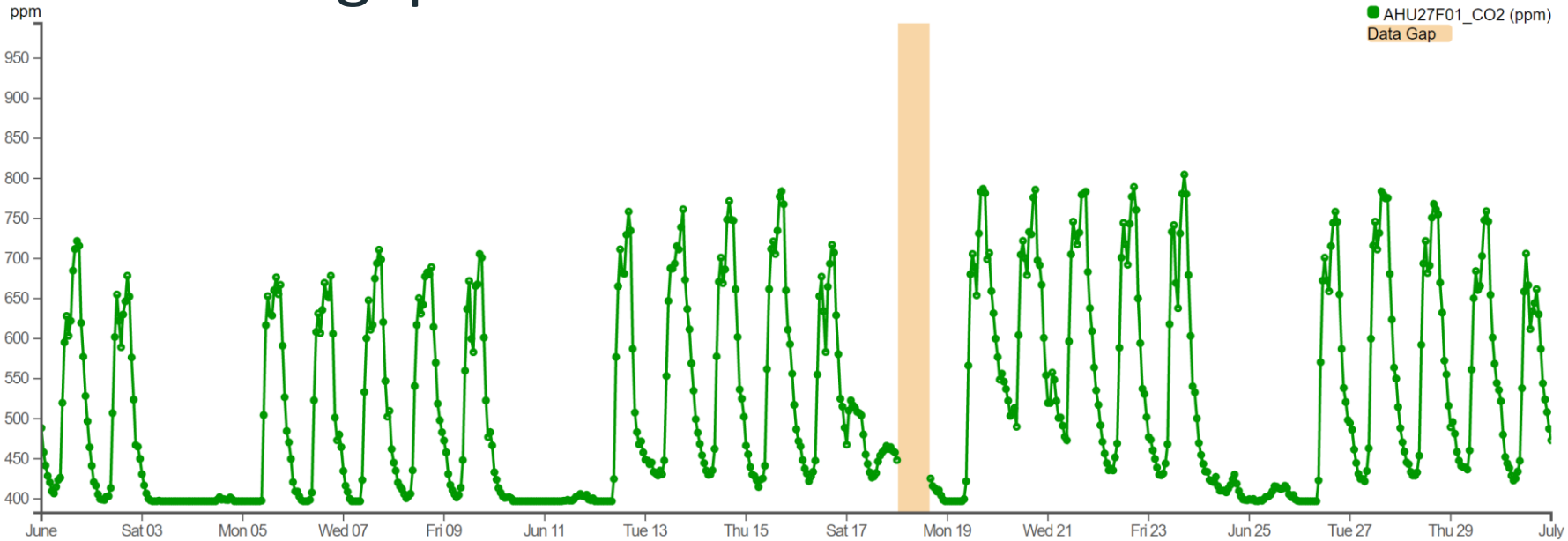
Data exploration

- Detect outliers

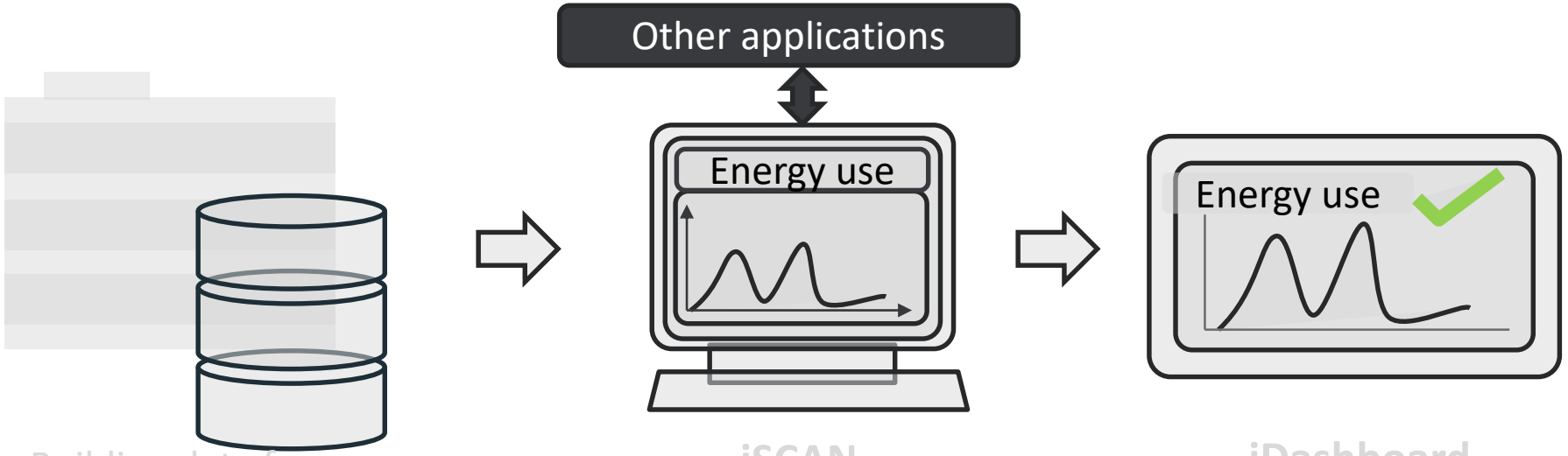


Data exploration

- Detect gaps



The iSCAN & iDashboard solution



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iDashboard

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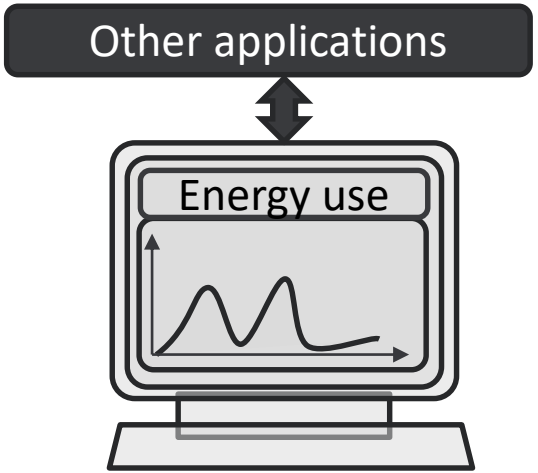
The iSCAN & iDashboard solution

Python

Machine learning:

- Data gaps;
- Extrapolation;
- Anomaly detection;
- Auto-tagging;
- Estimate occupancy;
- Correlation analysis.



Weather

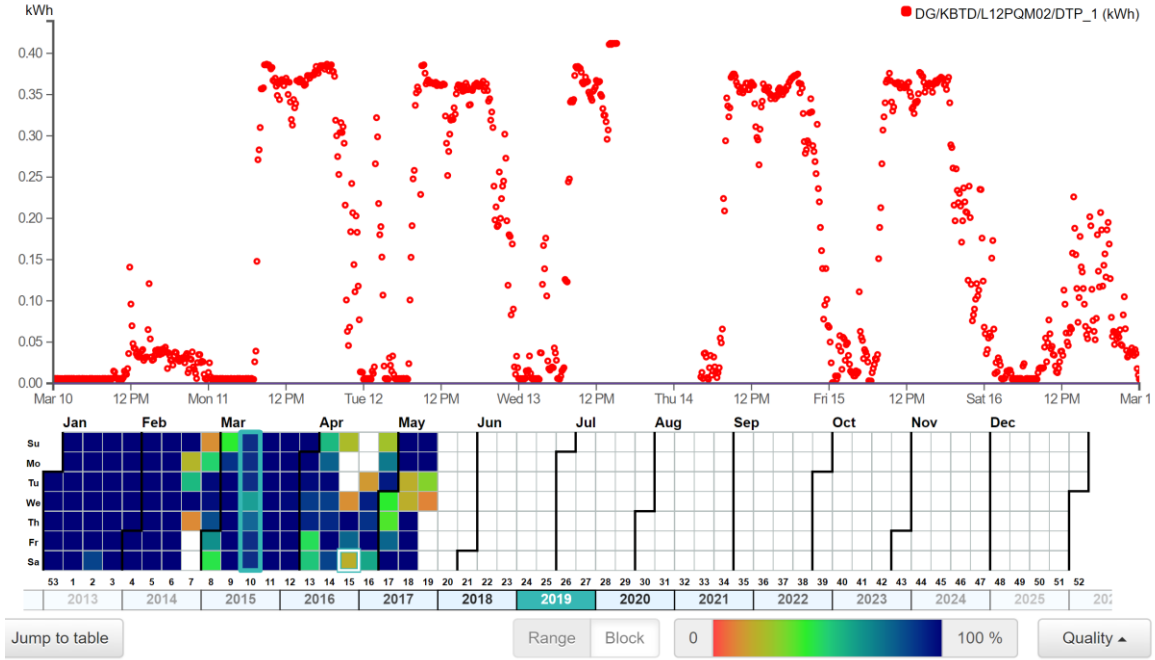
External weather providers for virtually all points on earth. (athenium analytics)

Shared calendars

Obtain calendar data inform of time series for:

- Meeting rooms schedules;
- Operation schedules;
- Holiday periods.

Other applications: interpolation



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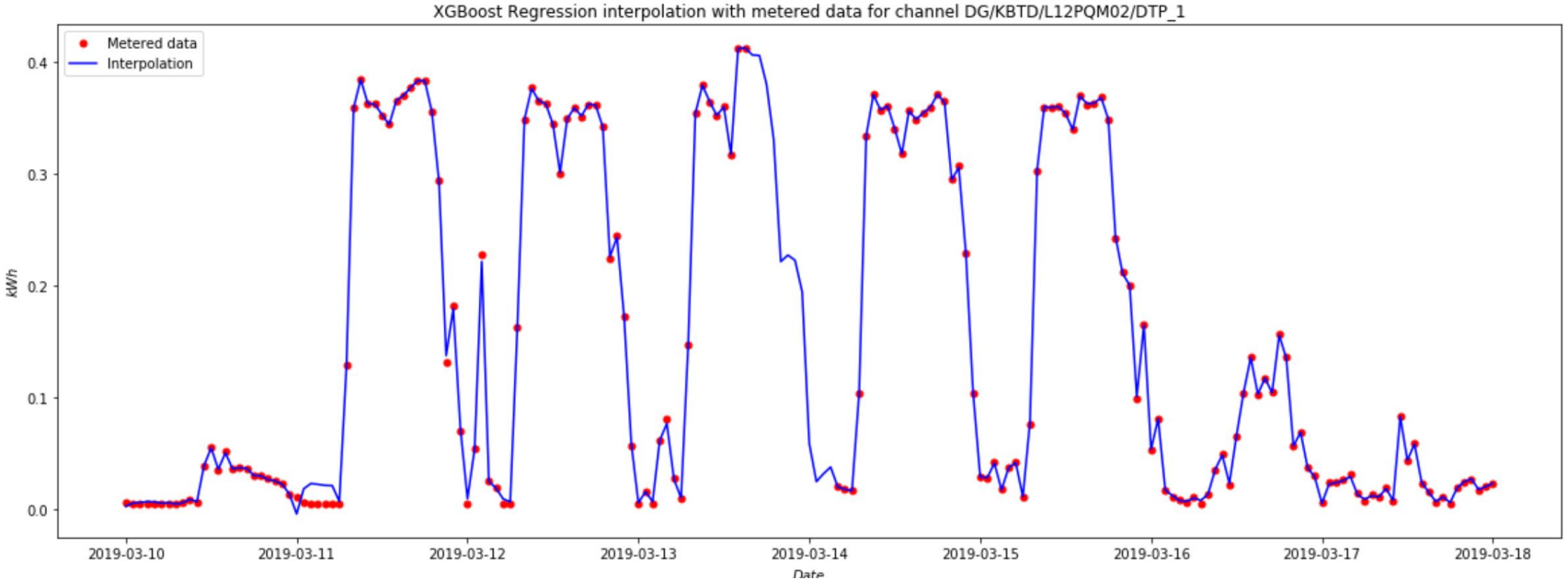

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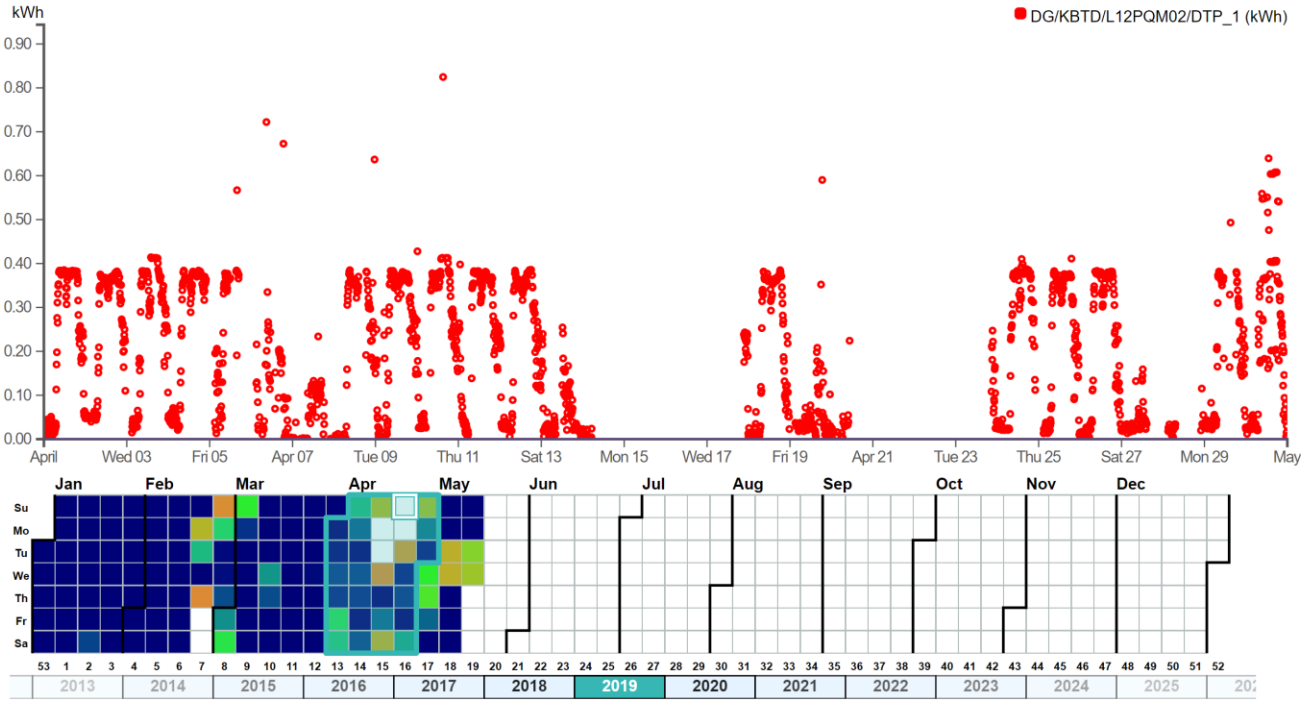

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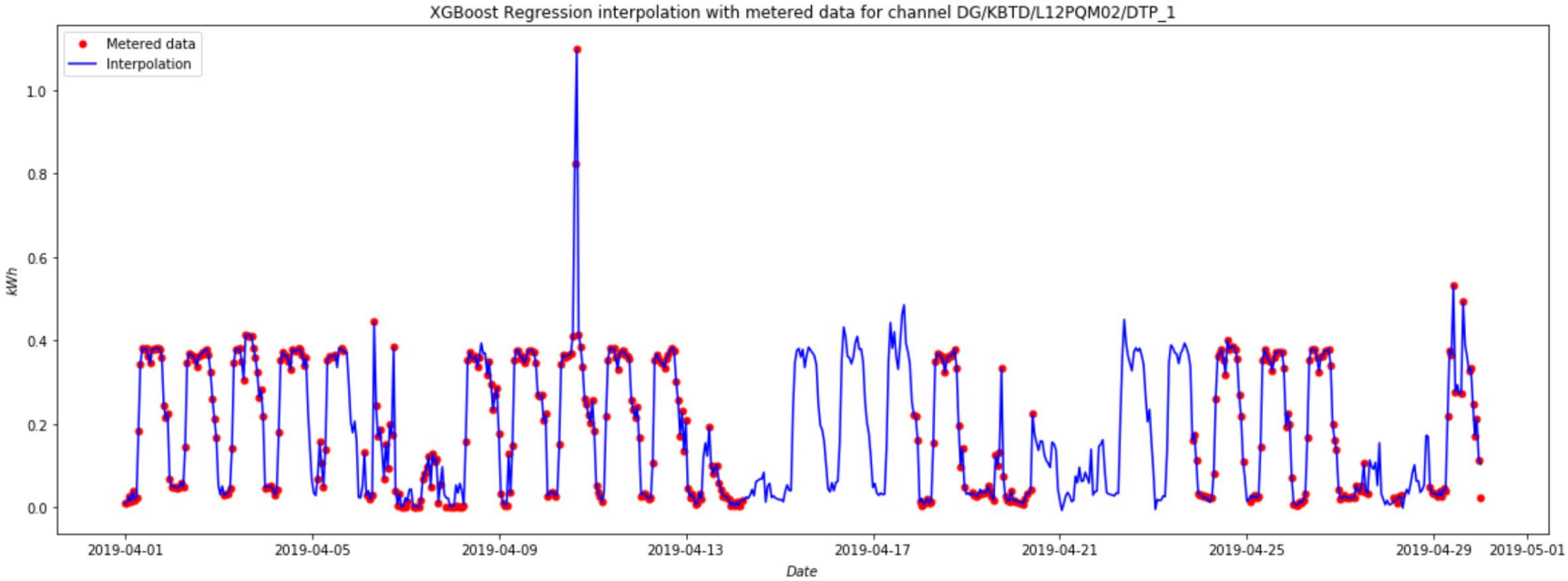
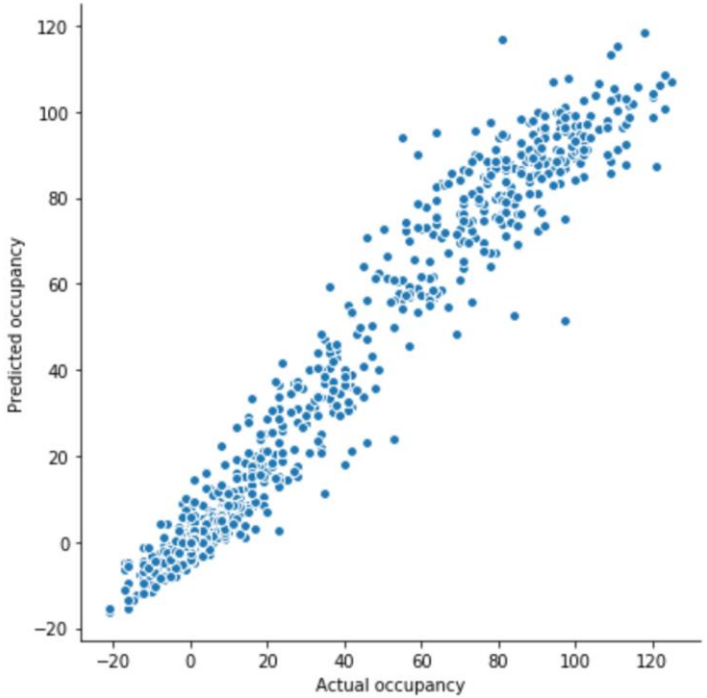
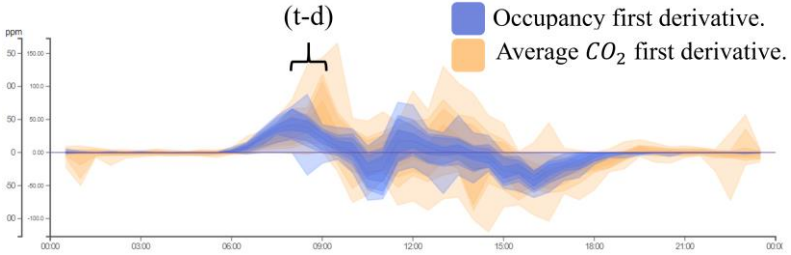
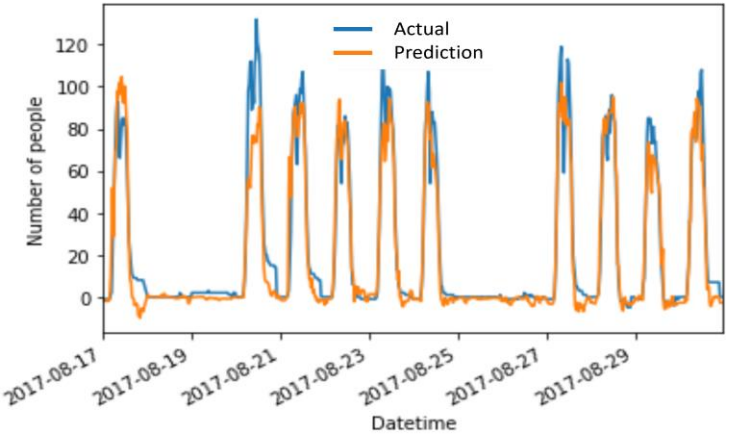


Other applications: Occupancy







Other applications: Tags

- Tags are words with specific meaning intended to provide context to raw data.
- Tagging energy meters and sensors are the first step for data analysis.
- Tagging can become a cumbersome task when the number of sensors is very large.

Other applications: Tags

- Industry increasingly accepted standard
- The goal is to make easier unlock value from the vast quantity of data being generated by the smart devices in homes, buildings, factories, and cities

Project Haystack

Condenser water to/from cooling towers

- condenser water leaving temp sensor
- condenser water leaving flow sensor
- condenser water leaving pressure sensor
- condenser water entering temp sensor
- condenser water entering pressure sensor
- condenser water entering flow sensor
- condenser water valve isolation cmd

Chilled water to/from AHUs

- chilled water leaving temp sensor
- chilled water leaving temp sp
- chilled water leaving flow sensor
- chilled water leaving pressure sensor
- chilled water entering temp sensor
- chilled water entering flow sensor
- chilled water entering pressure sensor
- chilled water delta temp sensor
- chilled water delta flow sensor
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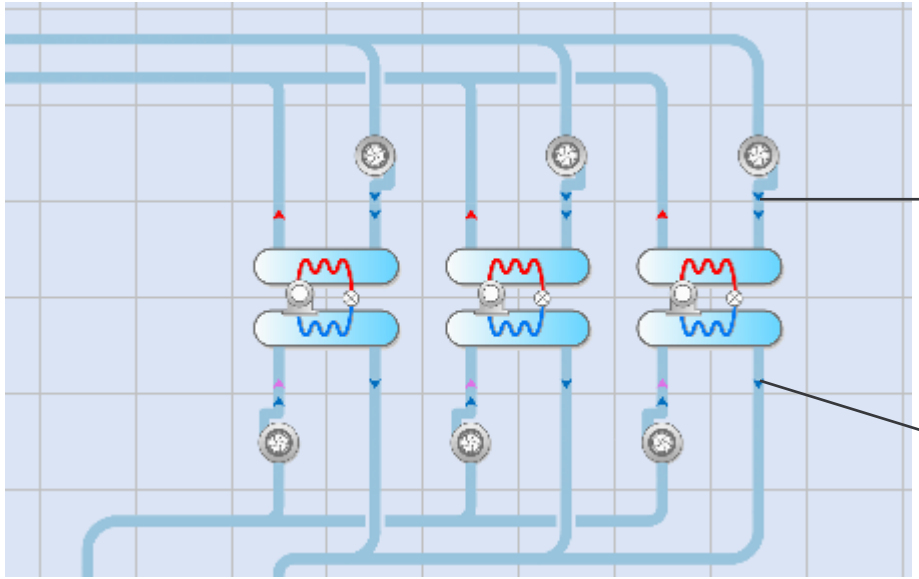
- chilled water valve isolation cmd

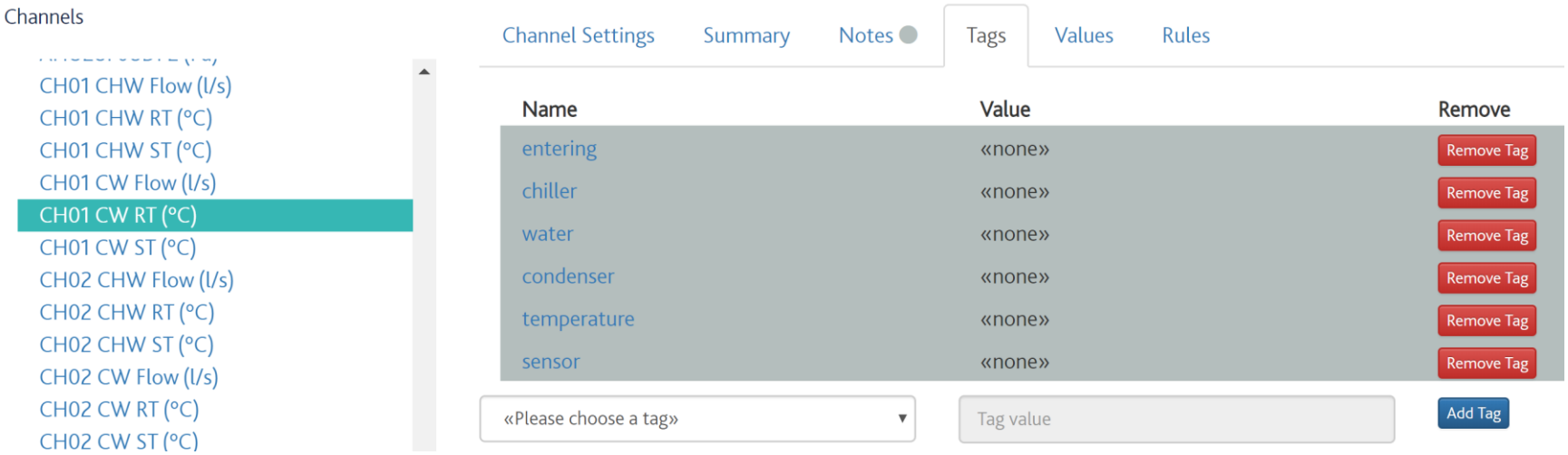
Other applications: Tags



- condenser leaving temp sensor

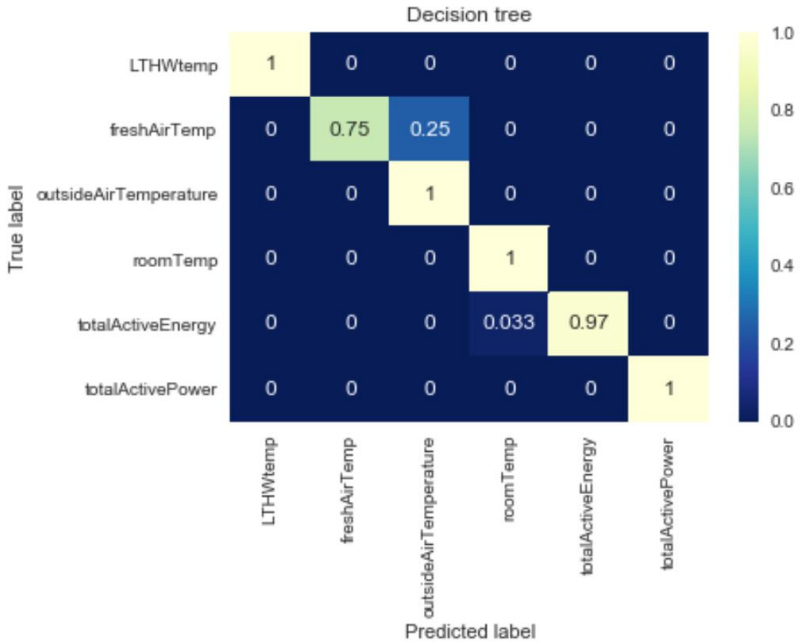
- chilled water leaving temp sensor
- chilled water leaving flow sensor
- chilled water leaving pressure sensor

Other applications: Tags

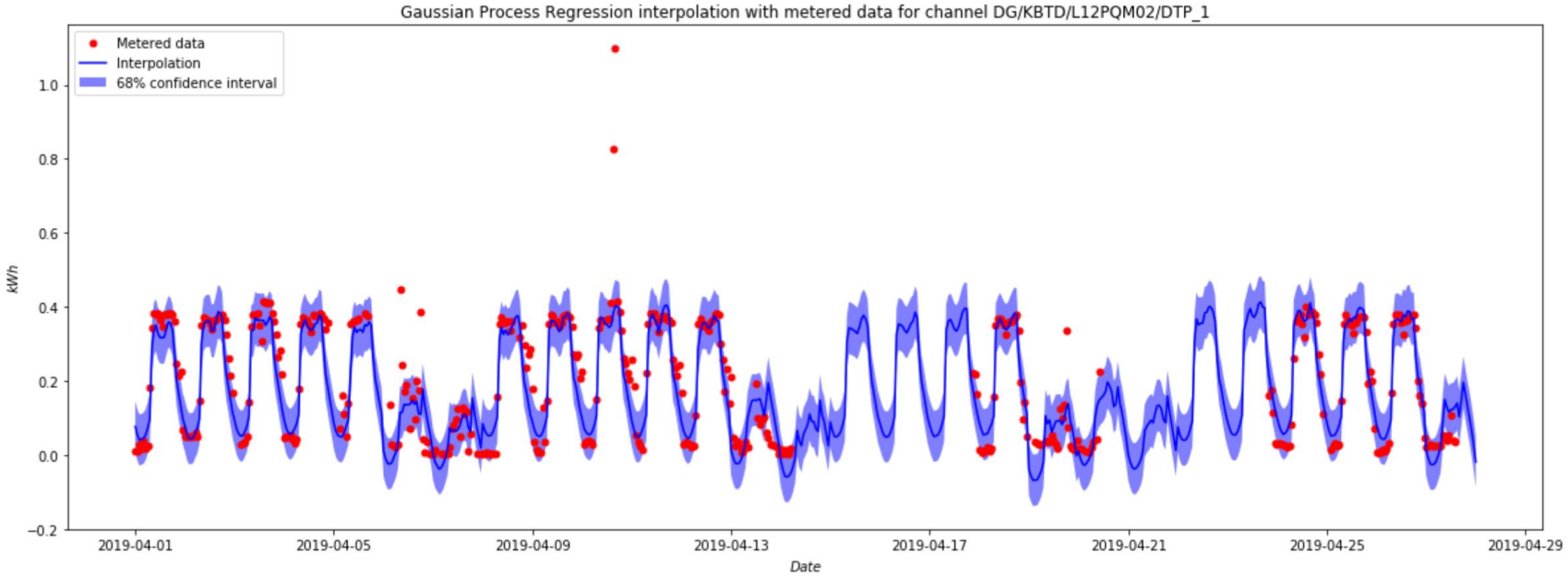


Other applications: Tags

Classification accuracy on the validation set: 98 % provided 30 % of the tags



Other applications: anomalies



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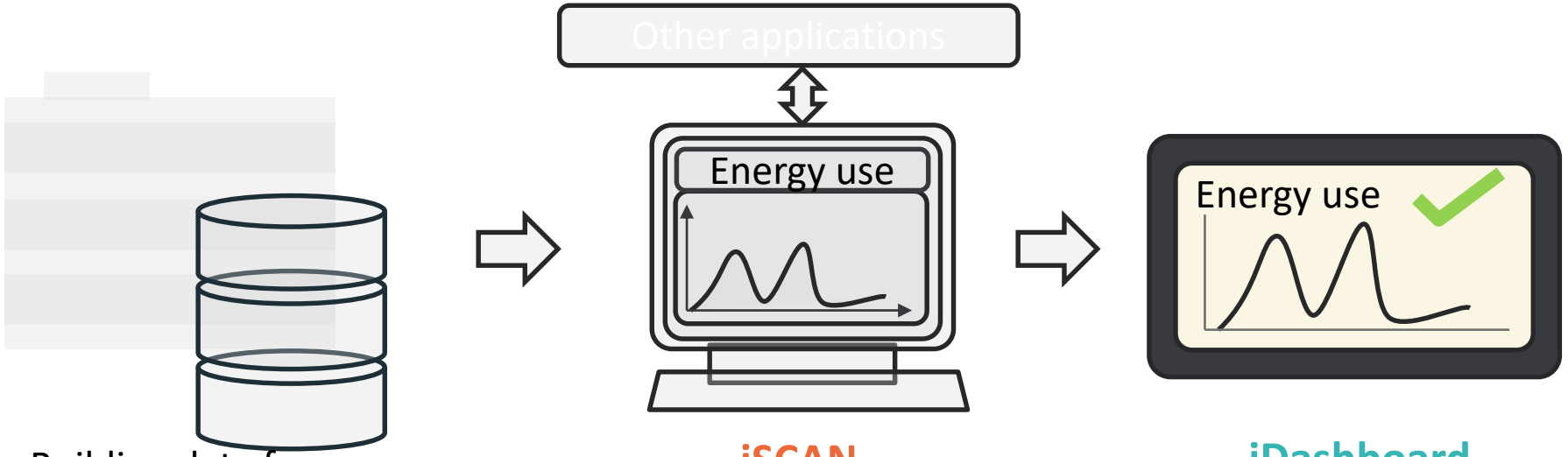

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Example – Helix building

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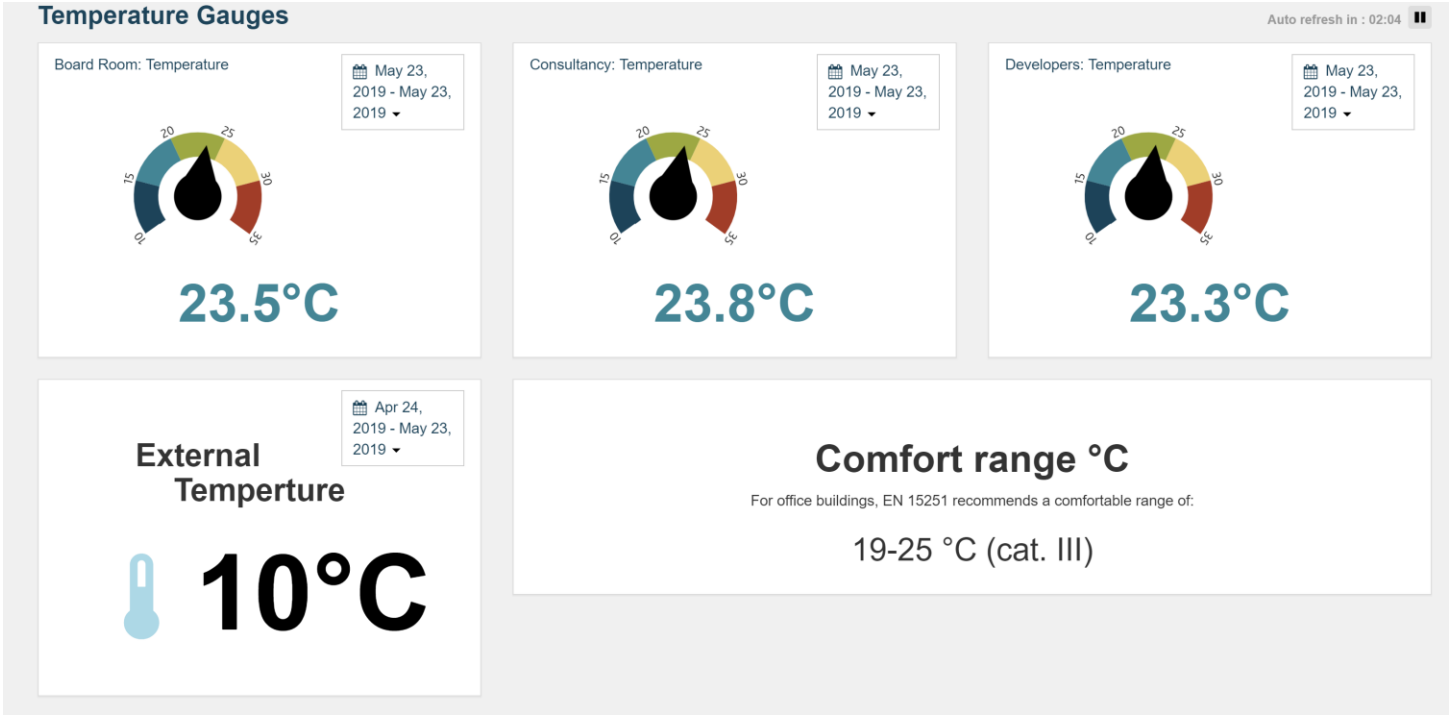

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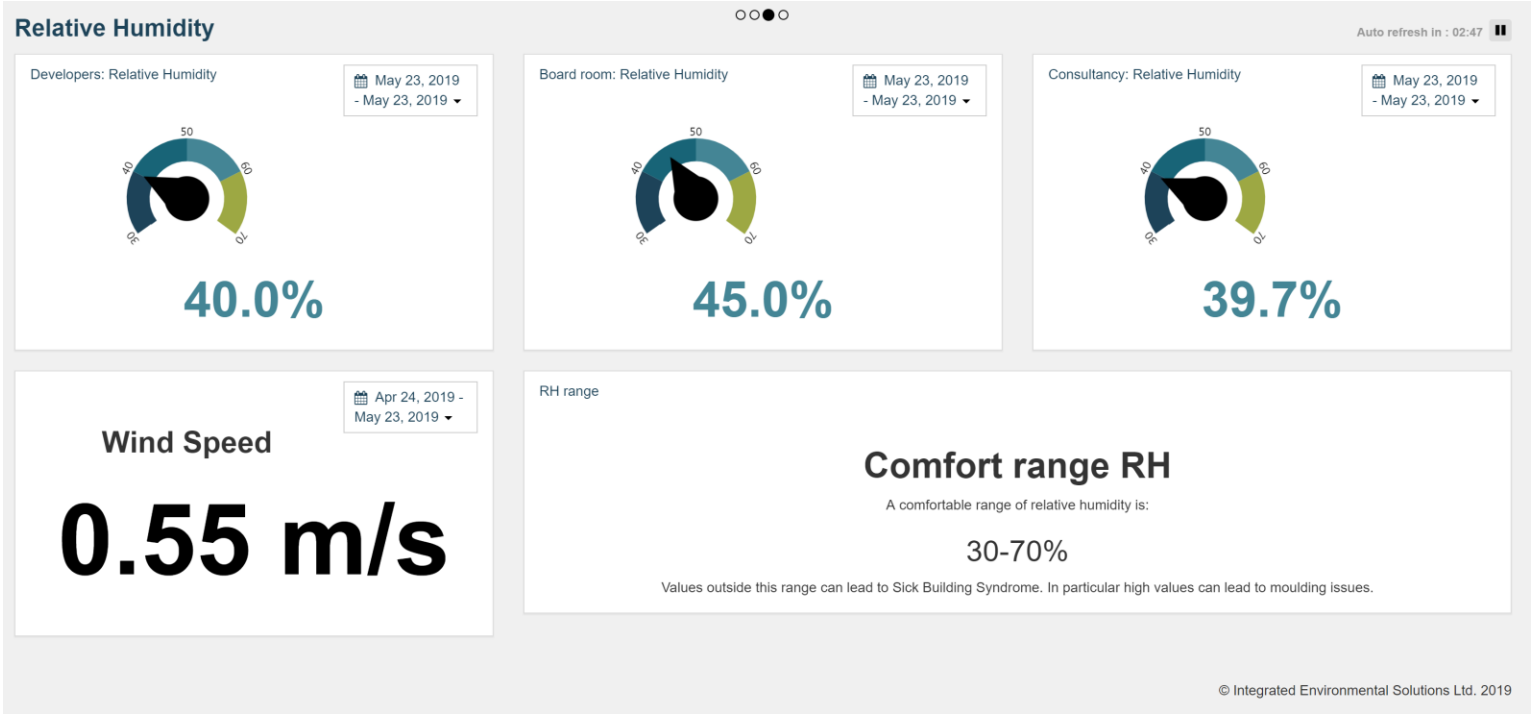

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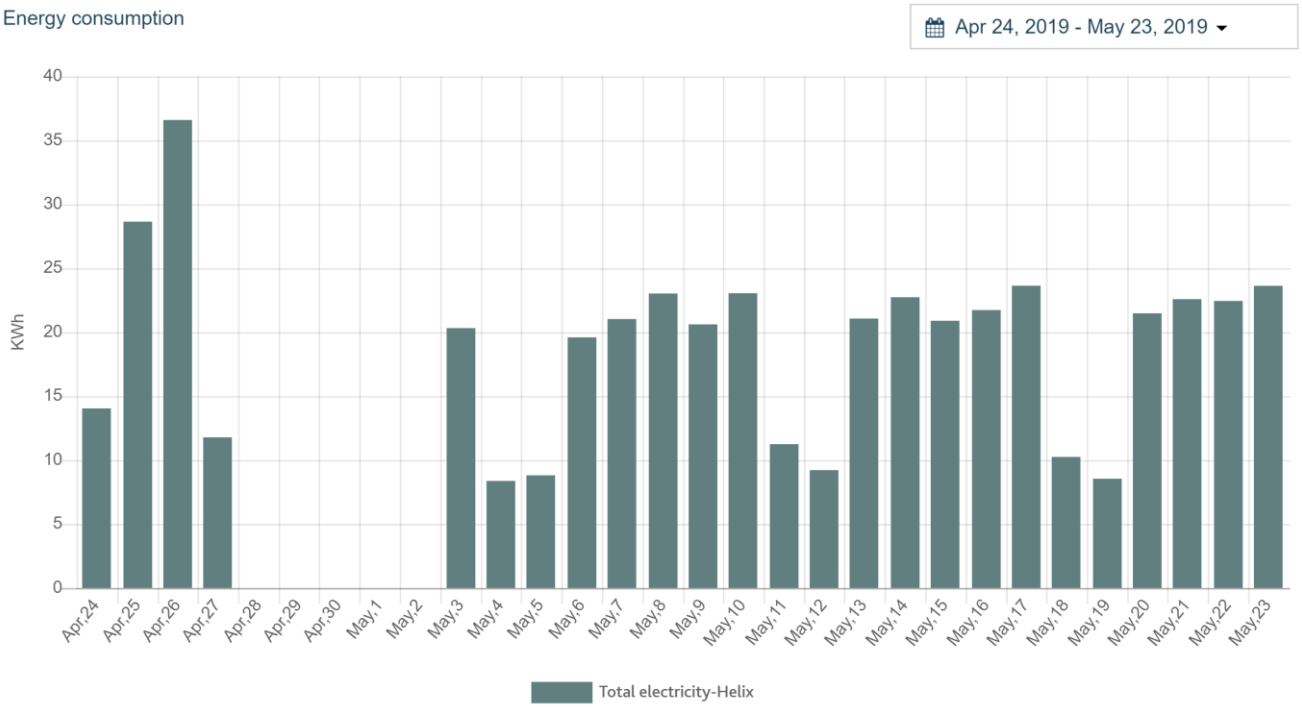
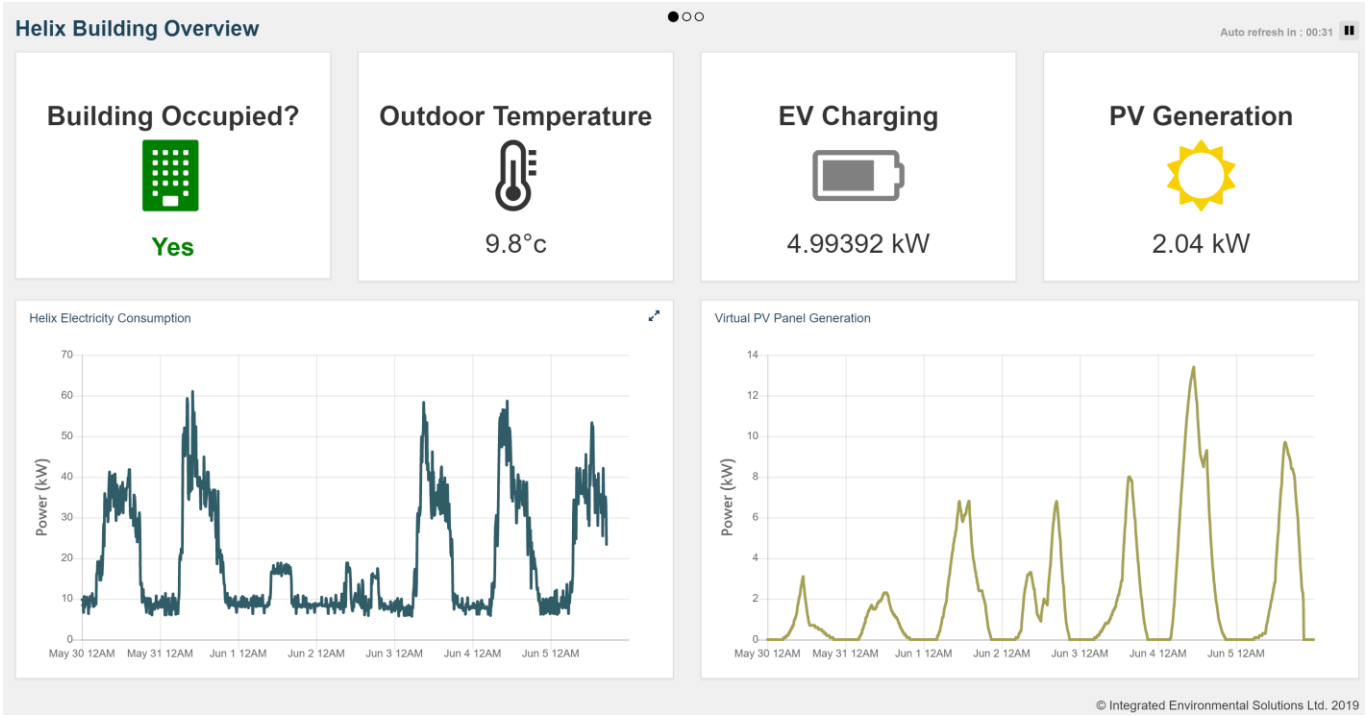


Example 2 – Helix building



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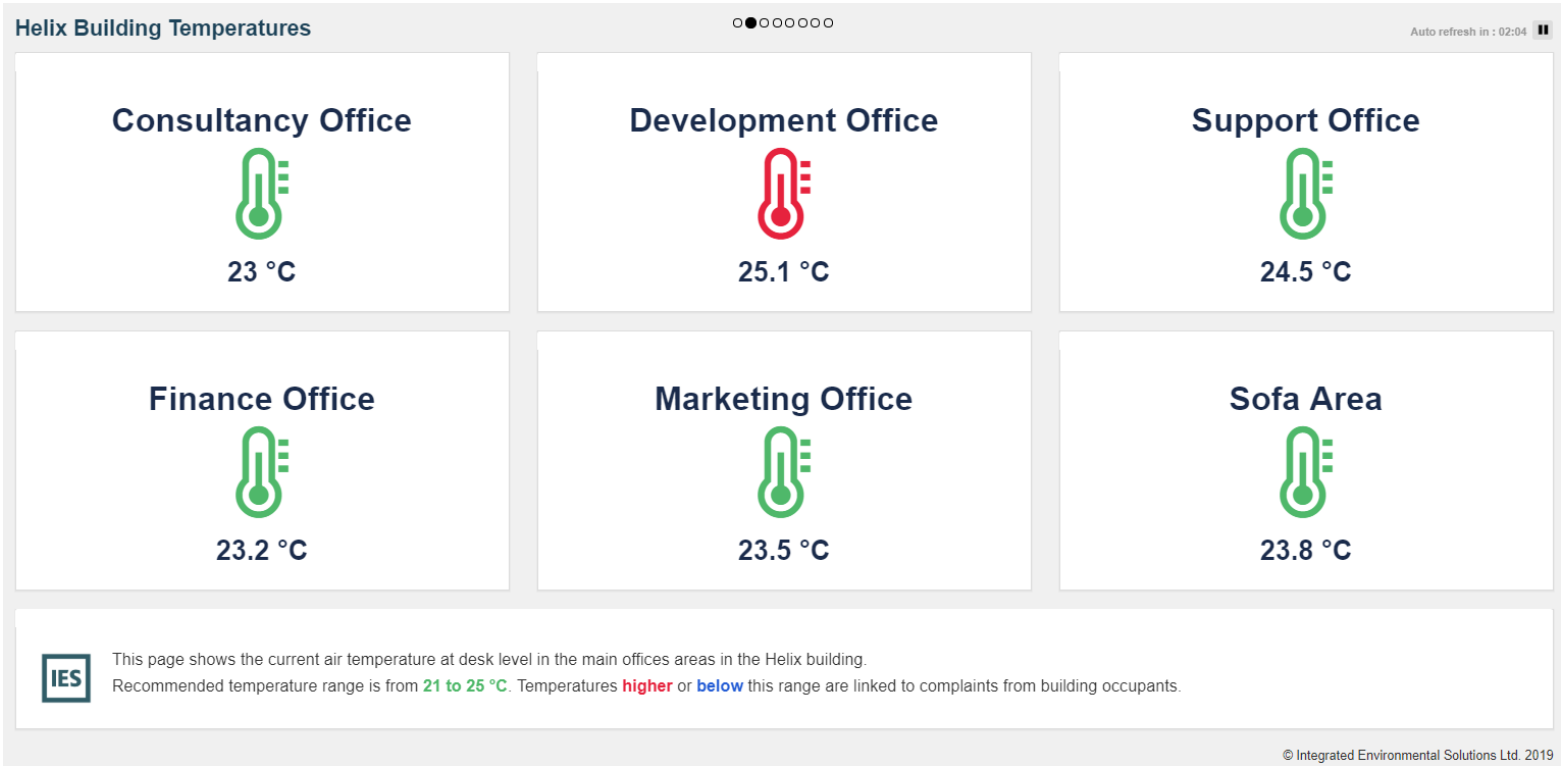

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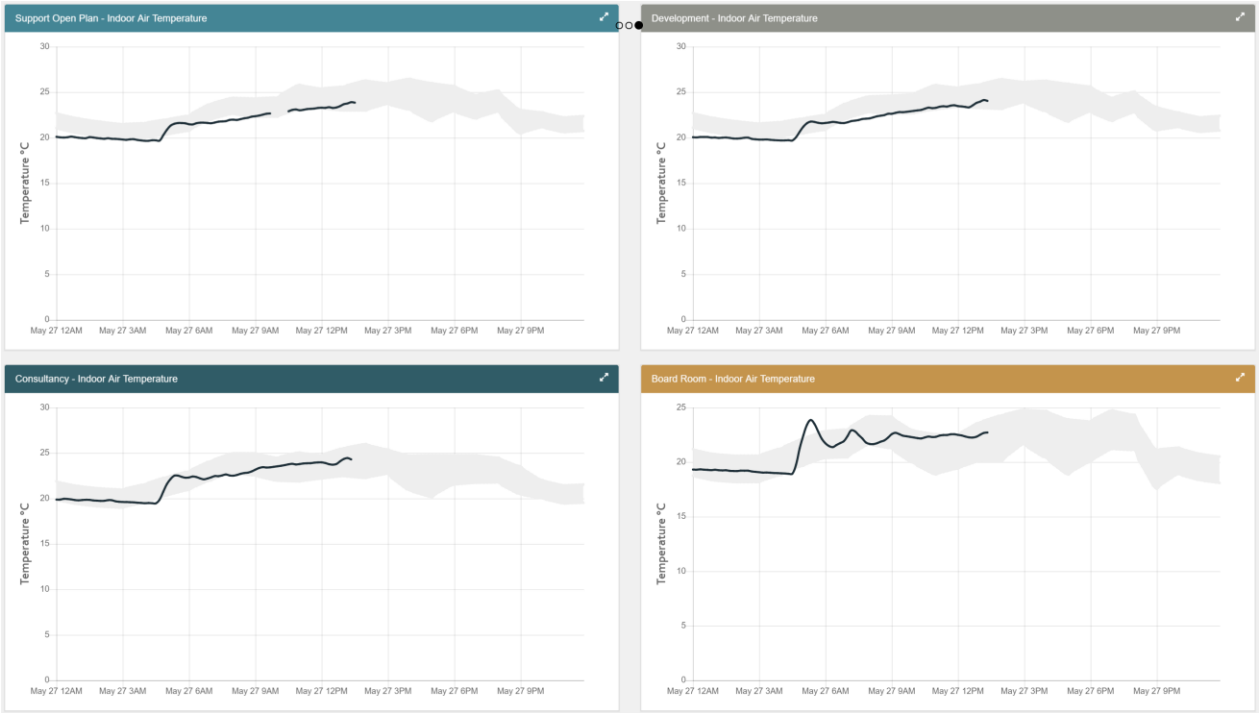

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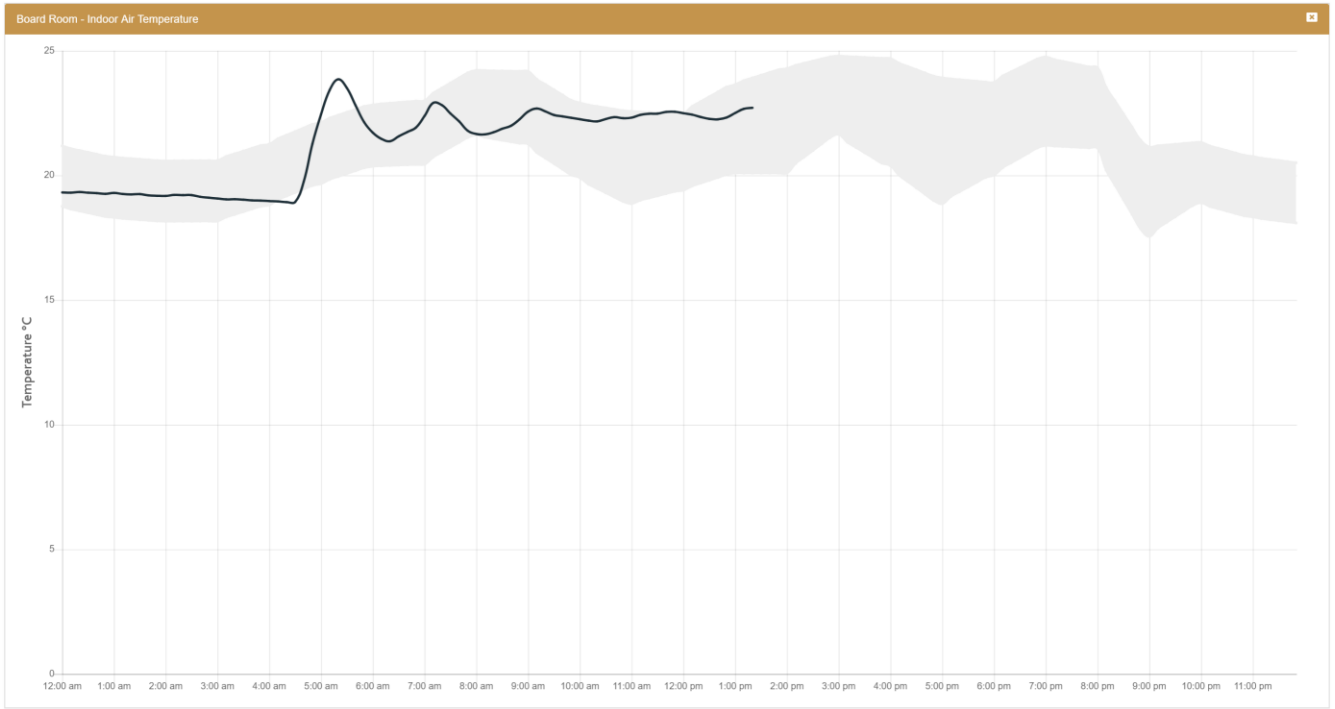
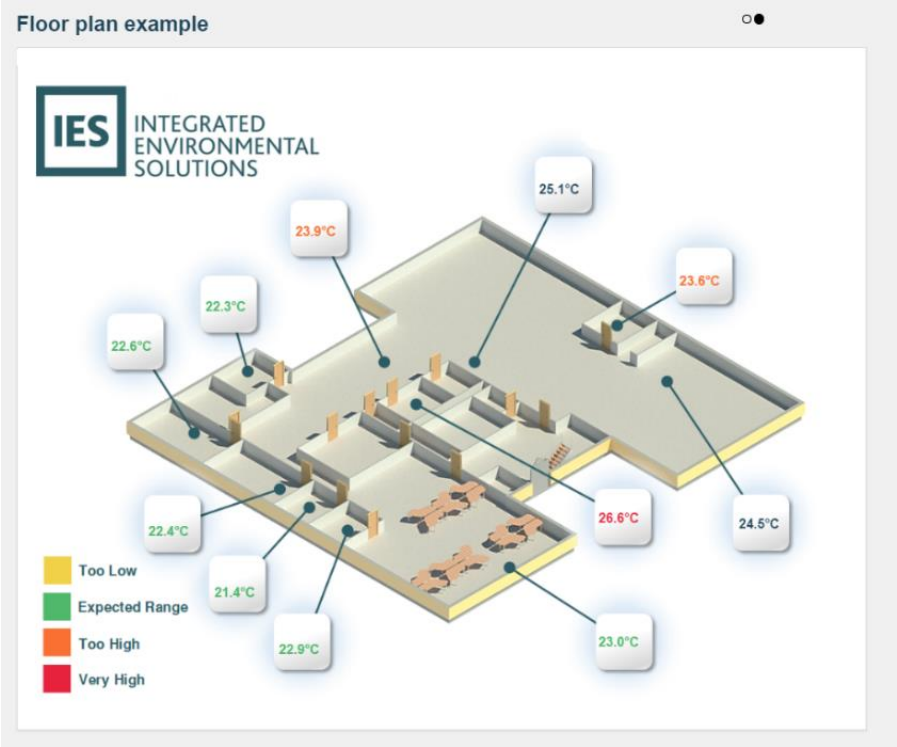


Example 2 – Floor plan



Conclusions

- iSCAN is used a data management platform that combines data from a number of sources including energy meters, sensors, weather stations, and Rest API applications
- iDashboards are used to visualise key information for obtaining quick insights about your data.