



iSCAN and iDashboards Overview

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Workshop part 1 - Overview

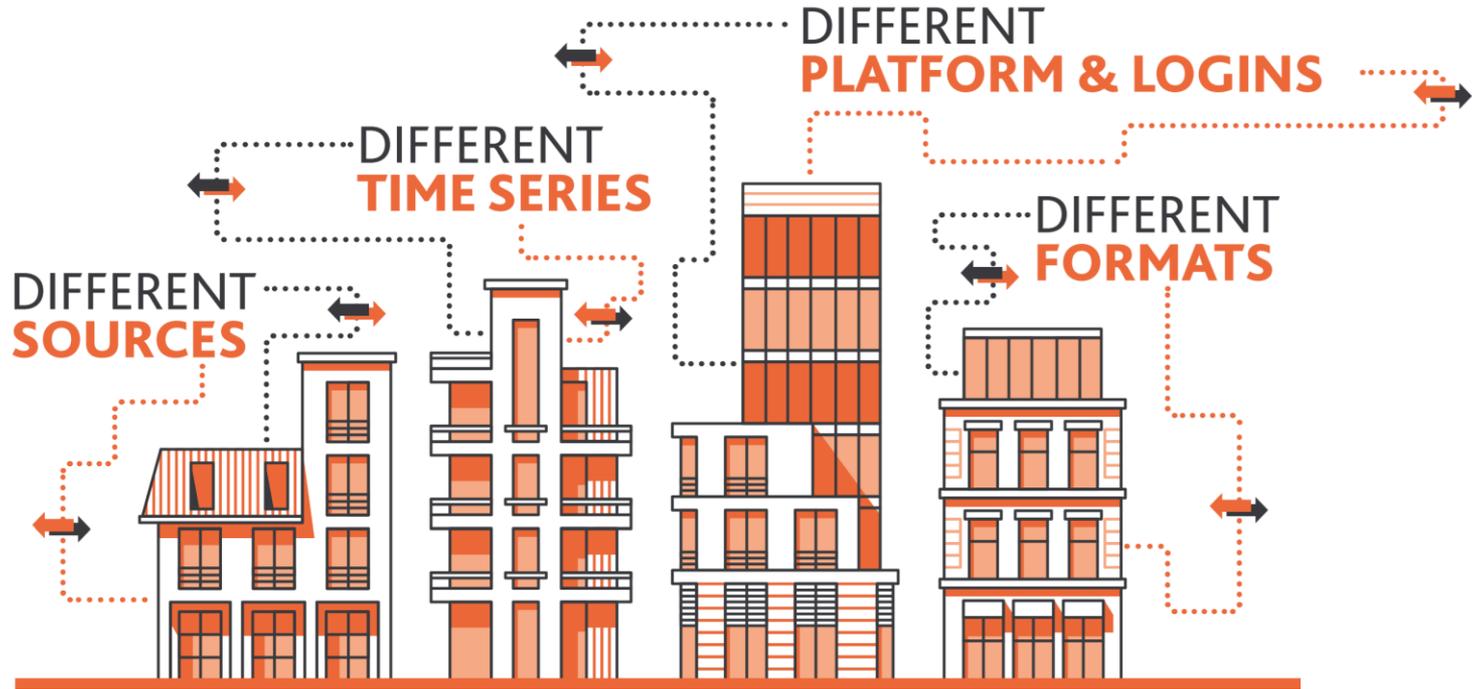
iSCAN & iDashboard solution overview

Workshop part 1 - Content



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

The problem



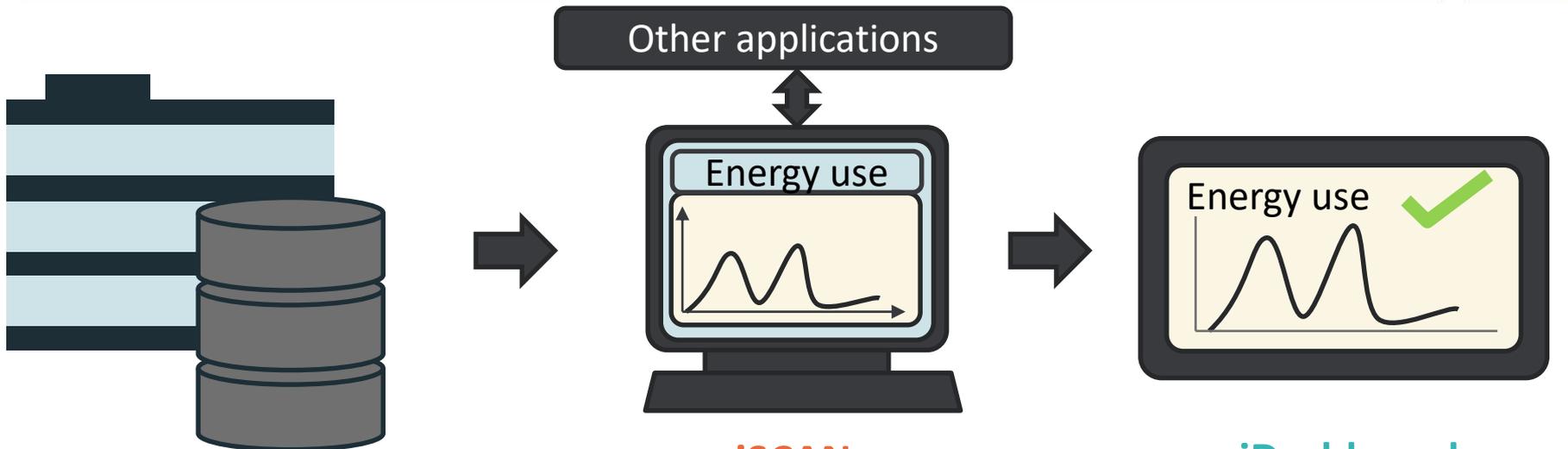
The problem



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

The iSCAN & iDashboard solution

IES



Building data from:

- Smart Meters
- Building Management Systems (BMS)

iSCAN
Data management:

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

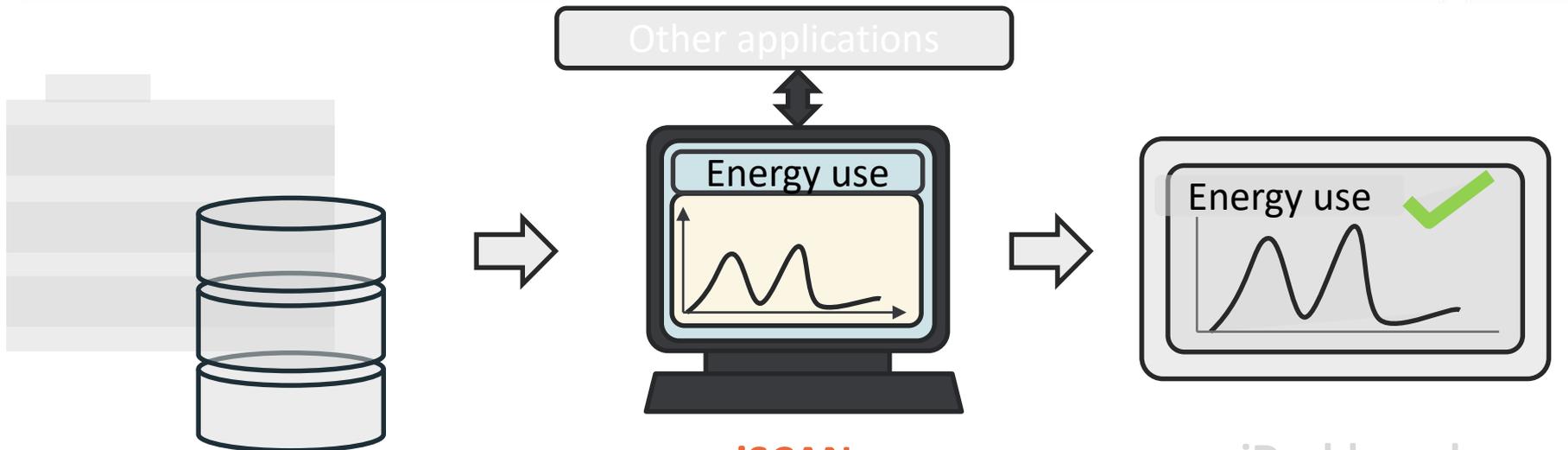
iDashboard

Data visualisation:

- KPIs
- Observe trends
- Present recent data

The iSCAN & iDashboard solution

IES



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iSCAN

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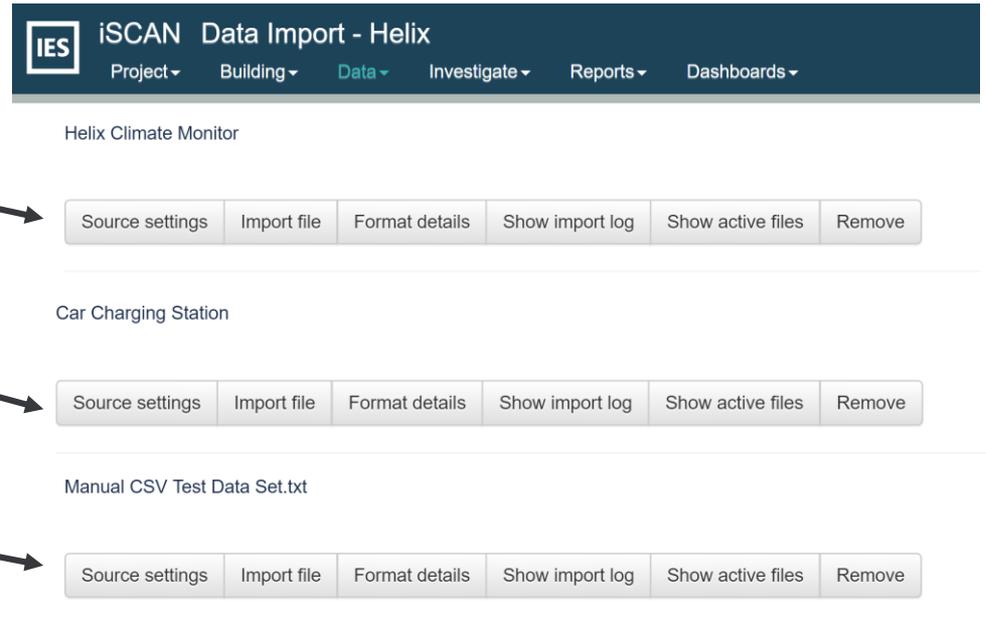
iDashboard

Data visualisation:

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The iSCAN & iDashboard solution

- Import data from various sources



The screenshot displays the 'iSCAN Data Import - Helix' interface. At the top, there is a navigation bar with the IES logo and menu items: Project, Building, Data, Investigate, Reports, and Dashboards. Below this, three data sources are listed, each with a set of control buttons:

- Helix Climate Monitor**: Source settings, Import file, Format details, Show import log, Show active files, Remove
- Car Charging Station**: Source settings, Import file, Format details, Show import log, Show active files, Remove
- Manual CSV Test Data Set.txt**: Source settings, Import file, Format details, Show import log, Show active files, Remove

On site weather station

EV charging station

Manual data uploads

The iSCAN & iDashboard solution

- Add context to data

Channel Settings Summary Notes ● Tags Values Rules

Name [?]

Import reference [?]

Level

Room

Units

Min value °C

Max value °C

Import limiting

Sample type [?]

- Spot value
- Average
- Cumulative
- Discrete stepping
- Metered Value

Expected period [?] min

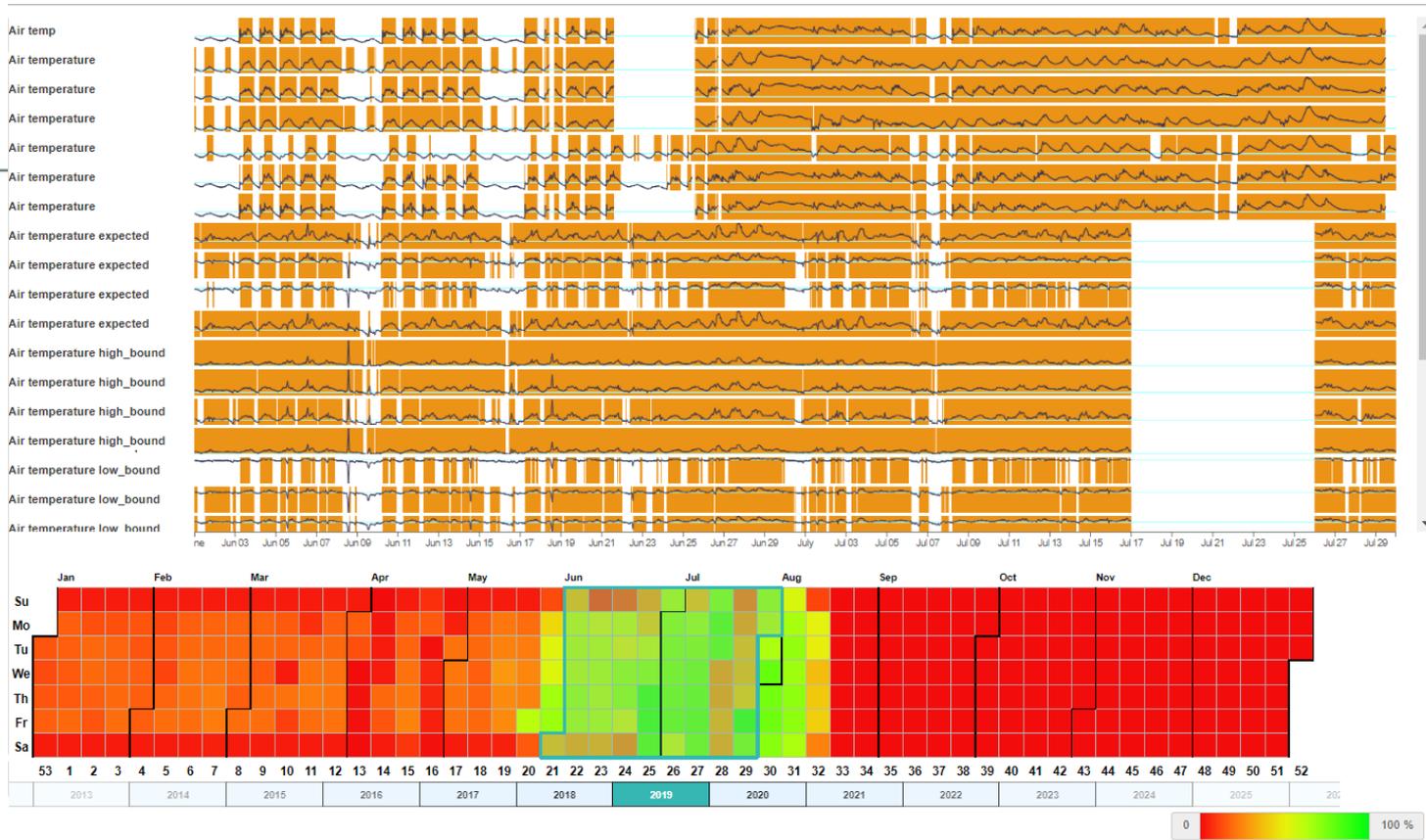
Export

- Export as data channel (APM)
- Export as data channel (CSV)
- Interpolate (APM CSV)
- Export as free-form profile (FFD)
 - Absolute
 - Modulating
- Interpolate (FFD)

Profile [?]

The iSCAN & iDashboard solution

- Data exploration

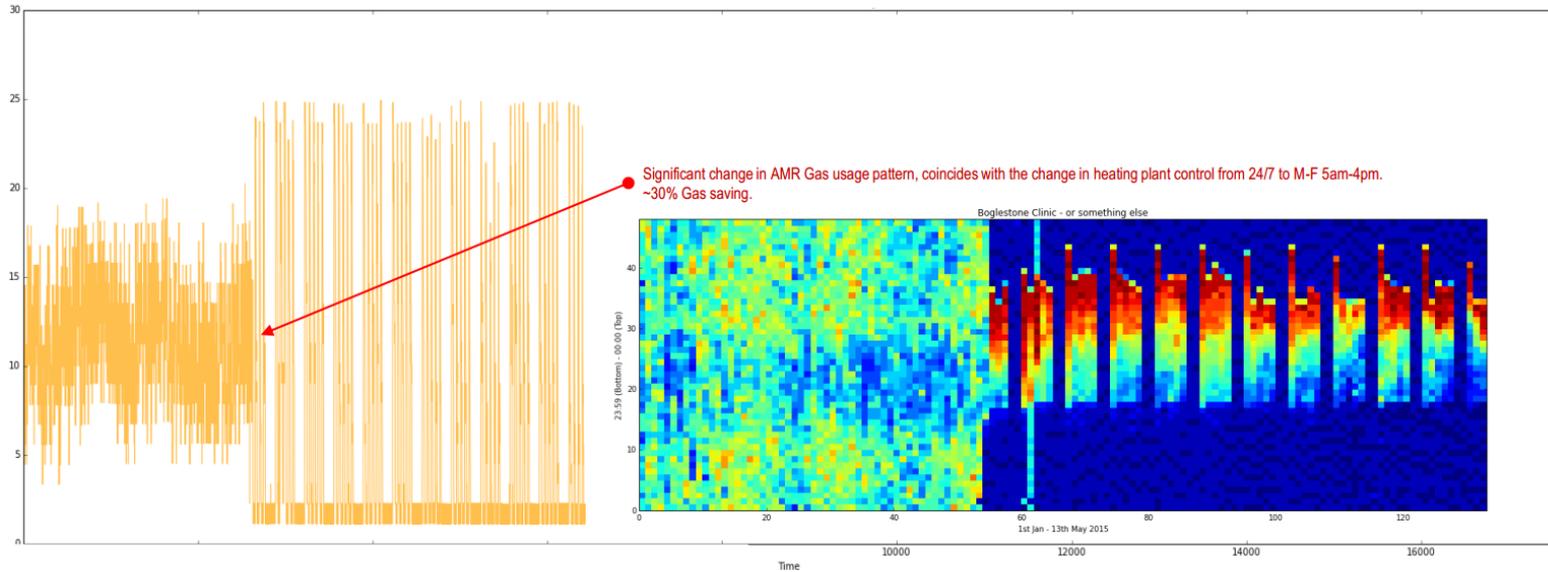


- Data Quality trend lines used to track data quality of all measured points
- Rogue controllers can be identified and fixed/replaced

Data exploration

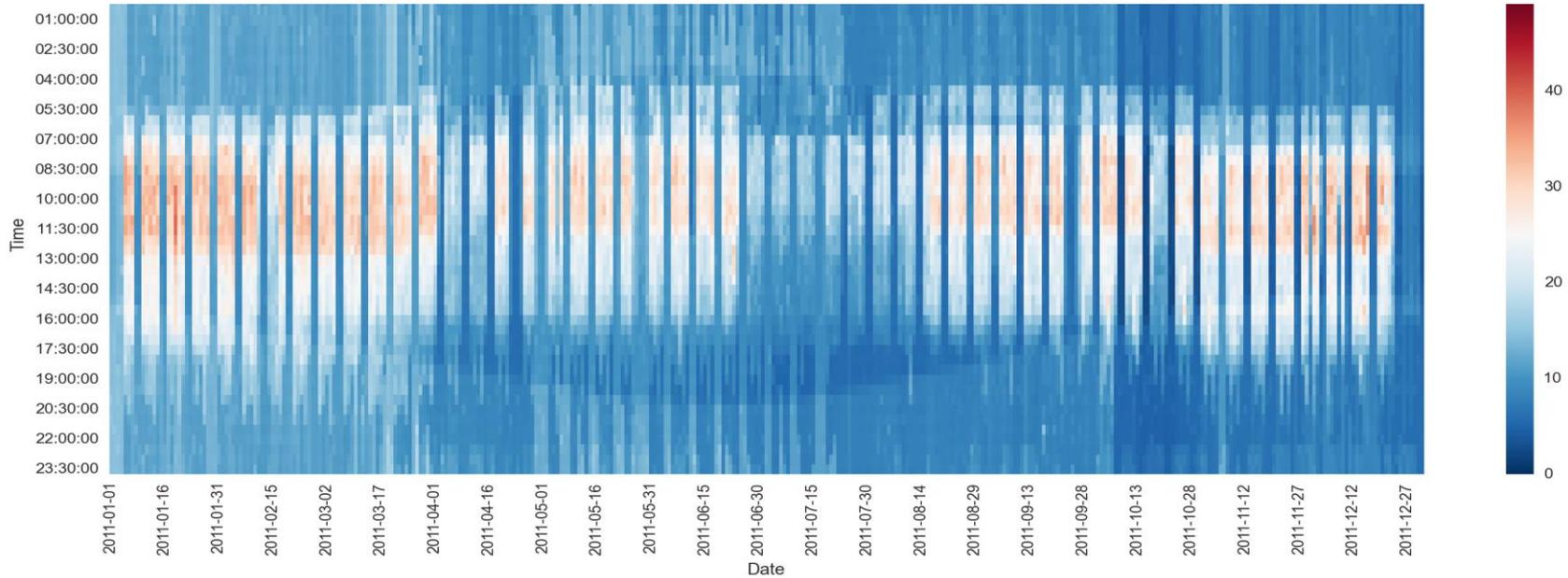


AMR Gas kWh



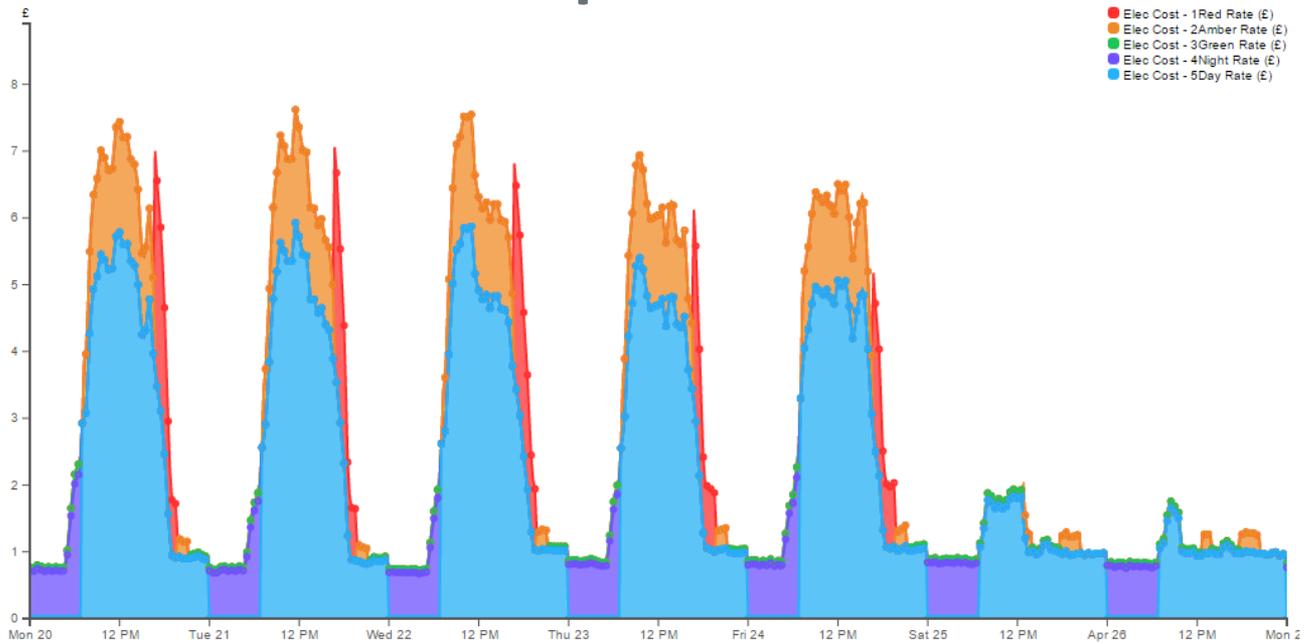
- 6-months performance tracking of LTHW boiler flow temperature – varying start/stop times observed

Data exploration



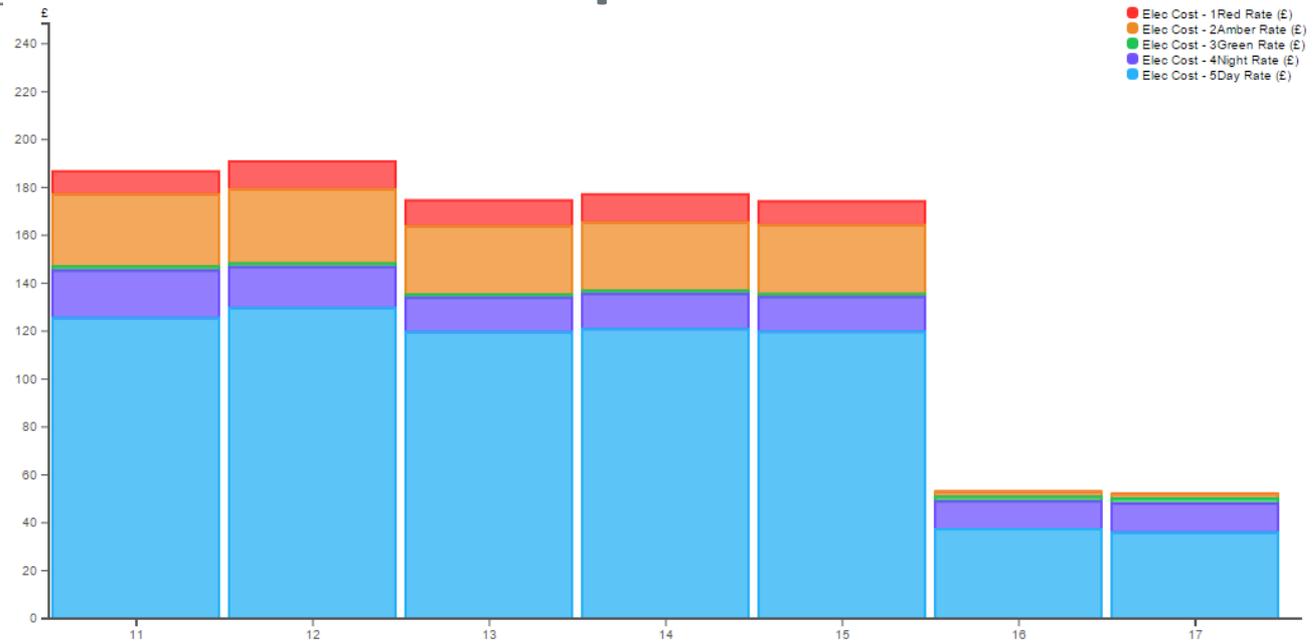
- Heatmap plots used to visualise annual performance at 30-min resolution
- Changing patterns of energy use observed – indicating performance drift

Data exploration



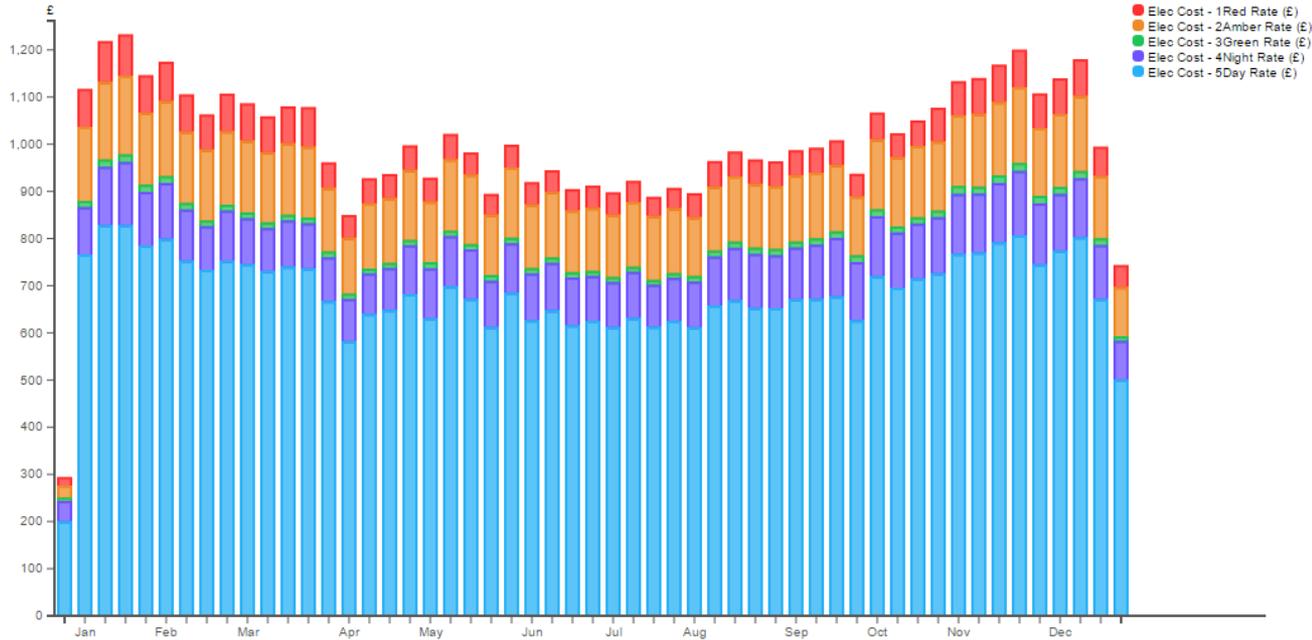
- Red tariff spike does not occur at weekends – as observed in 7-day power profile

Data exploration



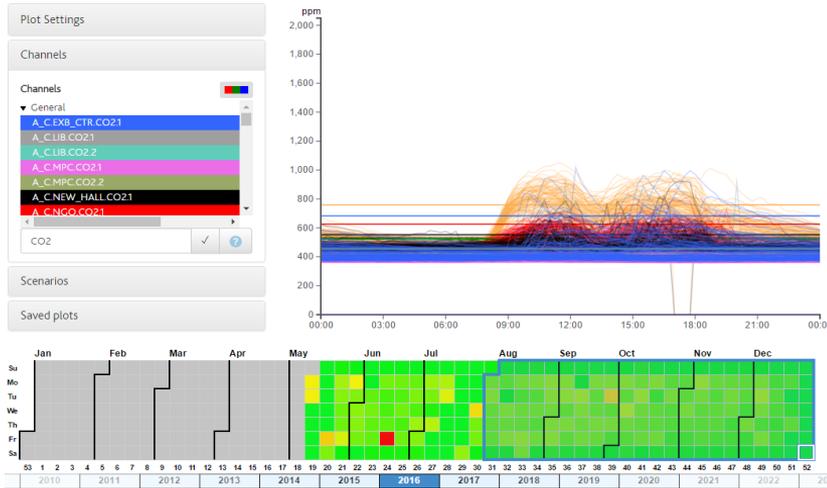
- Red tariff spike does not occur at weekends – as observed in 7-day power profile

Data exploration

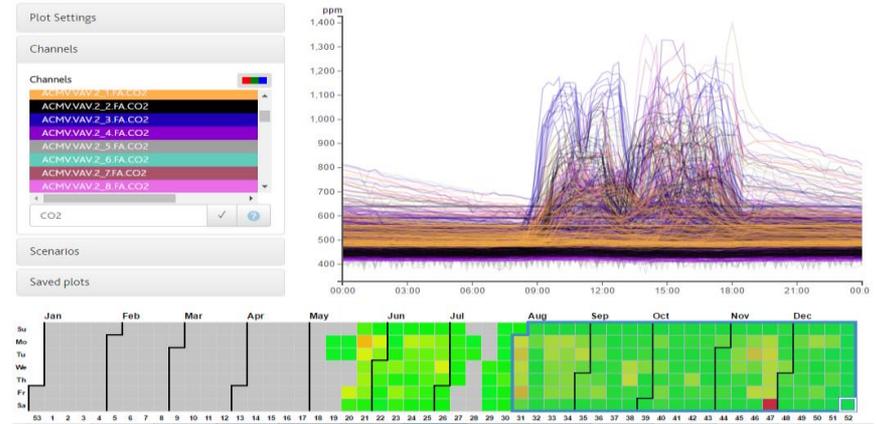


- Total power usage drops through summer as less heating and lighting are needed
- But red tariff charge is consistent throughout full calendar year
- Opportunity for implementation of a demand response strategy

Data exploration

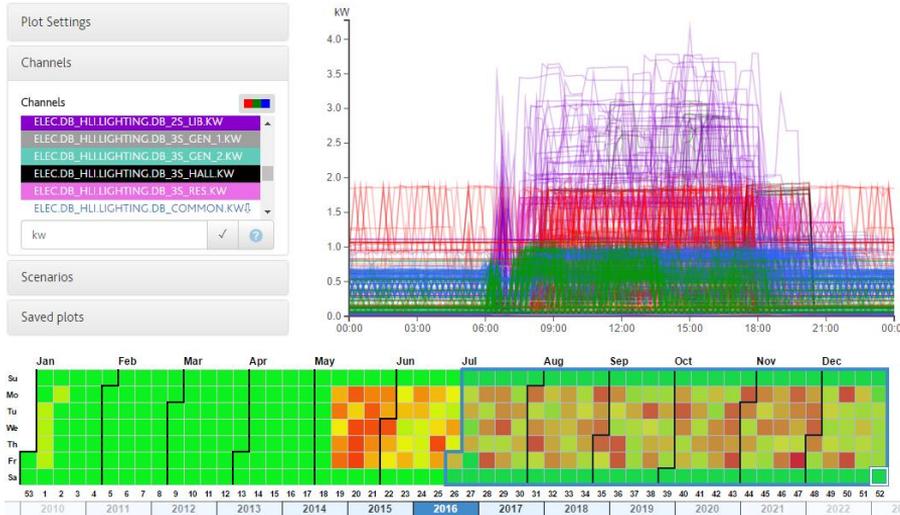


Potential CO2 sensor issues
(straight lines)

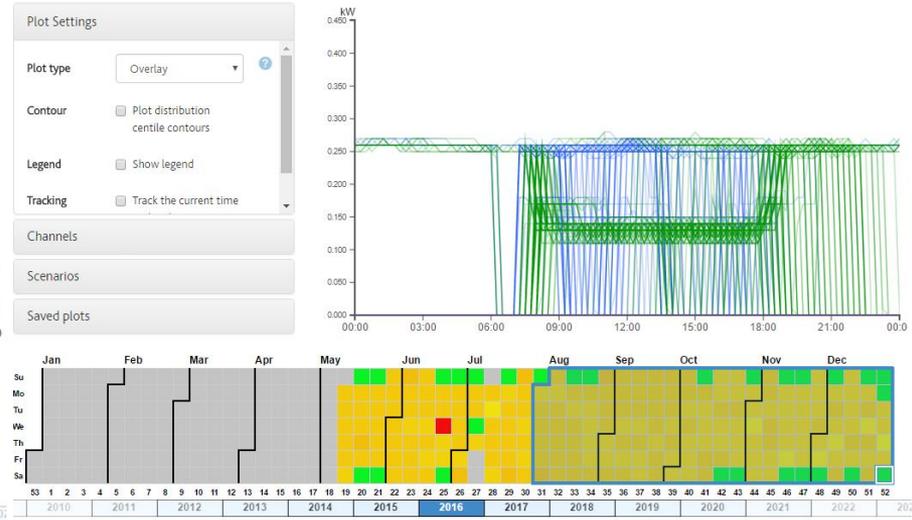


CO2 values exceeding 900 ppm in some
areas. Additional ventilation would
improve air quality.

Data exploration



Night-time lighting identified, outside of operating hours



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

Data exploration

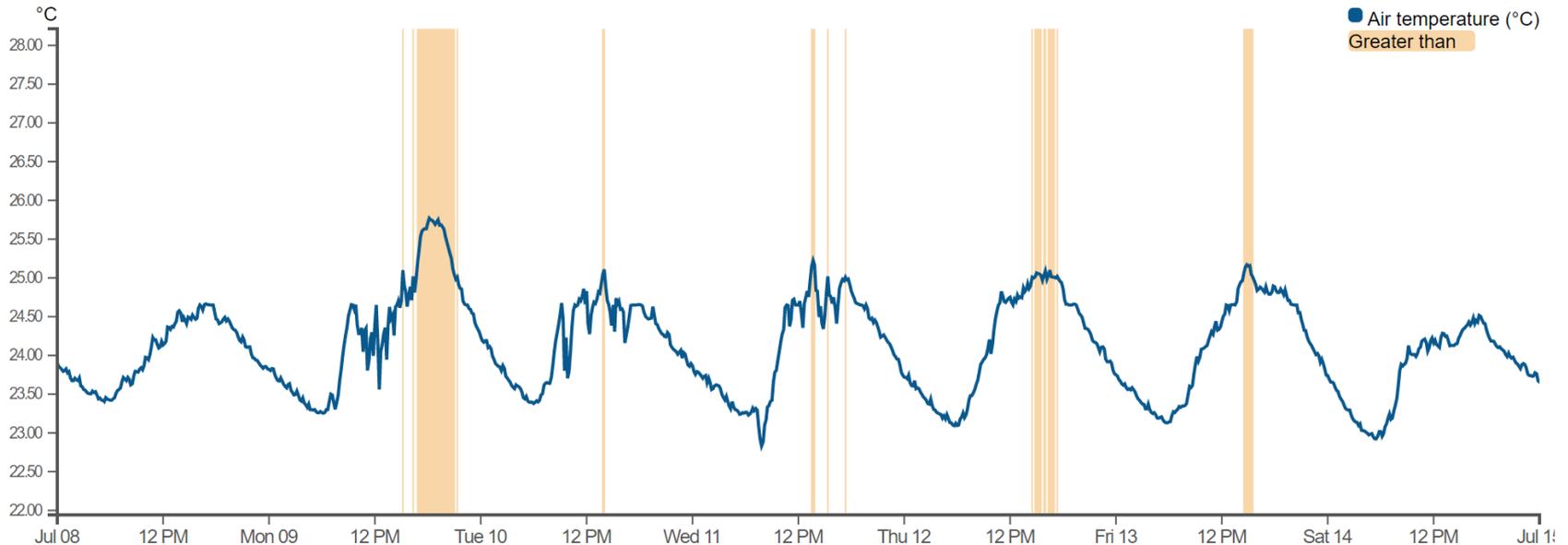


- Values higher than 25

Summary:

🕒 14 matches

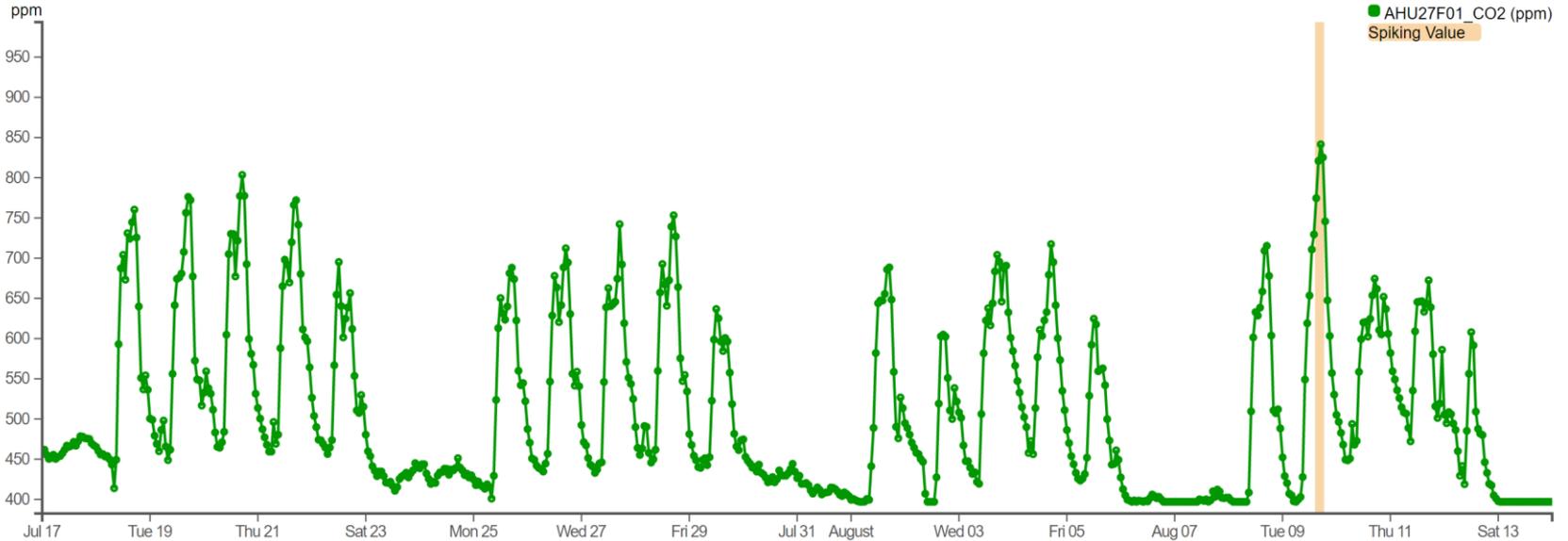
🕒 9.5 hrs



Data exploration



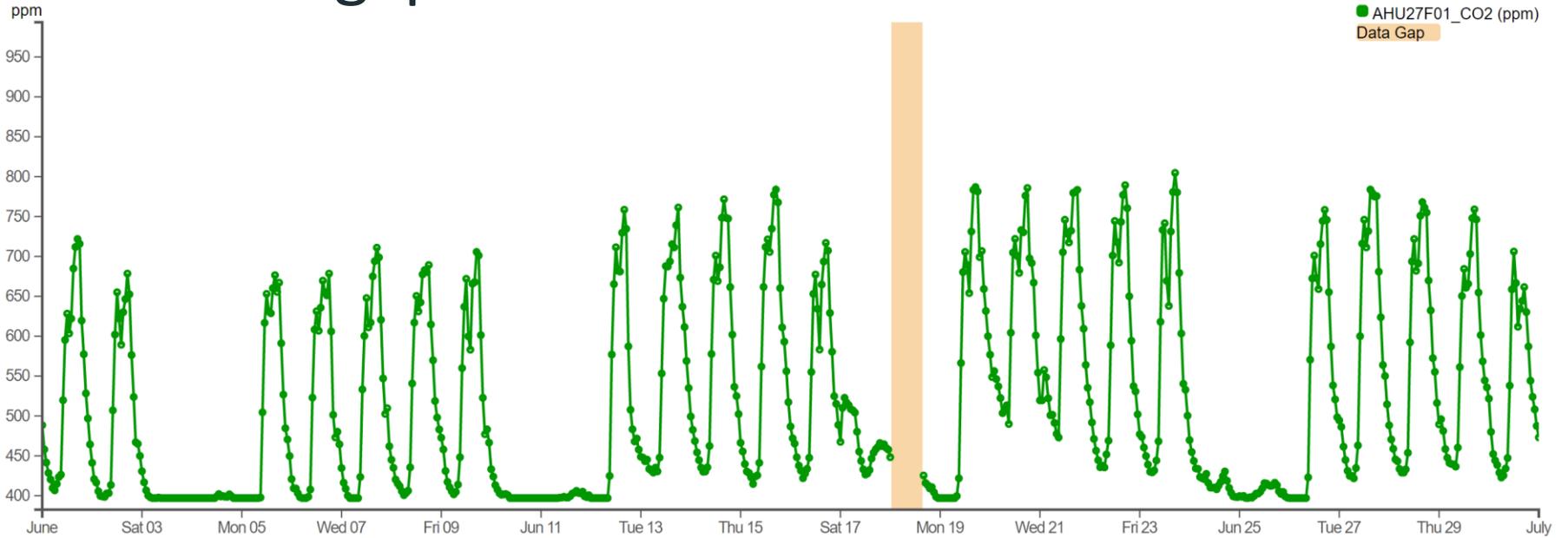
- Detect outliers



Data exploration



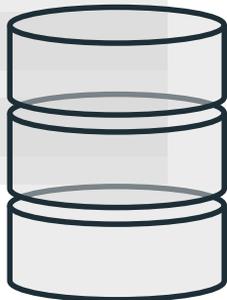
- Detect gaps



The iSCAN & iDashboard solution

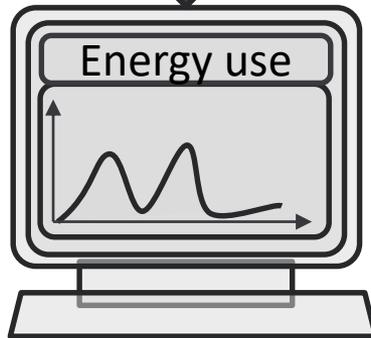
IES

Other applications



Building data from:

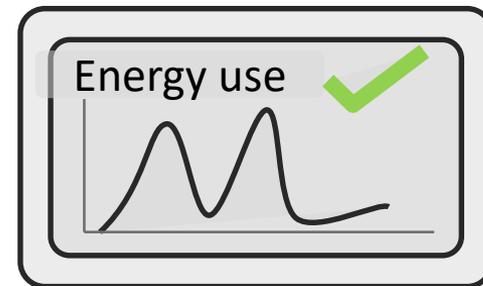
- Smart Meters
- Building Management Systems (BMS)



iSCAN

Data management:

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

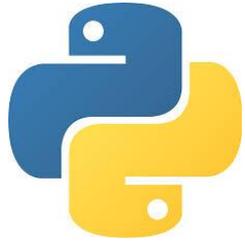


iDashboard

Data visualisation:

- KPIs
- Observe trends
- Present recent data

The iSCAN & iDashboard solution

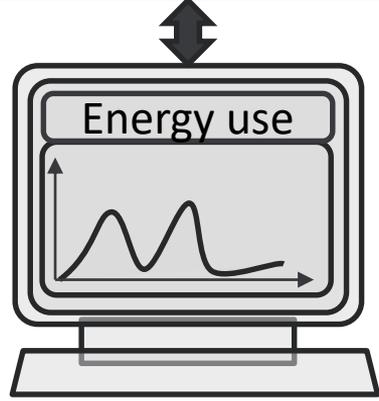


Python

Machine learning:

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

Other applications



Weather

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

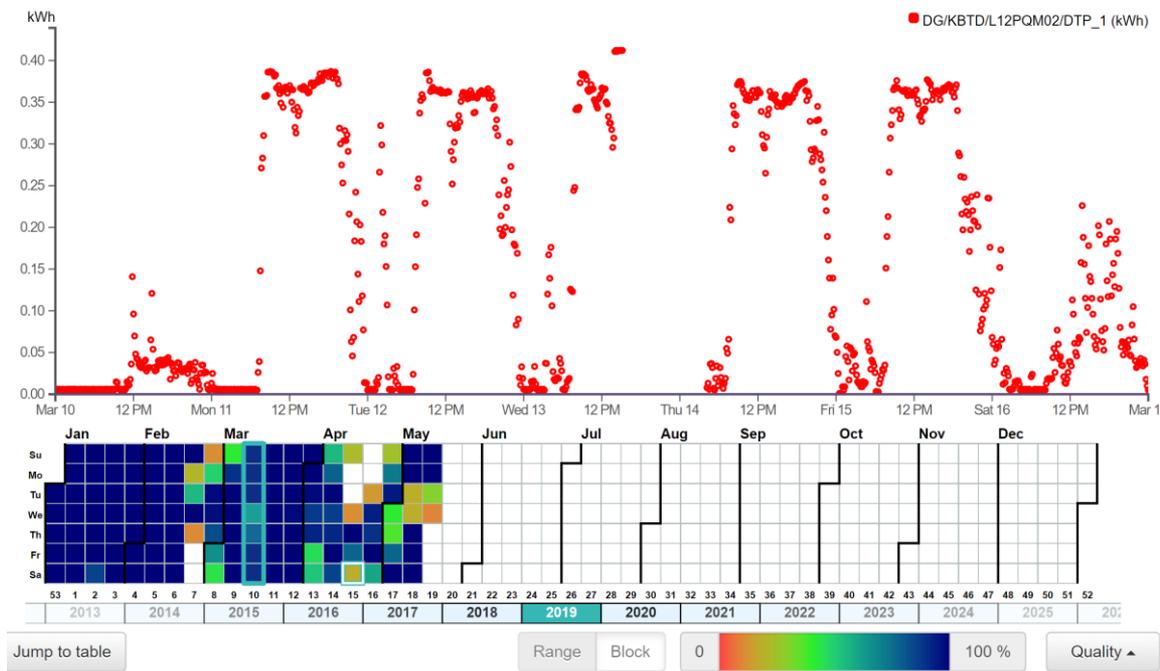


Shared calendars

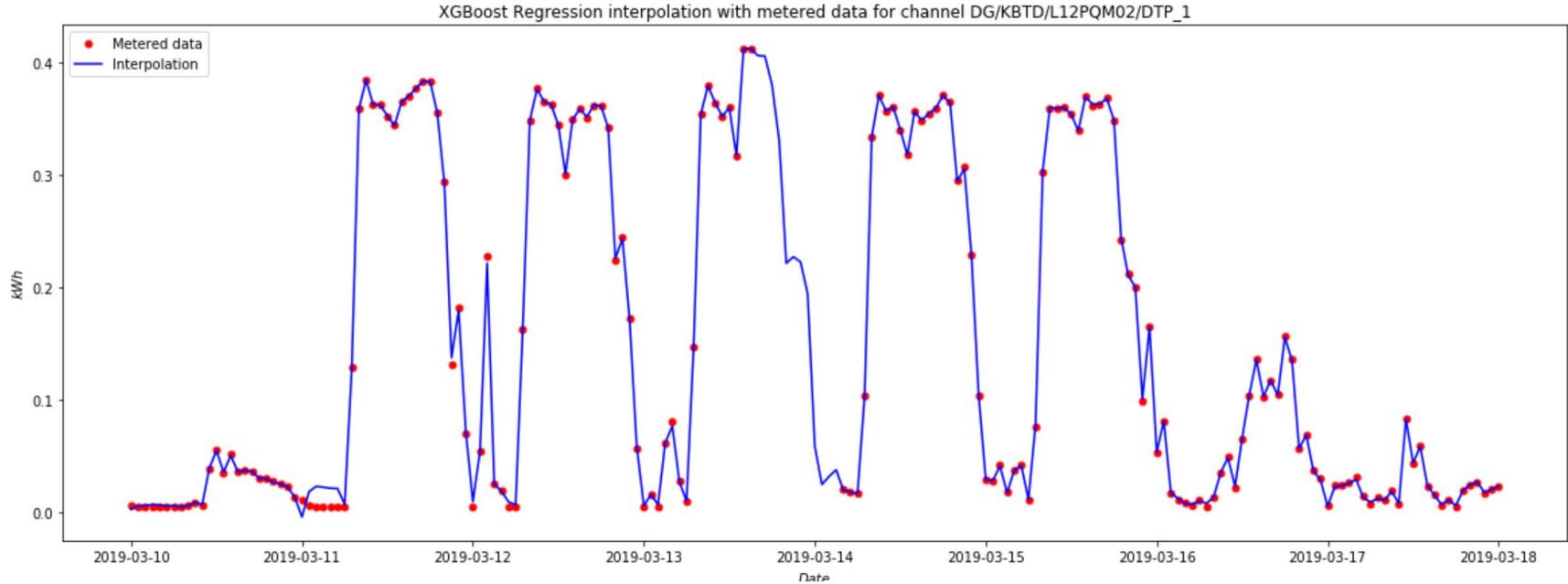
Obtain calendar data inform of time series for:

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

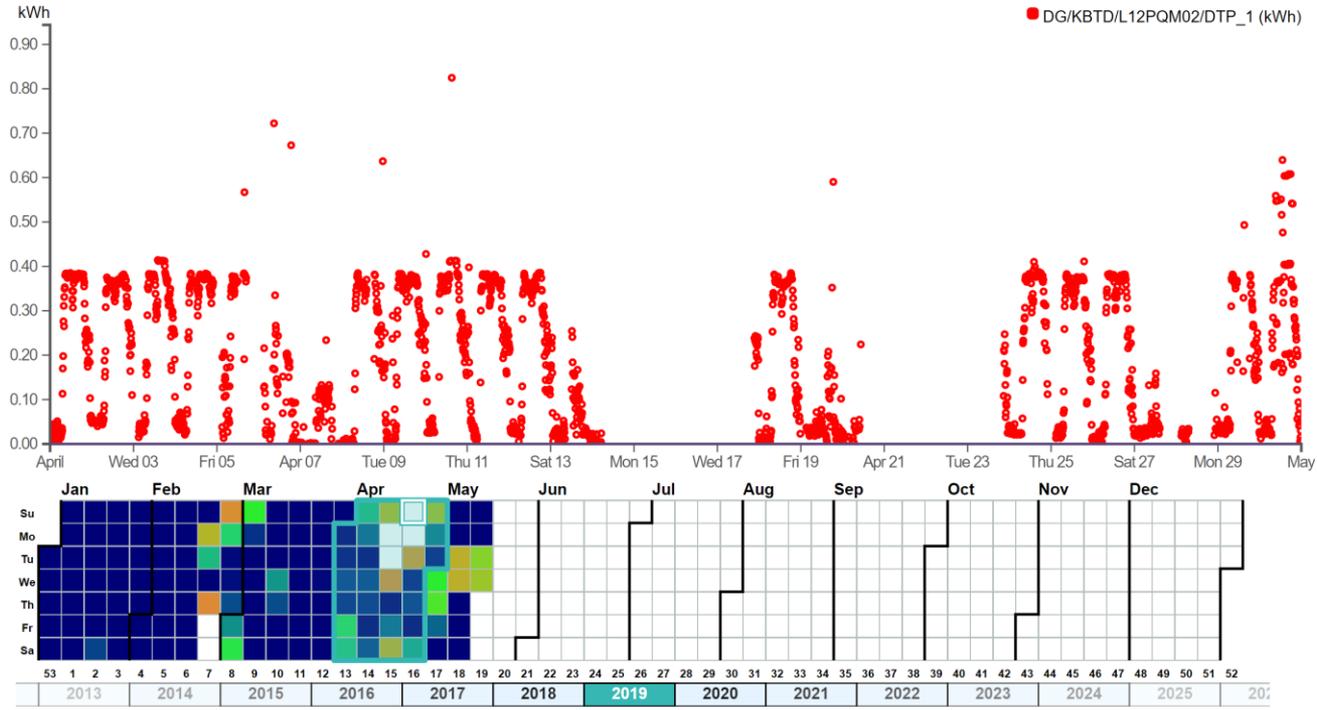
Other applications: interpolation



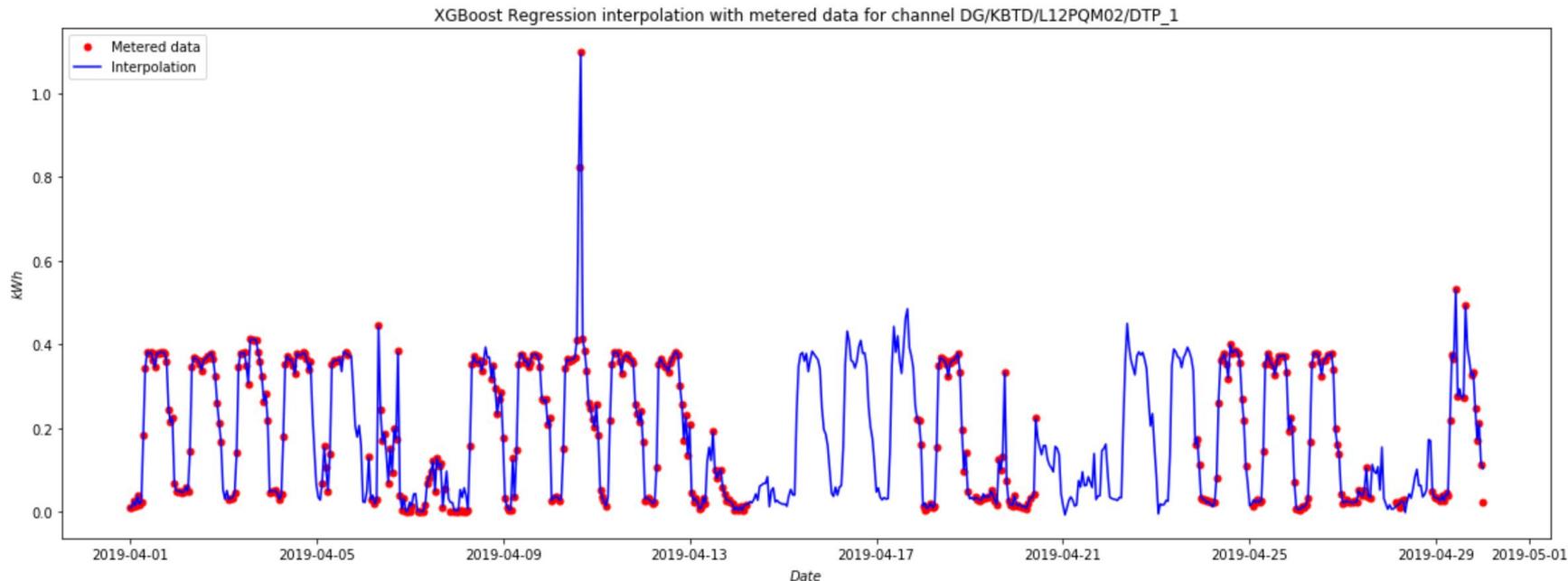
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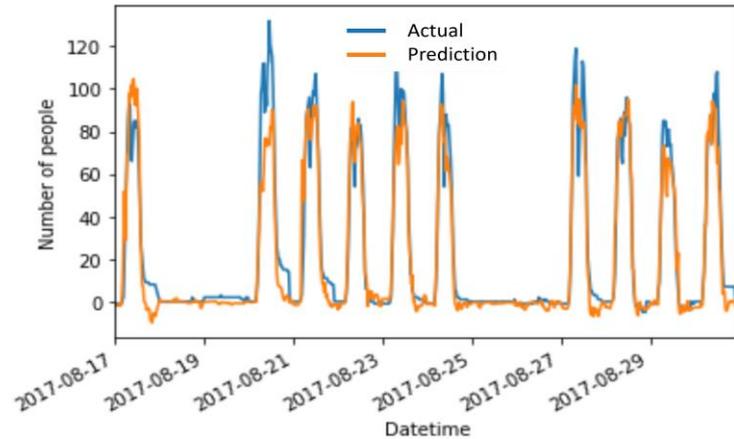
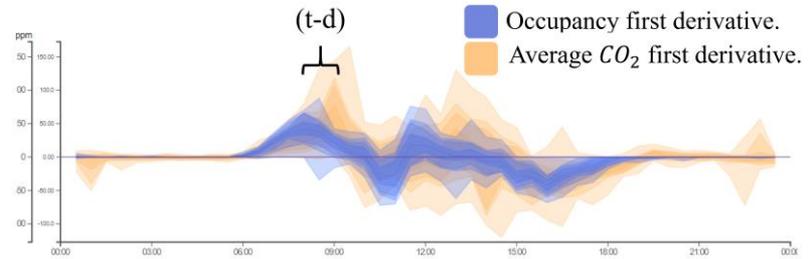
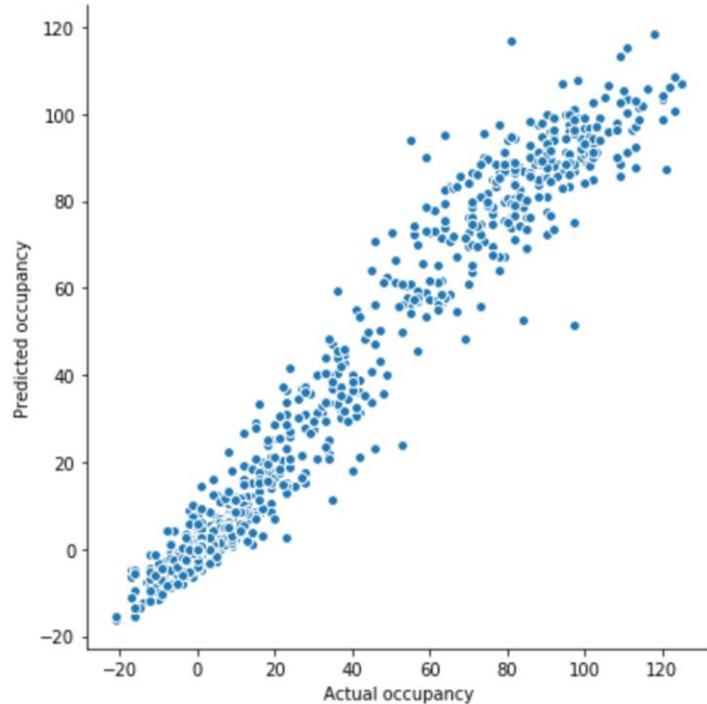
Other applications: interpolation



Other applications: interpolation



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

Condenser water to/from cooling towers

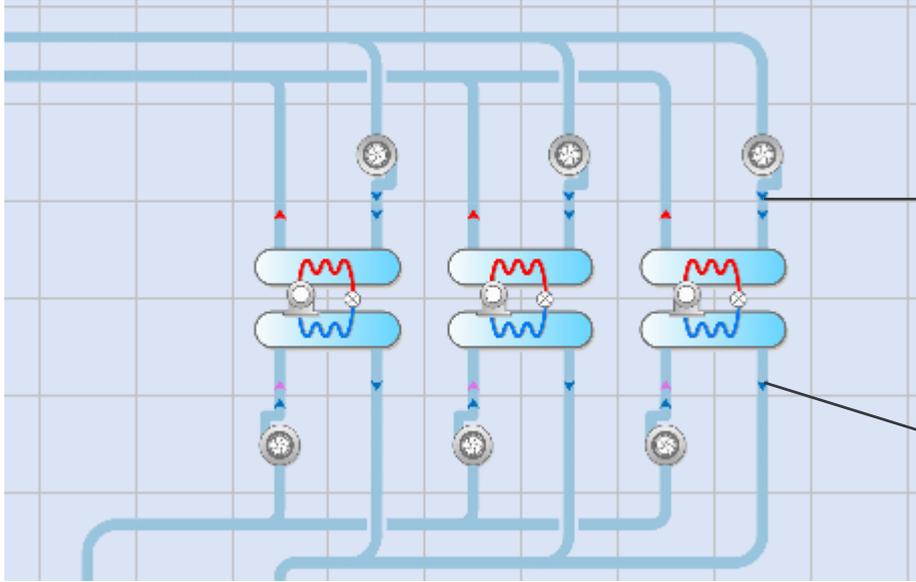
- [condenser water leaving temp sensor](#)
- [condenser water leaving flow sensor](#)
- [condenser water leaving pressure sensor](#)
- [condenser water entering temp sensor](#)
- [condenser water entering pressure sensor](#)
- [condenser water entering flow sensor](#)
- [condenser water valve isolation 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](#)
- [chilled water delta pressure sensor](#)
- [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



Channels

- CH01 CHW Flow (l/s)
- CH01 CHW RT (°C)
- CH01 CHW ST (°C)
- CH01 CW Flow (l/s)
- CH01 CW RT (°C)**
- CH01 CW ST (°C)
- CH02 CHW Flow (l/s)
- CH02 CHW RT (°C)
- CH02 CHW ST (°C)
- CH02 CW Flow (l/s)
- CH02 CW RT (°C)
- CH02 CW ST (°C)

Channel Settings

Summary

Notes ●

Tags

Values

Rules

Name	Value	Remove
entering	«none»	Remove Tag
chiller	«none»	Remove Tag
water	«none»	Remove Tag
condenser	«none»	Remove Tag
temperature	«none»	Remove Tag
sensor	«none»	Remove Tag

«Please choose a tag» ▼

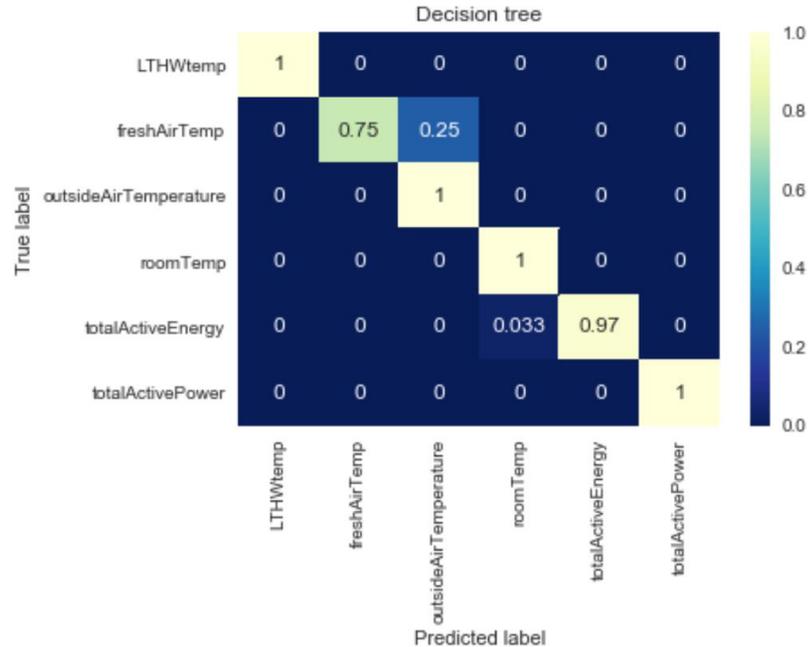
Tag value

Add Tag

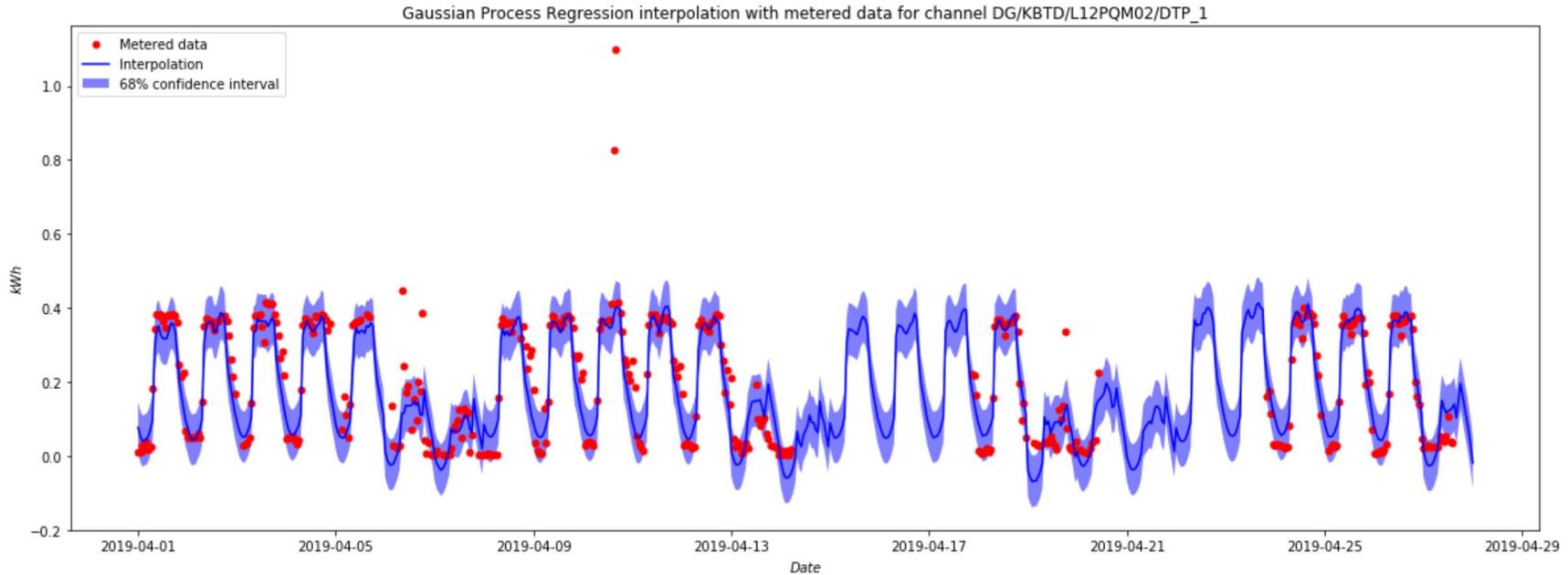
Other applications: Tags



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



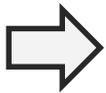
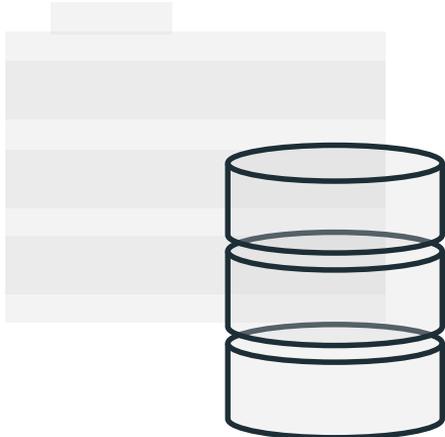
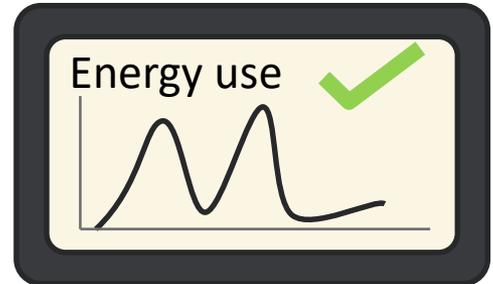
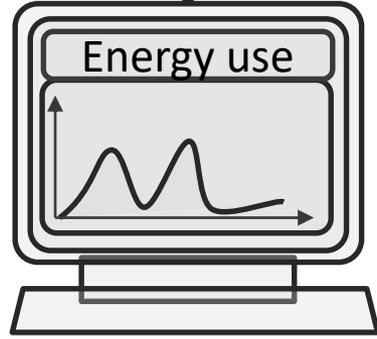
Other applications: anomalies



The iSCAN & iDashboard solution



Other applications



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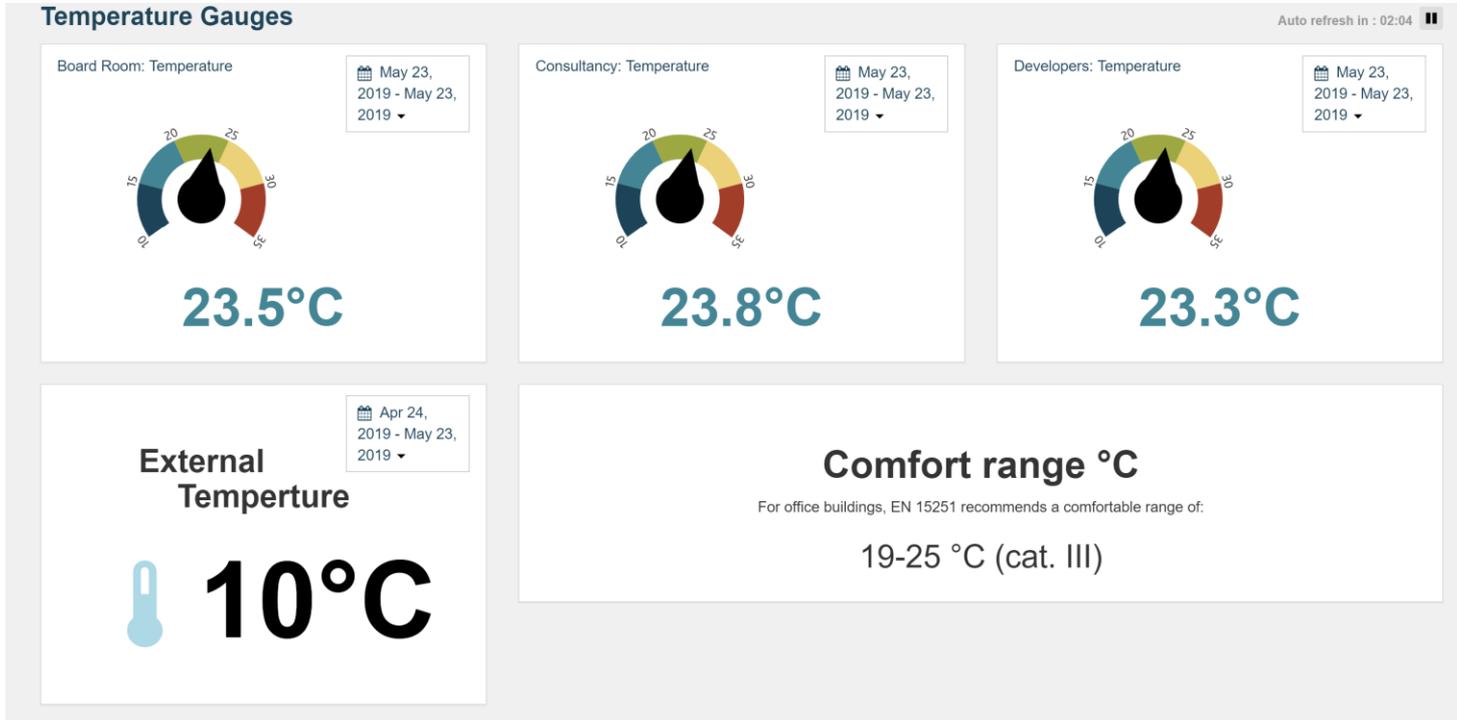
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Example – Helix building

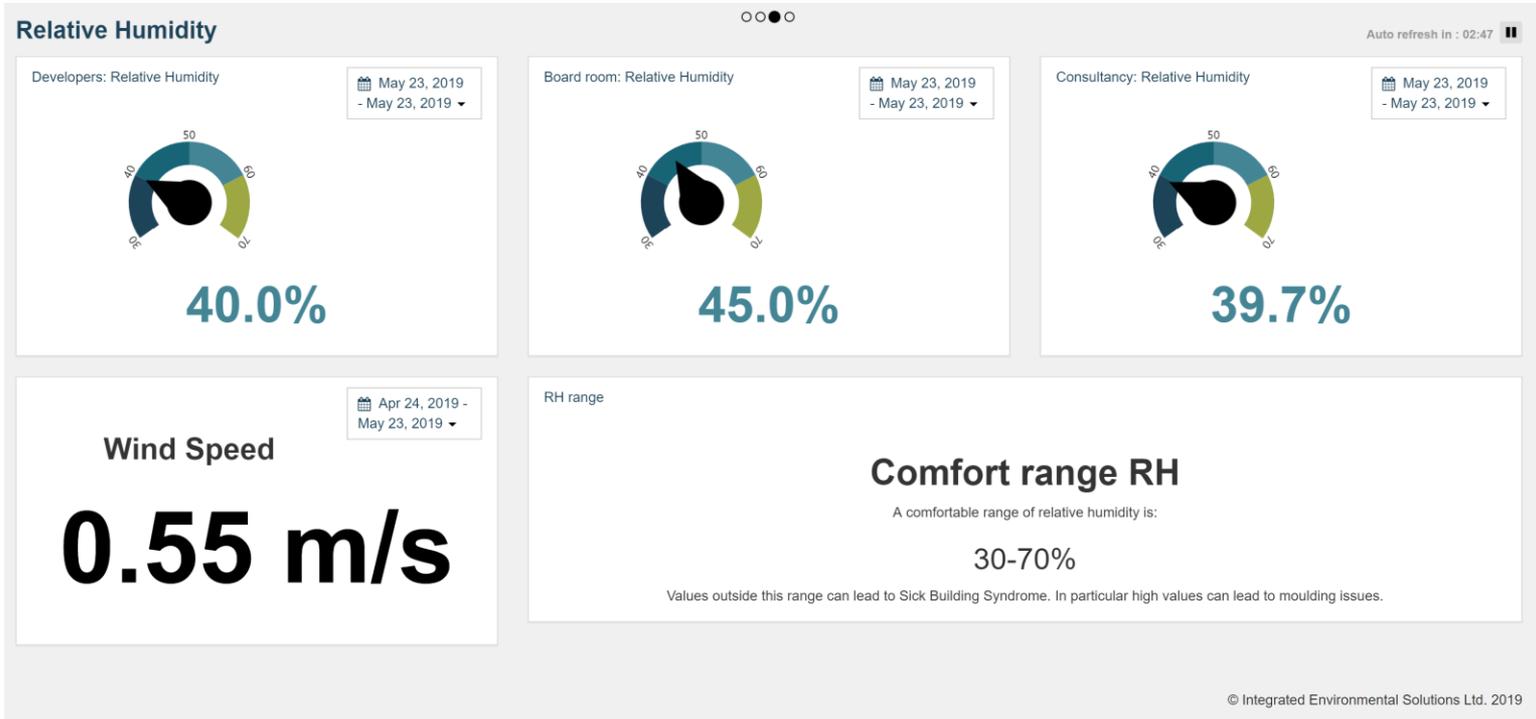
IES



Example 1 – Helix building



Example 1 – Helix building

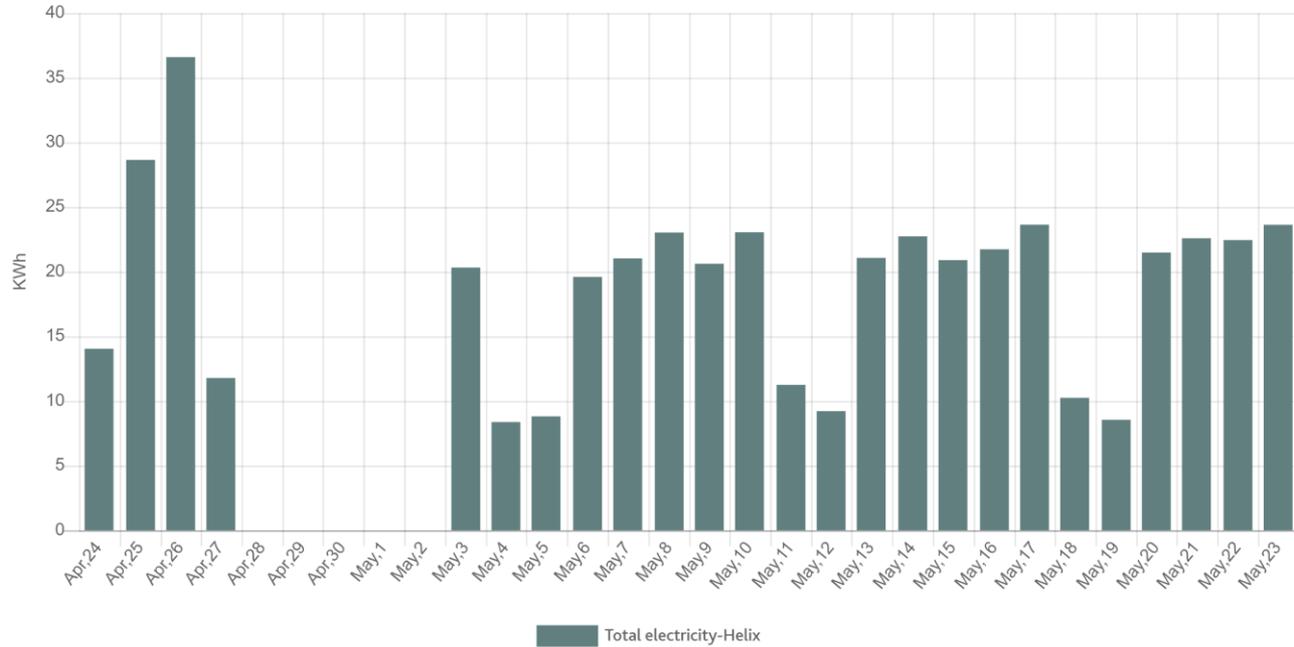


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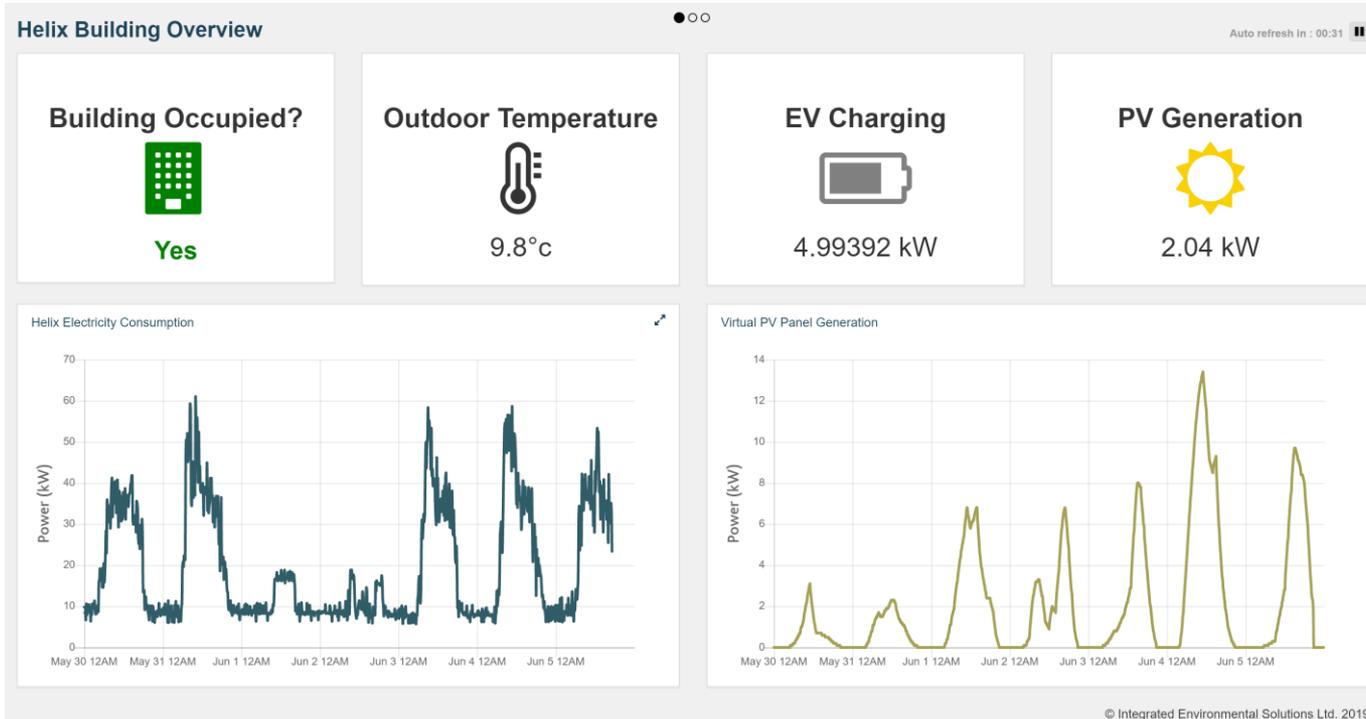


Energy consumption

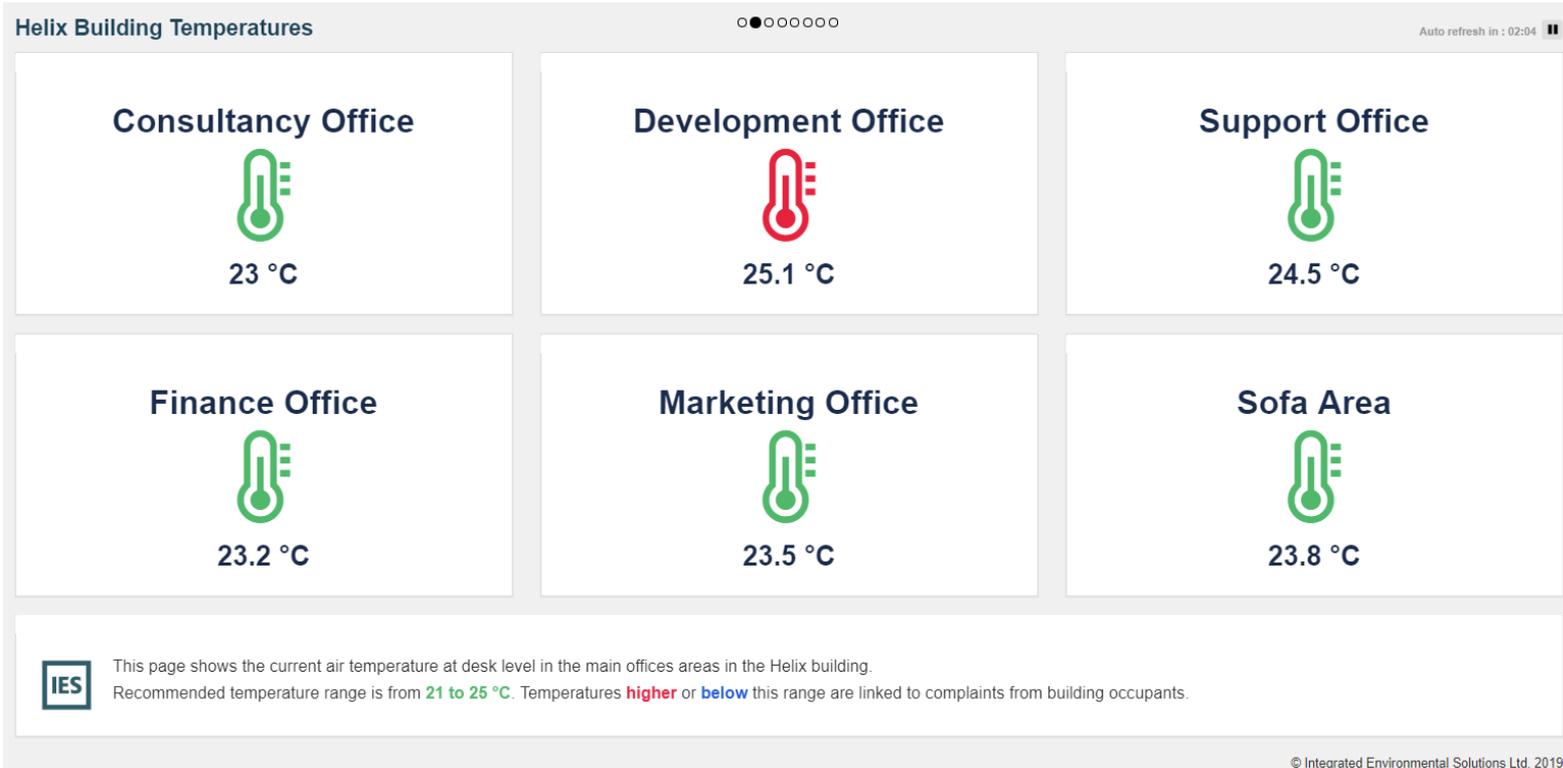
Apr 24, 2019 - May 23, 2019



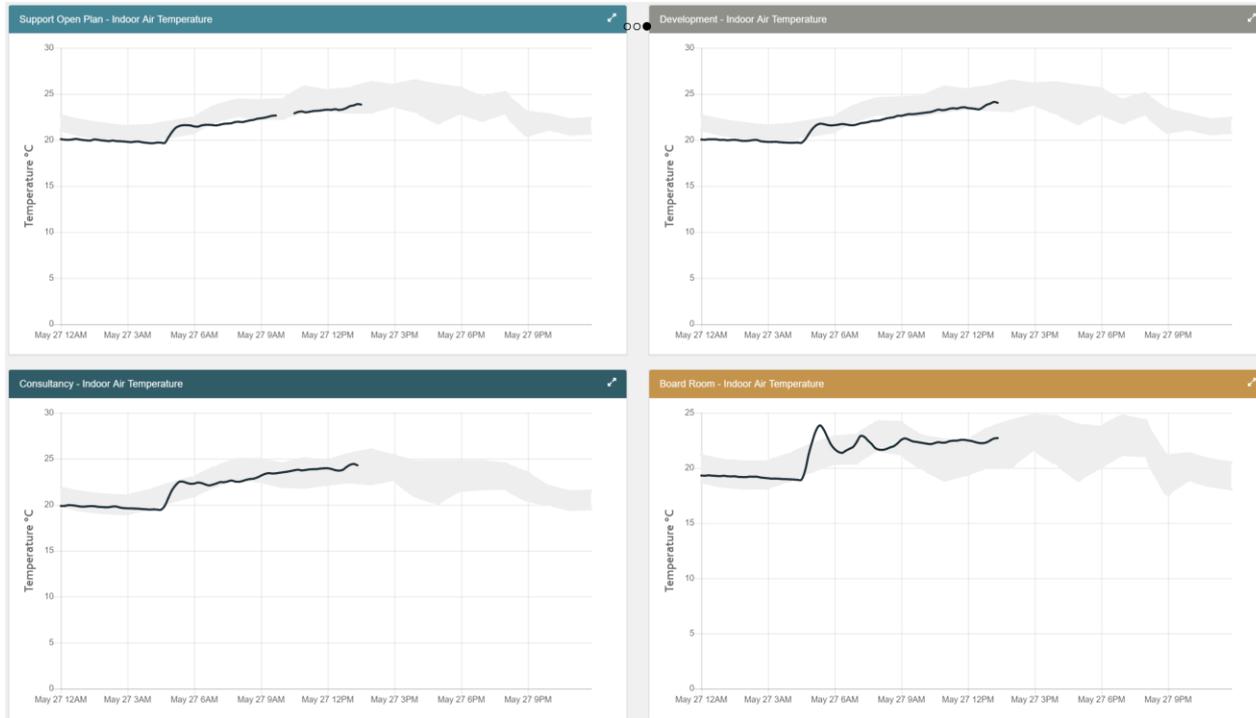
Example 2 – Helix building



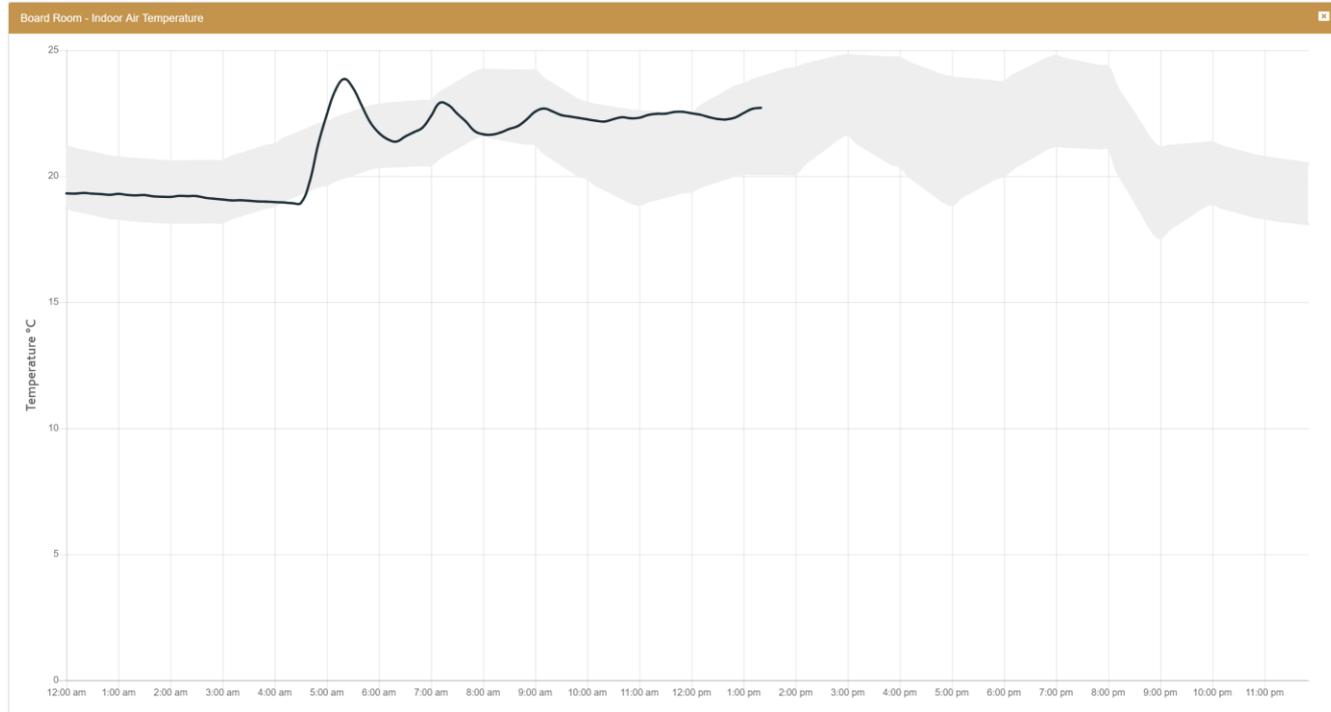
Example 2 – Helix building



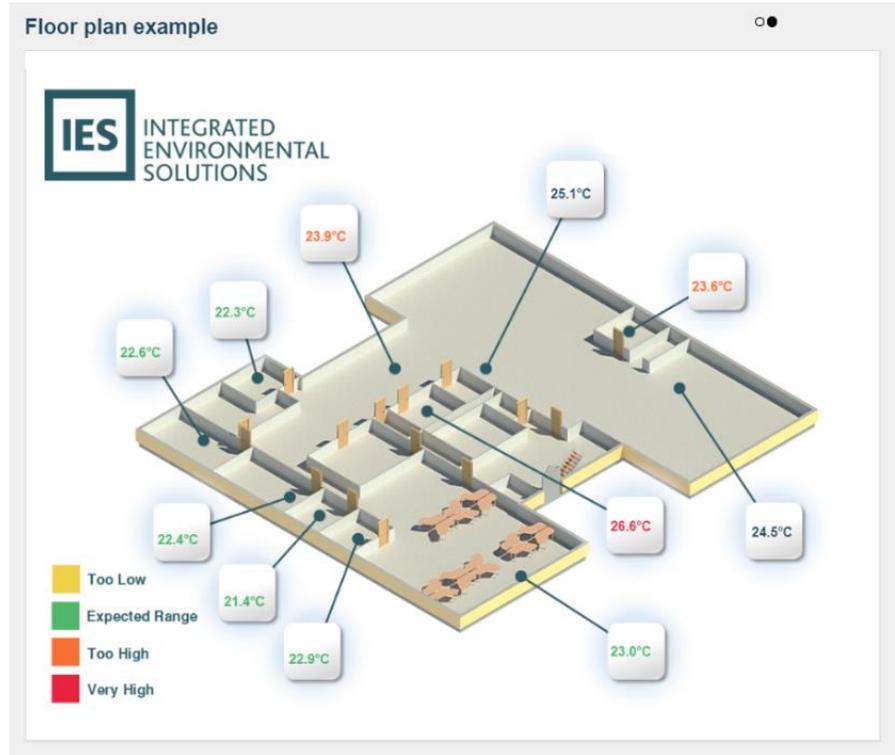
Example 2 – Helix building



Example 2 – Helix building



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.