



iSCAN and iDashboards Overview

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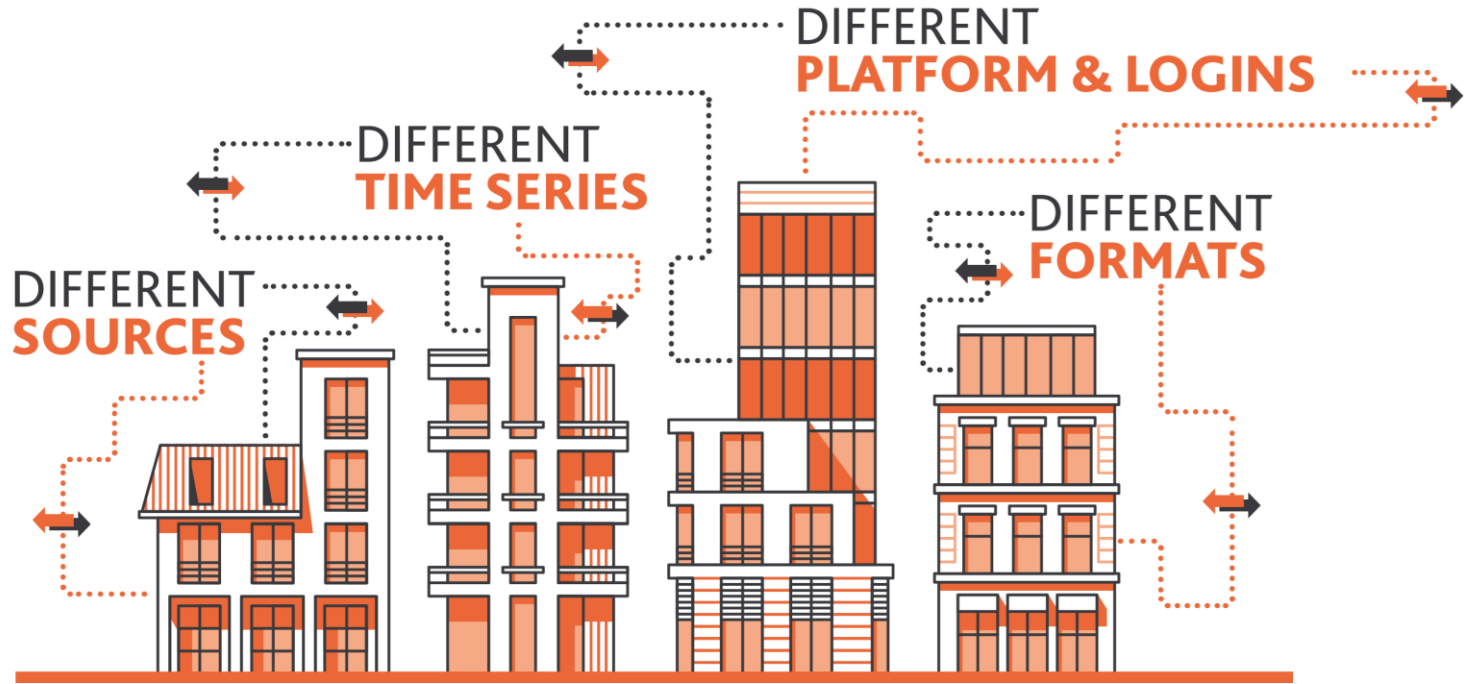
Workshop part 1 - Overview

iSCAN & iDashboard solution overview

Workshop part 1 - Content

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

The problem

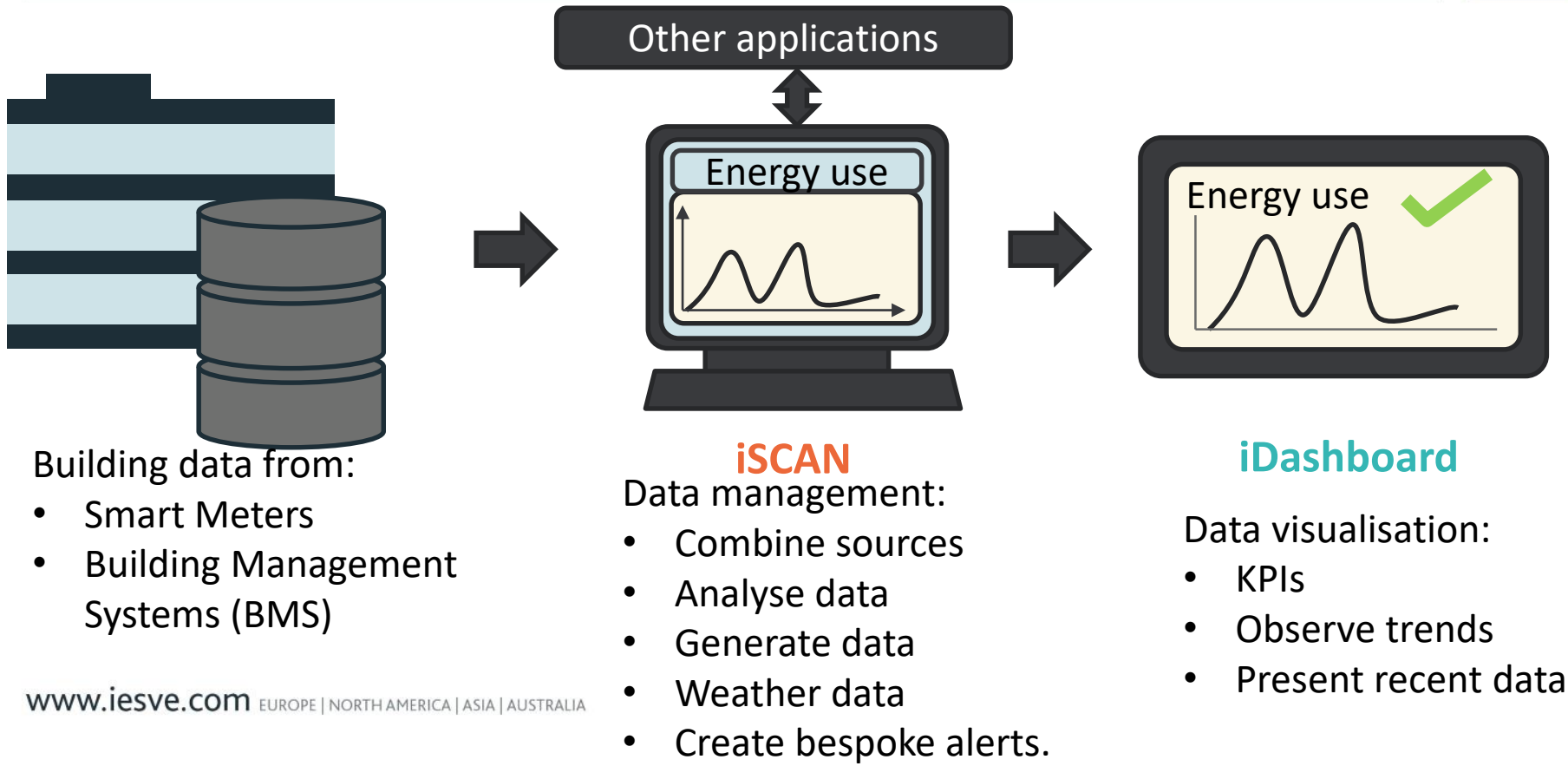


The problem

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

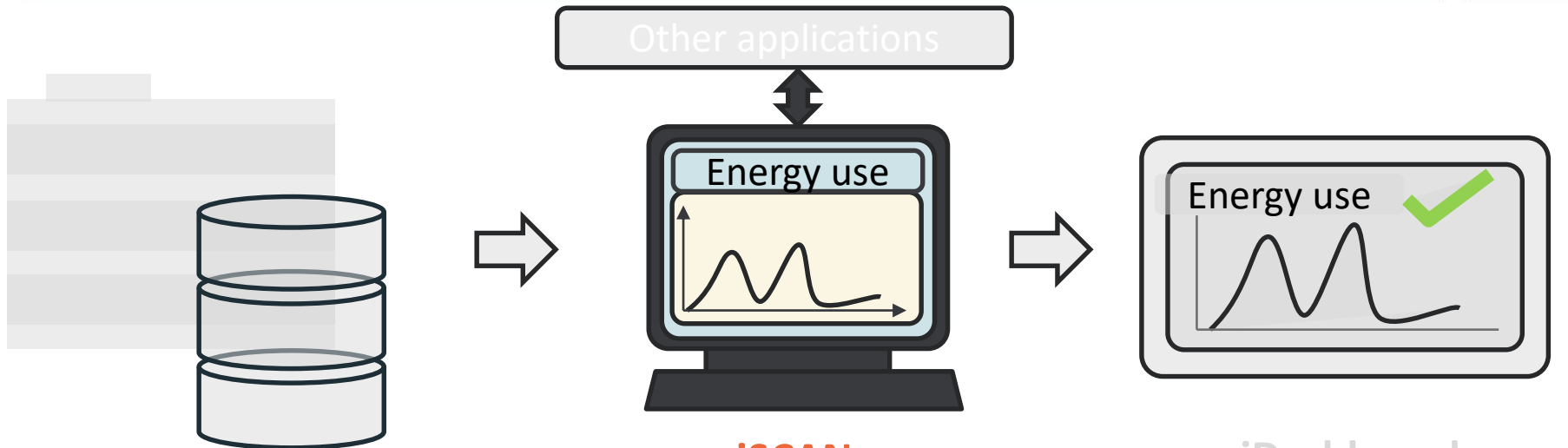
The iSCAN & iDashboard solution

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The iSCAN & iDashboard solution

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Building data from:

- Smart Meters
- Building Management Systems (BMS)

iSCAN

Data management:

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

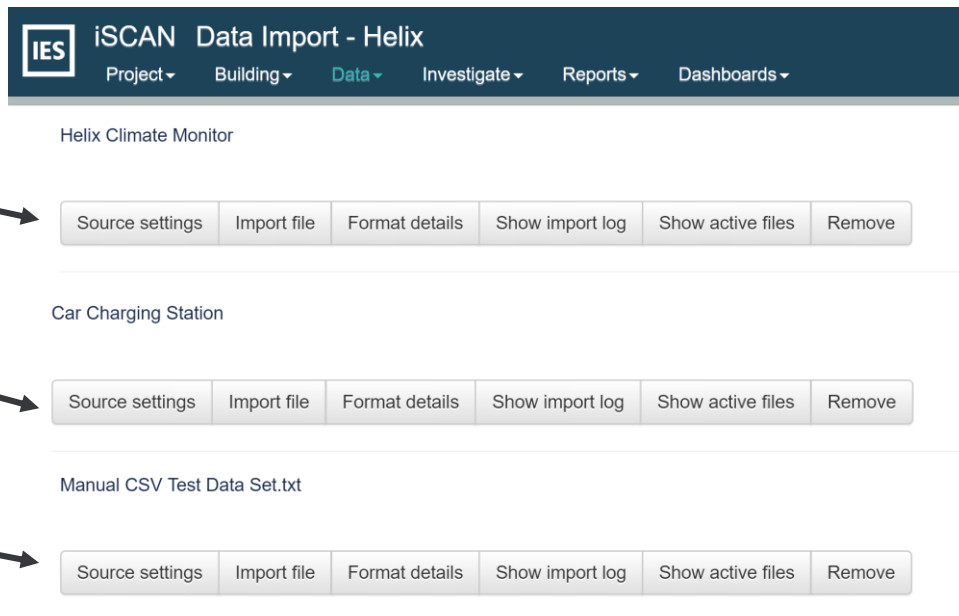
iDashboard

Data visualisation:

- KPIs
- Observe trends
- Present recent data

The iSCAN & iDashboard solution

- 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 tabs for Project, Building, Data (selected), Investigate, Reports, and Dashboards. Below the navigation bar, three data sources are listed, each with a corresponding row of 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

Air temperature

Import reference

device/CD00000087456512/TempC

Level

Room

Room

L00: Con Open Plan Office [AIM1]

Units

Temperature °C

Min value

13.495

°C

Max value

29.30333

°C

Import limiting

Abort: Any value outside of the lin

Sample type

☐ Spot value

☒ Average

☐ Cumulative

☐ Discrete stepping

☐ Metered Value

Expected period

as building

min

Export

☐ Export as data channel (APM)

☒ Export as data channel (CSV)

☒ Interpolate (APM CSV)

☒ Export as free-form profile (FFD)

☒ Absolute

☐ Modulating

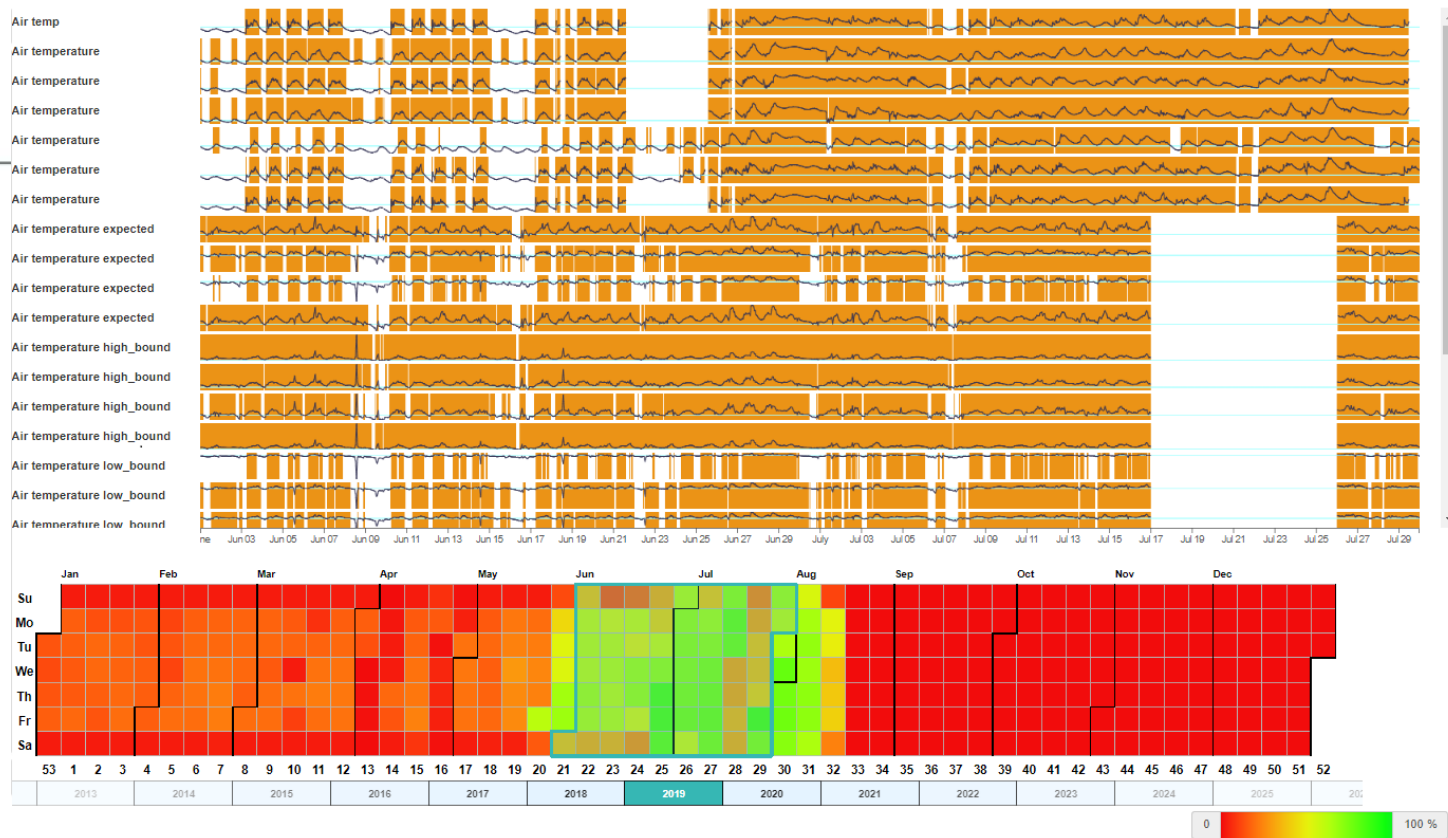
☐ Interpolate (FFD)

Profile

Profile name

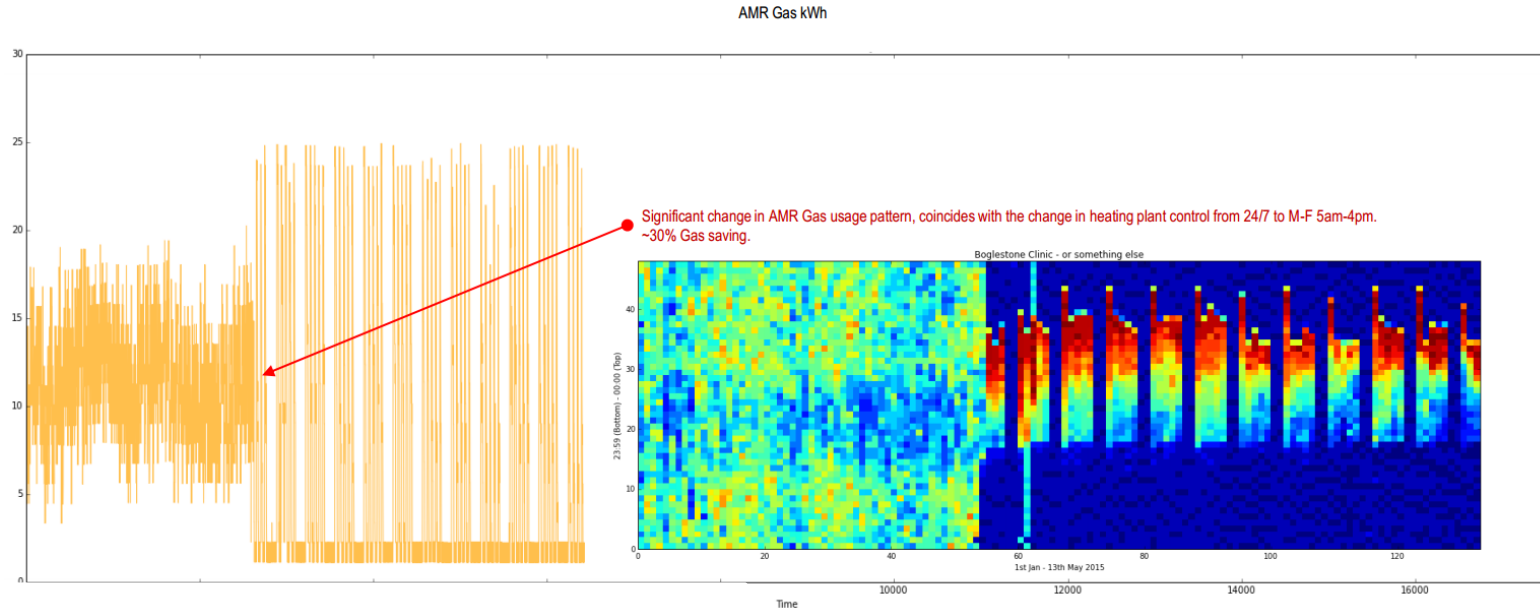
The iSCAN & iDashboard solution

- Data exploration



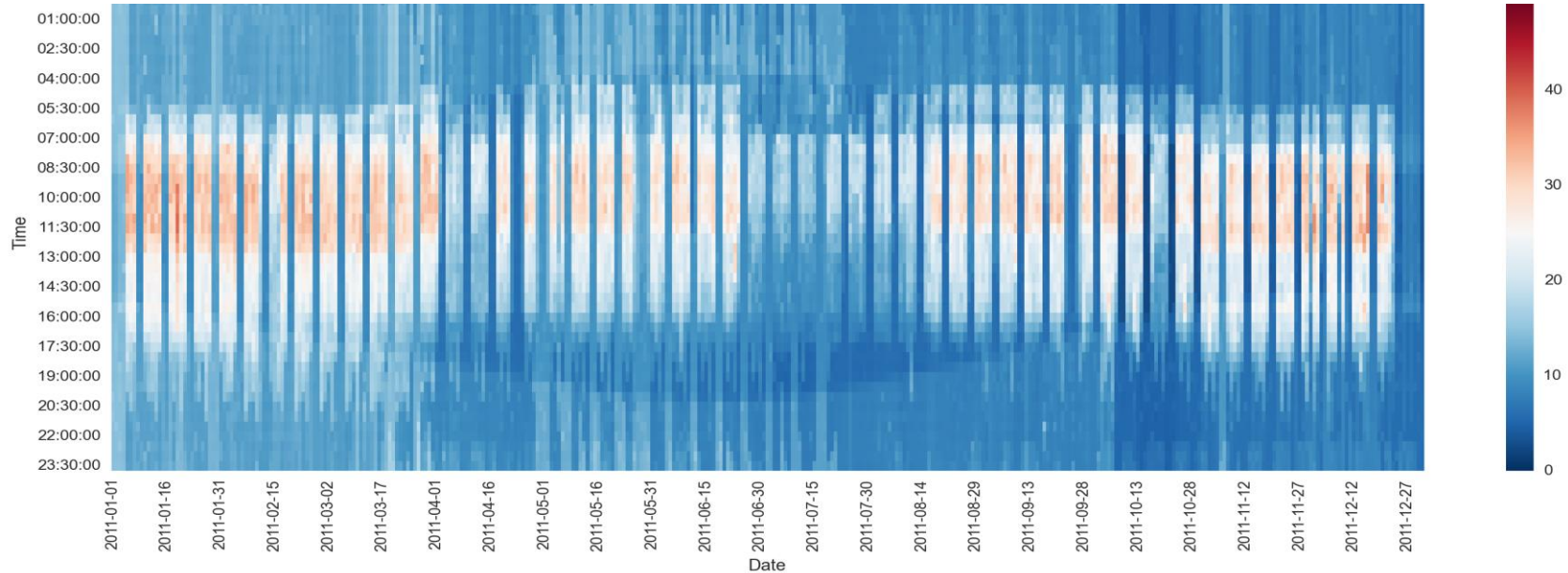
- Data Quality trend lines used to track data quality of all measured points
- Rogue controllers can be identified and fixed/replaced

Data exploration



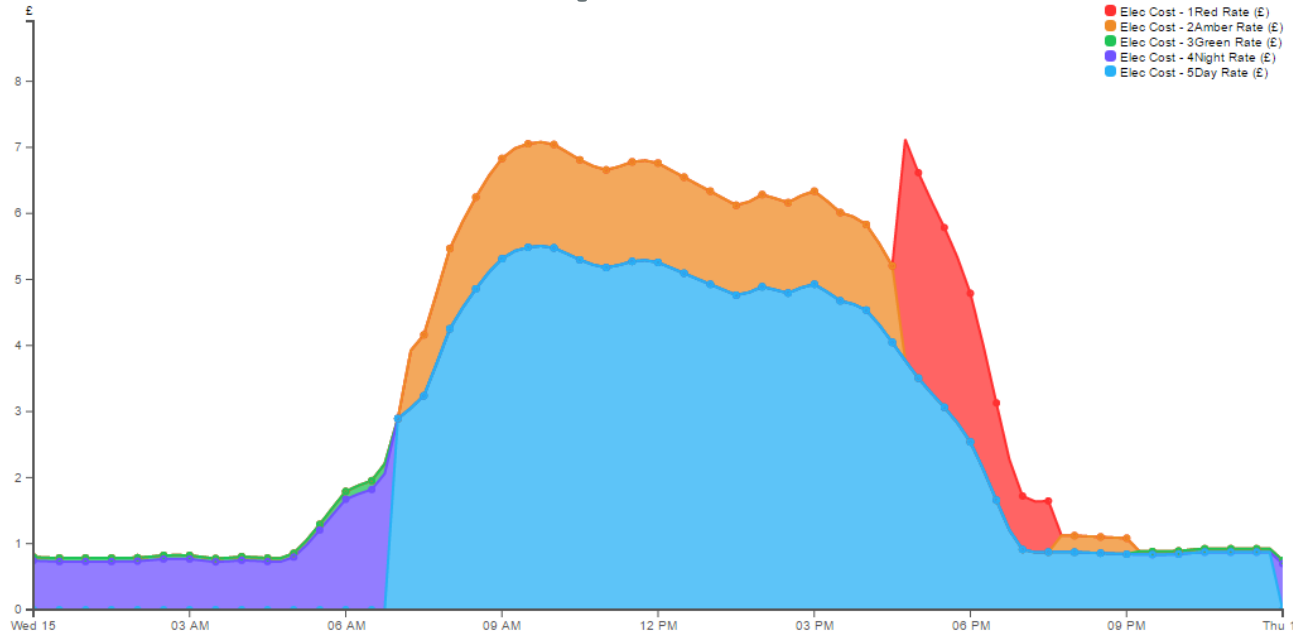
- 6-months performance tracking of LTHW boiler flow temperature – varying start/stop times observed

Data exploration



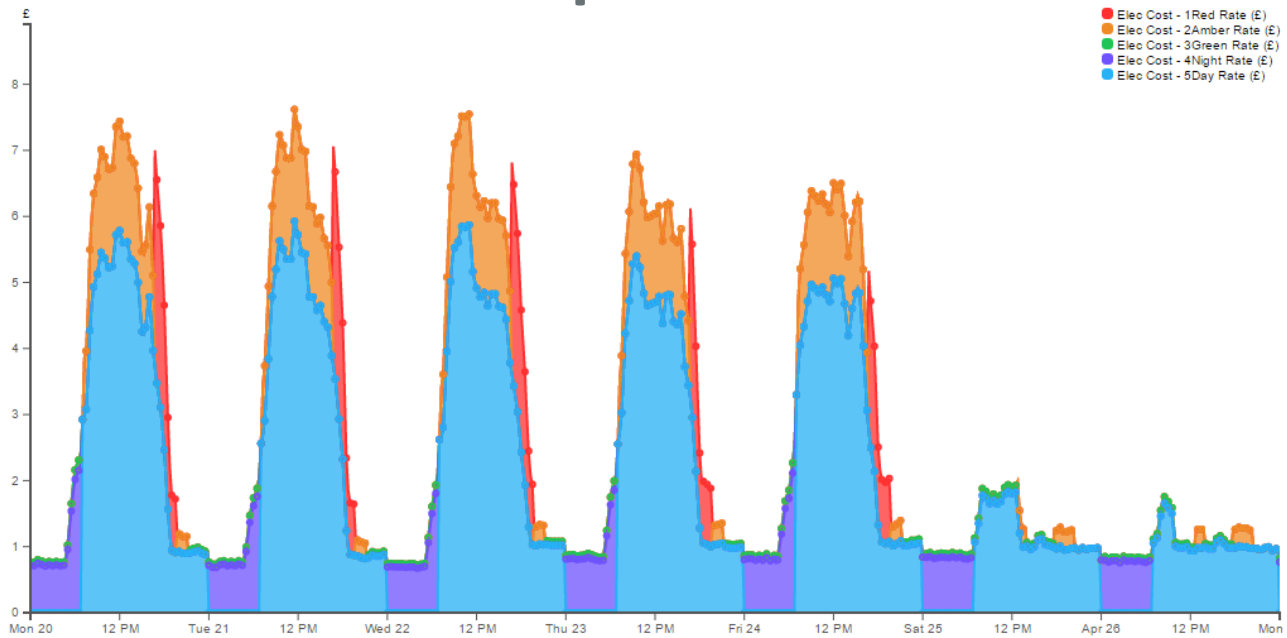
- Heatmap plots used to visualise annual performance at 30-min resolution
- Changing patterns of energy use observed – indicating performance drift

Data exploration



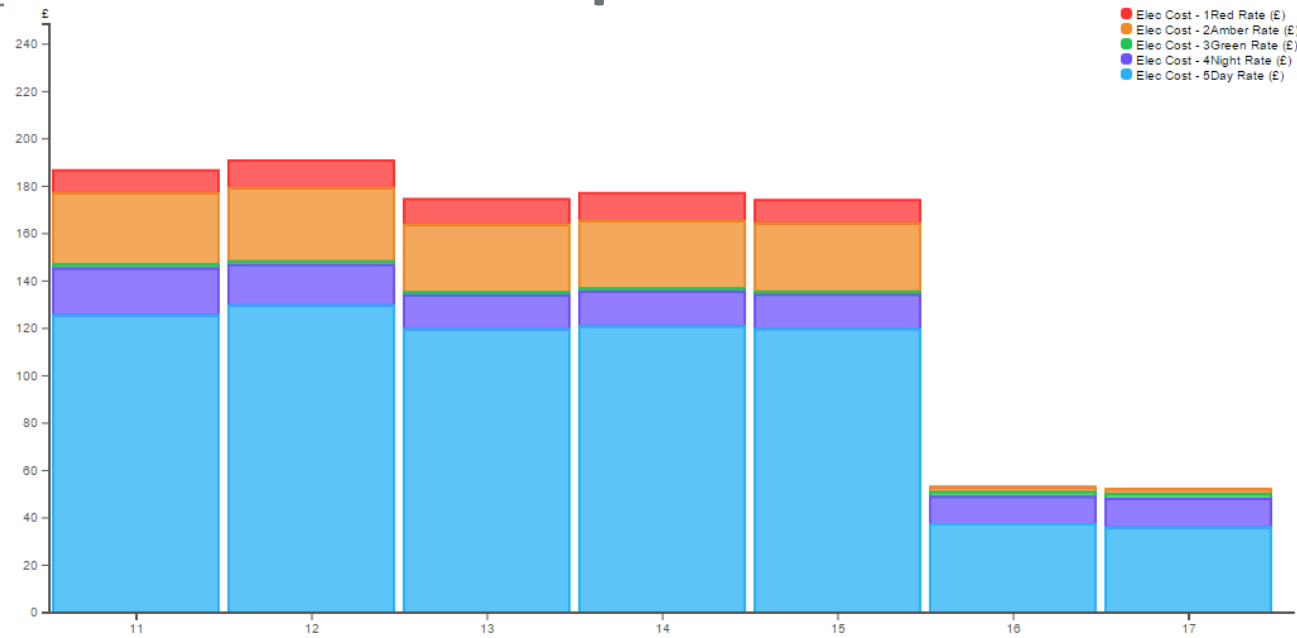
- Red-Amber-Green Tariff Analysis – late afternoon power spike observed
- Spike consistently occurs every weekday between 5-7pm

Data exploration



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

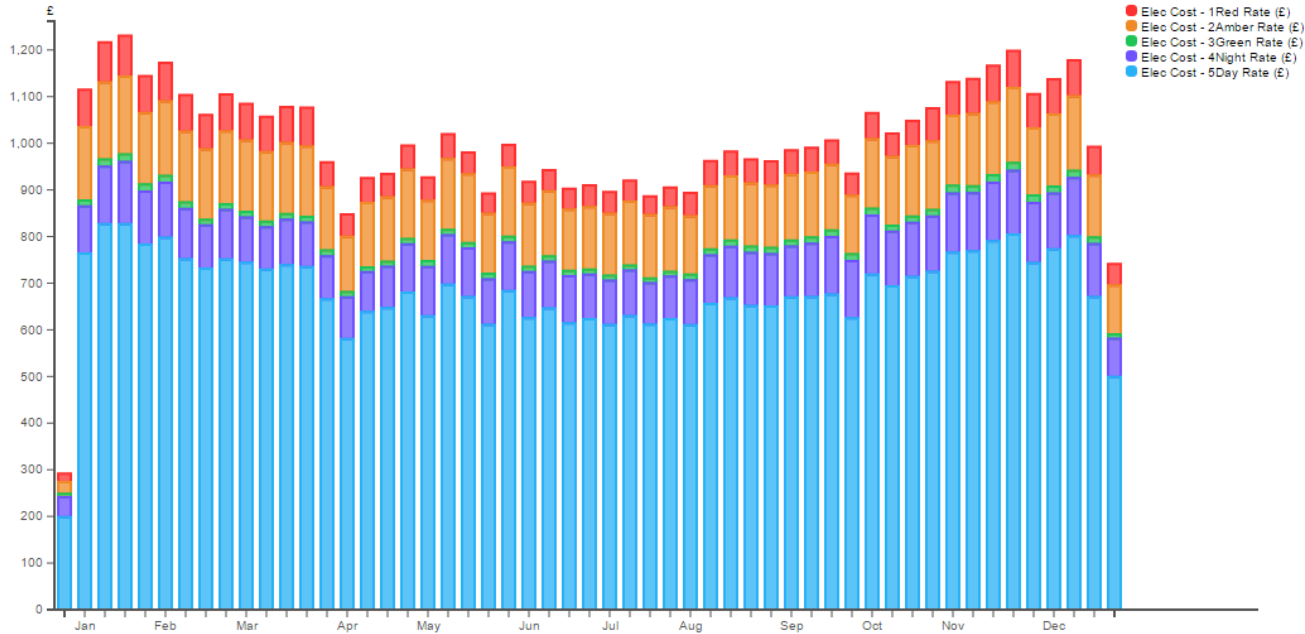
Data exploration



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

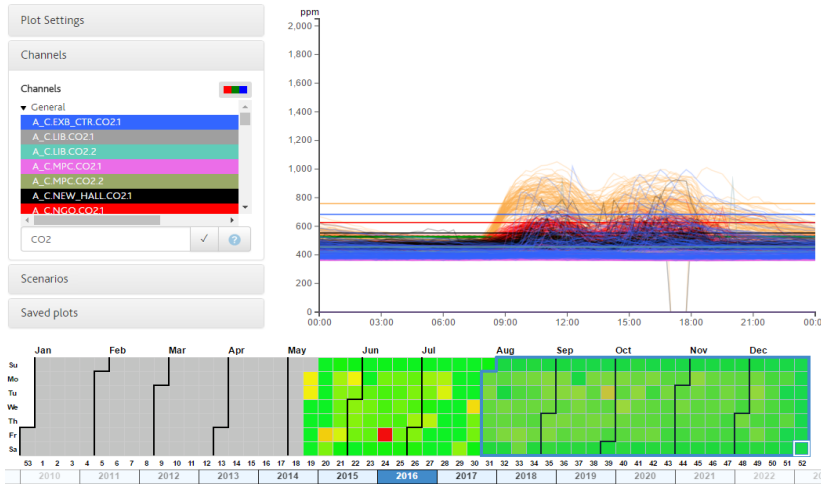
Data exploration

IES

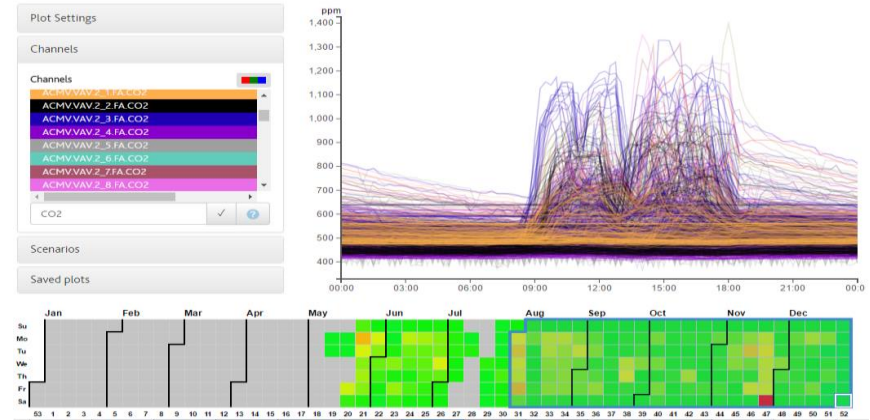


- Total power usage drops through summer as less heating and lighting are needed
- But red tariff charge is consistent throughout full calendar year
- Opportunity for implementation of a demand response strategy

Data exploration



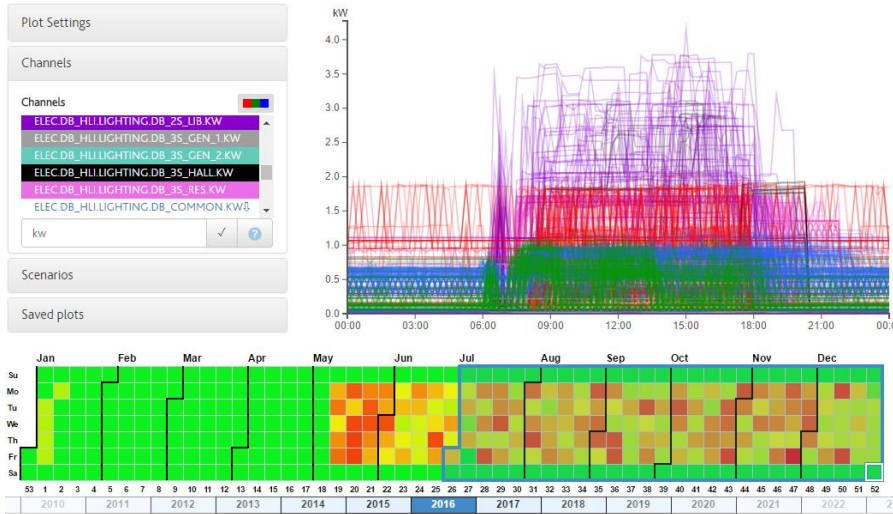
**Potential CO2 sensor issues
(straight lines)**



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

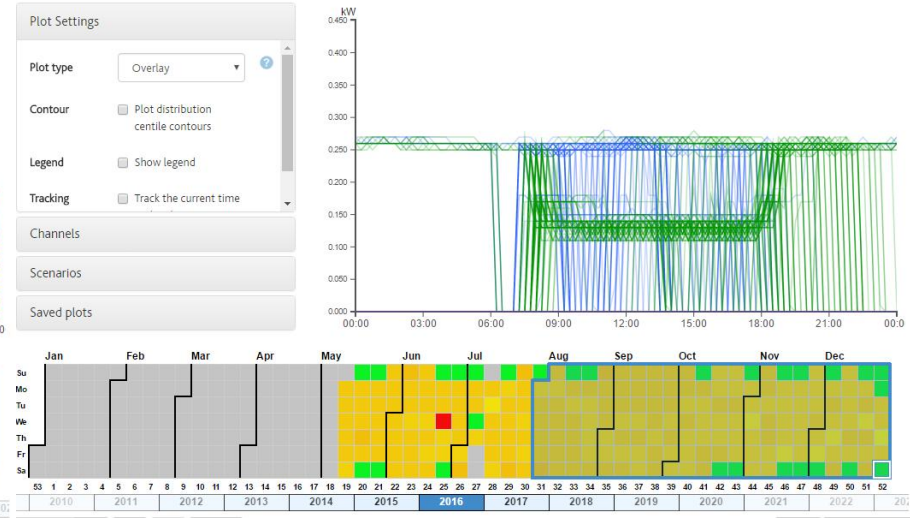
Data exploration

IES



Night-time lighting identified, outside of operating hours

www.iesve.com EUROPE | NORTH AMERICA | ASIA | AUSTRALIA



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

Data exploration

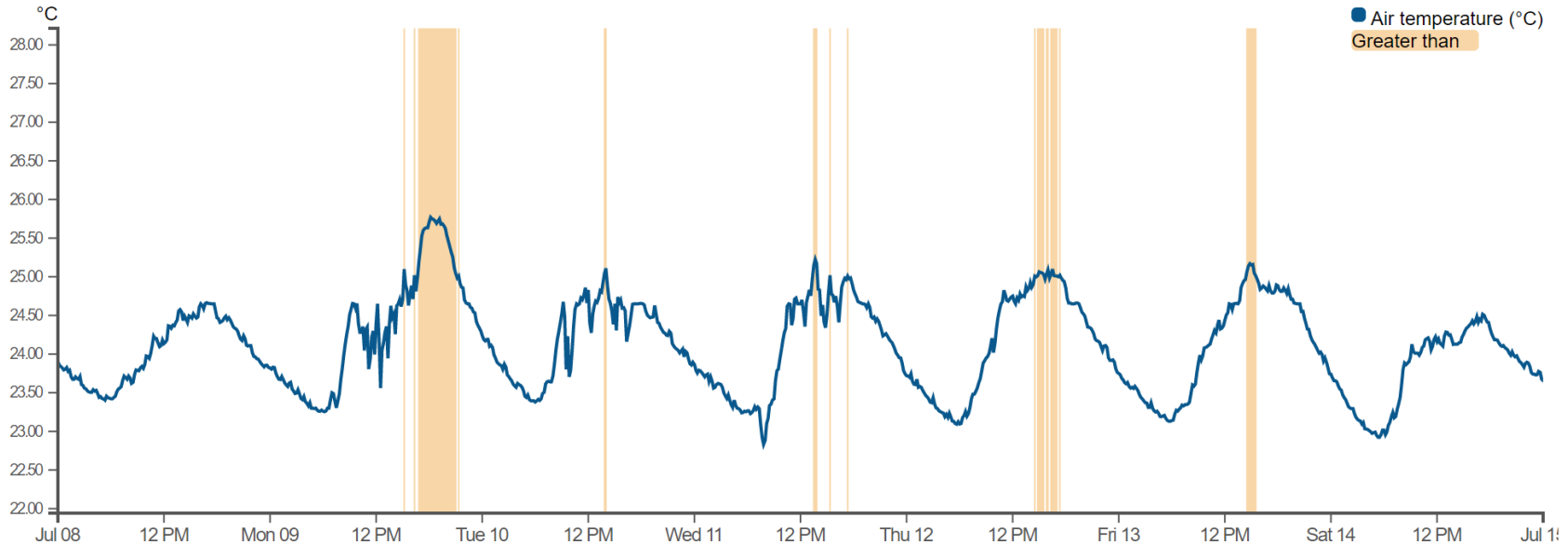
IES

Summary:

🕒 14 matches

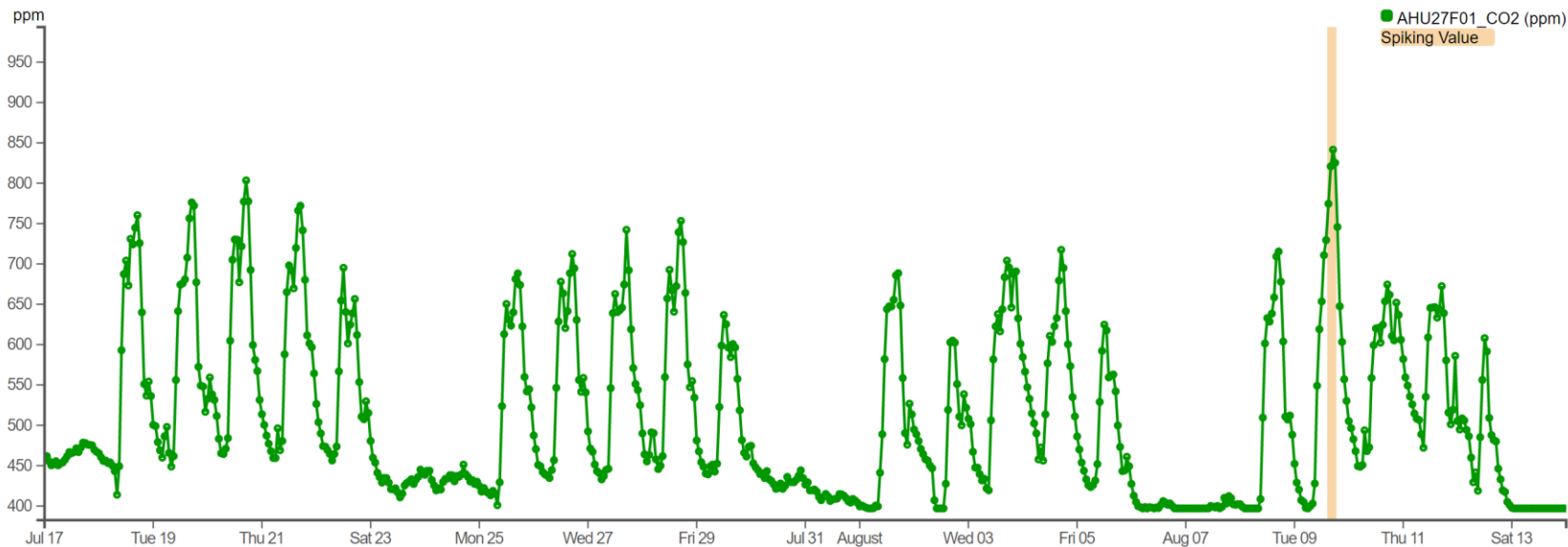
🕒 9.5 hrs

- Values higher than 25



Data exploration

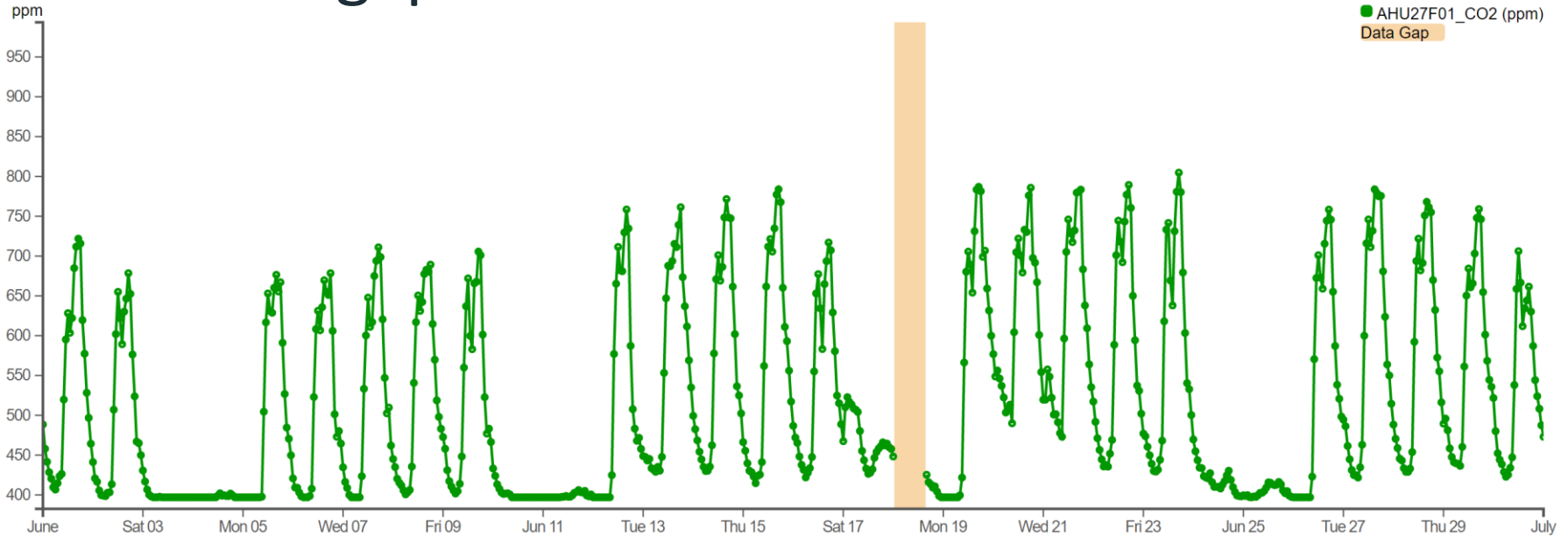
- Detect outliers



Data exploration

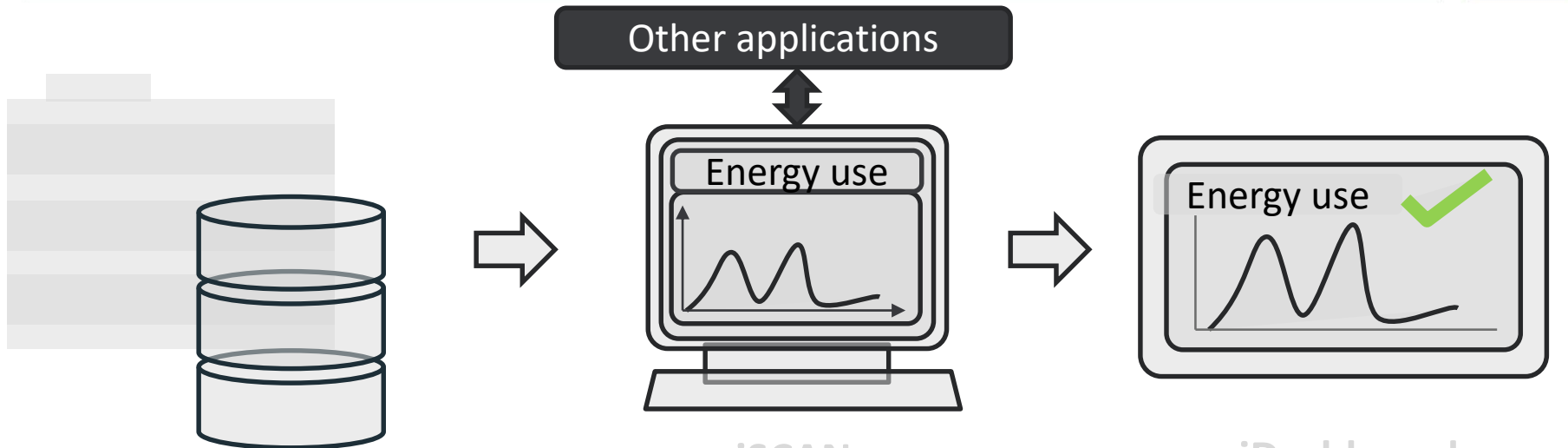
IES

- Detect gaps



The iSCAN & iDashboard solution

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iSCAN

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iDashboard

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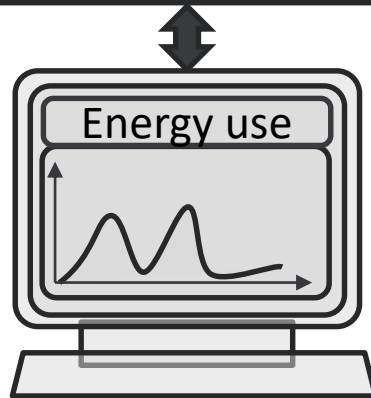


Python

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)

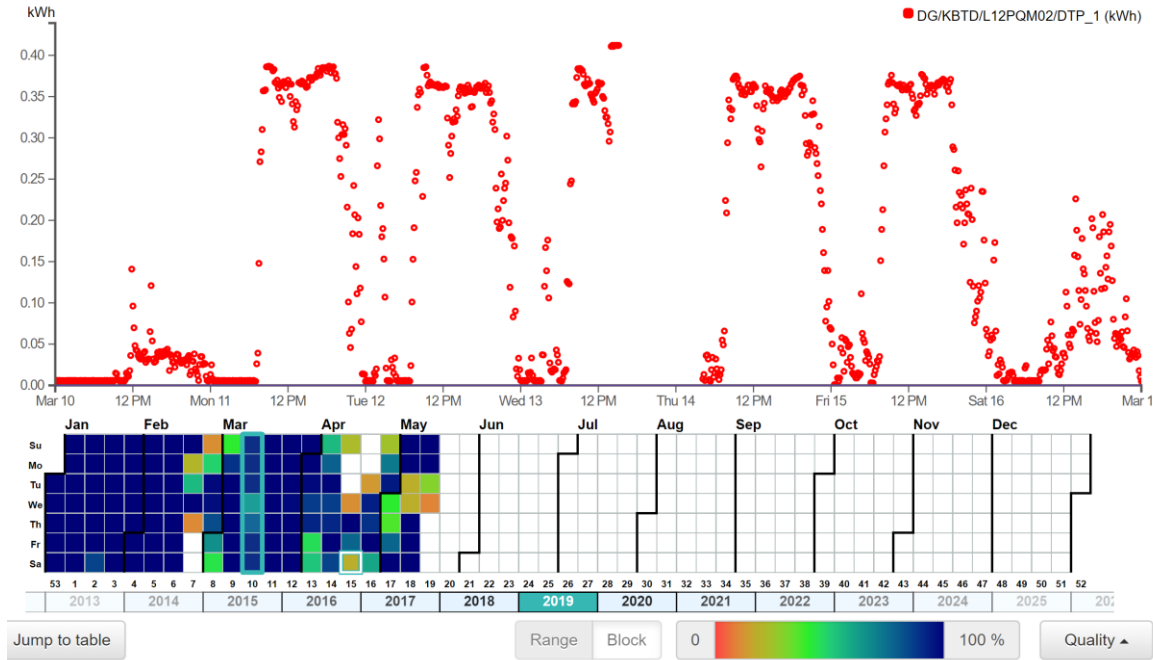


Shared calendars

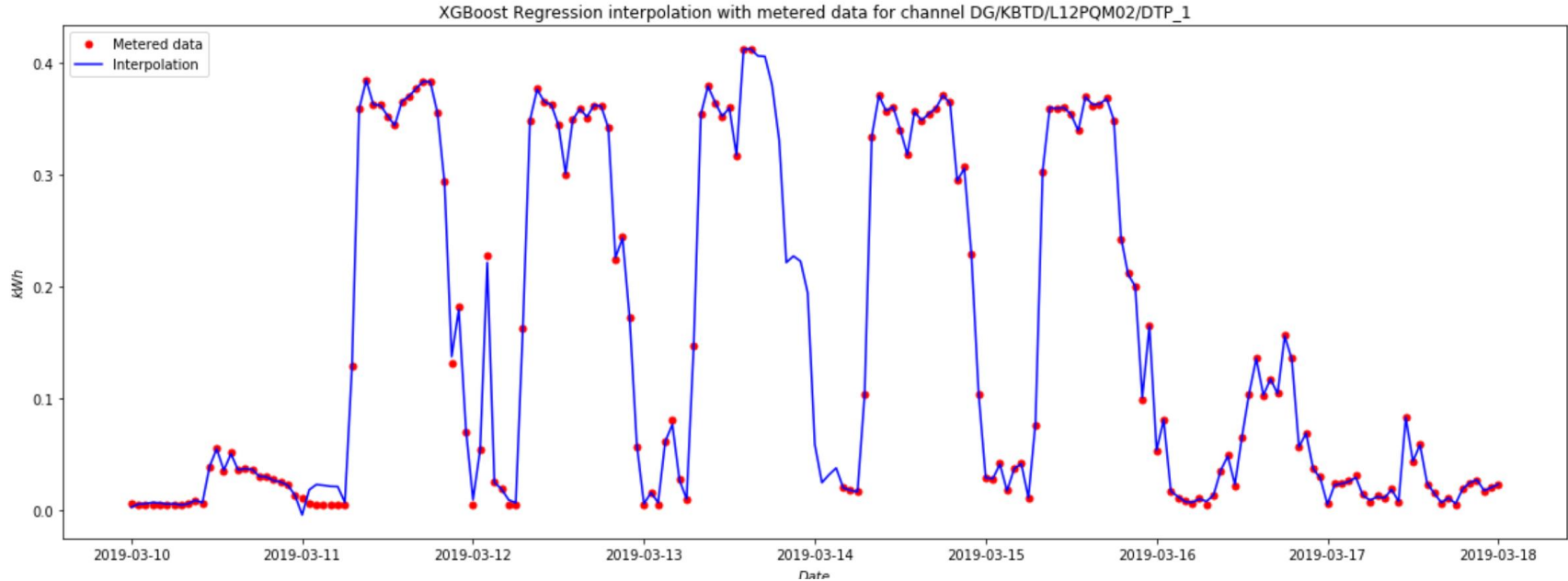
Obtain calendar data
inform of time series for:

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

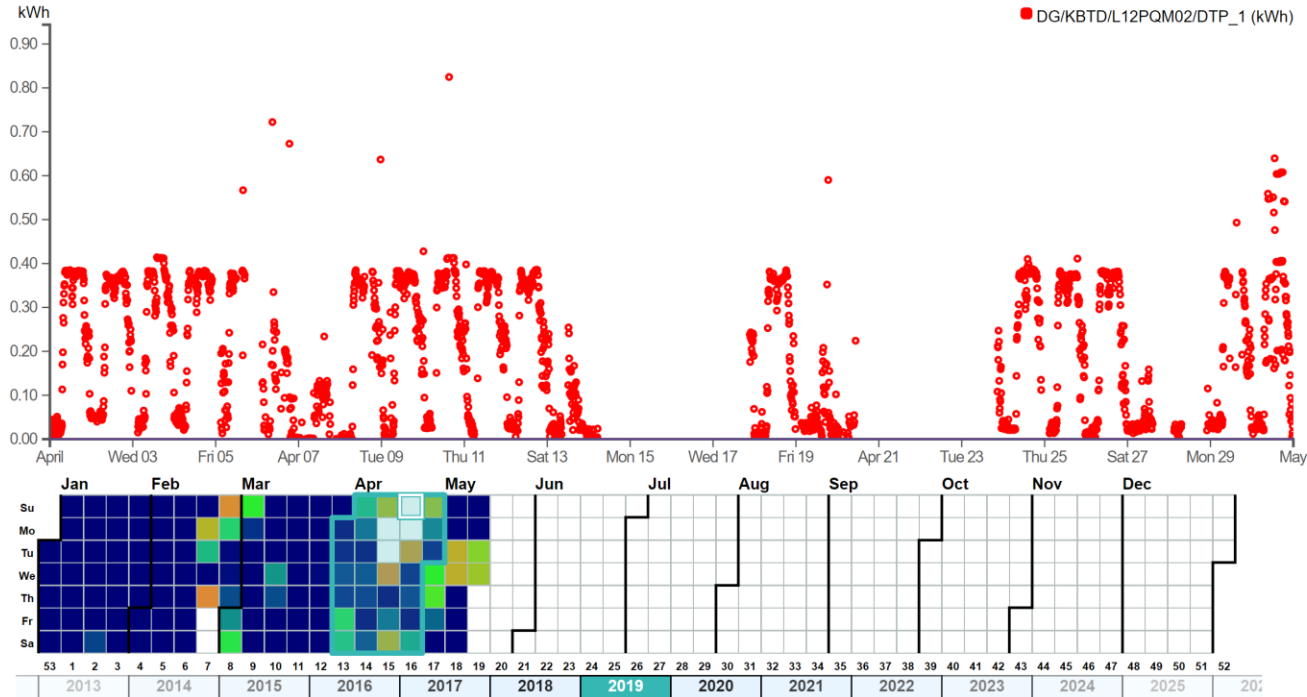
Other applications: interpolation IES



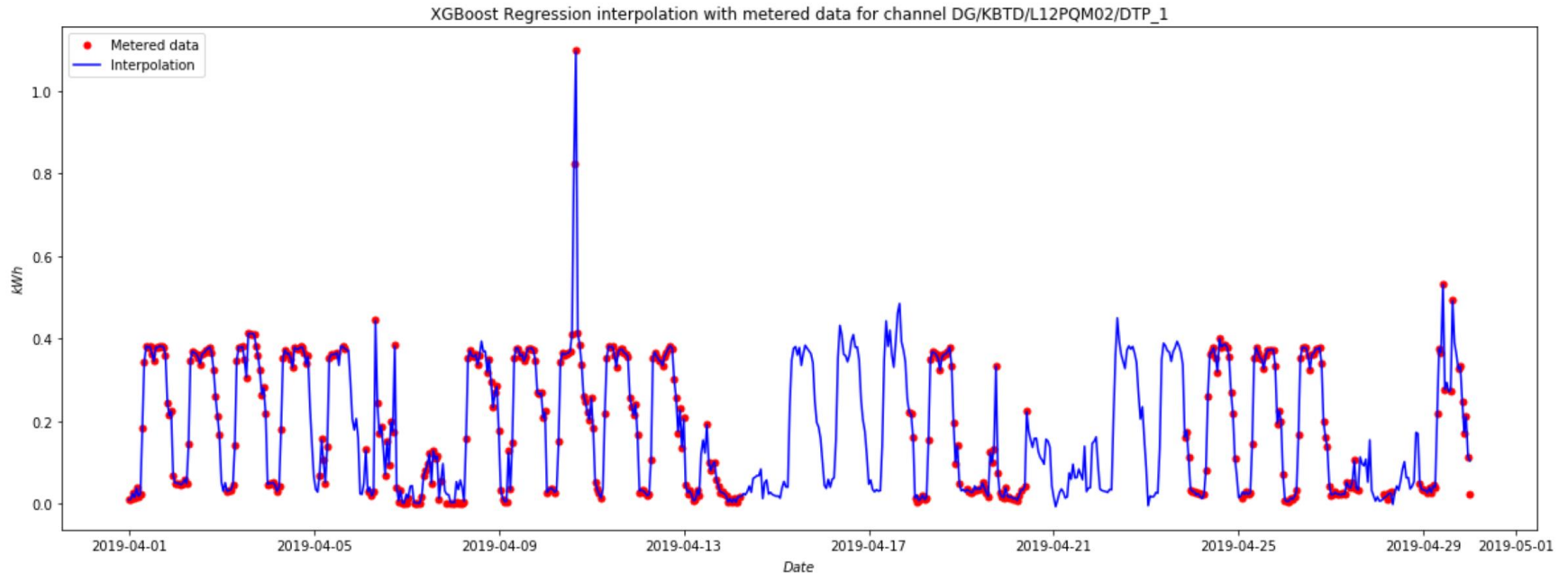
Other applications: interpolation IES



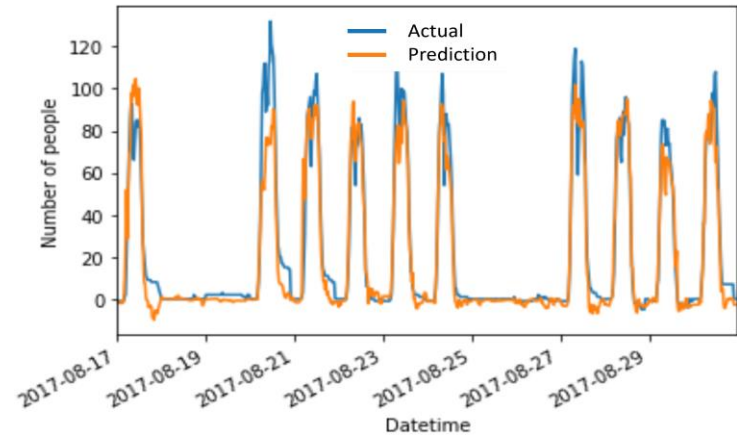
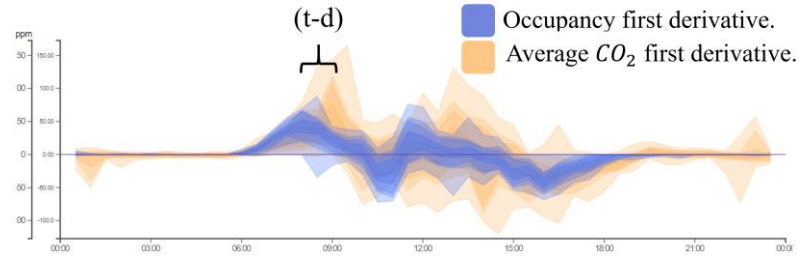
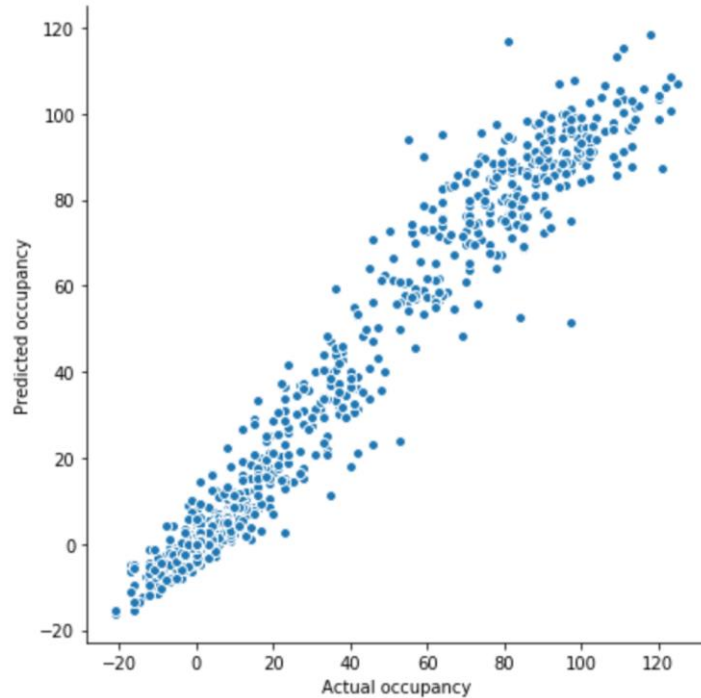
Other applications: interpolation IES



Other applications: interpolation IES



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



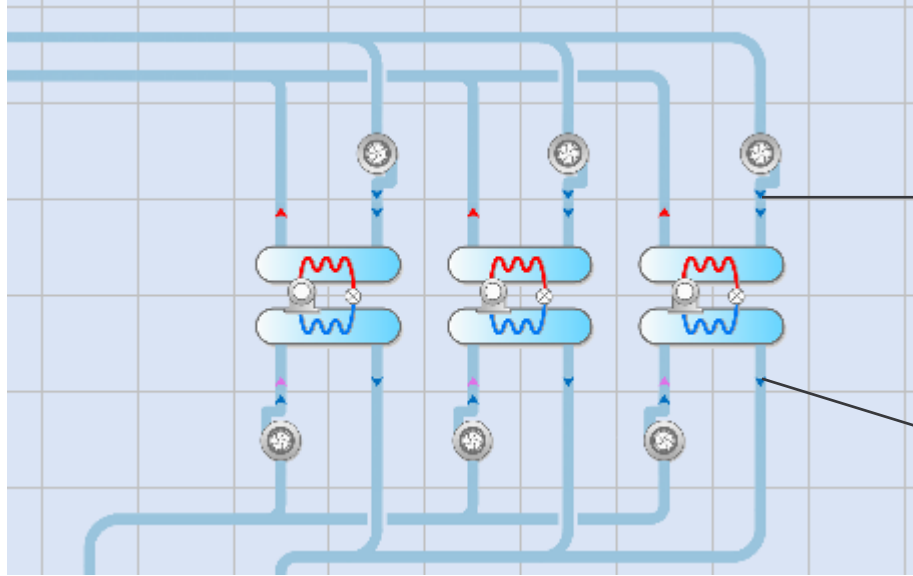
Condenser water to/from cooling towers

- [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

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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

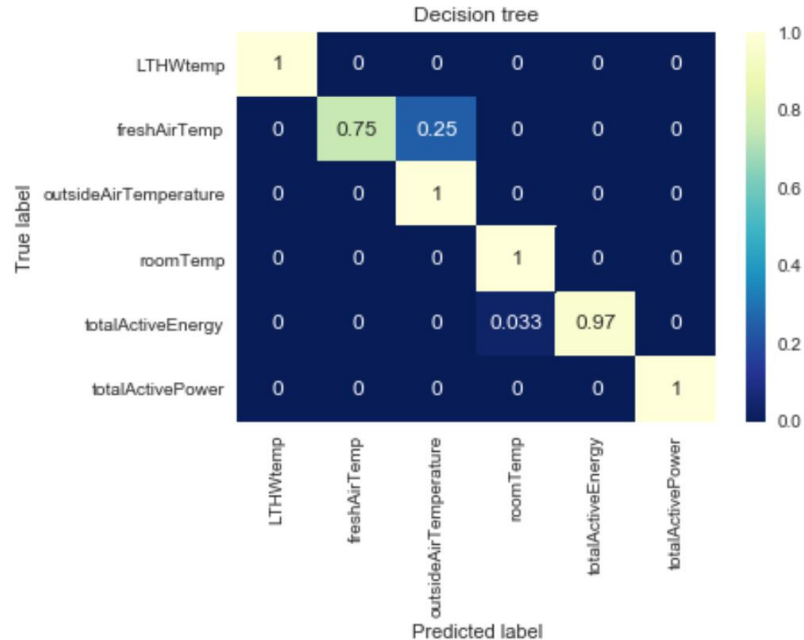
«Please choose a tag» ▼

Tag value

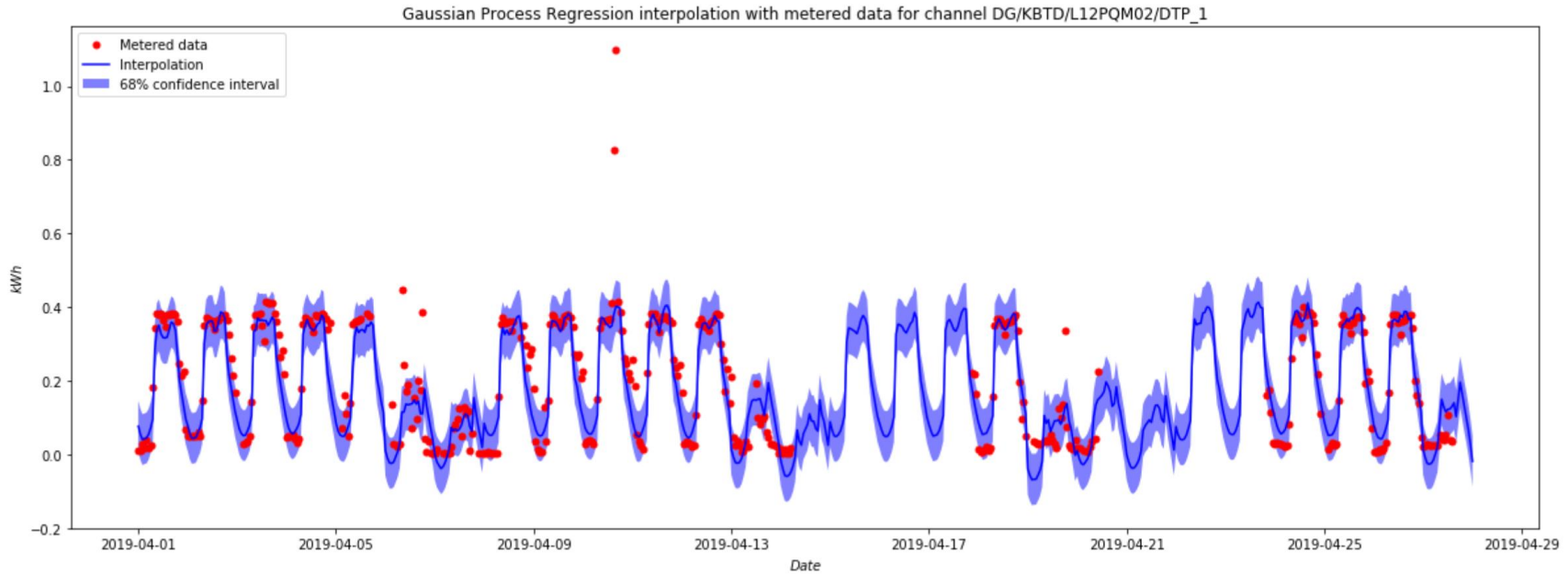
Add Tag

Other applications: Tags

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

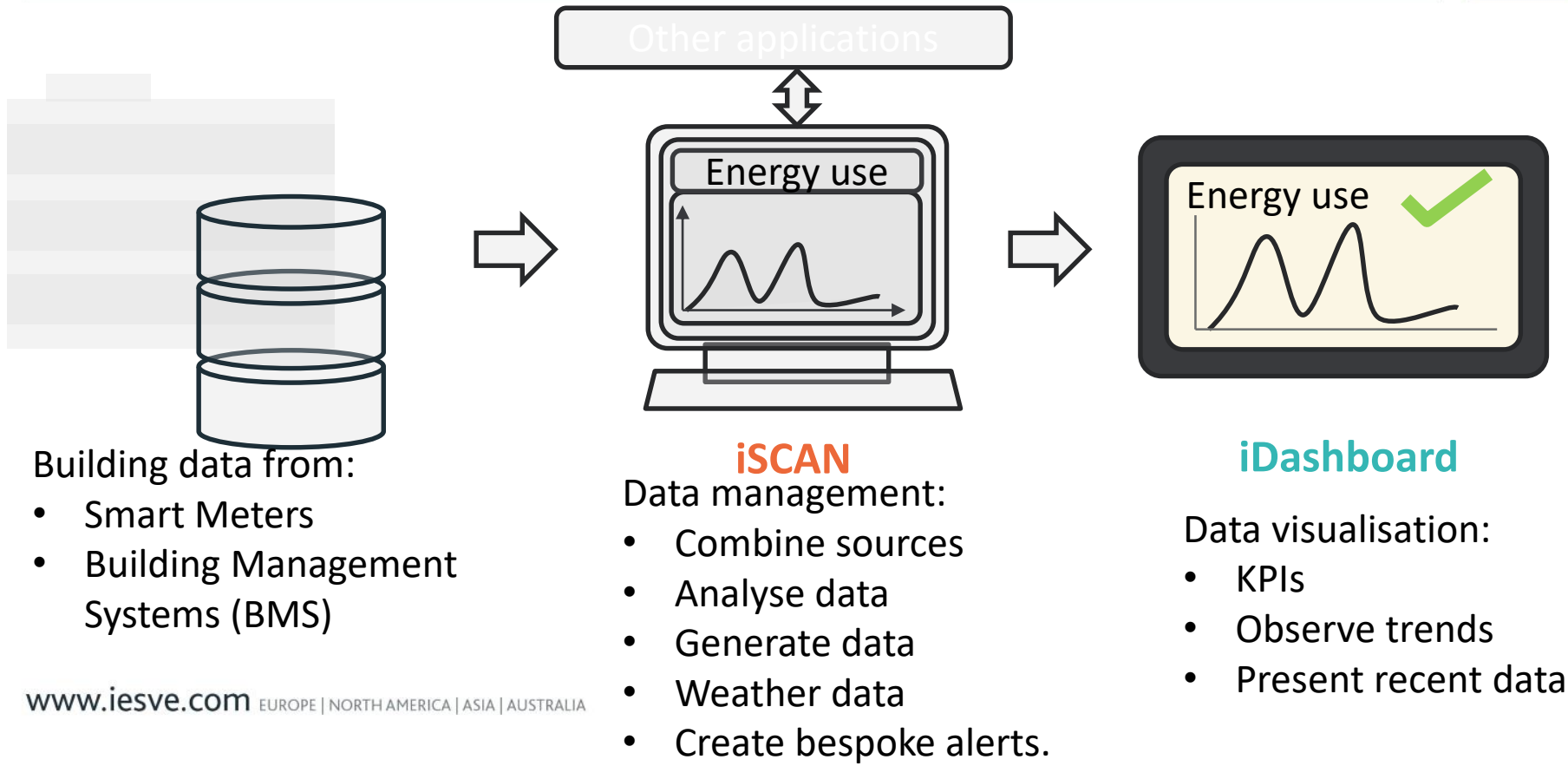


Other applications: anomalies



The iSCAN & iDashboard solution

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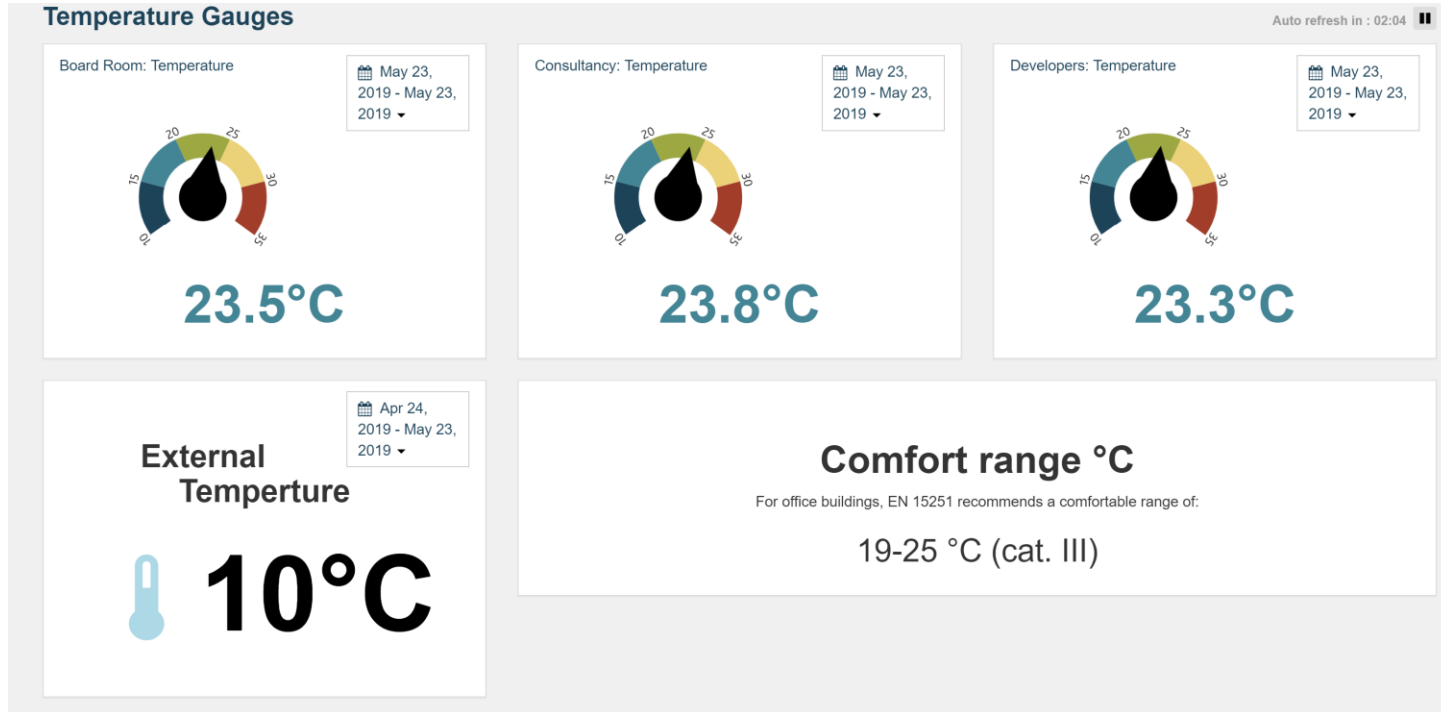
Example – Helix building

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Example 1 – Helix building

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Example 1 – Helix building

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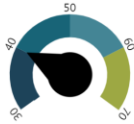
Relative Humidity

○○●○

Auto refresh in : 02:47

Developers: Relative Humidity

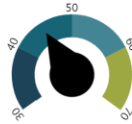
May 23, 2019
- May 23, 2019 ▼



40.0%

Board room: Relative Humidity

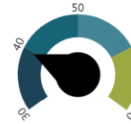
May 23, 2019
- May 23, 2019 ▼



45.0%

Consultancy: Relative Humidity

May 23, 2019
- May 23, 2019 ▼



39.7%

Wind Speed

Apr 24, 2019 -
May 23, 2019 ▼

0.55 m/s

RH range

Comfort range RH

A comfortable range of relative humidity is:

30-70%

Values outside this range can lead to Sick Building Syndrome. In particular high values can lead to moulding issues.

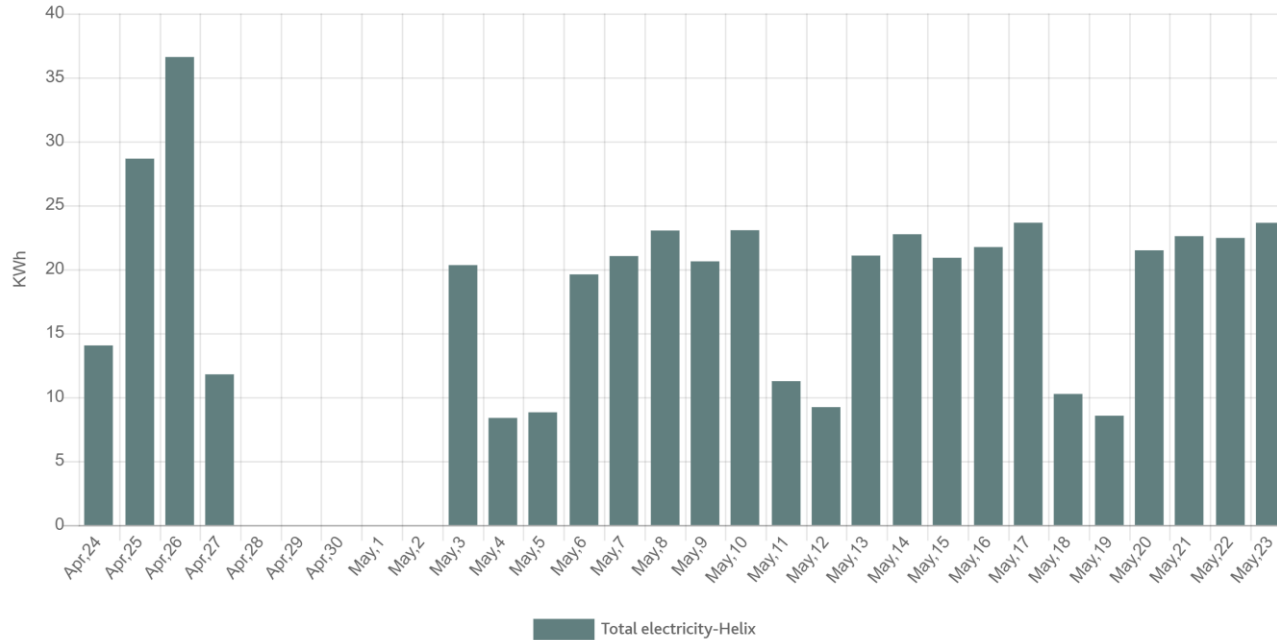
© Integrated Environmental Solutions Ltd. 2019

Example 1 – Helix building

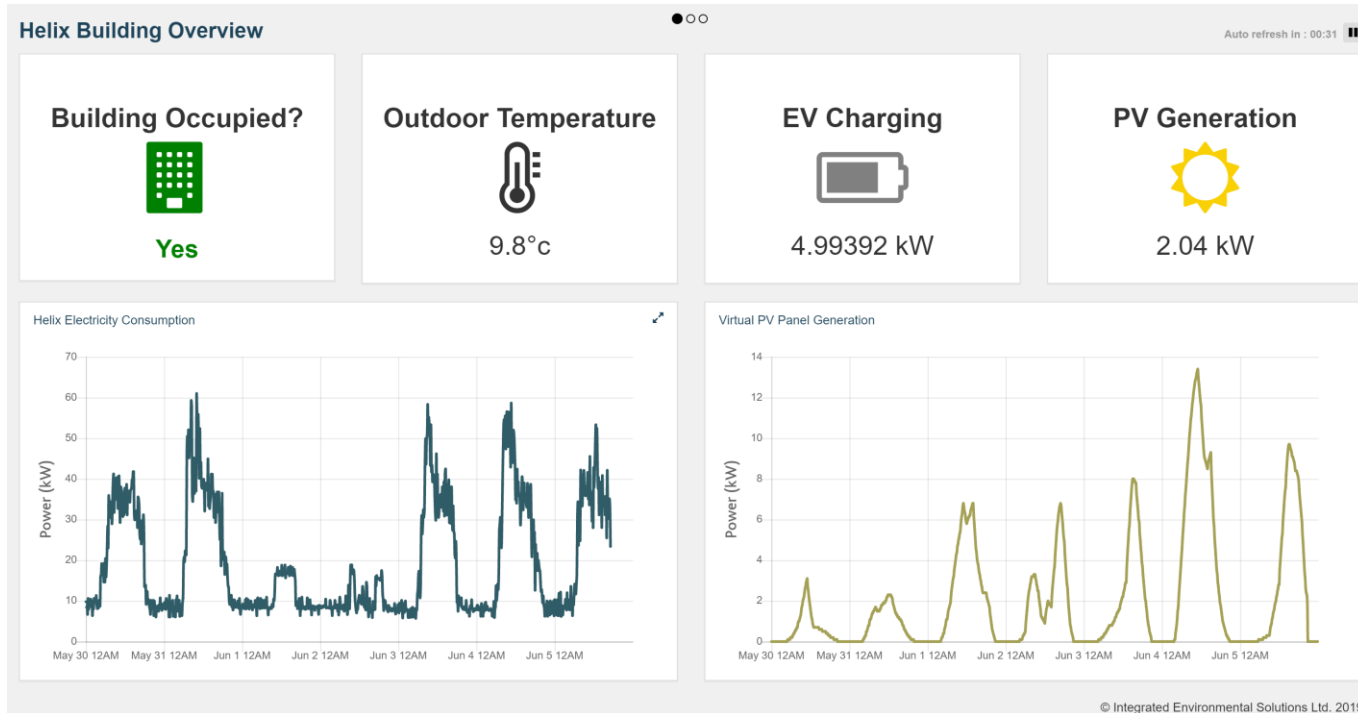
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Energy consumption

Apr 24, 2019 - May 23, 2019 ▾

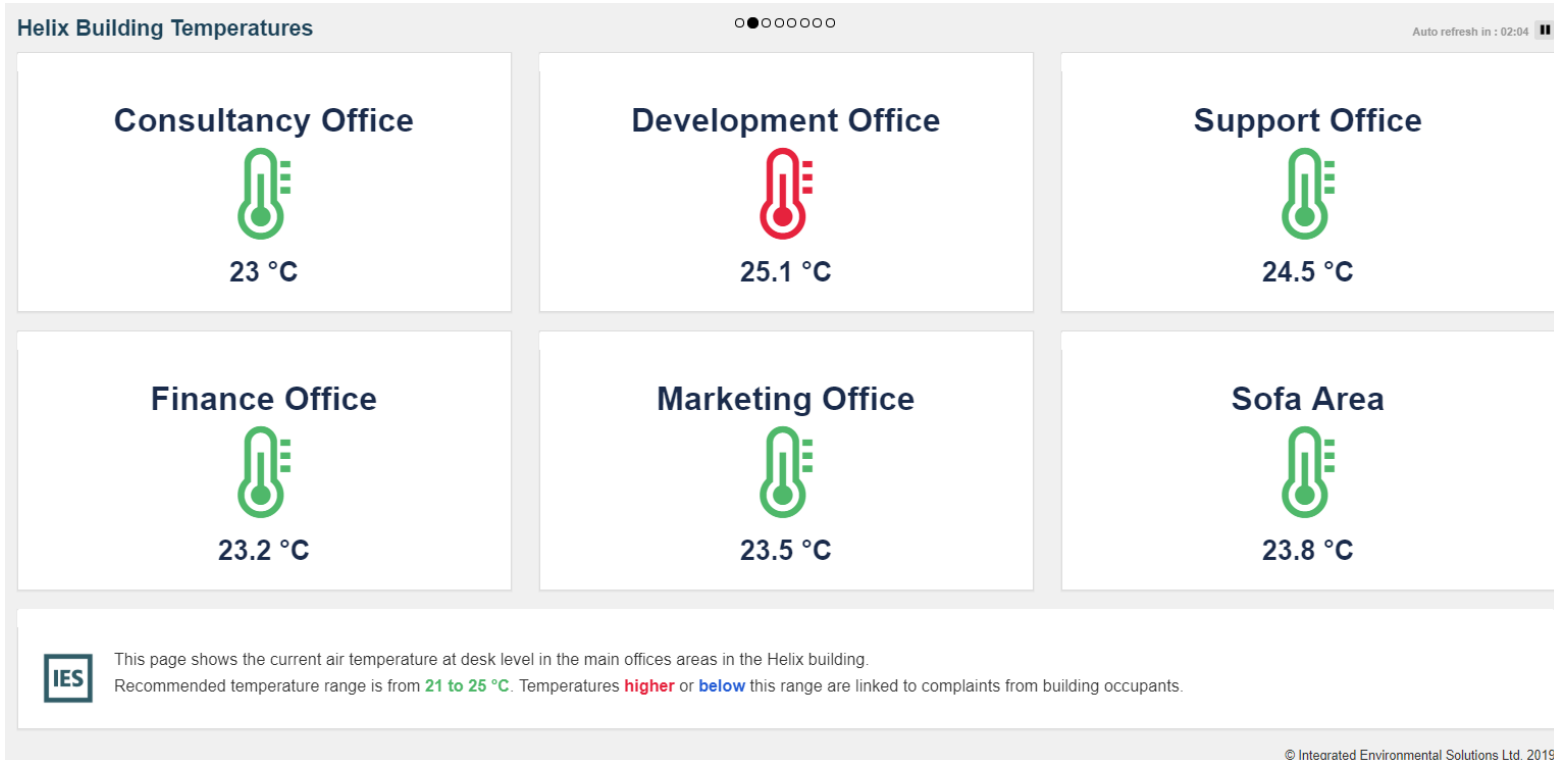


Example 2 – Helix building

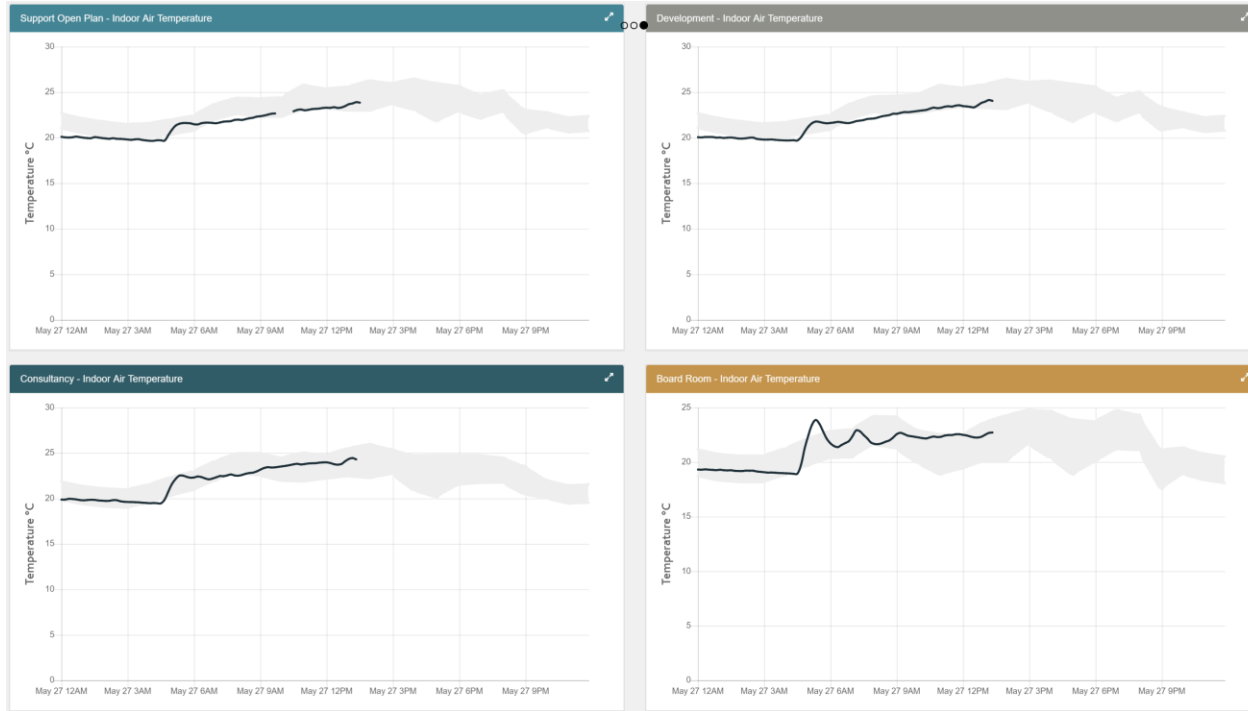


Example 2 – Helix building

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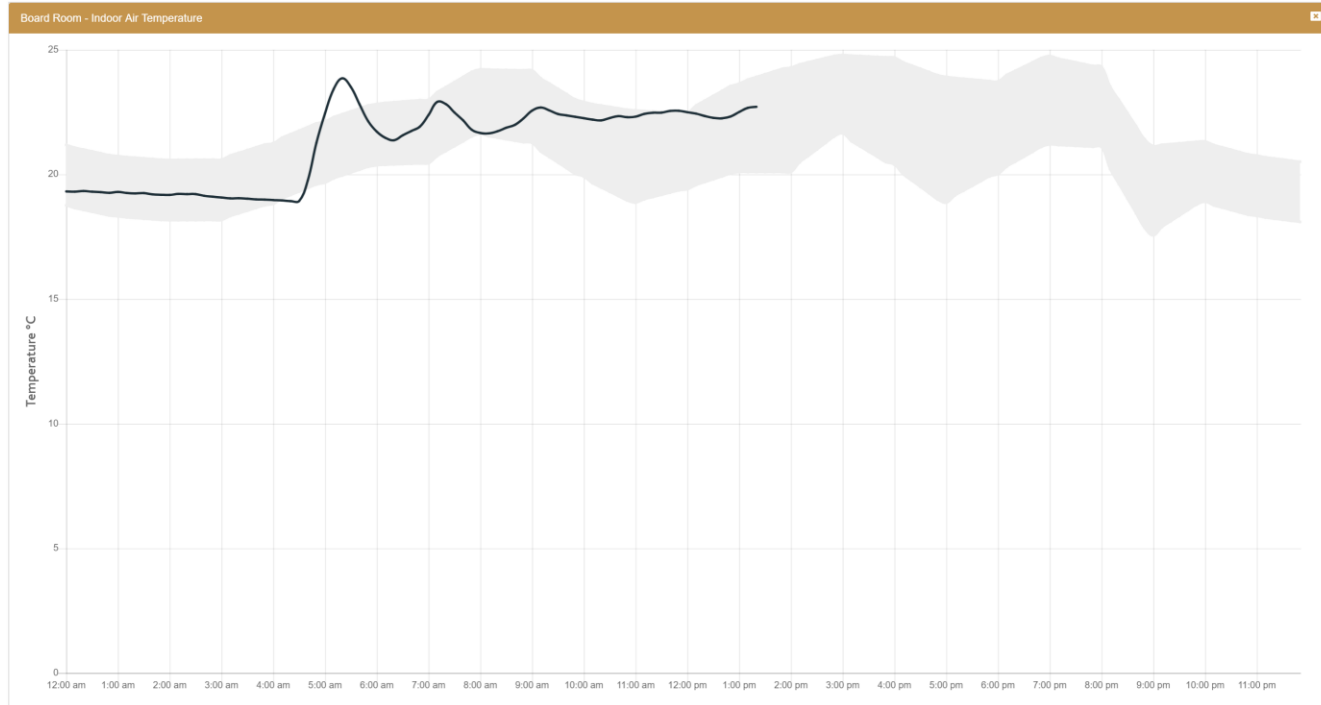


Example 2 – Helix building



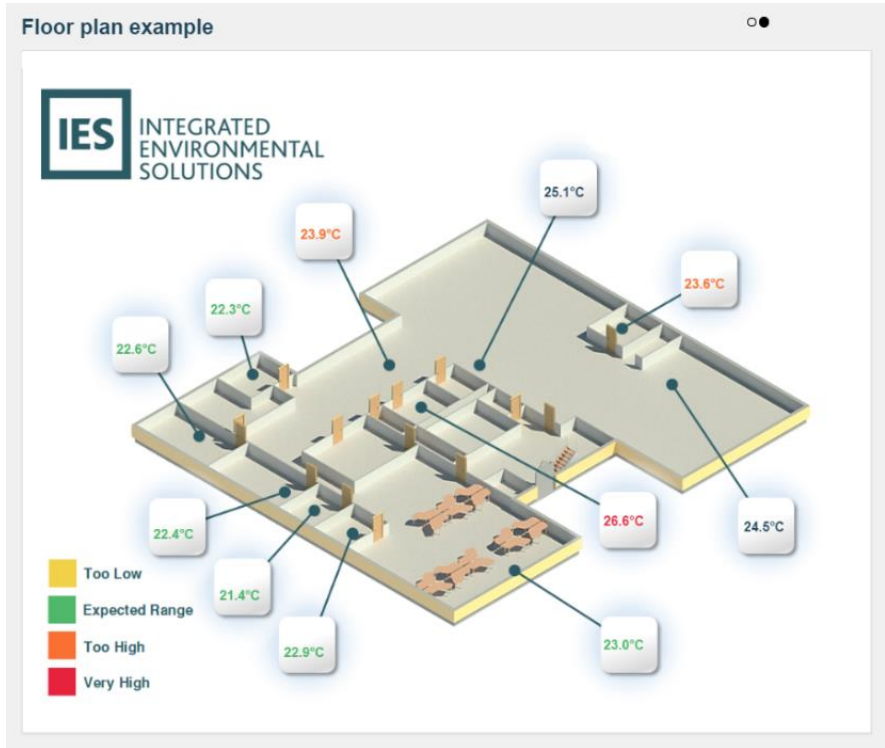
Example 2 – Helix building

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Example 2 – Floor plan

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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.