



# iSCAN and iDashboards Overview

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# Workshop part 1 - Overview

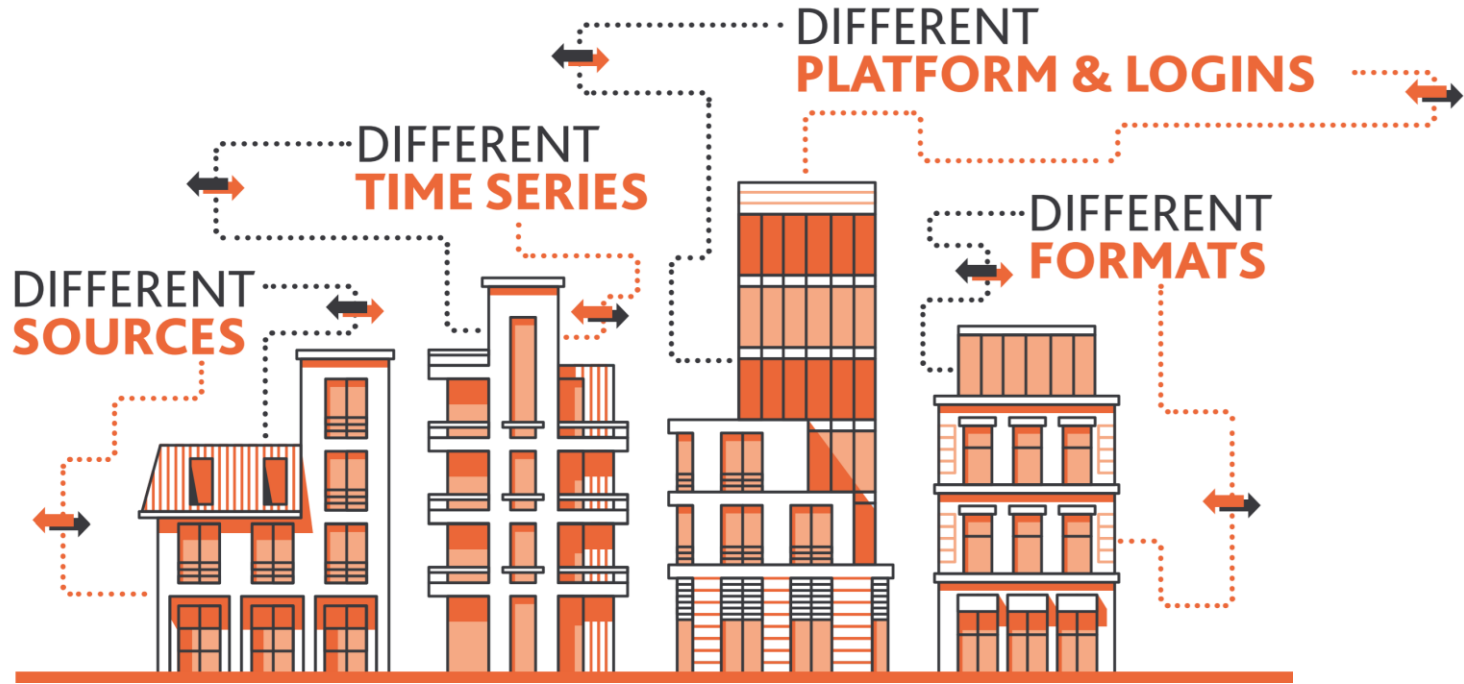
## iSCAN & iDashboard solution overview

# Workshop part 1 - Content

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

# The problem



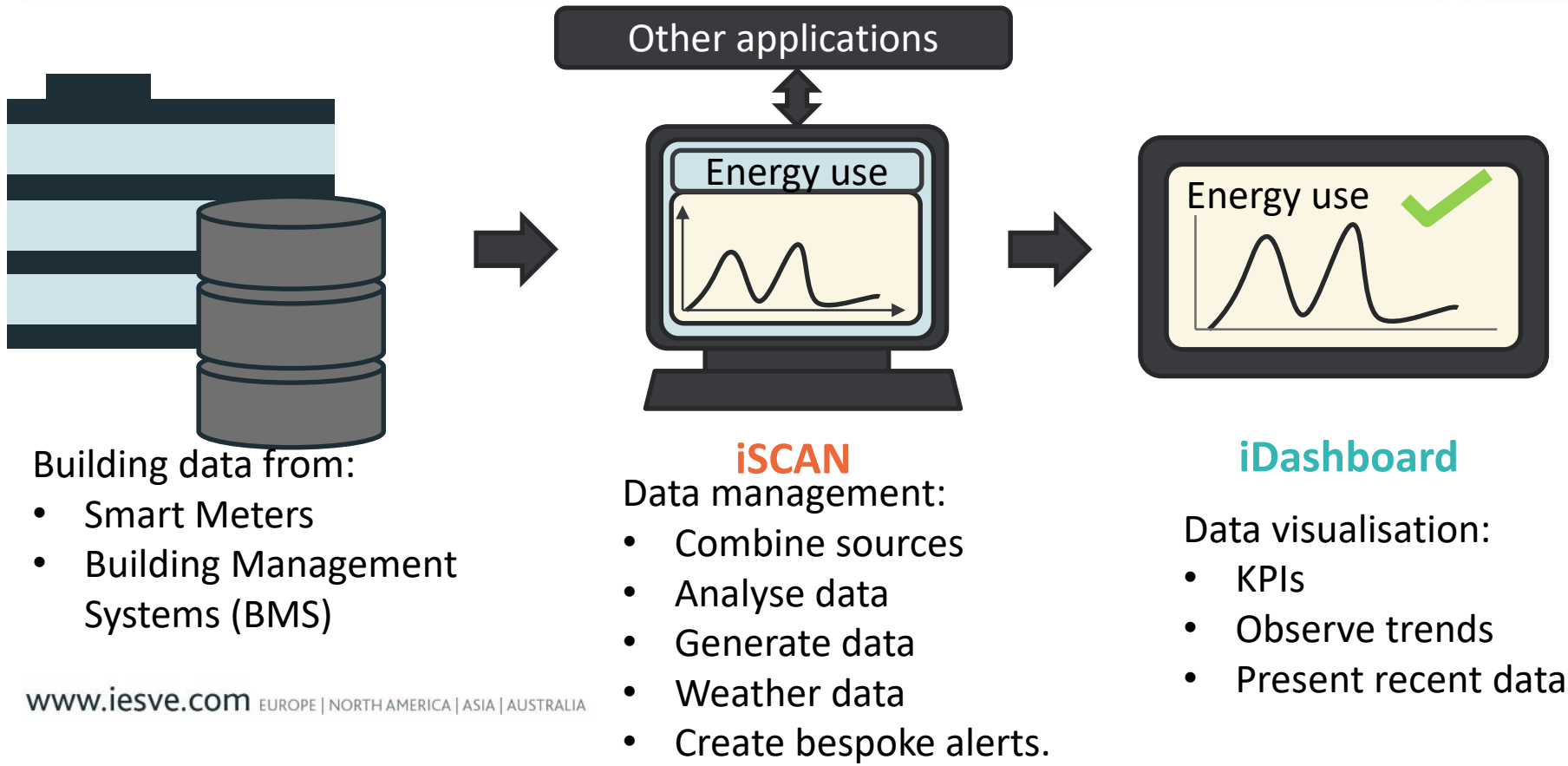
# The problem

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

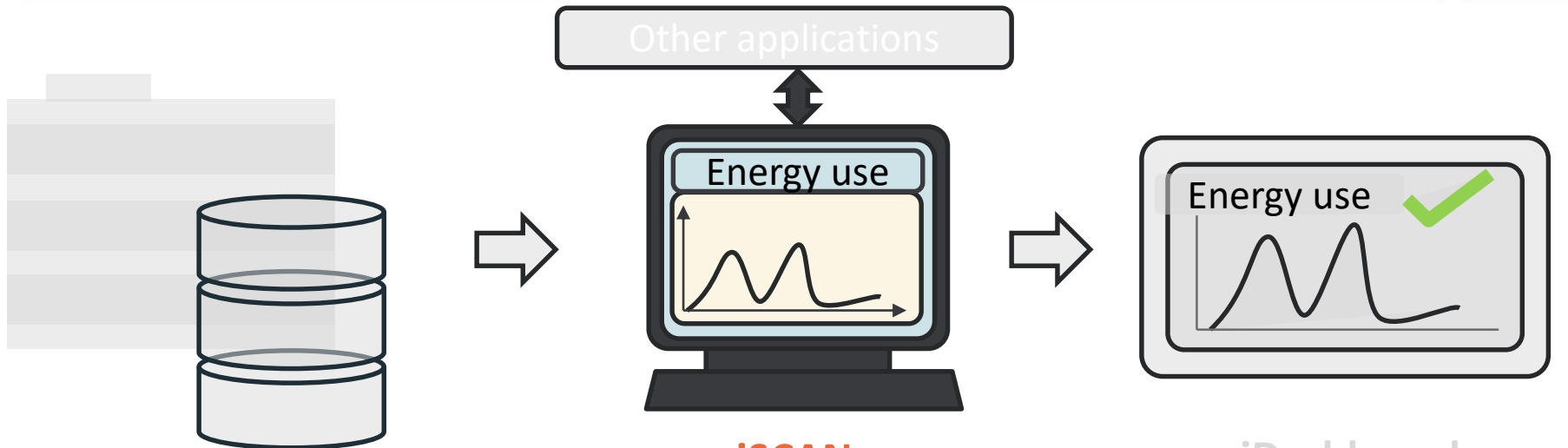
# The iSCAN & iDashboard solution

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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.

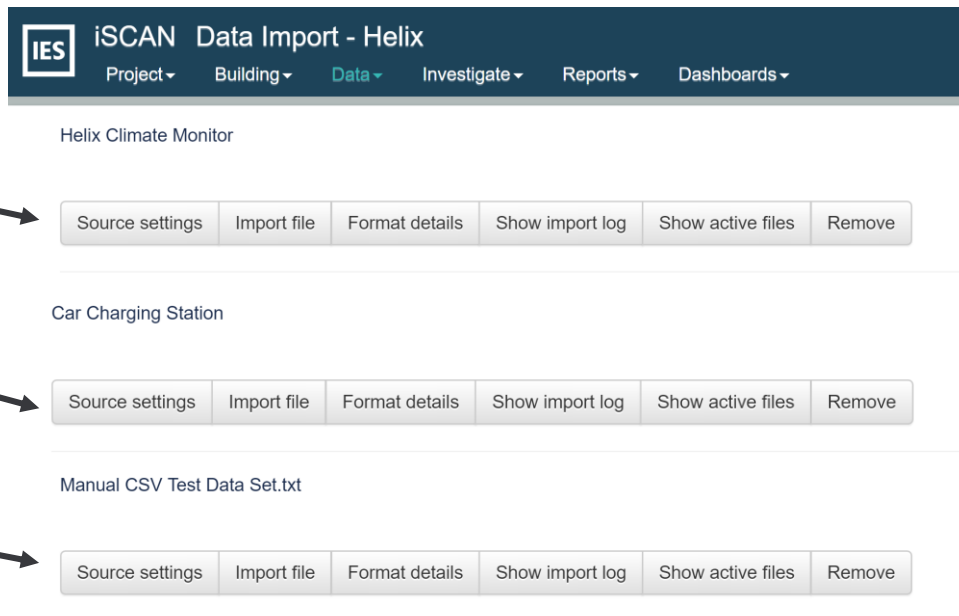
## iDashboard

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)

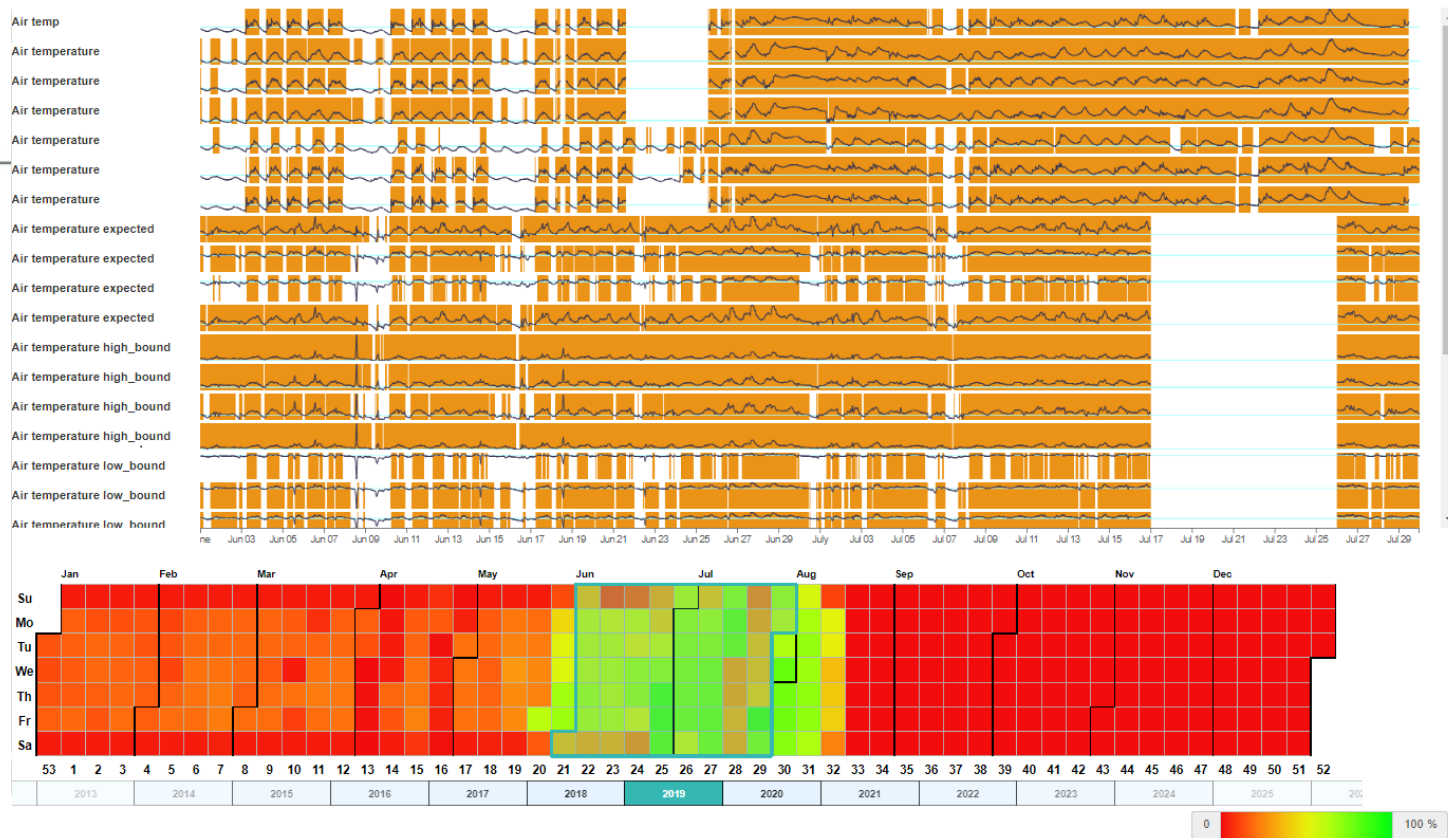
Profile

Profile name

# The iSCAN & iDashboard solution

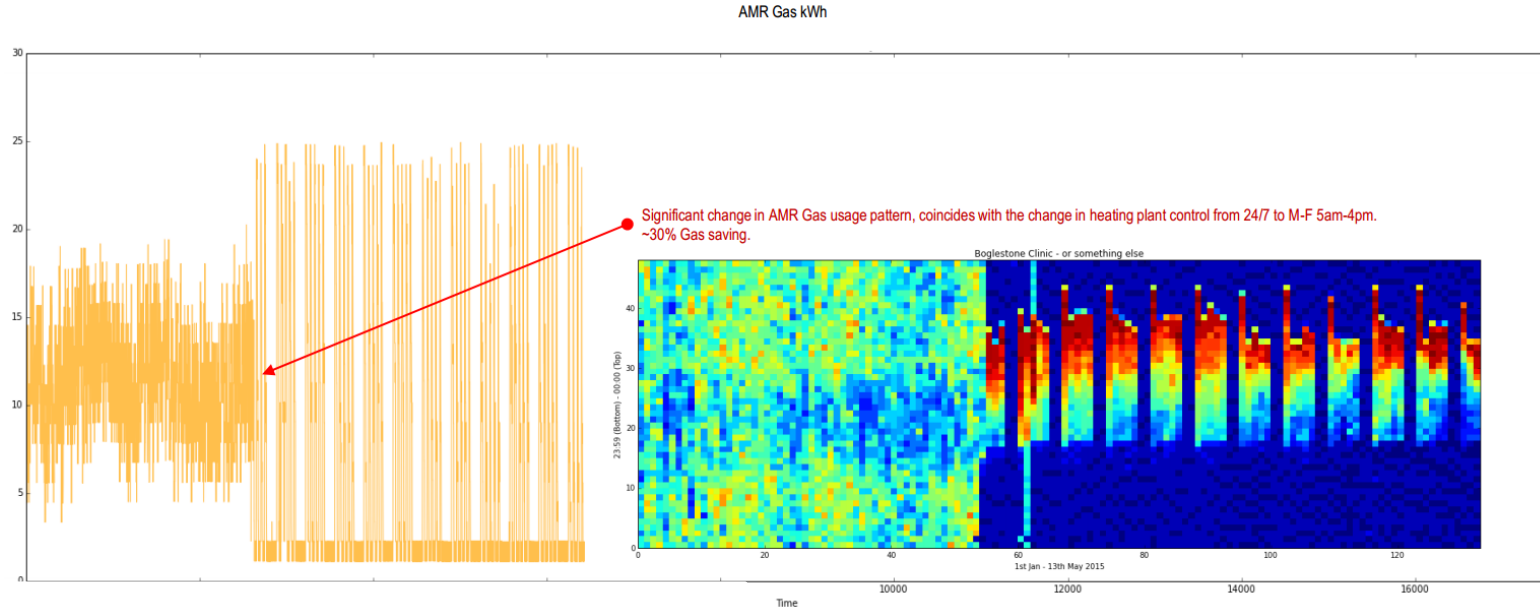
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- Data exploration



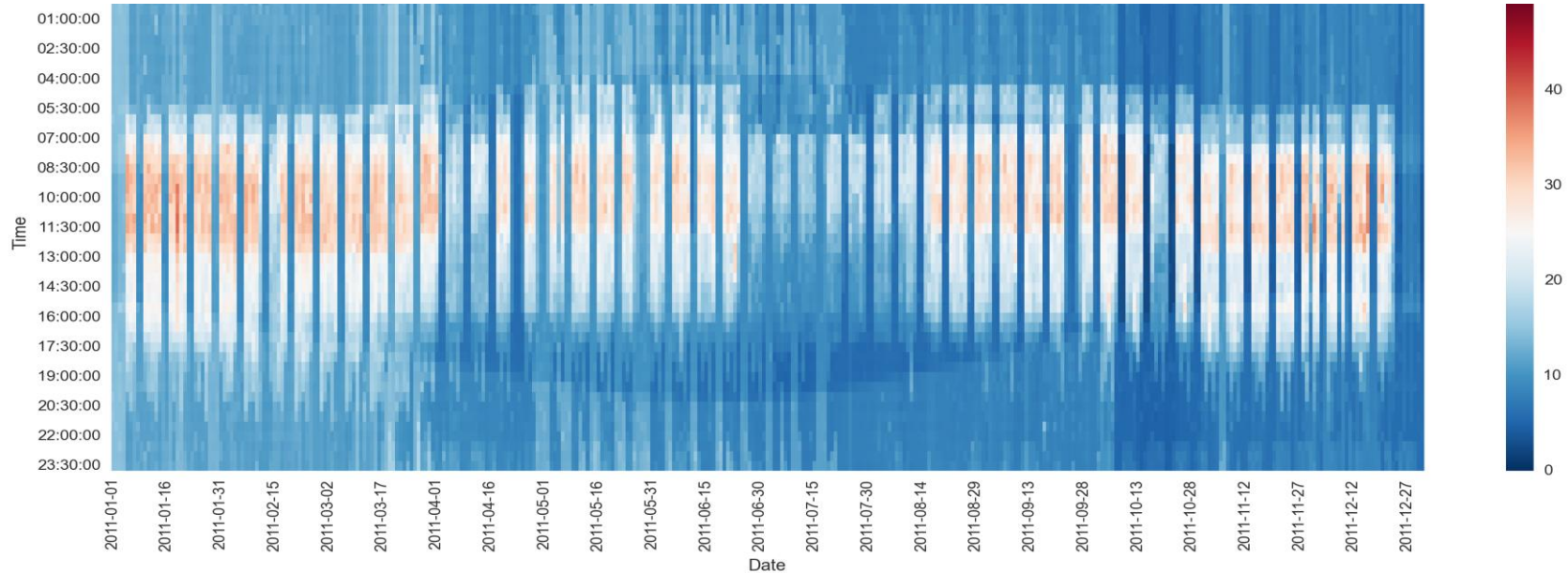
- Data Quality trend lines used to track data quality of all measured points
- Rogue controllers can be identified and fixed/replaced

# Data exploration



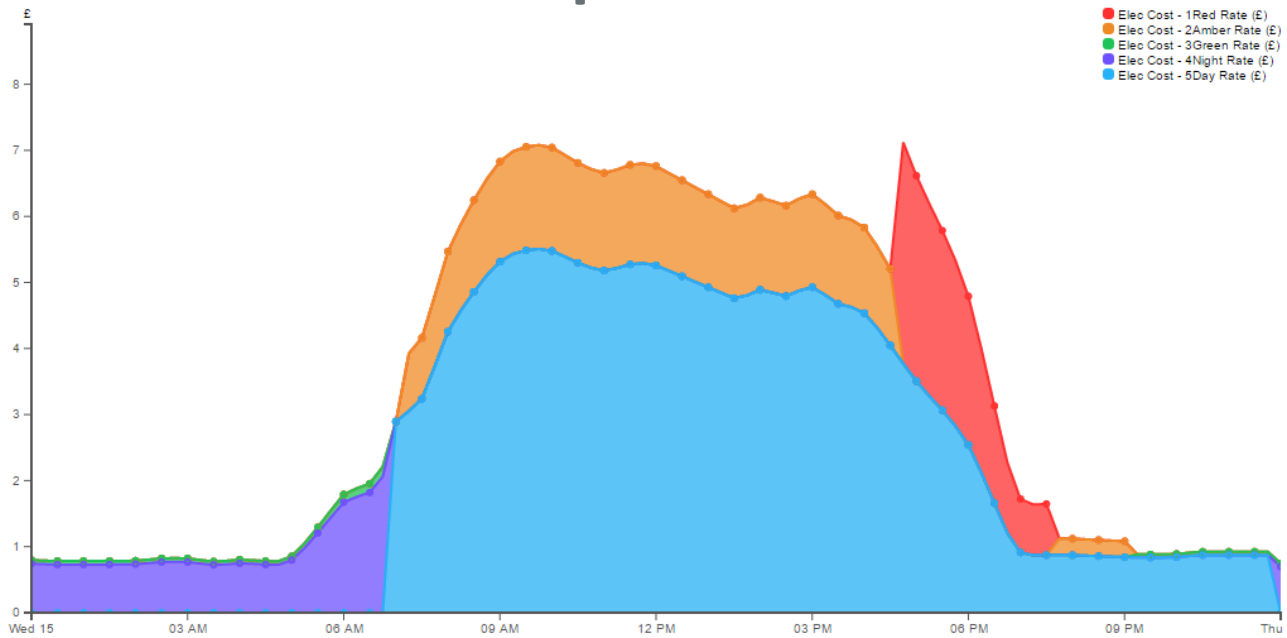
- 6-months performance tracking of LTHW boiler flow temperature – varying start/stop times observed

# Data exploration



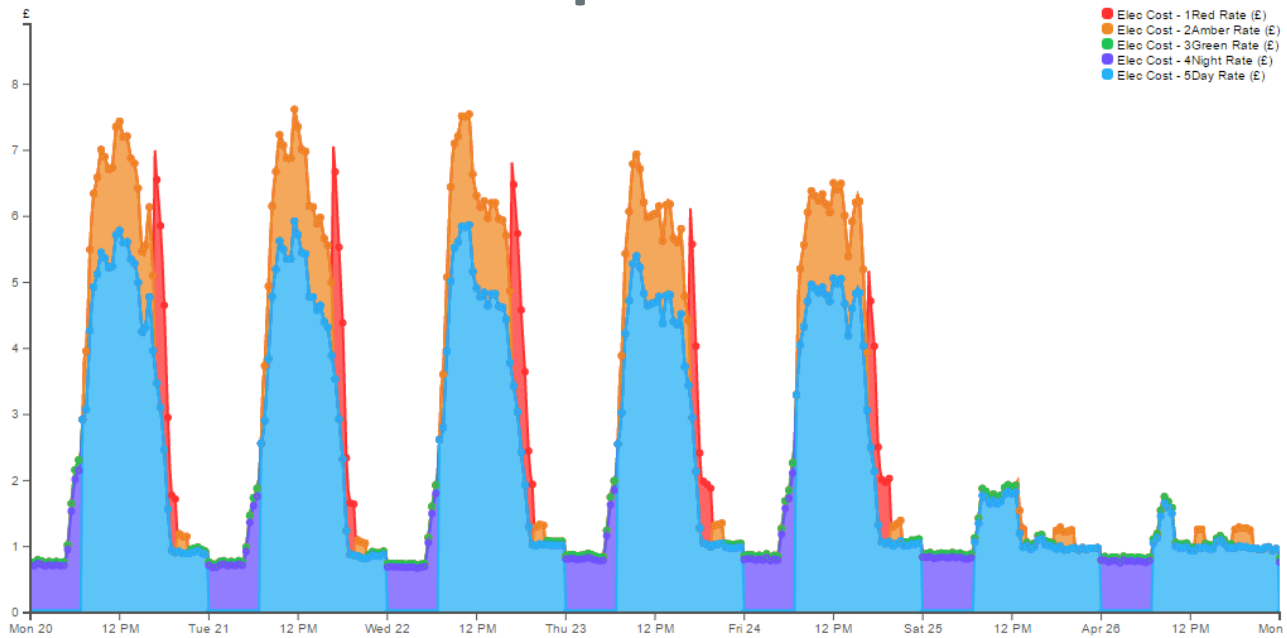
- Heatmap plots used to visualise annual performance at 30-min resolution
- Changing patterns of energy use observed – indicating performance drift

# Data exploration



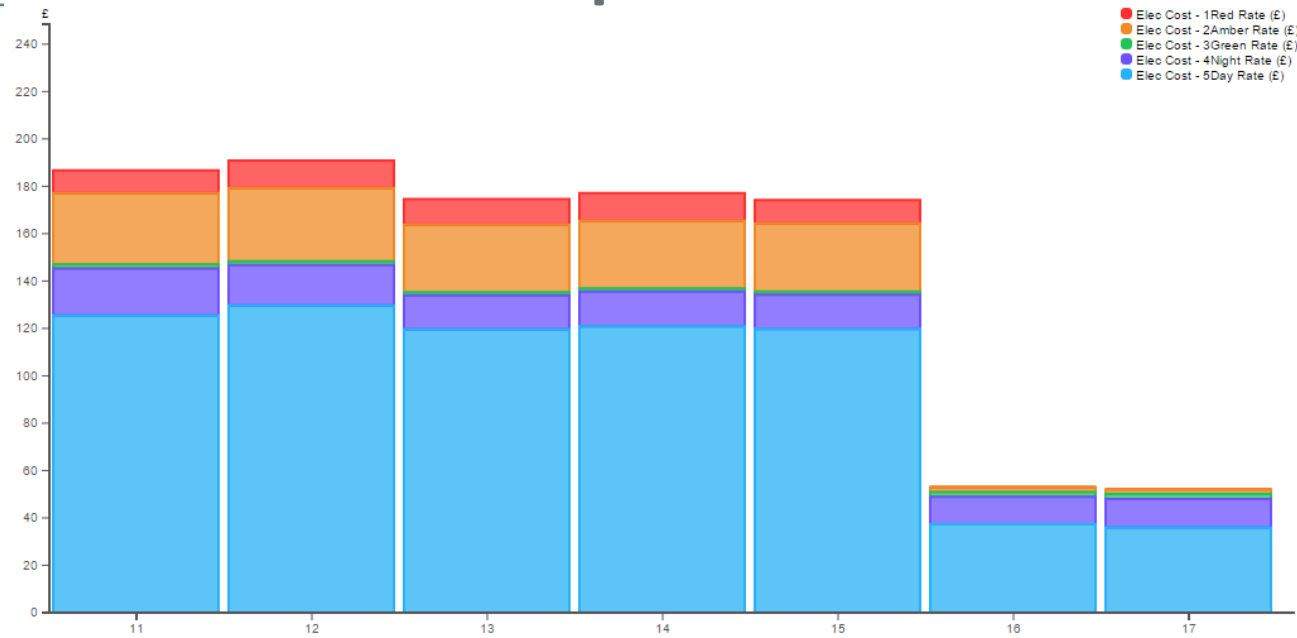
- Red-Amber-Green Tarriff Analysis – late afternoon power spike observed
- Spike consistently occurs every weekday between 5-7pm

# Data exploration



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

# Data exploration

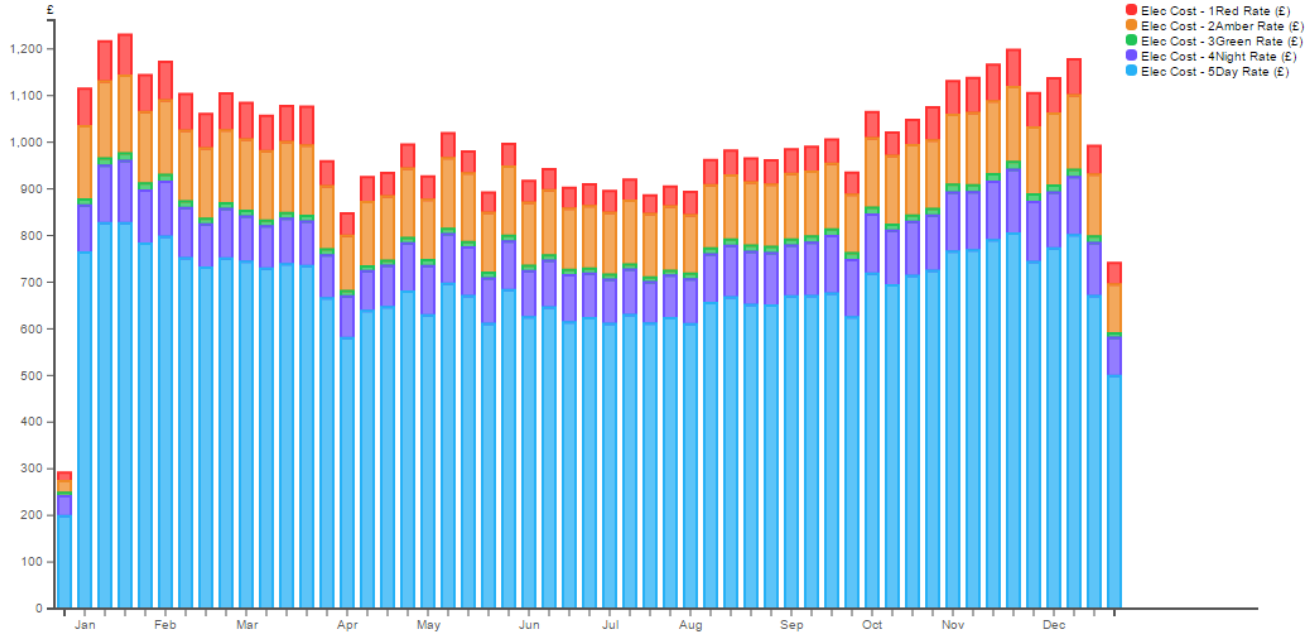


- Red tariff spike does not occur at weekends – as observed in 7-day power profile



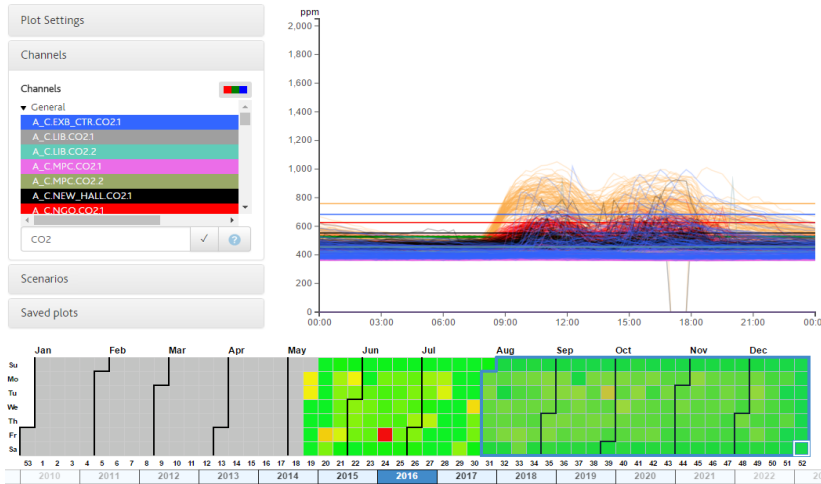
# Data exploration

IES

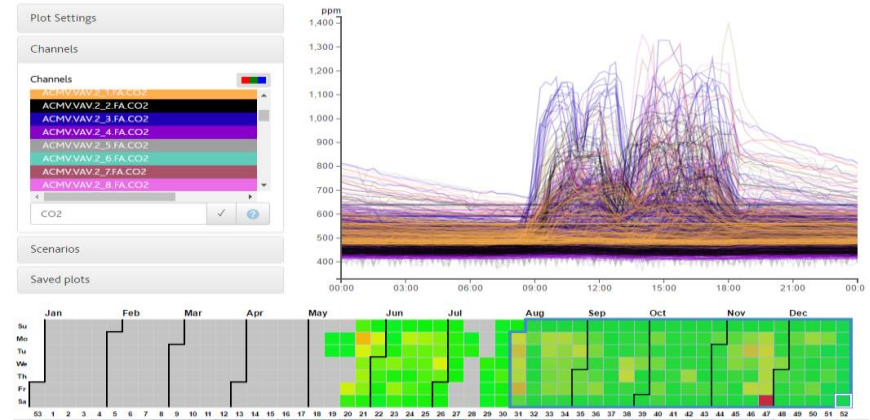


- Total power usage drops through summer as less heating and lighting are needed
- But red tariff charge is consistent throughout full calendar year
- Opportunity for implementation of a demand response strategy

# Data exploration



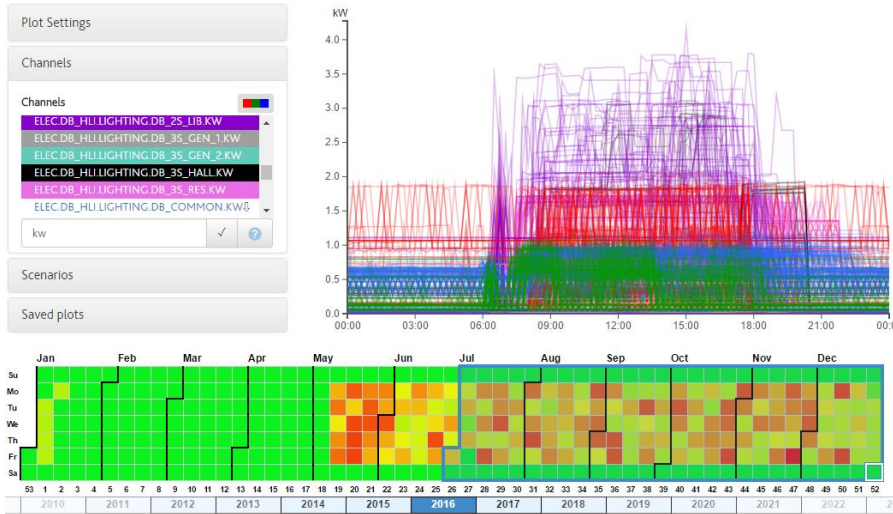
**Potential CO2 sensor issues  
(straight lines)**



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

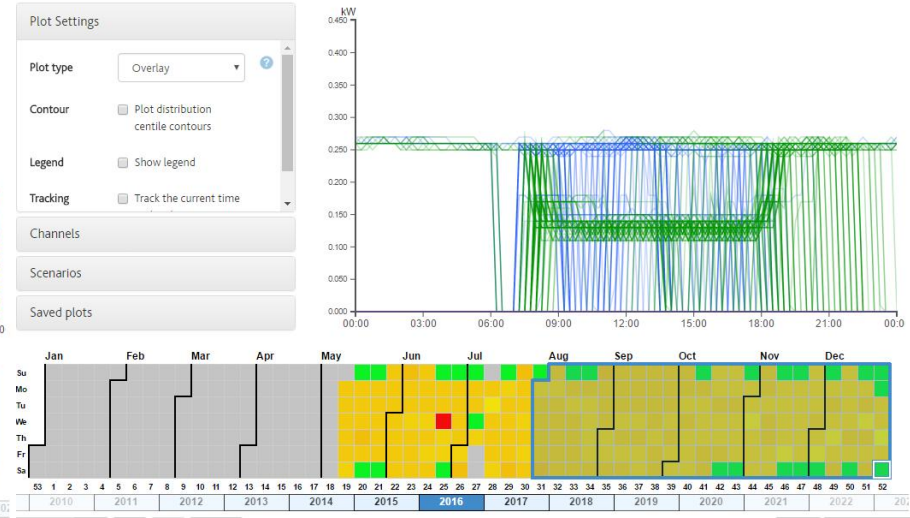
# Data exploration

IES



**Night-time lighting identified, outside of operating hours**

[www.iesve.com](http://www.iesve.com) EUROPE | NORTH AMERICA | ASIA | AUSTRALIA



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

# Data exploration

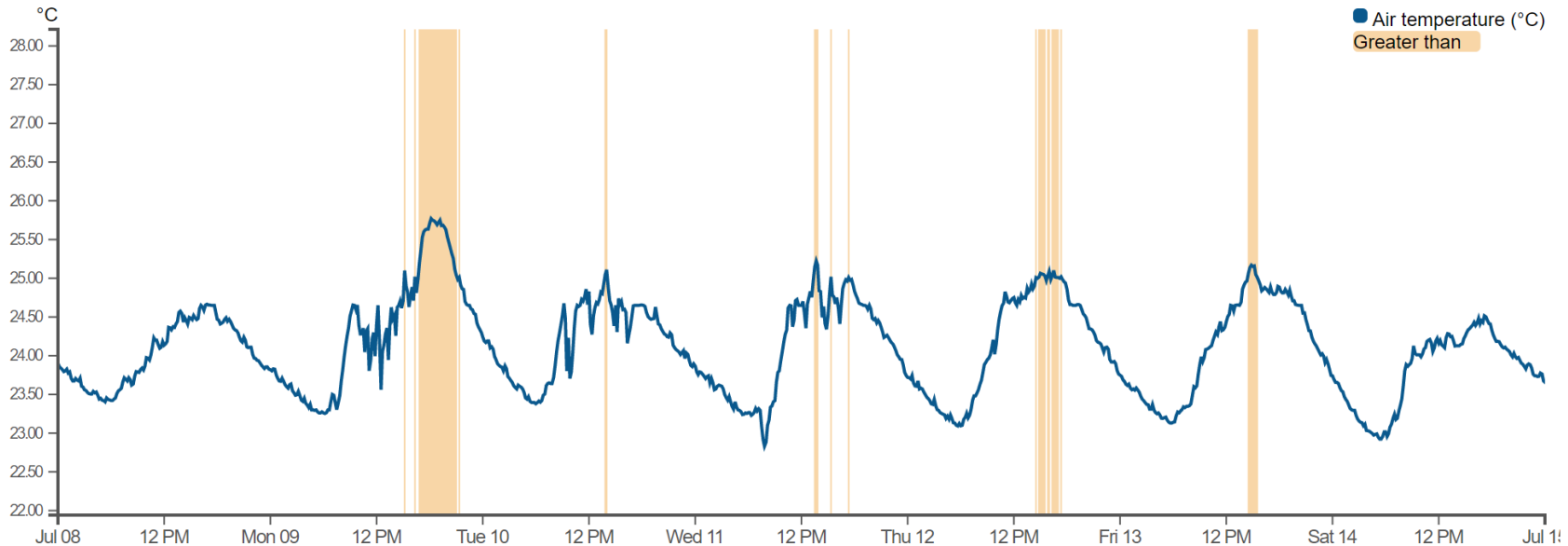
IES

## Summary:

🕒 14 matches

🕒 9.5 hrs

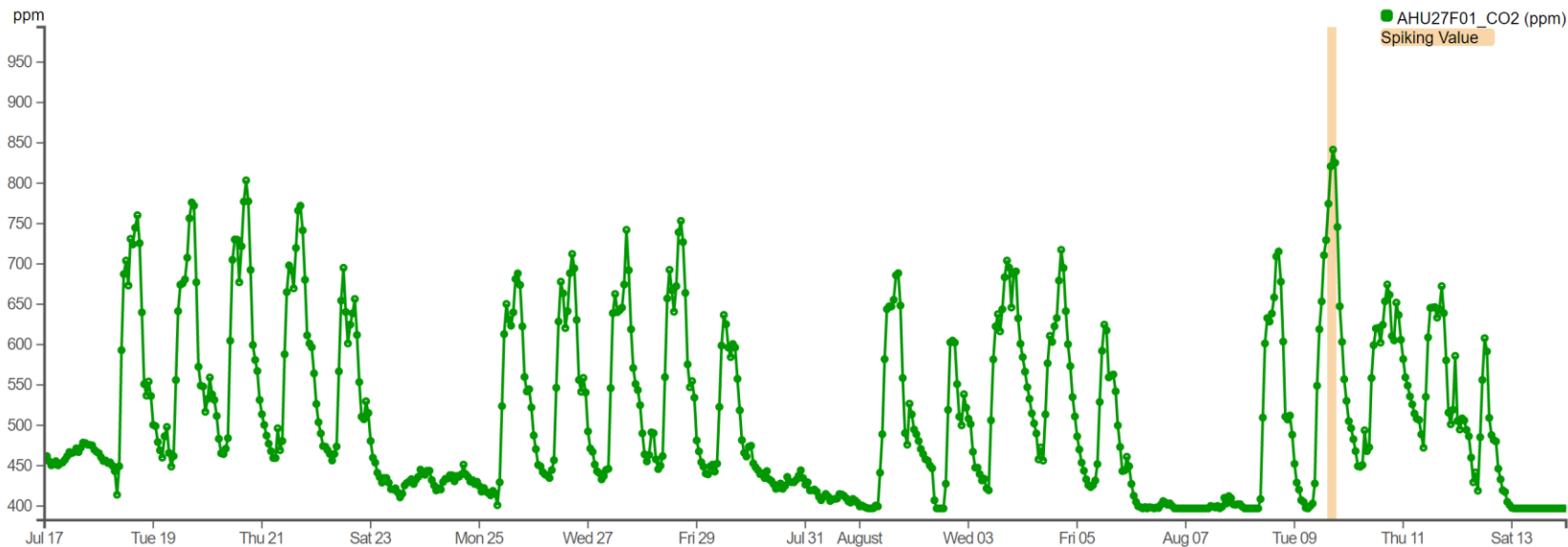
- Values higher than 25



# Data exploration

IES

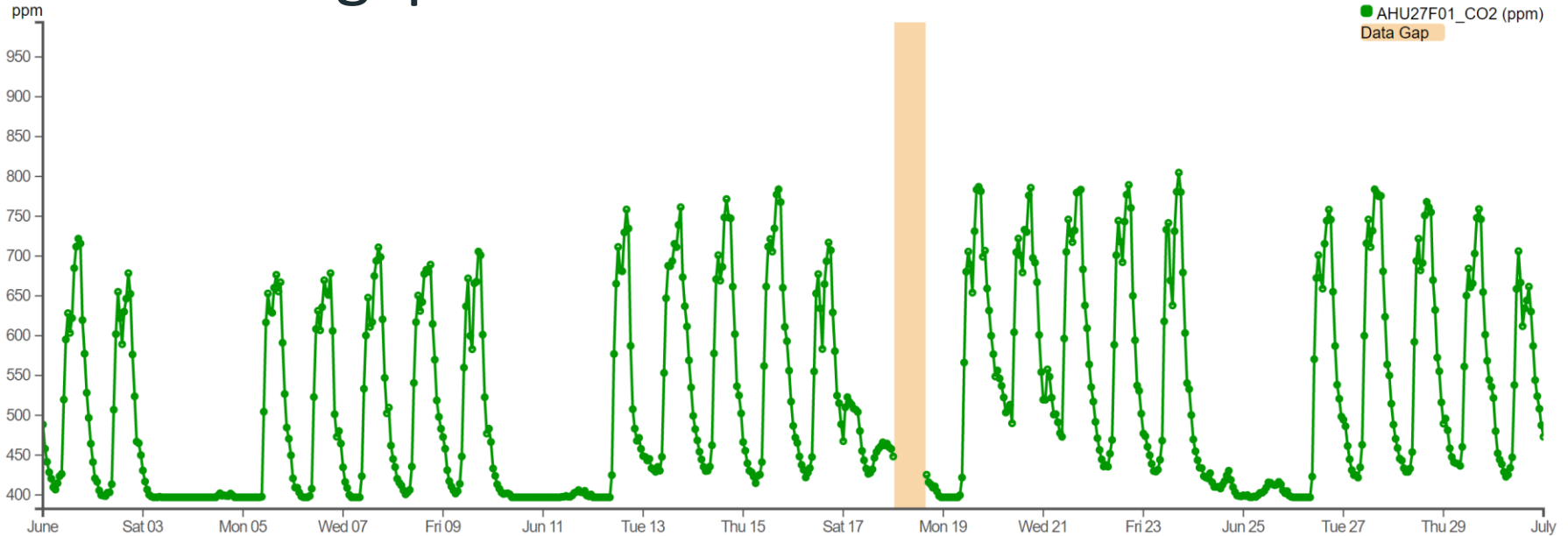
- Detect outliers



# Data exploration

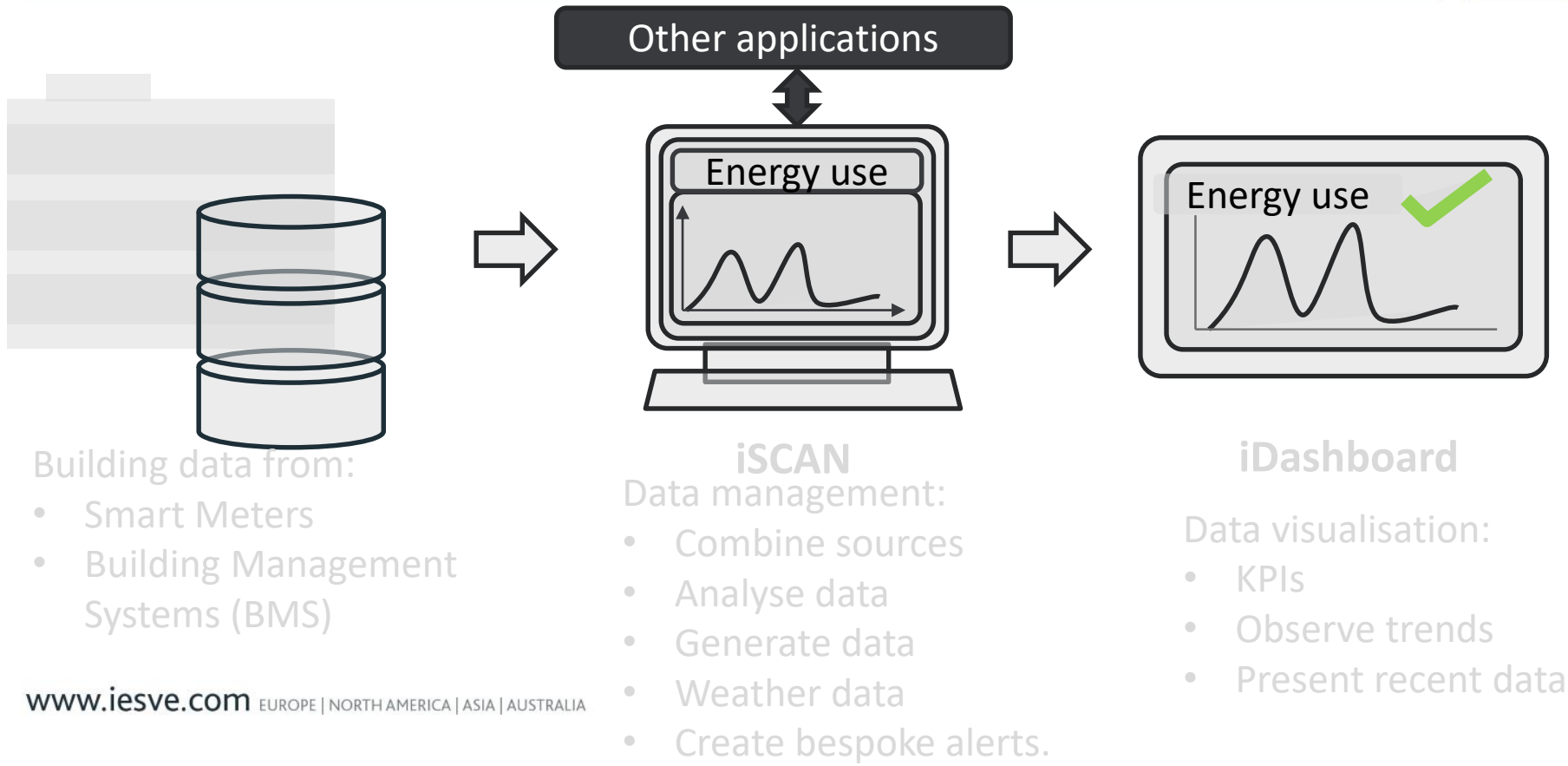
IES

- Detect gaps



# The iSCAN & iDashboard solution

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# The iSCAN & iDashboard solution

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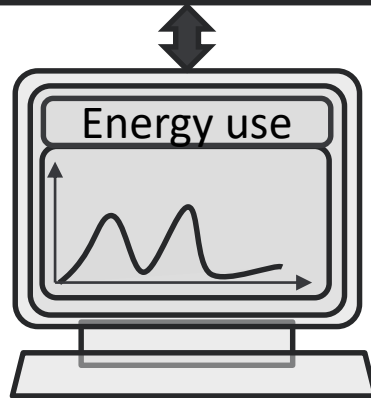


**Python**

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)



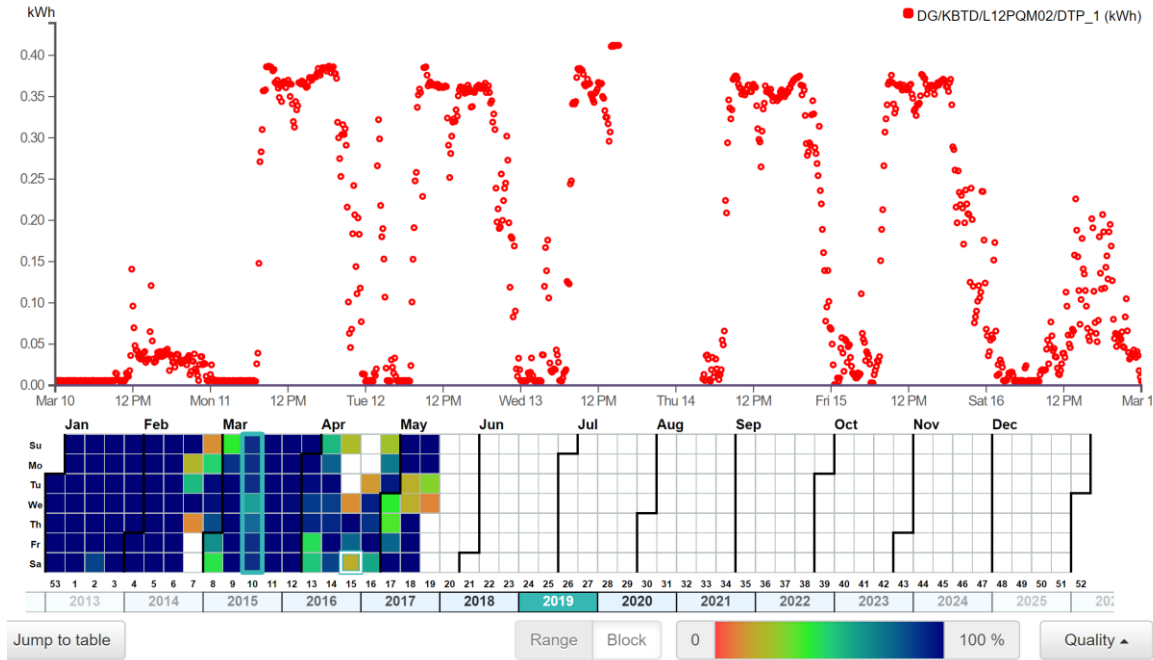
**Shared calendars**

Obtain calendar data inform of time series for:

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

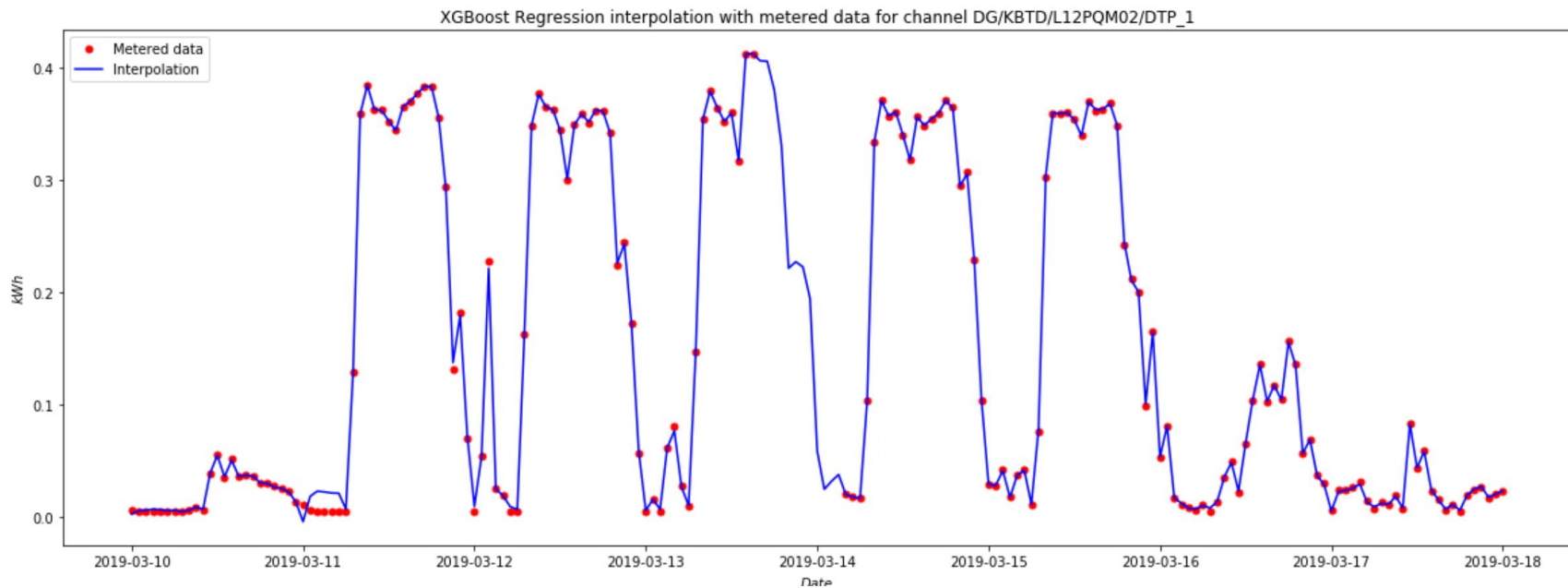


# Other applications: interpolation IES

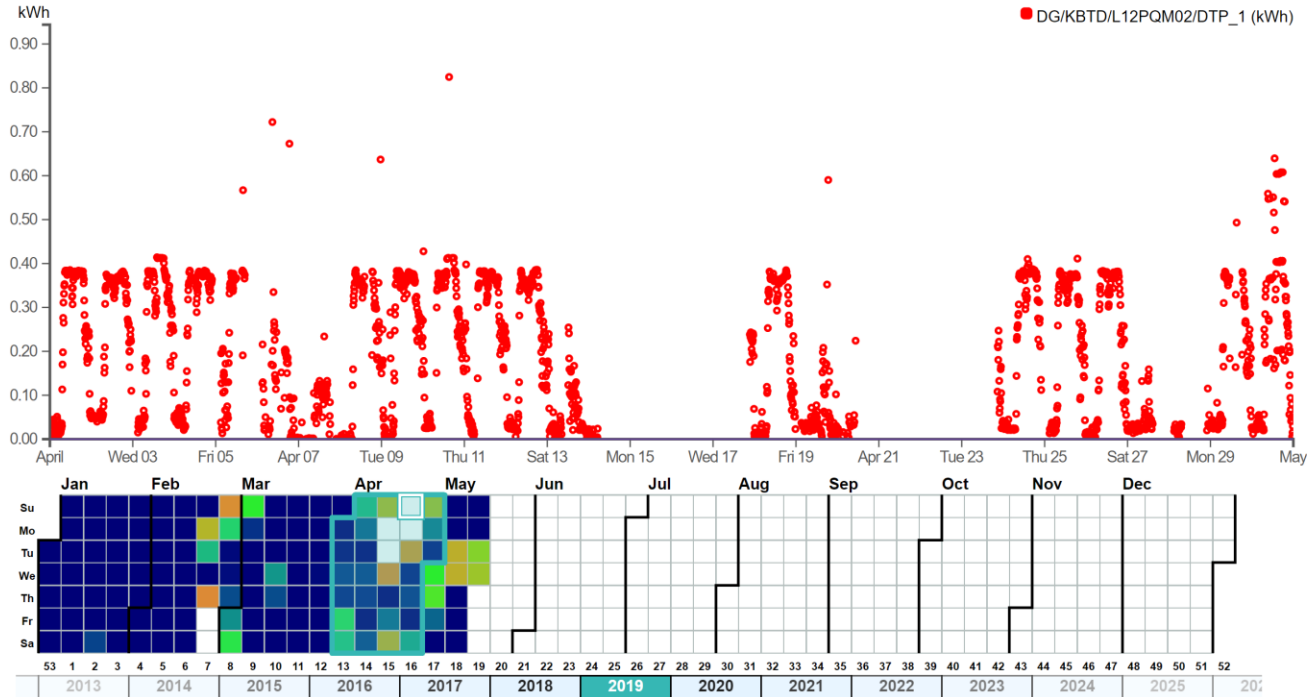


# Other applications: interpolation

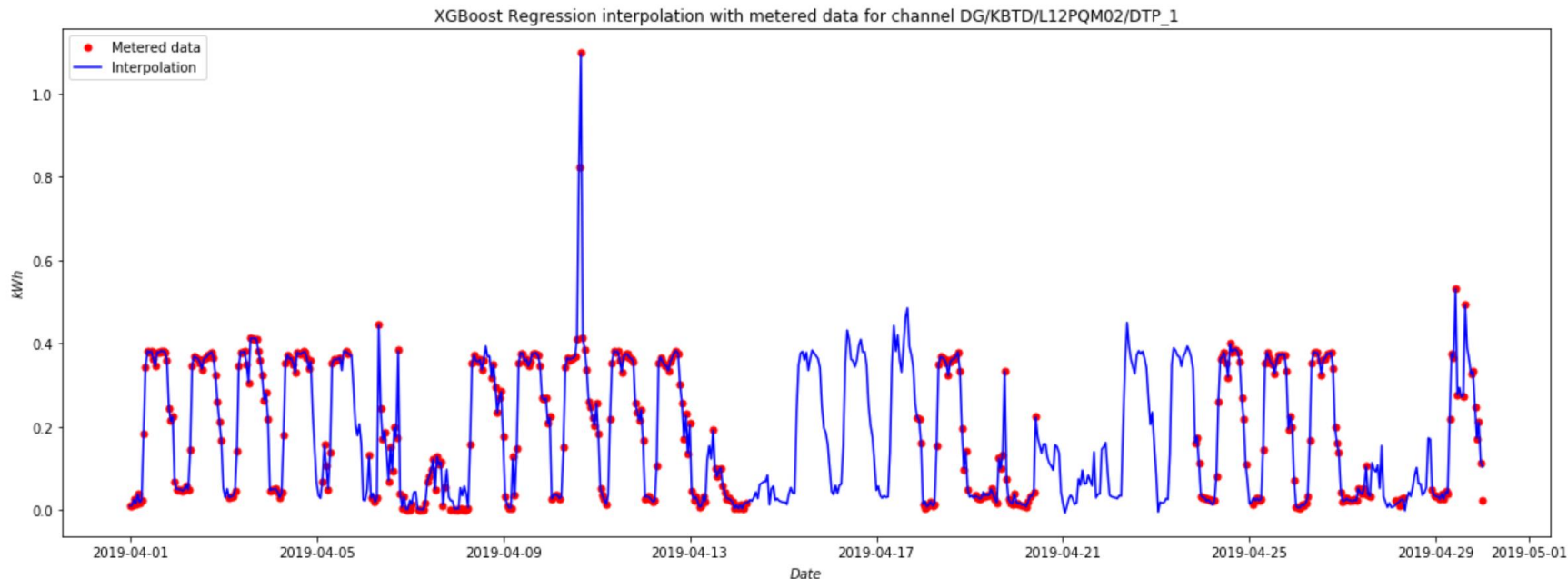
IES



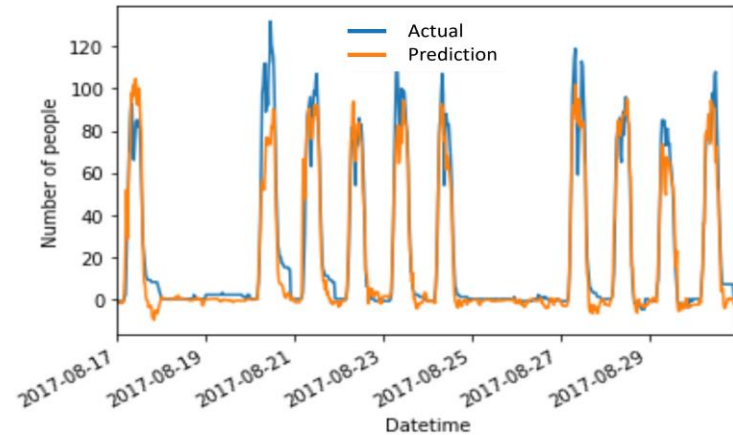
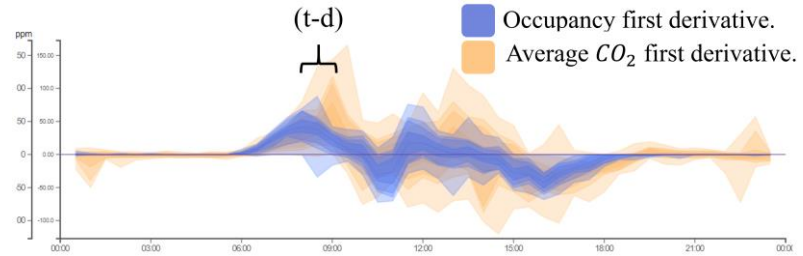
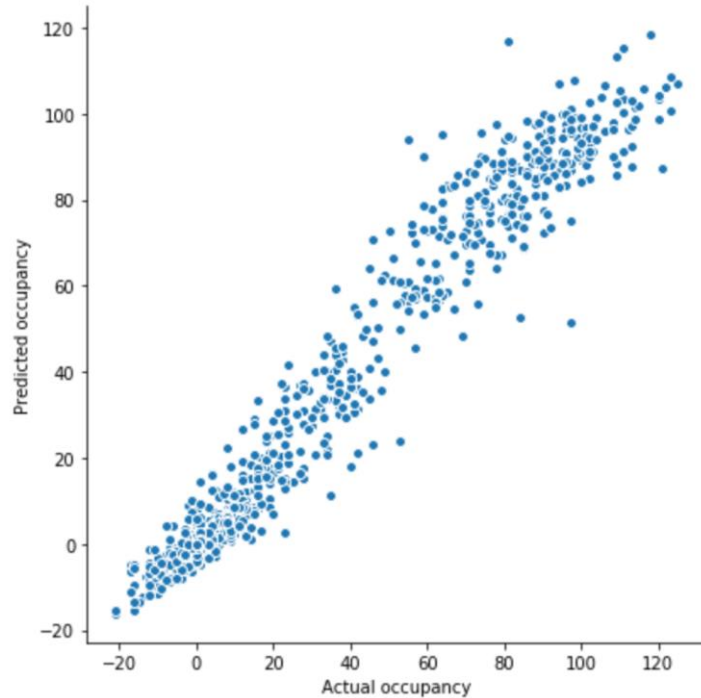
# Other applications: interpolation IES



# Other applications: interpolation IES



# Other applications: Occupancy



# Other applications: Tags

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- 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



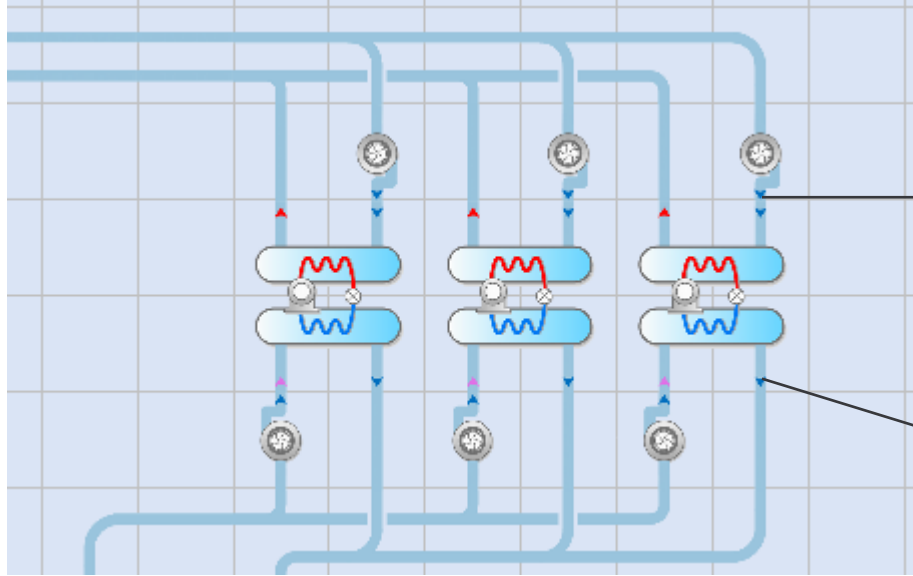
## Condenser water to/from cooling towers

- [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

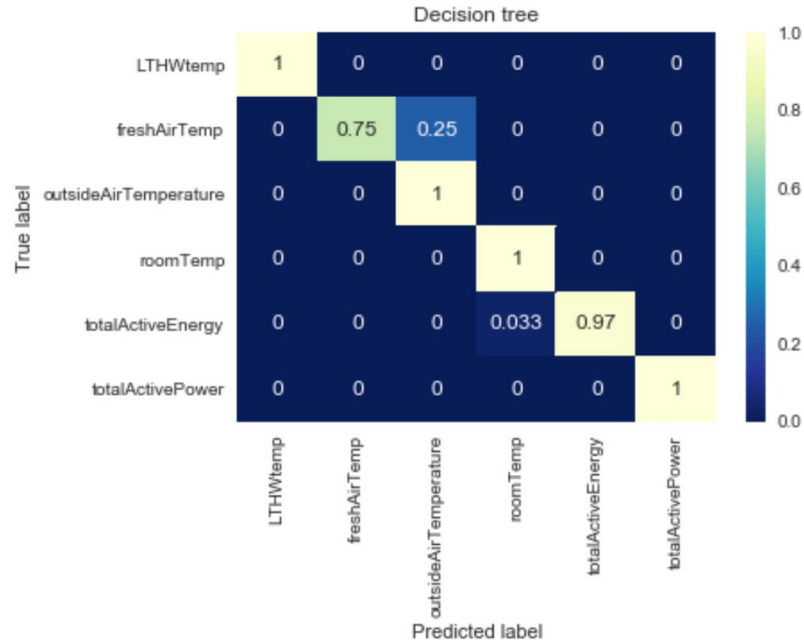
«Please choose a tag» ▼

Tag value

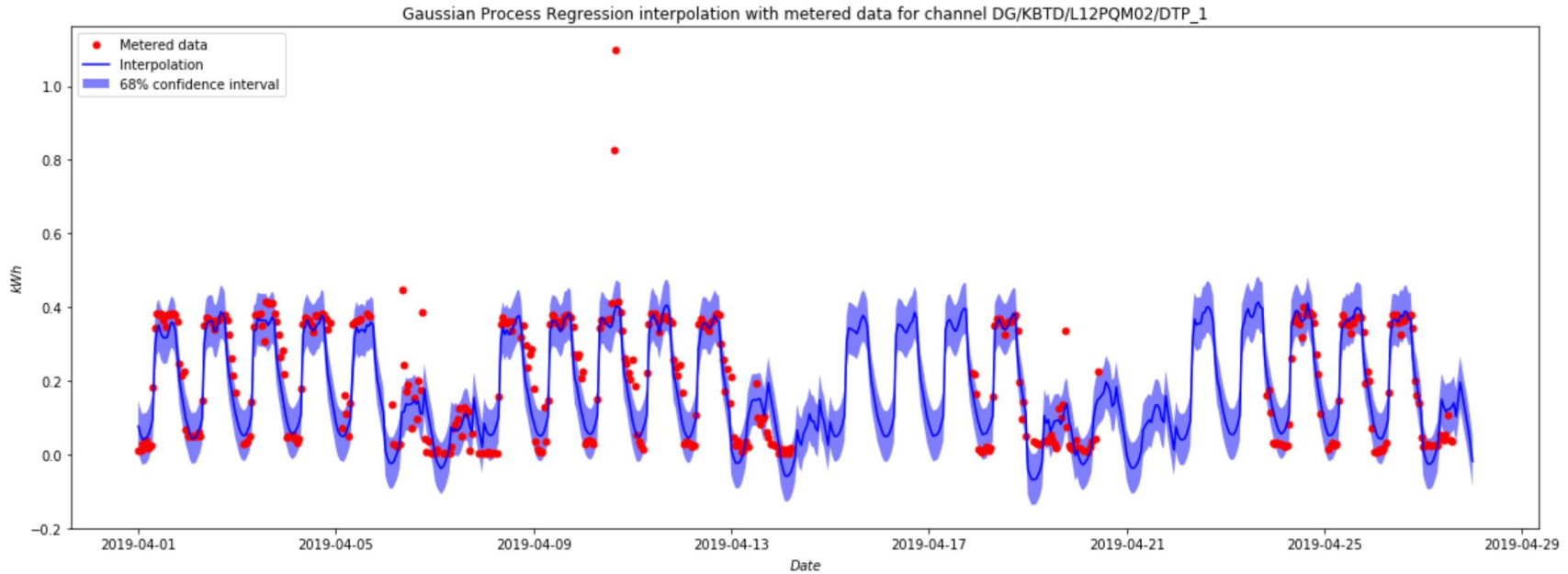
Add Tag

# Other applications: Tags

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

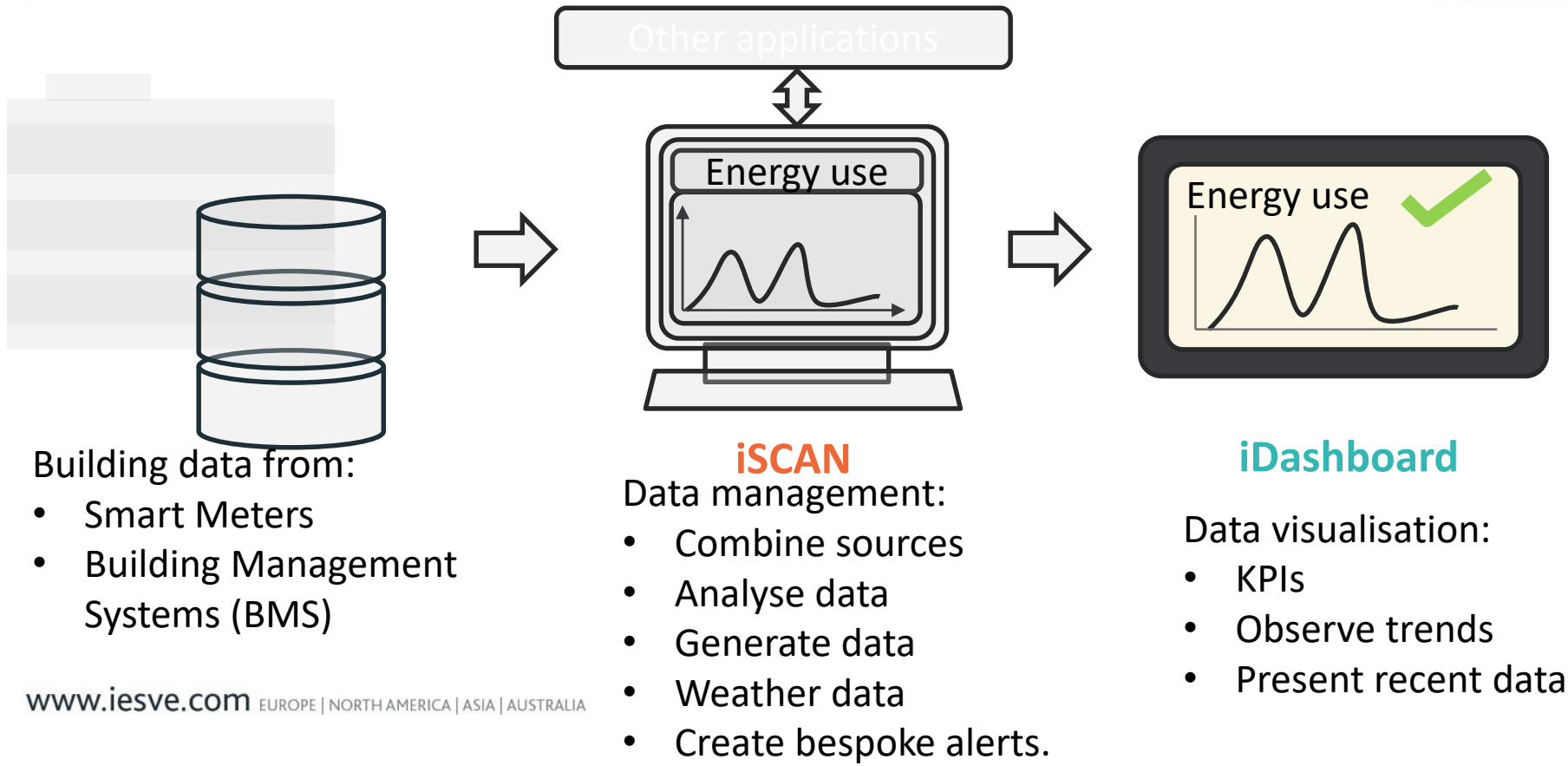


# Other applications: anomalies



# The iSCAN & iDashboard solution

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# Example – Helix building

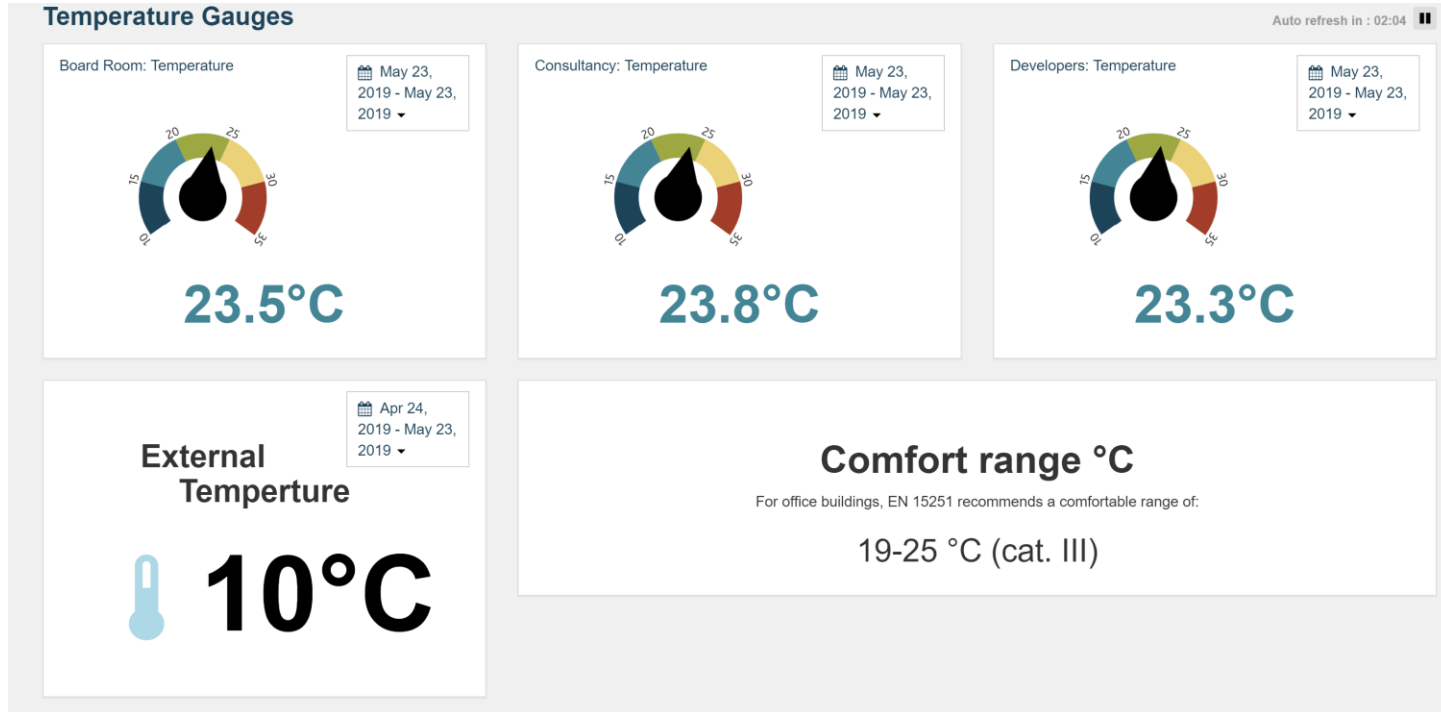
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# Example 1 – Helix building

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# Example 1 – Helix building

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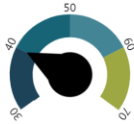
## Relative Humidity

○○●○

Auto refresh in : 02:47

Developers: Relative Humidity

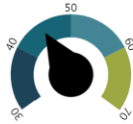
May 23, 2019  
- May 23, 2019



40.0%

Board room: Relative Humidity

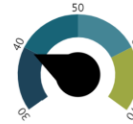
May 23, 2019  
- May 23, 2019



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.

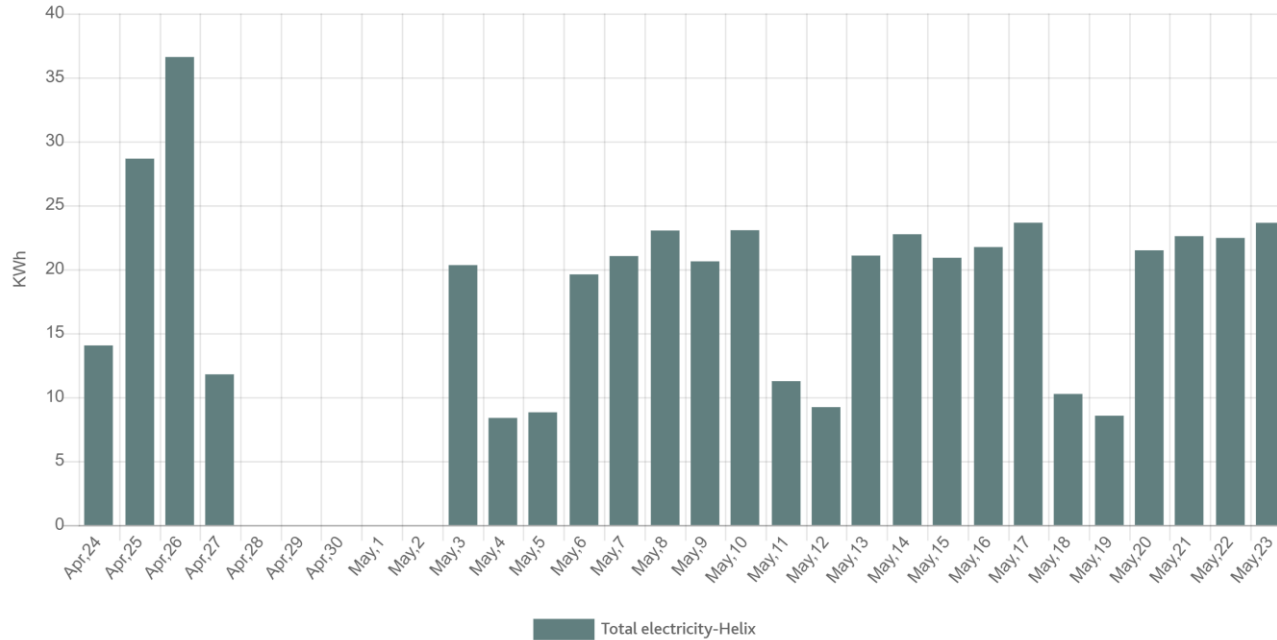
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# Example 1 – Helix building

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Energy consumption

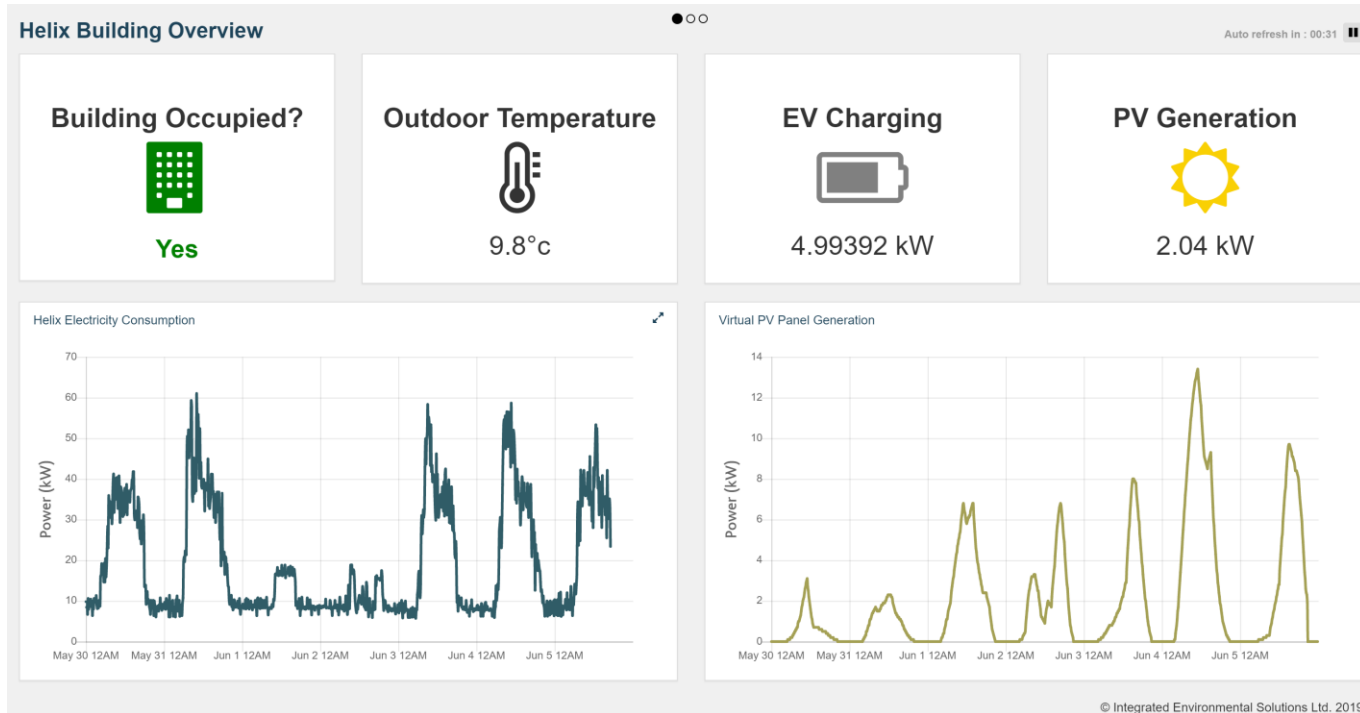
Apr 24, 2019 - May 23, 2019 ▾





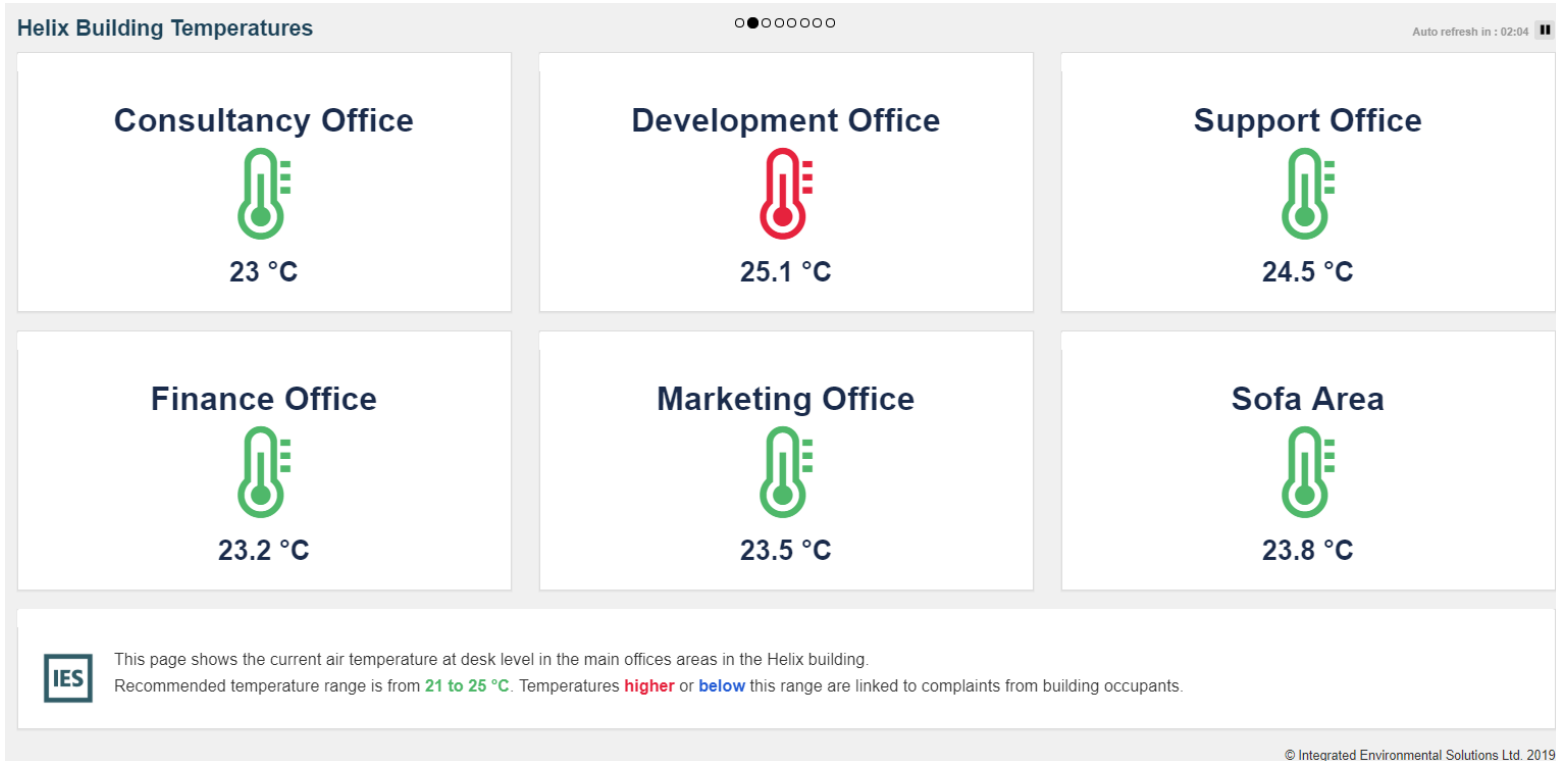
# Example 2 – Helix building

IES



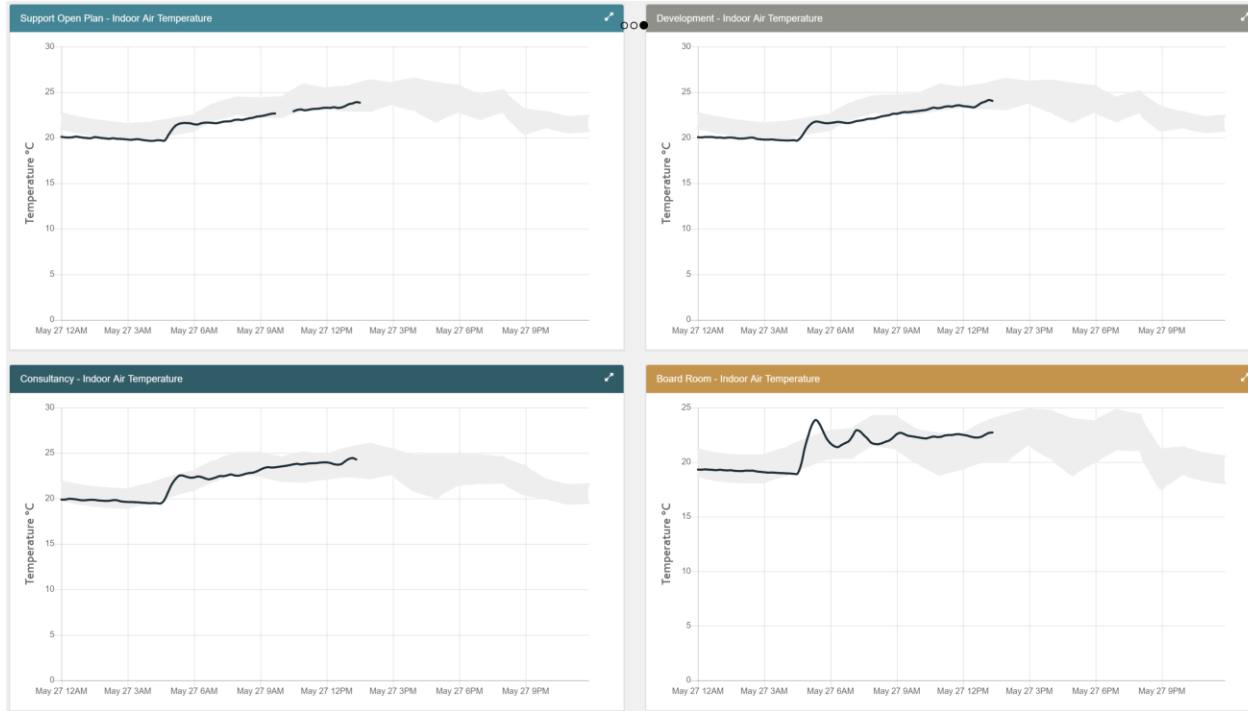
# Example 2 – Helix building

IES



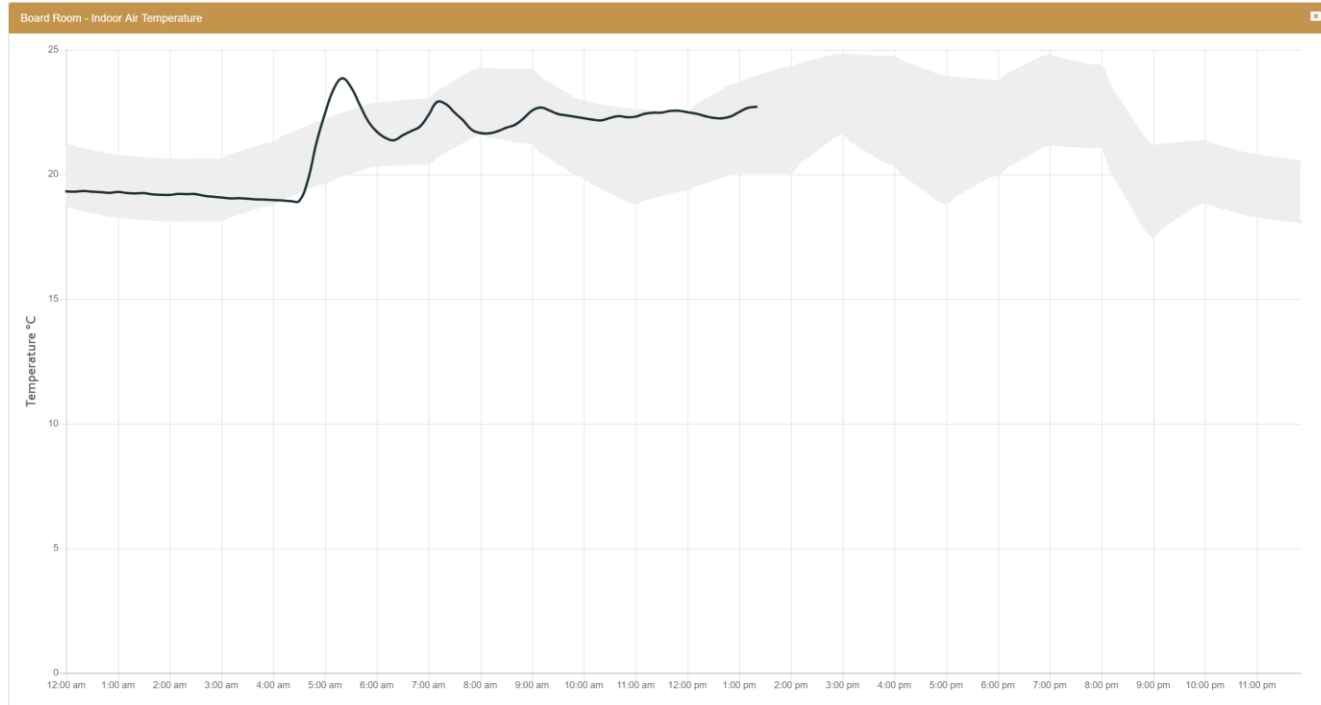
© Integrated Environmental Solutions Ltd. 2019

# Example 2 – Helix building



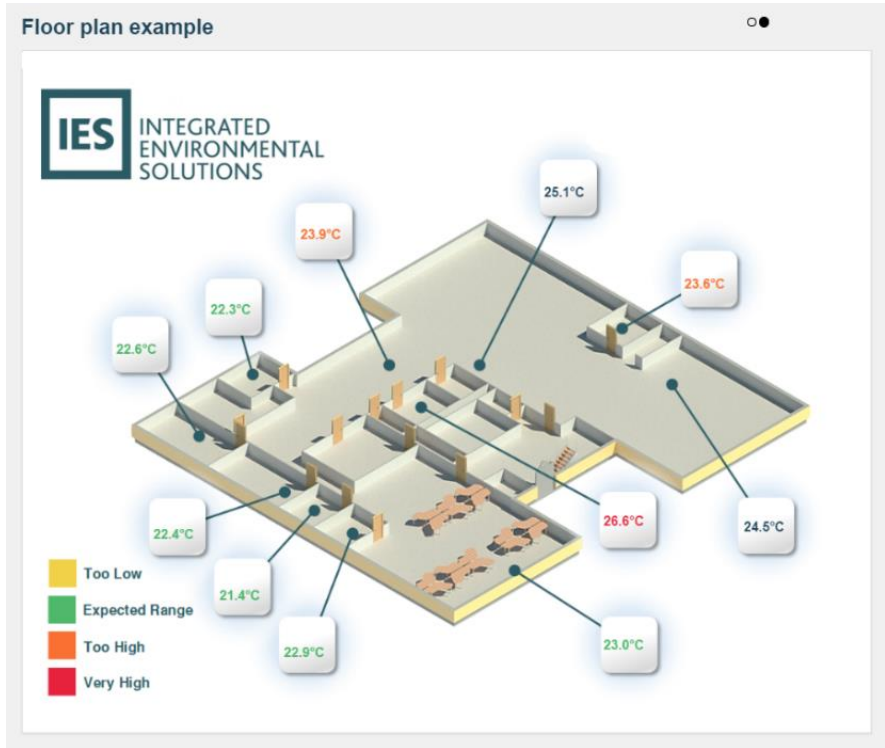
# Example 2 – Helix building

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# Example 2 – Floor plan

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# Conclusions

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- 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.