

Brindleyplace, Birmingham

Property Management & Building Analytics

**AVISON
YOUNG**



“

Avison Young are constantly looking for innovative ways to improve the efficiency of our managed buildings. We are delighted with the results following the implementation of Demand Logic at Brindleyplace which has exceeded expectations

”

Jonathan Aspinall,
Director,
Avison Young

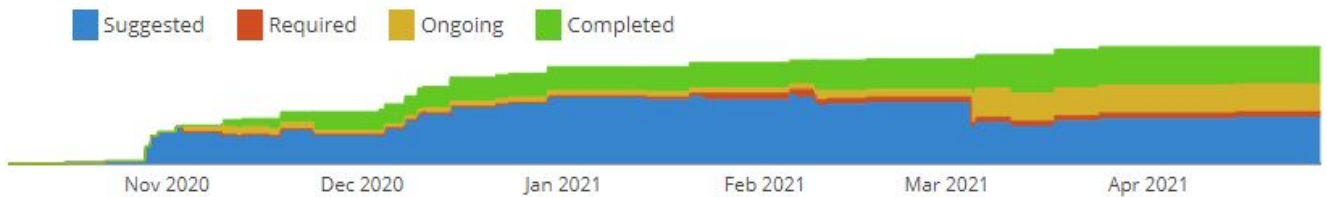
Summary

Demand Logic was approached at the beginning of 2020 by Avison Young who expressed an interest in using building analytics to support their property management offering at Brindleyplace. Whilst the Covid-19 pandemic put an initial hold on the instruction, both Avison Young and Hines, the Landlord, were eager to instruct Demand Logic and on 25th September Demand Logic were instructed.

On 9th October Demand Logic successfully deployed a Data Acquisition Device (DAD) in both 3 and 4 Brindleyplace. During the following weeks energy savings actions were identified and completed by the proactive Avison Young site team. Shortly after, 9 Brindleyplace was also included within the instruction.

The optimisation of major plant operation has been the priority to date, alongside the monitoring of Air Handling Unit (AHU) ventilation to adhere to the latest COVID-19 guidance. The team are now also beginning to concentrate on the FCUs and VRF units across the estate. The Avison Young team have demonstrated how quickly improvements can be made; improving energy efficiency, occupier comfort and mechanical effectiveness with building analytics.

Annual energy savings completed:
£55,000¹



1. Saving estimated using in built and desktop calculations based on live monitored data.

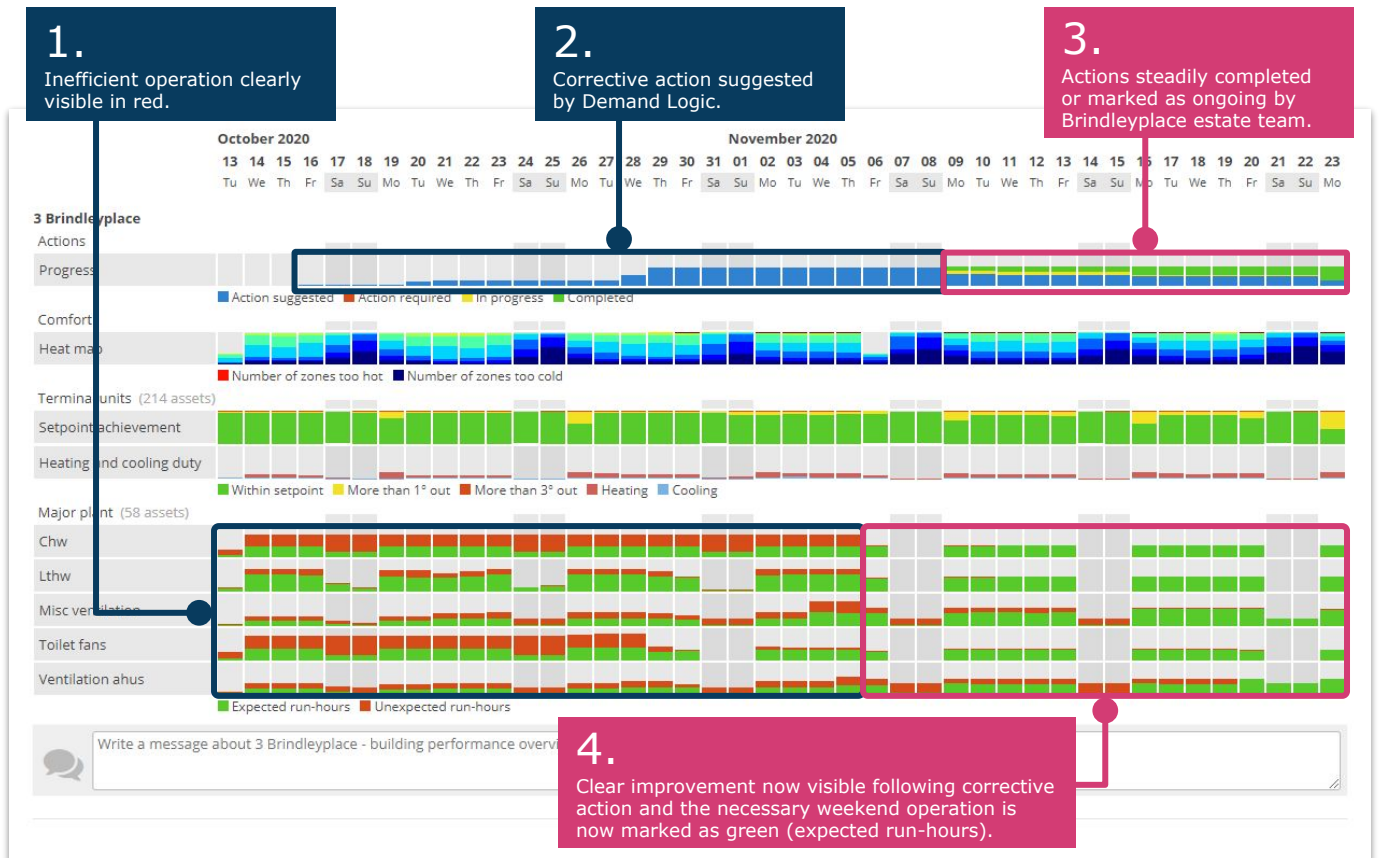
property performance simplified



Empowering property management

With a growing focus on carbon reduction, space-as-a-service and, in light of the Covid-19 pandemic, Indoor Air Quality (IAQ), property managers are demanding an even greater understanding of how their buildings are actually operating. Avison Young approached Demand Logic to open up the operational data within Brindleyplace, digitalising the systems and equipment responsible for not only a high proportion of operational carbon emissions but also the delivery of conditioned air to occupiers. This new transparency has subsequently enabled Avison Young to assess actual operational performance and drive improvement, ultimately delivering a proactive property management service which the industry requires.

Energy



The Avison Young team have made use of platform 'views' such as the Building Performance Overview (BPO) shown above to break through the invisibility and observe actual performance, without the need for lengthy specialist reports filled with caveats and assumptions. The above view is a good illustration of how performance has improved at 3 Brindleyplace, shortly after the Demand Logic service commenced.

“ Since implementation Demand Logic has helped identify inefficiencies with operational run times of plant items with the virtual meters demonstrating the reduction in energy and cost per plant item and the buildings as a whole, to date this has identified a saving of £52,000 in energy across the 3 sites. ”

Gary Hawkswood,
Estate Manager, Brindleyplace

Deployment and data acquisition

Demand Logic was instructed to deploy a Data Acquisition Device (DAD) at both 3 and 4 Brindleyplace on Friday 9th October 2020. The DAD connects to the Heating, Ventilation and Air Conditioning (HVAC) Systems, usually via Building Management System (BMS).

Demand Logic successfully deployed both DADs within a few hours and commenced data acquisition shortly after. Whilst both 3 & 4 Brindleyplace are reasonably modest sized buildings (measuring 80,000 and 113,000 sqft respectively) they still produce a vast amount of data; 31,000 data points continually measuring metrics such as temperatures, fan speeds and the operation of electronic valves.

The DAD continually 'polls' this data and, via a highly secure VPN, then copies and analyses it in Demand Logic's secure cloud infrastructure. By 16th October, following a week's worth of data acquisition and analysis, operational trends were becoming visible and Demand Logic was able to begin suggesting actions to the maintenance team.



The Data Acquisition Device (DAD) - The DAD measures 168 x 157 x 30mm. It can plug into a BMS network using a standard ethernet cable. It only requires mains power and internet access. Deployment of the DAD typically takes only 2 hours with data acquisition commencing shortly after.

Measuring baseline performance

One of the first things to be automatically generated by the Demand Logic platform is the Building Operational Performance (BOP) score which measures energy efficiency, occupier comfort and mechanical effectiveness. The BOP score provides a good indication of baseline performance in the first instance and appears in the Demand Logic *Performance Scorecard*.

Whilst at first the BOP score may appear to be a fairly simple metric, it is actually one of the most powerful indications of overall building performance as far as high-level analysis is concerned. Every temperature sensor, fan and valve at Brindleyplace is ultimately responsible for building-wide performance. Using an initial set of calculations and assessment criteria, Demand Logic turns the highly complex performance data generated by these devices into Comfort, Maintenance and Energy scores. From these the BOP score is then generated.

3 Brindleyplace: Portfolio benchmarking table for November 2020										
		Area	Activity	Actions				DL Score	Quartile	+/-
1	3 Brindleyplace	8,000	22	10	94.2	99.2	82.1	91.8	3 rd	19.5
	Average	8,000	22.0	10.0	94.2	99.2	82.1	91.8		+ 9.5

4 Brindleyplace: Portfolio benchmarking table for November 2020										
		Area	Activity	Actions				DL Score	Quartile	+/-
1	4 Brindleyplace	11,300	52	2	98.8	95.4	71.7	88.6	3 rd	111.8
	Average	11,300	52.0	2.0	98.8	95.4	71.7	88.6		+ 11.8

The scores are produced on a monthly basis, showing the average scores over the month alongside a recording of platform 'Activity' and 'Actions' completed in the given month. Also available is a 'Quartile' ranking which shows how the property compares, in terms of performance, to others in the Demand Logic portfolio. Crucially the scoring metrics in BOP mean that all buildings, old or new, are judged equally. A building which is more sustainable *on paper* will not have an inflated score. This is a practice often used by other scoring and certification methods which we believe is akin to green washing and contributes to the proliferation of the *performance gap*.

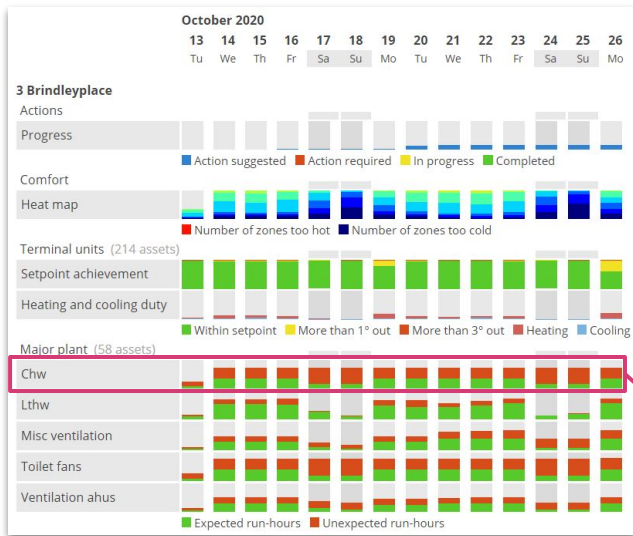
The first actions

The first step taken by Demand Logic is making sure that high energy consumptive major plant assets (such as boilers, chillers and pumps) are running as efficiently as possible. Even though they are some of the most prominent and visible pieces of equipment they are no less susceptible to erroneous activity, even to the most diligent maintenance teams. Optimisation of major plant operation has therefore been the priority for the Brindleyplace management team to date.

The DL platform visualises the operation of major plant using a series of simple charts and RAG reports. This is one way in which Demand Logic promotes 'data transparency' as it removes the information silo created by a BMS. The property management team have subsequently been able to evidence operational performance. This methodology also lays the foundation for a pathway towards identifying the cause of building wide inefficiency.

Example 1 - 3 Brindleyplace Chilled Water (ChW) system

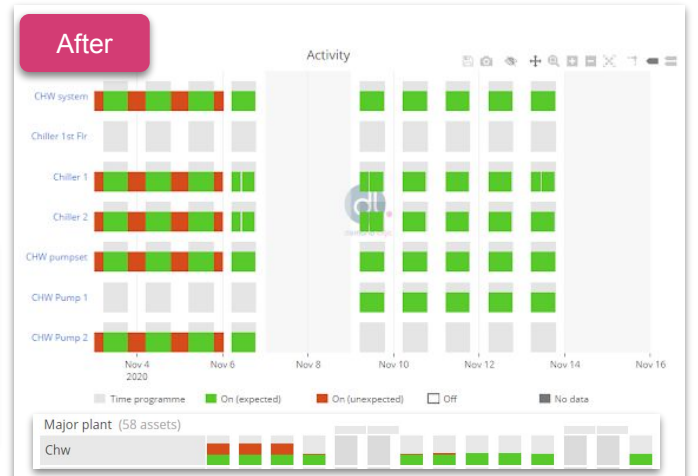
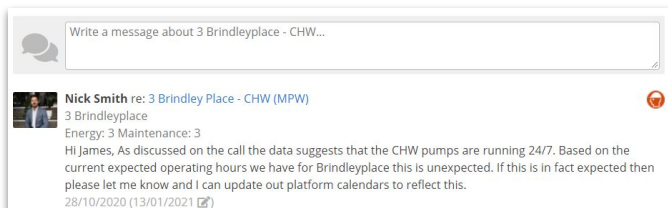
The screenshot below shows the *Building Performance Overview* (BPO) for 3 Brindleyplace in the opening two weeks following data acquisition. The BPO acts as a level down from the Scorecard as it begins to visualise how the Energy, Comfort and Maintenance scores are calculated as well as providing an overview of important systems and action progress. You will see the ChW system (highlighted) is shown under 'Major plant' with a series of bars displaying expected operation (in green) and unexpected operation (in red) for each day.



Demand Logic's "Drill Down" navigation means that users can move seamlessly from building level to asset level visibility. For example, the *Major Plant Watchdog* (MPW) below displays the run times of all assets within the selected system.



In the image labeled 'Before' you can clearly see that many assets which form part of the ChW system are running 24/7, including 2 chillers. Using the 'comment' section under the ChW MPW, Demand Logic raised an action (see below) which alerted the Brindleyplace management team to the issue. Following investigation using the DL platform the issue was resolved as seen in the 'After' images of the MPW for the ChW as well as on the BPO.

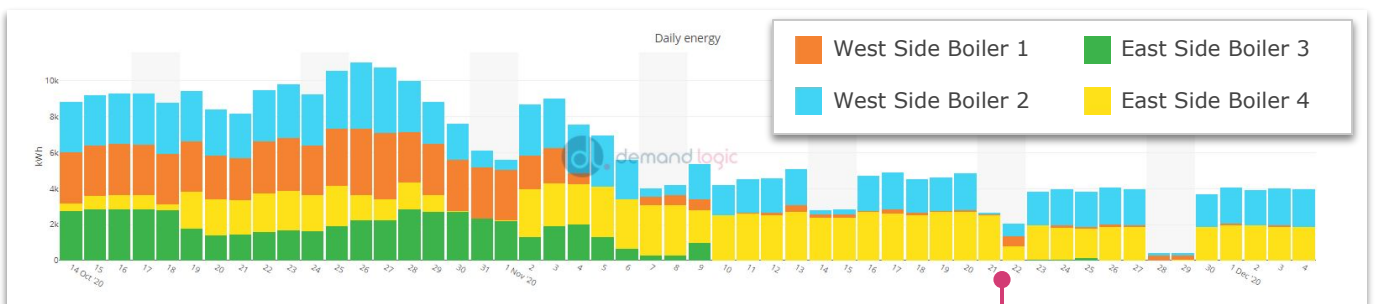
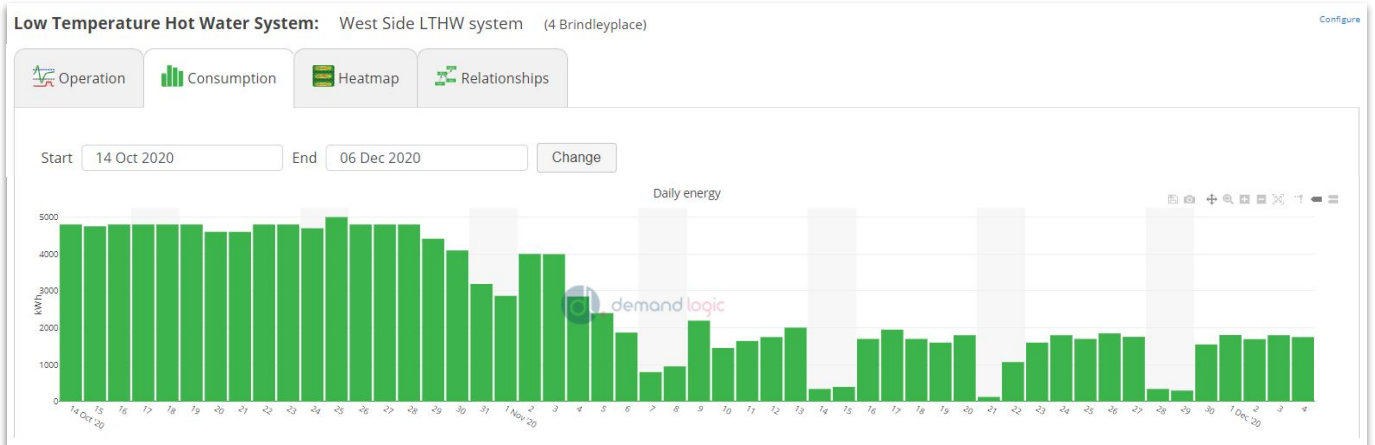


Example 2 - 4 Brindleyplace Low Temperature Hot Water (LTHW) system

Excessive major plant operation was also identified at 4 Brindleyplace. The example below shows the run times of the LTHW systems in 4 Brindleyplace during two 10 day periods (14/10/20 - 23/10/20 and 25/11/20 - 4/12/20). Excessive operation is clearly visible for the first period, shortly after Demand Logic deployed at the building. An action was raised and the management team used the platform to flag this with their engineer.



Using Demand Logic's *virtual meters* (VM), the level of consumption associated with the unnecessary operation can be calculated. The image below shows the consumption of the West Side LTHW system for the period 14/10/20 - 4/11/20. As the site team worked on improving the erroneous activity identified in the 'before' picture above, you can see a steady decline in consumption. In just over a week, the site team were able to reduce operation to a baseline level, with reduced weekend operation clearly visible. Overall, the action resulted in a reduction of energy consumption by just over 60%.

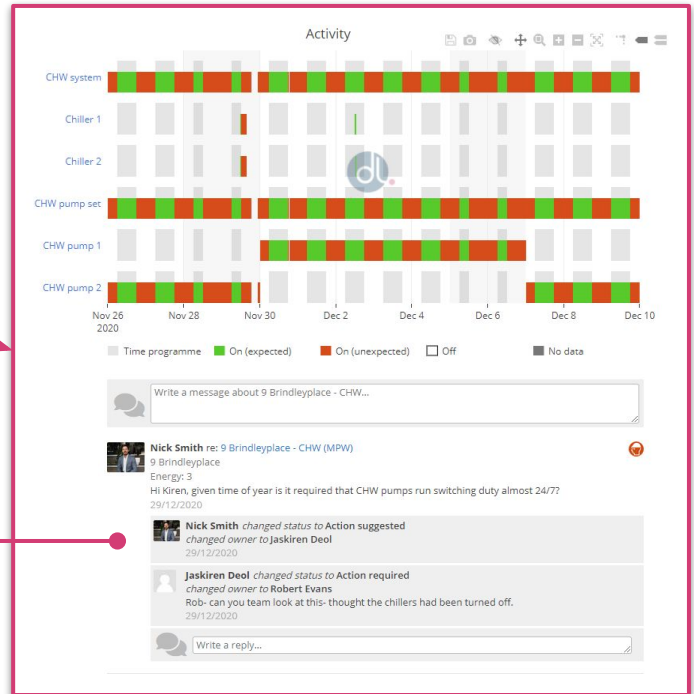
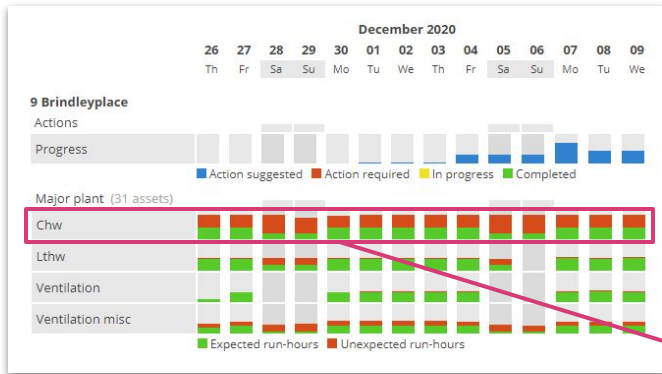


Boiler VM collection view - Similar action also took place with the East Side LTHW system as displayed in this VM collection view of the four boilers. Note how weekend operation has reduced to a minimum and each system now primarily runs off a single boiler.

Introducing 9 Brindleyplace

Given the quick results and success at 3 & 4 Brindleyplace, Avison Young decided to also instruct Demand Logic to deploy at 9 Brindleyplace in November, two months after the initial instruction.

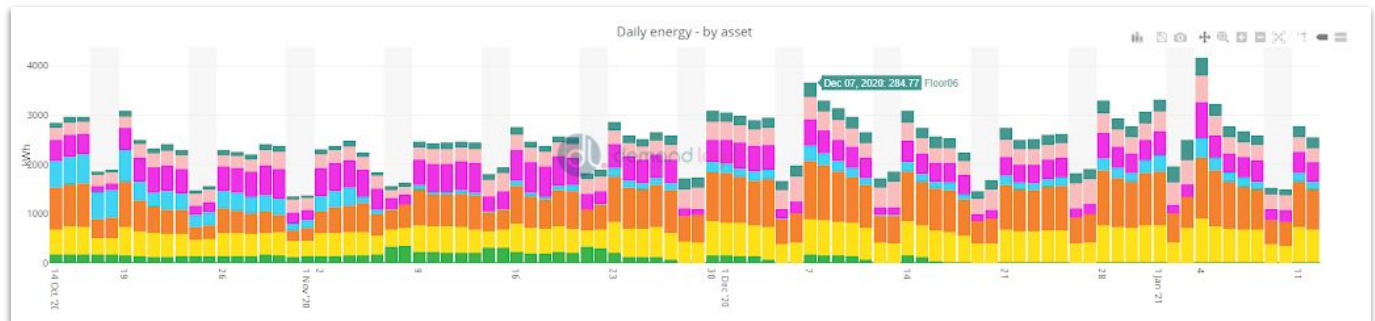
The BPO below shows that 31 assets make up four major plant systems in 9 Brindleyplace and three out of the four systems had unexpected asset operation during the period 26/11-09/12. The amount of red (unexpected run-hours) displayed for the ChW system in particular indicates that there are assets within the system which are unexpectedly running 24/7. Drill down to the MPW showed that the pumps were responsible. An action was quickly raised by Demand Logic and a member of the Brindleyplace management team was able to assign the task to the engineer.



Efficient collaboration - The action is raised on the MPW message board and associated with the view displayed. Clicking on an action will take you to this view meaning that an issue will always be evidenced. Actions can be assigned to appropriate 'owners' and the message board acts as an audit trail. Whilst this may seem unnerving at first, when used to its full potential it becomes a very useful tool for collaboration between property managers, facilities managers and maintenance engineers.

Beyond major plant

Whilst major plant items are the biggest individual consumers of energy, smaller equipment such as terminal units (TUs) can also be responsible for a large amount of unnecessary energy demand. Building 3, 4 and 9 have 604 TUs between them, made up of Fan Coil Units (FCUs) and Variable Refrigerant Flow (VRF) systems. Combined these make up a sizeable proportion of total energy demand. All TUs at Brindleyplace benefit from Demand Logic's virtual meters which estimates their consumption (see below VMs at building 4).

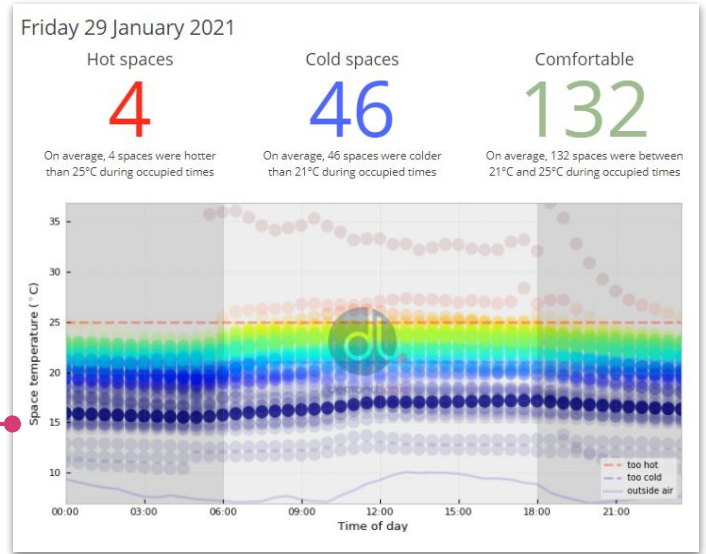


As well as their own energy demand TUs also place demand on major plant, potentially influencing their operation. This is even the case when care has been taken to ensure that chillers and boilers only operate within set time frames.

The importance of TUs goes beyond energy demand; they are the the equipment which is ultimately responsible for delivering conditioned air to building occupiers. The need to measure and improve spaces Indoor Air Quality (IAQ) has been growing over the last few years and ventilation has become a particular concern during the COVID-19 pandemic. Monitoring the fans, coils and various sensors within the Brindleyplace TUs is therefore vital when considering overall building performance.

Thermal comfort is a logical starting place when improving IAQ. Temperature is the main cause for complaint in office buildings and has a measurable impact on productivity. In addition, temperature sensors are common throughout HVAC systems so the data is likely already there, which isn't always the case with CO2 sensors for example.

The 'Comfort Tracker' - Demand Logic's Comfort Tracker monitors the temperature of different 'zones' within a building. Crucially, it measures readings from temperature sensors, rather than set points, and maps these against a thermal productivity meta-study. This comfort tracker is for 3 Brindleyplace and shows that, whilst most spaces are comfortable, 50 are either too hot or cold.



Terminal Units - Simultaneous heating and cooling

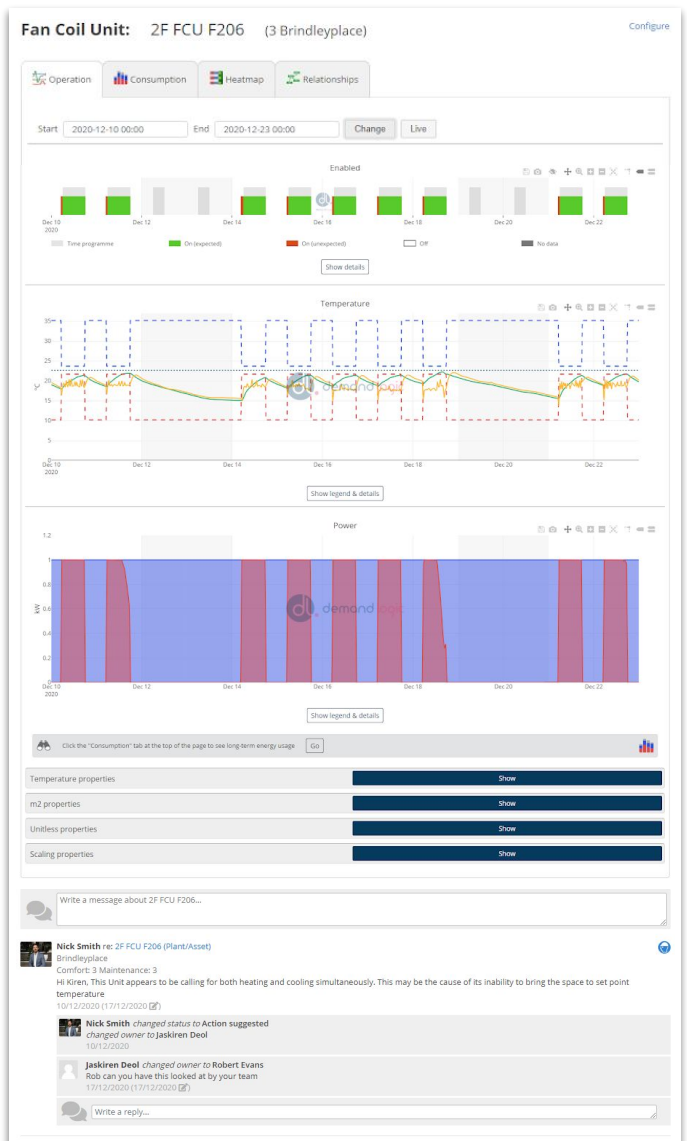
When balancing energy consumption and occupier comfort, identifying and correcting simultaneous heating and cooling is a quick win. Demand Logic's building analytics platform simplifies this process and the Brindleyplace management team are now beginning to target corrective maintenance.

Once problem units are identified using tools such as the *Comfort Tracker* mentioned above, site teams can then view the relevant 'asset page' (right) which provides operational information and diagnostics about a single piece of equipment.

In the example shown, the FCU is mostly operating within set timeframes (other than enabling about 100 mins earlier than expected). Regardless of this, the units is still continually demanding cooling power. When the unit switches on it then simultaneously demands heating power which is making it impossible to bring the space to it's set point temperature.

This was flagged by Demand Logic and the Brindleyplace management team have notified the engineer to resolve on their next routine visit.

In many cases, issues such as this can be diagnosed using the platform tools, increasing first time fixes and flagging issues before a tenant complains.



Terminal Units - Faulty sensors

The Demand Logic platform also identifies faulty sensors and brings them to the attention of site teams. Faulty and flatlined sensors often still feed data back to the BMS meaning that HVAC will operate as if the sensor data is correct. This can lead to unnecessary operation such as a boiler being switched on to provide heating, leading to unnecessary energy consumption and a 'hot/cold' space.

Problematic sensors

The following spaces were not included in the charts because of missing or suspect data. This can indicate a broken sensor, an offline BMS device or a data collection problem.

Export Columns Show 10 entries Search...

Terminal unit / sensor	Device address	Ave temp	Min temp	Max temp	Info
FCU 1.20		-53.3	-53.3	-53.3	Extreme value (broken sensor?)
FCU 3.13					Missing data
FCU 3.14					Missing data
FCU 3.17					Missing data
FCU 3.20					Missing data
FCU 3.21					Missing data
FCU 3.22					Missing data
FCU 3.23					Missing data
FCU 3.24					Missing data
FCU 3.25					Missing data

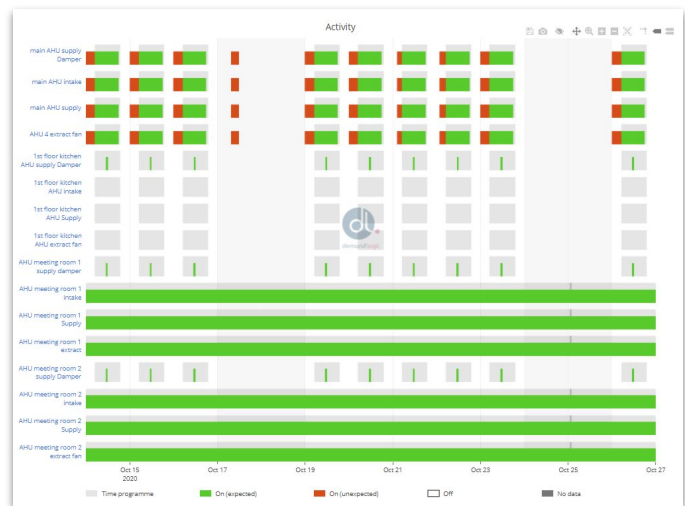
Showing 1 to 10 of 32 entries

First Previous 1 2 3 4 Next Last

Ventilation Air Handling Units (AHUs)

A number of actions concerning the AHUs at Brindleyplace have been promptly completed by the Brindleyplace management team. COVID-19 guidance has suggested that recirculating airflow should be avoided if possible meaning that the optimisation of the supply and extract AHUs at Brindleyplace has been a prominent area of focus since deployment.

The AHU MPW (right) and the commenting feature (below) provide a good example of how the team have been able to closely monitor, action and collaborate on improving ventilation at Brindleyplace.



Nick Smith re: main AHU supply (Plant/Asset)
3 Brindleyplace
Energy: 4 Maintenance: 3
29/10/2020 (09/11/2020)

Hi James, Looking at the main AHU while I understand that the fans may be required for ventilation due to COVID guidance it is unlikely that there is a requirement for heating valves to be demanding (and based on temperatures being supplied) heat from 0000 hours.

Nick Smith changed status to Action suggested
changed owner to James Morson
29/10/2020

James Morson changed status to In progress
changed owner to Robert Evans
Hi Rob Can I ask that the task is investigated for the main AHUs in building 3 thanks james
09/11/2020 (09/11/2020)

Nick Smith changed status to Completed
changed owner to James Morson
Looks like this has now been addressed and the main AHU is running 0500- 1900, Rob has updated that those are the required runtimes and I have subsequently updated the platform calendars to reflect this
09/11/2020

Status of action, green tick marks completed actions

Link to the 'view' associated with the action

Score associated with action

The initial comment which created the action

Date action raised and (date of latest comment)

Reply thread which doubles up as an 'audit' trail for the action

Nick Smith re: 3 Brindley Place - ventilation
AHUs (MPW)
3 Brindleyplace
Energy: 4
29/10/2020 (11/11/2020)

Hi James, Please could you confirm that all AHU fans are running 24/7 due to COVID guidance and that this is expected operation. I will then adjust our calendars to reflect this. Thanks

Nick Smith changed status to Action suggested
changed owner to James Morson
29/10/2020

Robert Evans changed owner to Robert Evans
Hi Nick, could you change your calendar to reflect, all main plant ahu's are on from 5am to 7pm all fcus are on 6am to 6pm
09/11/2020 (09/11/2020)

Nick Smith changed status to Completed
Thanks for that Rob - will do. I see that the main AHU has now been brought up to 5am start from 0000 - great. Nick
09/11/2020



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