

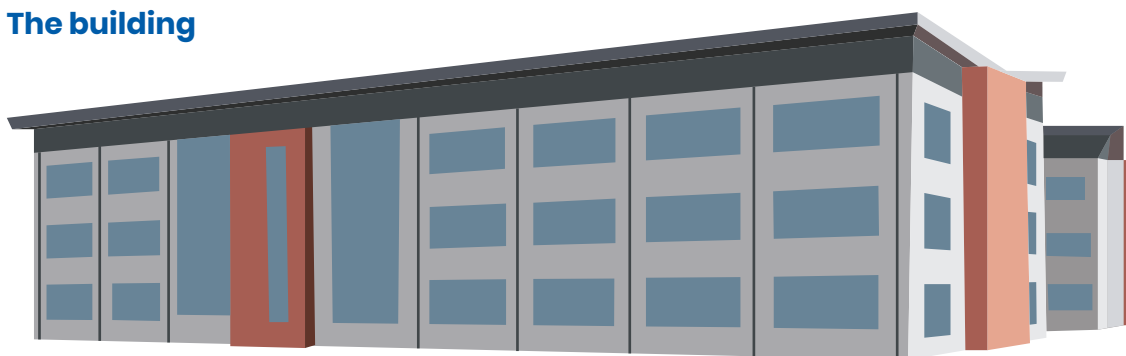
Delivering healthy and energy efficient buildings for British Gas

The pre-COVID-19 challenge



British Gas, and their Facilities Managers were looking for innovative ways to reduce their buildings' energy use and carbon emissions, while maintaining high comfort and air quality levels for staff. Further energy efficiency improvements were challenging as the buildings were already very well optimised. Large infrastructure changes and equipment upgrades would be too expensive, especially when considering disruption to existing operations within the building.

The building



SPINNEYSIDE, LEICESTER

- 3 -floors, 10,000m2 office building
- * Opened in 2003
- Multi-purpose open-plan space with a canteen, call centre, fixed-desks, hot-desks and meeting rooms.
- Trend BMS, controls a central 70 kW Air Handling Unit (AHU) with heat recovery, floor dampers and 256 fan coil units (FCUs).

The solution

LightFi Base sensors accurately, securely and anonymously detect occupancy levels in all variety of spaces inside the building. The Base sensors were connected to the BMS via BACnet/IP. Working with the BMS engineers, Demma Controls, the team commissioned a demand-based HVAC control strategy, which now allows the building to 'breathe' in line with real-time occupancy.

Two types of strategies were written into the BMS:

- Homogeneous ON / OFF FCU control triggered off the real time floor-level occupancy
- OPEN / CLOSED floor damper control, based on floor occupancy (binary), which in turn controlled the AHU fan speed via a pressure sensor downstream of the AHU.

In addition to pre-existing floor sensors, LightFi deployed plug-and-play sensors to monitor indoor air quality throughout the building, including CO2 levels, humidity and temperature. This data is easily available to the FM team on LightFi's Portal, via web or mobile interface.



Installing LightFi



By design LightFi's Base sensors are long-range and only 18 sensors were needed the 10,000m2 building. The installation was quick, cost-effective and non-disruptive with:

- The cabling completed in 3 days during morning and late afternoon, and
- BMS strategy commissioned within 2 weeks thereafter.

Outcomes

ENERGY & CARBON SAVINGS

Working together with M&E consultants, Concept Energy, the delivery team calculated savings of 2,500 kWh per week on the FCUs mechanical load. This achieved a 30T reduction in carbon emissions, - equivalent to planting 1,000 trees. - and resulted in a 2.5 year ROI for the full project cost.

Additional 0-10V variable floor-damper actuator control will add £35,000 per annum in savings, approximately 12% of the buildings HVAC bill, reducing the emissions by a further 110T.

41% LESS COMPLAINTS

The FCU control strategy reduces draughts when spaces are less occupied, and is able to free up cooling/heating capacity to help balance the building, and provide the right cooling/heating where necessary. Thanks to this, the number of recorded temperature complaints from building users dropped by 41% compared to last year.

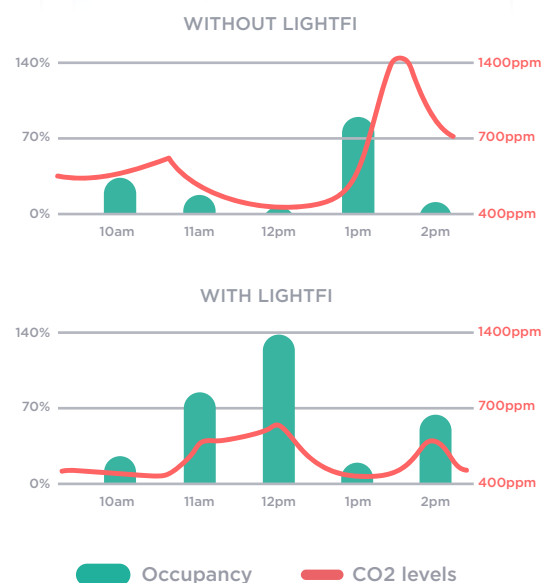
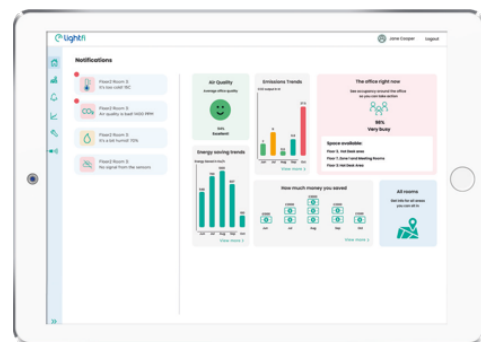
“The FCU control strategy reduced draughts when spaces were less occupied, and was able to balance the building. Number of verbal complaints received by FM teams dropped from 5 daily, to only a few per week.”

PRO-ACTIVE FM

Additional access to live temperature and indoor air quality data for the whole building through LightFi's Portal, enabled the FM team to take on a more proactive approach to managing comfort levels. For example, with LightFi's online dashboards, which are outside of the traditional and complex BMS, the FM team are able to quickly identify temperature sensitive areas and pre-empt potential comfort complaints.

AIR QUALITY IMPROVEMENTS

Historical correlation between CO2 levels and occupancy levels provided further insights on improving indoor air quality throughout the building. Utilising this information and LightFi floor-damper BMS control strategy, the team were able to improve the balance between energy efficiency, indoor air quality and comfort.



Post COVID-19 relevance



MINIMISING VIRAL RISK

To reduce the risk of viral infection transmission indoors, CIBSE and REHVA suggest that air recirculation should be turned off and the building to switch to 100% fresh air intake. As FCUs are essentially 'recirculation' units, but are also necessary to move fresh air into the space, the LightFi FCU strategy is playing a key role in reducing COVID risk. As building occupancy is reduced due to social distancing, using the LightFi FCU strategy and keeping the right amount of FCUs ON would be the best strategy. This ensures the right amount of fresh air is supplied to building users, while minimising the risk of viral infection transmission between other FCU locations on the floor.

HIGH-DENSITY INDOOR AIR QUALITY MONITORING

CIBSE advises that nondispersive infrared (NDIR) CO2 sensors are a useful measure of COVID risk. LightFi's environment sensors called Fresh are NDIR CO2 sensors. Having accessible, real-time data from these sensors allows the FM team to pro-actively manage COVID risk throughout the building.

