

AIR CONDITIONING OPTIMISATION



THE CUSTOMER



The Society of Motor Manufacturers & Traders (SMMT) is the voice of the UK motor industry, representing more than 800 automotive companies in the UK. SMMT operates from their head office on Great Peter Street in Westminster, London which they purchased, refurbished and moved into in 2012.

The five-storey building incorporates four floors of open plan offices and multiple meeting rooms, a ground floor exhibition area for members to showcase their vehicles and a basement refractory.

Birdsall has maintained the building for SMMT since the refurbishment in 2012.

THE CHALLENGE

The challenge of this project was to test the SmarterDM optimisation software in authentic situations over a 12 month period to fully understand its performance and effectiveness. This would allow us to provide SMMT with an effective energy management platform to achieve energy savings and enhanced perception into the operation of their air conditioning system.

"...AFTER ONE YEAR THE FINANCIAL, OPERATING, AND
ENVIRONMENTAL RESULTS WERE VERY IMPRESSIVE"

SVINNY PHUL, HEAD OF IT, SMMT

"BIRDSALL UNDERTOOK THE AIR CONDITIONING OPTIMISATION PROJECT IN OUR BUILDING VERY PROFESSIONALLY. AFTER ONE YEAR THE FINANCIAL, OPERATING, AND ENVIRONMENTAL RESULTS WERE VERY IMPRESSIVE. WE ARE DELIGHTED TO BE ABLE TO CONTINUE TO BENEFIT FROM THE ENERGY MANAGEMENT SYSTEM WHICH WILL BE MAINTAINED BY BIRDSALL.

OUR MEMBERS APPRECIATE THE INITIATIVES THAT HAVE BEEN TAKEN FOR THE BENEFIT OF ALL.

SVINNY PHUL, HEAD OF IT, SMMT

THE OBJECTIVE

The objective was to optimise the air conditioning system to create an improved working space for the occupants, manage the facility in a more sustainable manner and enhance customer satisfaction.

Optimising a buildings air conditioning system first requires an understanding of how the building was designed originally and how it is being used at present and how the occupants wish to use it in future. From there we can devise and implement an air conditioning optimisation strategy to deliver what is required through monitoring, measurement, data collection, data analysis, diagnosis and actions.

Birdsall's air conditioning optimisation services incorporate cutting edge software and hardware to undertake these tasks. Our R&D department are constantly evolving our optimisation models and we implement all these new developments in the field to prove their value.



Daikin VRV Units

THE PROJECT

Birdsall installed a cloud-based energy management system with a link to the existing Trend BMS system to enable the AC system to be closely monitored, managed and optimised.

The project included:



Wireless environment monitoring hardware installed throughout the building to measure temperature, humidity and occupancy in key spaces.



Wireless AC controls hardware installed to give remote scheduling capability based on environment conditions.



Integration with existing Trend BMS to give remote visibility of key systems.



Setup and configuration of alerts to proactively inform the building managers of important building data (e.g. AC faults, high or low temperatures, excessive energy consumption and other system faults).



Design of a user-friendly homepage with data displayed for site electricity.



It was important that we trained the building’s management and maintenance team to use the energy management software, in order for them to work alongside the Birdsall air conditioning engineer responsible for the building to establish a common understanding among all parties.

The system allows the team to access real-time data and manage their energy spend and maintenance regimes in a more proactive manner. The comparison tools within the portal helped to establish site energy baselines and provide a monitoring and measurement platform to verify savings programmes and analyse performance.

We connected to the original Trend BMS which allowed us to bring all of the data onto Birdsall’s own monitoring dashboard. This enables monitoring and control of individual boiler plant and air handling units as well as providing greater scheduling flexibility and set point control allowing changes to be made on desktop and mobiles devices.

Summary Comparison Plant							
ACU Environment Facility Meter Fire System Heating & Hot Water Leak Detection Meter Ventilation							
Equipment Name	Physical Location	Mode	Fan Speed	Set Temp	Drive	Room Temp	Fault Code
Canteen	Lower Ground Floor	Auto	Low	21c	OFF	23.7c	OK
Comms 1	Lower Ground Floor	Cool	High	20c	OFF	21.9c	OK
Comms 2	Lower Ground Floor	Cool	High	20c	ON	19.6c	OK
Comms 3	Lower Ground Floor	Cool	High	20c	ON	20.6c	OK
Radio	Lower Ground Floor	Heat	Low	22c	OFF	22.3c	OK

Through the monitoring we pick up data such as:

- Run Times
- Fan Speed
- Mode
- Air Temperatures
- Fault Conditions

Birdsall can also access the individual AC fault codes to allow diagnosis of faulty plant to be undertaken off site, to reduce time on site and avoid unnecessary site visits if issues can be resolved remotely. This element of the project makes up a key strategic benefit of the system for Birdsall & SMMT.

Birdsall remotely schedule the operation of the individual AC units and controllers around the site. Operating three modes of operation (Normal, Eco and Off) with a view to reducing AC run times to drive energy savings and a clear return on investment for the project. By controlling the AC, master schedules can be set, amended live at any time and local control can still be granted with regular overrides to prevent large time chunks of overspend.

Measurement of environmental conditions across the site is another key part of the project. This helped to ensure desired environmental conditions are maintained for the comfort of office staff and to provide more data to drive more optimised, automated scheduling of the AC units.

We use temperature set points to drive its operation or occupancy profiles to define more optimised times of operation which drives savings by eradicating energy overspend. This temperature data enables us to explore where greater savings opportunities are available for example turning off equipment for short pockets of time throughout the working day.

The deployment of the portal provides the ability to set up monitoring metric alerts such as AC error signs, dirty filters on air handling units and temperatures,



Office Area




Office Area

THE OUTCOME

Over the course of 12 months this project delivered a 14% reduction in electricity consumption. The annual savings achieved to date deliver a return on investment of less than 2 years.

We are confident that further reductions in electrical consumption and monetary savings are achievable in year two of the project once further optimisation of the air conditioning can be implemented, and behavioural trends becomes established.

 Analysis Alarms 29 Admin		
Period	Usage	Cost
Previous Day	505 kWh	£66
Month to Date	505 kWh	£66
Previous Month	18,108 kWh	£2354
Year to Date	165,272 kWh	£21,485
Previous Year	328,952 kWh	£42,764

The monitoring and control of environmental conditions has significantly improved the sustainability of the building and a better understanding of electrical usage and billing is significantly better.

We have also seen additional savings from improved maintenance since installing the technology. We anticipate call-out and remedial costs to decrease as we utilise the system for remote monitoring, which will provide further on-going savings and greater reliability.

THE ONGOING OPTIMISATION

Under the maintenance contract Birdsall will continue to monitor and adapt scheduling of the air conditioning systems based on occupancy data. This will further minimise energy use and maximise savings. This project has already identified further optimisation potential within a number of areas of the building that require only minimal capital costs and behavioural change to deliver and will be implemented in subsequent phases of the project.

The success of this project has meant that we have made this new service model available to all of our customers.

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