

Energy Reduction at the Highways Agency



Busy national organisations require large and often complex premises to manage their operations. The corollary is often heavy energy consumption to power the buildings, their services and their systems.

The Highways Agency is one such organisation, that looks after all of the country's major roads and controls the flow of traffic from 5 control centres situated strategically throughout the country at major motorway nodes. Like all government agencies, it has been set challenging targets to reduce its carbon footprints through energy saving.

As its resident facilities manager, Vinci Facilities, through its Technical Services Department, as asked to assist in the task of securing these significant energy savings.

The centres are, by necessity a 24/7 operation, permanently manned, and the comfort and safety of those operatives is of paramount importance to Vinci. This permanent occupation presents some special circumstances when it comes to energy savings. Equipment tends to run continuously, and there is little downtime where equipment can be switched off. Therefore the solution was to achieve greater running efficiencies.

The first of the buildings to be converted to greater energy efficiency was the modern Quinton control centre, situated just off the M5 and which houses the control centre for the busy Midlands section of the motorway network. Heating is provided by 3 gas boilers providing hot water to a heating coil situated in a central Air Handling System that provides warm air throughout the building.

During the summer months air conditioning is provided by a chilled water coil within the air handling unit (AHU). The air was distributed by a forward facing fan driven by an uncontrolled 7kW motor. Vinci Facilities suggested that significant energy savings could be made by changing this fan for a far more efficient electronically commutated plug fan which could fitted at a low cost into the existing system.

They contacted Efficient Air, who after a through survey to identify no-cost/low-cost initiatives and capital investment opportunities recommended replacing the (supply and extract belt driven backward laminar fans in the existing air handling units with new high efficiency PLUG, direct driven backward curved fan impellers.

The initial prediction of Fan Energy saving of 25% to match the required air volume has been exceeded, and the new installation is now achieving the same air volume and saving an average figure of 54% electrical motor input power. The new fans are running at constant speed 1,405 rpm/48Hz. This modification resulted in a reduction of 30,660 kWh and some 16.9 Tonnes of CO₂ per annum.

For the Supply Fan AHU at 100% Air Volume Efficient Air is calculating an Energy Saving of 54%. This figure equates to a load reduction of 3.5 kW, equivalent to a capital saving of over £2,700.00. The projected payback period for replacing the fan is 27 months. The annual CO₂ reduction for this Unit is 16.9 tonnes.

Changing from conventional belt drive to direct drive has created savings for the Highways Agency on belt maintenance, as well as removing the frictional energy losses associated with belt driven systems. Efficient Air have also designed additional capacity into the new fan arrangement for more air volume if required, and there is an opportunity to reduce air flow even more, to obtain further significant savings

