



## Belfast International Airport drops its carbon emissions by 500 tonnes per year

**The enormous capacity of variable speed drives to offer huge energy savings, while making a substantial contribution to the fight against global warming, has been clearly demonstrated at Belfast International Airport where annual energy savings will top 1,000,000 kWhrs following the refurbishment of a number of the terminal's air handling units.**

Following the previous success of retrofitting VSDs to two 30 kW circulating pump drives, Airport Technical Supervisor Colin Sloan decided to fit variable speed drive control to the 28 fans on the AHUs covering 35 – 40 % of the main airport. "From past experience we knew that VSDs could offer substantial energy savings and with rapidly rising electricity prices, and prompted by the availability of a 30% grant from our energy supplier, Energia, under their Energy Efficiency Scheme, we decided to refurbish a number of our air handling units with variable speed drive control."

Belfast International Airport handles over 5,000,000 passengers per year and the air conditioning system is in operation continuously to guarantee passenger comfort. Some 28 fans, totalling 240 kW of installed load, represent a significant proportion of the airport's annual energy bill.



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Initially the fans were running uncontrolled at full speed with direct on-line start and preliminary measurements had indicated that the motors were oversized and running inefficiently and well below full capacity. Fitting variable speed control would not only offer energy savings but would improve passenger comfort throughout the airport. The building management department of Belfast company VIS Security Solutions carried out a detailed site survey of existing loads and presented a report with showed that with only a 20% turndown on fan speed, the system would return energy

saving sufficient to pay for itself in less than 1 year. It highlighted that conditions within the airport, varying widely with daily and seasonal temperature conditions and passenger numbers, could be stabilised by linking the drives through ModBus & BACnet communications with CO<sub>2</sub> monitors in each of the passenger processing areas, and that this would return the maximum energy savings.

Subsequently, 28 Danfoss VLT® 6000 HVAC drives, supplied by local Danfoss partner Greenville Electrical, were installed and commissioned, initially with the drive



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outputs limited to 30 – 37Hz, pending full commissioning of the air quality monitors. Despite the hot summer conditions, during which the air-con system functioned satisfactorily with the fans at 80% speed, the actual savings exceeded expectations and the energy bill was down by over £15,000 for the three month period. In cooler weather conditions, it is anticipated that savings will be even greater, especially with the AHUs under full automatic environmental control.

According to Colin Sloan “the first quarter savings indicate we’ll get a return on our investment in less than 8 months and comfort conditions for our customers will certainly be improved. It was vital that there should be minimal disruption to the airport during the refurbishment so VIS took every opportunity to simplify the installation process. The use of fieldbus communications reduced the complexity and cost of the control wiring and the new control panels were pre-built and installed

with the existing control panels used temporarily as a junction box.

All of the work was carried out during normal working hours but nonetheless, downtime was absolutely minimal during the change-over and neither the staff nor the passengers noticed any disruption. These savings are so spectacular we’re currently looking at the remainder of our AHUs and indeed every variable load device right across the airport with a view to fitting variable speed drives to them and making even greater savings.”

Once the full climate control system is commissioned, it is anticipated that the annual energy savings will exceed 1 million kWhrs., saving the airport well in excess of £60,000 per year.

The green benefit also has to be considered and Belfast Airport’s new installation will contribute a reduction in carbon emissions of over 500 tonnes annually.



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