Wakefield house awakens to new fan system

Government-owned office building in Adelaide more efficient after EC upgrade

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Energy Comparison

System	Starting Current	Operating current	Annual kWh	CO_2 emissions	Annual operating cost
Old belt driven centrifual fan	>80 A	8.6 A	18,640	12.7 tonnes	$3,540
New EC plug fan	<6 A	4.7 A	9,170	6.2 tonnes	$1,740
Savings			9,470	6.5 tonnes	$1,800
Supply airflow			+10%		
Cooling capacity			+20%		
Fan energy used			-50%		

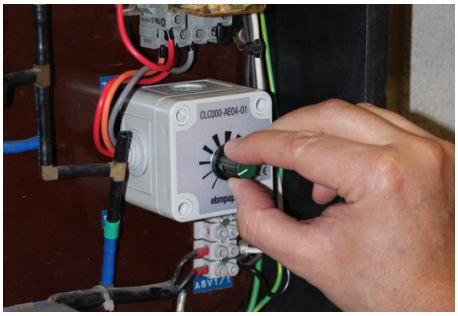
Project

The iconic Wakefield House building in Adelaide, South Australia, was not delivering airflow as per the National Construction Code (NCC) standard due to poor fan installation. Wakefield House underwent a 2-step retrofit program to bring the installation up-to-date and reach compliance with the NCC.

The old belt-driven AC fan system's proximity to the cooling coil reduced the cooling capacity of the AHU, as only part of the coil face was utilised, which resulted in insufficient capacity delivered to the floor.

Locating the fan so close to the cooling coil creates turbulence and increases the system static, which reduces the supply air quantity by approximately 10-15% from design. When combined with the reduced performance of the cooling coil, the net reduction in capacity to the floor is approximately 45% from design.

Application



The EC RadiPac fan pressurises the plenum chamber and provides uniform air pressure and volume across the whole cooling coil, achieving greater capacity. The new ebm-papst EC RadiPac fans were placed away from the coil, and a new damper was installed to provide an equivalent pressure drop, which provides more stable distribution and supply air control.

Product Performance and Benefits

After 2 years in operation, a site evaluation confirmed a 194,000kWh avoided energy usage per annum for the building, equivalent to 132t CO_2e.

As fan energy is typically the most significant consumer of energy in a commercial building, the reduction of approximately 50% from replacing AC fans with EC plug fans had a significant impact on the total energy consumption and reduction in greenhouse gas emissions.

Airflow increased by 10%, returning the supply air quantity to the design figure. Combined with increased coil efficiency, cooling delivered to the floor was increased by approximately 15-20%.