

## SHOWCASE PROJECT: 3M: LABORATORY BUILDING 236 VENTILATION UPGRADE

### SOLUTION OVERVIEW

3M improved the energy performance of one of its main laboratory buildings at 3M Center—the company’s corporate headquarters and primary research and development site—by converting the lab space ventilation system to variable air volume (VAV). The project reduced the facility’s energy intensity by 12 percent against its baseline year of 2010.

As in many research facilities, the laboratory spaces at 3M Center employ fume hoods—ventilation devices designed to capture, contain and exhaust harmful chemical fumes from the laboratory—to allow researchers to safely conduct experiments. Conventional fume hoods exhaust large volumes of air at a constant rate. This translates into very high energy consumption because an enormous amount of energy is needed to ventilate the lab space and provide fresh air from outside that has been treated to meet the safety and comfort levels required for lab occupants.

Improved energy efficiency in a laboratory can be achieved by using VAV fume hoods technology. A VAV ventilation system matches the amount of make-up air in the lab to the amount of exhaust air in the lab in order to maintain negative air pressure in the lab with respect to the air pressure in the corridors as required by code and 3M Safety Guidelines. The system also allows the user to control the airflow needed in the laboratory. Decreasing the amount of conditioned exhaust air where possible conserves energy by reducing the need to replace it with treated air.

### SECTOR TYPE

Industrial

### LOCATION

Maplewood, Minnesota

### PROJECT SIZE

505,000 Square Feet

### FINANCIAL OVERVIEW

Project Cost \$1,430,000

### SOLUTIONS

3M began implementation of the ventilation upgrade during the second quarter of 2011, and completed the project during the second quarter of 2012. The VAV system adjusts the required

airflow needed in the laboratory and reduces the conditioning of supply air. These efforts included the installation of dampers, variable speed motors, fans and additional process controls on 133 exhaust hoods throughout the lab space.

Most of the laboratory buildings at 3M Center are Constant Volume Systems. This is the first existing building that was converted to VAV. There is one other building in the process of being converted to VAV and there is a feasibility study in process to look at a third laboratory building in 2013.

Total project cost was \$1.43 million, though the cost was partially offset by a \$286,200 Process Efficiency Rebate from Xcel Energy, the local electric utility. Preliminary results show a 45,000 cubic feet per minute reduction of air supply, which is equivalent to a 16% reduction in total required volume.

There was some hesitation and apprehension from the researchers during the initial phases of the project and 3M has some punch list items yet to be resolved. Still, considering the complexity of the project, 3M considers the overall construction process to have gone relatively smoothly.

## **OTHER BENEFITS**

The energy efficiency ventilation system upgrade at 3M's headquarters research laboratory building will avoid approximately 6,000 metric tons of carbon dioxide emissions per year—that is equivalent to the emissions from 14,000 barrels of oil consumed. Other benefits were noise level reductions and improved overall general ventilation in the labs.

## Annual Energy Use

(Source EUI)

Baseline(2010)

423 kBtu/sq. ft.

Actual(2013)

372 kBtu/sq. ft.

## Energy Savings

12%

## Annual Energy Cost

Baseline(2010)

\$2,100,000

Actual(2013)

\$1,700,000

## Cost Savings

\$400,000



Upgraded ventilation system at a 3M lab