

# FOCUS ON CASE STUDIES: HVAC AND CONTROLS

## THE PROBLEM

The Kettle Moraine School District identified critical facility and technology infrastructure needs as part of a comprehensive long-term master plan to repair and revitalize their aging schools. In order to address these needs, they passed a referendum in conjunction with their community to improve occupant comfort and save energy district-wide at their facilities. One way they achieved this goal is by improving the heating, ventilation and air conditioning (HVAC) systems at their schools. Improving the HVAC system will:

- **Keep temperature more consistent leading to more comfortable students and staff.**
- **Optimize fresh air being delivered to classrooms which can reduce energy consumption.**

## THE APPROACH

The District wanted to increase occupant comfort and save energy in classrooms and other school spaces. The HVAC system was identified as an area in need of improvement. The existing constant volume (CV) HVAC system was not providing consistent temperatures. In addition to upgrading the HVAC system, air quality would also improve. A variable air volume (VAV) HVAC system was proposed as a solution. This upgrade would improve occupant comfort, but also give the buildings and grounds staff more control over their building. The energy savings also provided a payback and financial benefit to taxpayers of the District.

## THE SOLUTION

In spring 2015, the Kettle Moraine School District contacted Focus on Energy about upgrading the HVAC systems with digital controls in four of their schools. A VAV air distribution system and building automation controls were installed to help vary the volume of air delivered to the space based on the heating or cooling needed per a specific thermostat. This gave the District the opportunity to adequately heat and cool spaces on a case-by-case basis.

In addition to adjusting the supply air temperature based on need, they were able to regulate air flow into a space. These features of a VAV system allow for more precise control of temperatures and utilize outside air for “free cooling” – the method of using outside air in the right temperature zone to cool an indoor space. The District’s Energy Advisor and mechanical contractor were able to combine upgrades at the four schools into one custom project. As a result, The District benefited from more control of the buildings and met its goal of increasing occupant comfort and energy savings.

## Project Breakdown:

- **Equipment Installed:** Replaced constant volume air delivery controls with variable air volume boxes and building automation controls.
- **Benefits:** Improved occupant comfort by delivering room specific conditioned air needs and added more control from building automation system.
- **Annual Energy Savings:** 337,949 kWh and 56 kW
- **Focus on Energy Incentive:** \$41,606
- **Payback:** 4 Years



**The application process was simple enough as our Energy Advisor guided and offered assistance as needed. Chris followed up in a timely manner to keep the process moving.**



**Dale Zabel,  
Director of Facility  
Services/Safety**

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