



Introduction

The Ontario School District is committed to reducing energy consumption by updating their schools with energy-efficient equipment. Condensing, high-efficiency boilers are being installed in both retrofit and new construction projects to provide efficient heating with a decrease in energy use. Thames Valley District Schools have reported more than \$159,000 in energy cost savings after replacing boilers in 30 schools. The Hastings and Prince Edward District Schools are in the first year of an initiative to reduce energy consumption by 5% over 5 years.

Renovation projects continue to take place across the Ontario School Districts as management works to implement cutting-edge technology that will improve educational spaces. Technological advancements have allowed manufacturers, mechanical contractors, and end-users to move away from atmospheric boilers and other near condensing boilers to high efficiency condensing equipment that can achieve 91-96% efficiency.

To continue the momentum of building an Eco-friendly environment for children, school boards across Ontario, Canada have subscribed to energy conservation management systems that regulate the operation of high -efficiency boilers.

“The school boards have learned the effectiveness of boiler maintenance and the cost benefits of protecting their investment.”



Boiler Room Design

During the Spring and Fall, ‘shoulder’ seasons, boilers in the Ontario School District achieve high levels of efficiency because the boilers only operate at partial load. A 130–150°F loop allows the boilers to achieve high condensation levels, which creates energy savings. The majority of the school buildings are currently operating above 90% efficiency.

When two or more boilers are running, it is important to operate the boilers in a modulating mode. Boiler modulation allows multiple boilers to operate at 50% or less instead of running one boiler at 100%. The lower firing rate is spread across the boilers, which helps the boilers achieve higher levels of efficiency. This practice has also been implemented in the redesigned boiler rooms of the Ontario School District.

Piping and venting have also been carefully considered in each of the installations to support the low mass boilers. A primary-secondary piping configuration helps separate the boilers from the system loop. The venting includes sealed combustion that brings cool air from outside of the building directly into the boiler.

This combustion process lowers the temperature of the flue gas to achieve more condensing and higher efficiency.

The NURO® control system assists with maintenance reminders. Each school has a maintenance parameter set point to help schedule maintenance every six months. During complete maintenance, at the end of the school year, the fireside of the boiler is cleaned and the waterside is inspected. The mechanical contractor also performs boiler tune-up and replaces gaskets, igniters, etc. During the winter months, another inspection is performed to ensure that the pH level is within range and the combustion is tuned properly. An analyzer is used to confirm the correct combustion.



Boiler Maintenance

Prior to the boiler room upgrades, there was a lack of performed annual maintenance. With the installation of new equipment, maintenance has become a priority to protect their investment. The school district management team has ensured that mechanical contractors, who continuously perform service to the high efficiency boilers, are properly trained.

“It is important to understand the water make up chemistry for treatment, and the controls of these highly efficient boilers to help extend the life expectancy of the system,” said Steven Weber, Technical Sales Representative at Smith Energy. “They understood what was needed to be accomplished to become more efficient”

Running a boiler at high or low pH levels can be detrimental to a boiler system. For this reason, a pH meter has been installed on every new boiler installation in the school districts to provide daily visibility of the conditions of the water. Prior to installing pH level meters, the process to monitor pH levels was cumbersome and lengthy. The meters have simplified the process and enforce corrective actions. Excess oxygen is also a concern, so air elimination has been incorporated into each boiler plant design.



Continued Support

Each school within the district is committed to a maintenance strategy and will continue to advocate for it with the support of the Ontario School District’s management team. The ongoing relationships between the schools, mechanical contractors, and water quality organizations will help support their efforts to provide an Eco-friendly environment to all children in Ontario, Canada.

Smith Energy and Patterson-Kelley will also continue to provide support by offering training to school custodians and inform them about the proper care of commercial condensing heating equipment and continuous maintenance.

