

HVAC Systems: NJ Energy Program

Project: Roselle Park School District

A \$1.98M HVAC replacement project, delivering +35% in energy savings and qualifying for a 66% rebate from South Jersey Industries Clean Energy Program.

Background

Located in New Jersey, Roselle Park School District was challenged with inefficient heating in two of its five buildings: the Middle School and the High School, which together serve 1000 students. The High School was utilizing two natural gas boilers that were installed in the 1960's, and the Middle School had a steam boiler and steam water heat exchanger that were past their useful life.

After conducting a detailed site assessment, CM3 identified that there was significant energy efficiency opportunity if the District opted to replace its antiquated HVAC equipment while simultaneously adding in some fundamental components which would further optimize the equipment while also prolonging its useful life.

In addition to achieving considerable energy efficiency, CM3 helped the District apply and qualify for \$1.3M in rebates through Elizabethtown Gas (South Jersey Industries) Clean Energy Program.

Results

Under the Clean Energy Program, Roselle Park School District implemented the nearly \$2 million HVAC renovation program in the two schools which resulted in the replacement of the existing boilers, addition of variable speed pumps and inclusion of a magnetic motor.

In the process of replacing the boilers, CM3 was also able to clean and organize the mechanical room in both locations. This provided a greatly reduced boiler footprint so that both schools now have significantly more room in their mechanical rooms.

Additionally, by utilizing condensing boilers, CM3 greatly reduced the need to draw in outside air for boiler combustion. This saved energy and allowed for a more comfortable mechanical room.

The Clean Energy Program provided rebates of 66% of the installed cost for the project. This meant that the District would be responsible for approximately \$649K.

About the program

The Small Business Direct Install Program from the New Jersey Clean Energy Program is designed to help small organizations use less energy and save more on their utility bills. The program is particularly relevant to schools, faith-based organizations and small businesses, because participants in this program must have an annual electric demand of 200kW or less.

The program covers a significant percentage of the upfront cost to install the recommended energy efficiency measures which include:

- » LED lighting and lighting controls (interior, exterior)
- » HVAC upgrades and controls
- » Building automation controls
- » Refrigeration equipment
- » Motors and variable frequency drives
- » Efficient water heating measures

Equipment

High School: Replace two natural gas hot water heating boilers with new, more efficient, smaller-sized condensing boilers. These boilers have an efficiency rating of 96%.

Middle School: Replace steam boiler and steam to hot water heat exchanger with two new high efficiency gas hot water condensing boilers, while eliminating the heat exchanger. By eliminating the heat exchanger, the hot water will be sent directly into the building, which is a more efficient mechanism for providing the hot water into the building heating loop.

Both Schools: Add new variable speed pumps equipped with a permanent magnet motor that will replace the existing inefficient pump for each boiler. The original pumps are single speed, compared to the new B & G Ecocirc pumps that have an internal variable frequency drive which ramps up the energy savings by matching the pump capacity needed at various heating loads. This helps to ensure the system is only using the energy needed to heat the building at any given time.

Both Schools: As the boilers are being installed on older systems, magnetic water filters, equipped with a cartridge that can be easily removed and cleaned, were also installed. The magnetic properties catch metal in the water as it passes through the filter. This ensures that any metal, mill scale, or rust do not get into the boiler and thereby reduce efficiency.

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The combination of the new boilers' efficiency plus the newly-added ability to modulate will allow the District to achieve an estimated reduction in fuel consumption of 35% or more over the original boilers.

- Pat Hannigan

CM3 HVAC & Mechanical Services

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Before



After



ROSELLE PARK MIDDLE SCHOOL

Before



After



ROSELLE PARK HIGH SCHOOL



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