

MIDWEST

St. Paul school is latest to conclude geothermal is ‘the way to go’

Space constraints, energy savings and the long-term return on investment convinced St. Paul Public Schools to install a ground-source geothermal heat pump system at a high school that until now hasn’t had a cooling system.



by Frank Jossi
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Facilities project manager Henry Jerome at Johnson High School, where a an \$18.8 million geothermal project expects to cut natural gas consumption by more than half. Credit: Frank Jossi

A St. Paul, Minnesota, high school expects to reduce its natural gas use by more than half with the installation of a ground-source geothermal heat pump system.

When completed this summer, the \$18.8 million project at Johnson High School will join just a handful of similar systems at Minnesota K-12 schools.

COVID-19 and climate change are both adding pressure on schools to update aging heating, cooling and ventilation systems, and the availability of federal pandemic relief funds has helped more projects move forward in recent years.

In St. Paul, only about a third of public schools have air conditioning — a growing liability as heat waves become more common, resulting in **potentially distracting or dangerous temperatures** in classrooms. The district also has a goal of reducing greenhouse gas emissions from its buildings by 45% by 2030.

Johnson High School, in the Payne-Phalen neighborhood on the city's East Side, is among the sites that has lacked cooling options. Its 1961 facade and interior were refreshed a few years ago but its HVAC system is decades old.

Space constraints limited the school's options. While geothermal systems can require a large underground footprint, relatively little equipment is installed above ground, which along with financial aspects made it a good option.

"Geothermal seemed the way to go," said Henry Jerome, facilities project manager.

The school district hired a local firm, TKDA, to consult on the project. Over the spring, the district hired a contractor to bore 160 wells 305 feet deep into the school's baseball field. A liquid glycol mixture will run through buried pipes, transferring heat between the ground and the school's heat pump.

The school won't be able to entirely depend on geothermal during the coldest stretches of winter. A high-efficiency condensing boiler and two steam boilers will remain in operation when temperatures drop below freezing, but the school expects to cut natural gas consumption by more than half.

The heat pump is expected to be running by August. TKDA mechanical engineer Tim Hoseck said geothermal systems need two to three years to come into balance and will become more stable and efficient over time.

Geothermal can cost more upfront than conventional heating and cooling systems and require enough land for well drilling. But the economics can appeal to schools, governments, and other building owners with long-term outlooks. After installation, the systems require a relatively small amount of electricity to operate.

Peter Lindstrom, a manager for Minnesota's Clean Energy Resource Teams, specializes in helping public sector organizations with clean energy projects. He said geothermal is getting more attention recently as public schools and other institutions aim to reduce emissions and energy costs. Other Minnesota schools that have installed geothermal systems include Pelham, Onamia, and Watertown-Mayer Schools. And it may not be the last in St. Paul.

"I was looking at the energy savings and the potential to reduce our carbon emissions, and that really seemed intriguing," said the St. Paul district's facilities director Tom Parent. "We are going to look at it for other schools."