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Libraries Digging Deep for Geothermal Savings

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Ossining

In the Region

THE opening of Ossining's public library was delayed last year because of problems with the geothermal system, and the building had to be closed for several days so the system could be repaired.

But everything was humming just fine last week as adults read by a fireplace, teenagers cruised the Internet and children did their homework in comfort.

Nine months after the library opened to great acclaim, staff members are keeping an eye on the geothermal system, which uses the earth's constant temperature below the frost line to heat and cool the airy 47,000-square-foot building. During a cold spell this month, they had to reduce the intake of fresh air that gets heated by the system because it could not warm up the frigid air fast enough.

"It's a learning process," said Elizabeth Bermel, the library's director. "We've had to make some adjustments."

Ossining's library, on Main Street, is among three in Westchester that have, or plan to install, geothermal systems. One is under construction in Greenburgh, and Mount Kisco plans to break ground in February on a library incorporating the clean-energy technology.

"We wanted to set an example for the community with a building that's energy-efficient, environmentally friendly and as green as possible," said James M. Palmer, the village manager.

Geothermal systems have become popular as the price of heating oil soars, and building owners seek to cut the use of fossil fuels.

These systems circulate water through pipes that go as deep as 1,500 feet, where water maintains an average temperature of 55 degrees. In winter, the water comes up into the building and goes

through a heat exchanger that extracts heat. The heat generated evaporates a refrigerant, with the evaporated gas drawn through a compressor that creates heat to warm the air.

In summer, the process is reversed, as water goes through the exchanger to condense the refrigerant gas that has already been evaporated by the room air. That creates a cooling effect.

Ossining cut the library's heating and cooling costs sharply. When the library was designed two years ago, heating oil was $1.71 a gallon, and the library's engineering consultant predicted the geothermal system would cost $16,273 a year to run, about half the cost of fuel and electricity for an oil-fired boiler and air-conditioning system. With heating oil now at $3.10, annual savings are estimated at $37,000.

Installation can be more expensive than for traditional systems. But with lower operating costs, owners can recoup added upfront costs over time. Ossining, for example, expects that to happen in less than five years, while Mount Kisco, whose new library will be about a third the size of Ossining's, expects the payback to take more than 15 years, Mr. Palmer said.

And installation is not without risk. Ossining has what is called an open system, which circulates water from the aquifer. While drilling one deep well, earthen material around the pipe collapsed, said Salvatore Coco, the project architect. Engineers eventually found that sediment from the collapse had clogged the system; the library was closed while the system was purged.

"We got all the debris out of there, and since then, we haven't had a problem," Mr. Coco said.

In Greenburgh, engineers wanted to drill five wells, 1,500 feet deep, to heat and cool the library, on Tarrytown Road. But New York City's Delaware Aqueduct runs 1,300 feet under the site, and city officials objected to drilling too close to it, said Mr. Coco, who is also the architect for Greenburgh's library.

They ended up drilling 40 wells, 500 feet deep, to heat the 48,000-square-foot building.

In Mount Kisco, engineers plan to drill 30 wells, 450 feet deep. Like Greenburgh's, Mount Kisco's will be a closed system, which uses a solution of water and antifreeze and does not tap the aquifer, said Laurence J. Barile, an engineer whose firm, Damiano Barile Engineers of White Plains, is also installing a geothermal system at the Post Road Elementary School in White Plains.

"With oil prices so high," Mr. Barile said, these systems "become very competitive."