CASE STUDY

Olmsted County: Building on Experience to Deliver Smarter Sustainability

BUILDING & HVAC SYSTEM HISTORY

Built in 2009, the Olmsted County Public Works facility brought together the county's infrastructure operations in one central location. The large, multipurpose complex supports an impressive range of departments — from engineering and inspections to soil and water conservation, parks and recreation, traffic management, and fleet maintenance.

Originally, the building was designed as a model of efficiency, featuring one of the first geothermal pond systems in the county portfolio. Using pond water on the condenser side, the system was considered state-of-the-art at the time. However, maintaining high efficiency levels proved challenging. The single-loop configuration struggled to meet heating demands, leaving operations teams continually fine-tuning performance.

Despite these hurdles, the building's design and location — an expansive prairie site near a former quarry — positioned it well for future growth. By the early 2020s, the county had outgrown the facility and needed additional space and modernized systems that would align with new climate and energy goals, which ultimately led to a building expansion and installation of a retrofitted Darcy geothermal system.

"Once we saw the life-cycle data and realized how much the IRA incentives could offset, the decision became simple."
— Ben Johnson, Olmsted County Engineer

2
WELL SYSTEM

612
MBH HEATING DEMAND

45
TONS COOLING DEMAND

DECISION-MAKING PROCESS FOR RETROFIT

The retrofit was driven by both necessity and opportunity. Olmsted County needed to expand capacity for its growing departments while modernizing systems to reduce emissions and long-term costs. When the County Board launched a new Climate Action and Energy Plan, leaders committed to building electrification and energy reduction across facilities.

Decision-makers evaluated several HVAC options — from boiler/chiller systems to advanced geothermal — analyzing each through a life-cycle cost lens. While geothermal required higher upfront investment, federal IRA incentives significantly improved the financial case, covering up to half of the eligible costs. The system's efficiency, low operational footprint, and compatibility with the county's sustainability goals made it the clear choice.

Still, the proposal required convincing a few skeptics. Some staff remembered the original geothermal system's struggles and were cautious about repeating past issues. But the new Darcy Solutions aquifer-based system presented a fundamentally different approach — a closed-loop, compact design that addressed prior reliability challenges.

DESIGN & CONSTRUCTION

To bring the project to life, Olmsted County assembled a collaborative team including Facilities Director Matt Miller, Building Operations Manager Greg Larson, Chad Schuman, and the HGA design team, with Darcy Solutions leading geothermal design and implementation.

The site's open landscape simplified well placement and left room for future expansion. However, coordination among multiple contractors introduced complexity, particularly around well inspection and integration points. The team also faced regulatory learning curves, as state agencies were new to Darcy's aquifer thermal technology.

Despite these challenges, construction remained on schedule. Once installed, the system's small footprint and minimal disruption were welcome surprises. "After we understood how Darcy's system worked, it was remarkably simple and efficient," said Larson.

LESSONS LEARNED

- **Engage operators early.** Involving long-term system operators in design decisions leads to smoother commissioning and better performance.
- **Train and communicate.** "There's no school of Darcy," said Miller — meaning education and collaboration are key to integrating new technology.
- **Plan for resilience.** Backup systems and redundancy should be part of any geothermal strategy in a northern climate.
- **Estimate conservatively.** Early test wells and clear scope boundaries improve cost accuracy and reduce project confusion.
- **Upgrade strategically.** Larson noted that updating internal building equipment during the geothermal retrofit might have further optimized performance.

Ultimately, after a brief learning curve, the system performed as expected — cutting energy costs, reducing emissions, and aligning seamlessly with county sustainability goals.

A MODEL FOR WHAT'S NEXT

With the Public Works retrofit now in operation, Olmsted County is already applying lessons learned to upcoming projects — including the Graham facility, which will use similar geothermal technology to take advantage of Inflation Reduction Act incentives.

For county leaders, this is about more than one building. It's about modernizing public infrastructure to match the region's sustainability ambitions — creating efficient, resilient systems that serve today's needs while preparing for a carbon-free future.

As Miller summed it up: "We're learning as we go, but the results speak for themselves. We'd make the same decision again."

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