



GEOHERMAL HEAT PUMP CASE STUDY:

PCC Austin Family Health Center

First Illinois Community Health Center With Geothermal



Name: PCC Austin Family Health Center

Location: Chicago, Illinois

Size:

- 18,300-square-foot facility
- 7 boreholes, each drilled 650 feet deep
- 15 small-package heat pump units ranging from 0.75–5 tons

Unique Features:

- The energy recovery ventilators in the system reduced the calculated thermal load by approximately 25%–30%, in turn reducing the required equipment capacity and loop field capacity

Energy Savings: Estimated to save about 600x10⁶ Btu (approximately 180,000 kWh)/year compared to an air-source heat pump system with electric resistance back-up heat meeting ASHRAE 90.1 energy standards

Cost Savings: Estimated to save about 57% in energy costs compared to an air-source heat pump system with electric resistance back-up heat meeting ASHRAE 90.1 energy standards

Geothermal Trendsetters. The PCC Austin Family Health Center was a new build in 2009, pioneering the use of geothermal heat pump systems in community health centers in the state of Illinois. The system heats and cools one building with seven boreholes drilled to depths of 650 feet. *Photo from PCC Austin Family Health Center*

Serving the Community by Choosing Geothermal

When PCC Community Wellness Center (PCC) leadership first envisioned the PCC Austin Family Health Center, they saw a building that showed commitment and care to the people it served. The PCC Austin Family Health Center provides health care services to underserved community members in the Austin neighborhood of Chicago. Residents of Austin are disproportionately lower-income and mostly people of color, a population historically overexposed to industrial pollution. Leadership decided PCC Austin Family Health Center would be different—entirely heated by geothermal from the start, limiting its emissions.

An engineering consulting design firm designed the facility's geothermal heat pump (GHP) system in 2007–2008. At the time, geothermal heat pumps were uncommon in Chicago. But the concept was

promising, and the system's clean energy features would add to the proposed health center's community benefits.

A Small but Mighty System

The engineer consultants identified small-package heat pump units as the simplest and easiest-to-maintain solution for the health center building. Fifteen such units, ranging in capacity from 0.75 to 5 tons of refrigeration, were installed in the ceiling space, five for the first floor and 10 for the upper floor.

At this site, small packaged heat pump units were less expensive to install than reversible chillers serving air handling units. Because they are installed indoors, they are also easier to maintain in the notoriously cold and harsh Chicago winters. The engineers learned during construction that the ceiling space needs to be roomier than systems that might be placed outside or on a roof to accommodate maintenance workers.

The system consists of 7 boreholes that are each 650 feet deep, but this was a change from the original design of 20 boreholes, each 300 feet deep. Contractors found unanticipated underground concrete structures on the site, including an old foundation, so the drilling contractor redesigned the field using a deeper borehole length with fewer boreholes. This alternate design has now sustained 15 years of good performance with the field still operating within the expected temperatures.

Opportunity To Gain a Competitive Edge

The building's geothermal heat pump system was unique when it was being developed and served as a talking point for fundraising and garnering support for the project. In fact, other health centers in the area visited the site during construction with an interest in using a similar system in their own facilities, even going so far as to hire the same contractor. The PCC Austin Family Health Center was so successful, PCC built a second facility down the street with an identical heat pump system.



The two-story, 18,300-square-foot PCC Austin Family Health Center is LEED Gold certified. The center provides medical care, dental care, and counseling to underserved community members. *Photo from PCC Austin Family Health Center*



I would recommend a geothermal heat pump system to other health facilities without reservation. It's great for funding opportunities, it's great for publicity, and it's great for the world. ”

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