



GEOHERMAL HEAT PUMP CASE STUDY:

Norton Commons, Kentucky

1,200+ Homes Heated and Cooled
by Geothermal Heat Pumps



Name: Norton Commons, Kentucky

Location: Prospect, Kentucky

Site Type: Multiuse community

Size:

- 600-acre community with 1,200 single-family homes and 500,000 square feet of commercial space
- Multiple 350-foot deep boreholes for every single-family home and business, depending on property size and energy load
- Plans to double in size over the next several years

Unique Features:

- One of the largest residential communities heated and cooled by geothermal heat pumps in the United States
- Developed in close collaboration with drillers, builders, contractors, and manufacturers

Cost Savings:

- Average annual savings of 45% over fossil fuels
- 30% tax rebate from ENERGY STAR® Program and 2022 Inflation Reduction Act

Funding Sources:

- Each geothermal heat pump system is integrated into the property costs ahead of construction

Norton Commons is a community heated and cooled by geothermal heat pumps near Louisville, Kentucky. *Photo from Norton Commons*

Powering Neighborhoods With Geothermal Heat Pumps

While many communities in Kentucky are powered by traditional energy methods, Norton Commons was faced with a challenge that became apparent during the construction of their first neighborhood, called South Village. HVAC condensers and compressors, which are often bulky and noisy, were too cumbersome for this high-density community. In order to improve livability and reduce sound pollution for their second neighborhood in 2013, North Village, Norton Commons decided to install geothermal heat pumps (GHP) for all residents. Located just east of Louisville, Kentucky, it also includes over 500,000 square feet of commercial space in addition to parks, recreational areas, and civic amenities that support two distinct villages of 2,880 total residences.

The North Village neighborhood boasts a feature not seen in most similarly sized communities in the United States—a vertical, closed-loop geothermal heat pump system for every individual home, business, and community resource. This style of system was chosen due to the wide variety of mixed-use structures, including large and small residences, living/workspaces, stores, schools, and a church.

A More Dynamic Community Without the Noise

The collaborative nature of the building process helped both existing and new residents of Norton Commons remain open to the idea of a community heated and cooled by geothermal heat pumps. After a lot is sold, it takes one day to drill the looping boreholes that make up the geothermal heat pump system before the owner takes possession. The quantity of boreholes can vary with property size and energy demands, with a minimum of two for a standard single-family home.

Drilling companies work hand-in-hand with 15 different builders to maintain the architectural standards of Norton Commons, and with the geothermal heat pump manufacturer and its distributor, to ensure that each installation is performed correctly. The process takes one day before the home is built and can support a 4- to 5-ton heat pump that is usually situated underneath the garage.

The dense neighborhoods of Norton Commons were particularly well-designed for geothermal heat pumps, as many of the single-family homes are only 6 feet apart. With traditional condenser units producing approximately 60–65 db of noise, several clustered condensers can create a large amount of sound pollution. Switching to geothermal heat pumps has created more peaceful neighborhoods across Norton Commons, improving the quality of life for its residents.

Energy and Cost Savings

At Norton Commons, the cost of individual geothermal heat pump units varied due to a wide variety of building sizes, but the energy savings and the reduced maintenance costs on a per-lot basis usually lead to a payback period of just 6–7 years for most systems in the community.

A Future Bolstered by Geothermal Heat Pumps

Aside from cost, one of the biggest surprises for Norton Commons was how eager buyers were for this type of clean energy solution. New buyers readily accepted the installation of geothermal heat pump systems for their new residences, while the broader local community was excited to hear about the enhanced energy efficiency



Geothermal heat pump drilling at a new housing development in Norton Commons, North Village, Kentucky.

Photo by Norton Commons

and the adoption of green energy solutions within the development. Norton Commons found that connecting their builders with the geothermal heat pump distributor personally for a “first look” at the technology was instrumental to success, as was prioritizing media interviews about the energy-efficient systems for public awareness.

North Village continues to grow, and Norton Commons expects the number of individual residences with geothermal heat pump systems to double in the coming years. The aesthetics and peaceful nature of the neighborhoods will be one draw for new residents, as will the ENERGY STAR program, bolstered by the 2022 Inflation Reduction Act, which offers a 30% government tax credit on geothermal heat pump system installation for owners.



We were kind of surprised with the infrequent questions about geothermal and why we were mandating this type of system because in larger structures the cost was sometimes higher. But people were excited, agreeing very quickly. ”

Marilyn Patterson, General Counsel & Marketing Director at Norton Commons

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