

SPOTLIGHT

A CASE STUDY PUBLICATION BY GEOSTAR



CASE STUDY

01

Hunt Country Vineyards in Branchport, New York

Award-winning New York winery heats and cools with geothermal systems

Objective: To reduce environmental impact of the winery while simultaneously saving money on operation costs. Read on to see how GeoStar geothermal was perfect for the job.

Vineyard Size: 2,755 Square Feet

Unit Type: GeoStar Aston Series Hydronic

Number of Units: 6

Loop Type: Vertical loop in eight 375 ft. wells

Located in the heart of New York's celebrated Finger Lakes wine region, Hunt Country Vineyards is a family-owned farm and winery. The 170-acre farm has been home to the Hunt family for six generations. Today the farm includes 50 acres of vineyards, where the family grows 13 varieties of cool climate grapes using sustainable agricultural practices.

Hunt Country Vineyards earned national attention in the 1990s as a pioneer producer of Vidal Blanc Ice Wine. But the pioneering spirit at Hunt Country Vineyards is not limited to wine production. In 2015, the New York Geothermal Energy Organization presented its 2015 Top Job award to Hunt Country Vineyards and Moravec Geothermal for the vineyards'

innovative geothermal heating and cooling system.

Installed in 2012, the system supports the sustainability goals that are so important to the Hunt family. "It's all part of trying to optimize our environment for long-term sustainability," said Art Hunt, founder and owner.



GeoStar Aston Hydronic System & Air Handler

The GeoStar Aston Hydronic system and air handler used at the winery are engineered for high-volume demands and feature advanced technology and innovative components to achieve the highest levels of performance and comfort. To learn more about GeoStar products, visit us at geostar-geo.com.

Contracted and installed by:
[Moravec Geothermal | moravecgeothermal.com](http://moravecgeothermal.com)

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Geothermal system offers substantial energy savings

A geothermal system takes advantage of free energy stored just below the surface of the earth. Using a series of pipes (an earth loop) buried in the ground and a geothermal (sometimes referred to as a ground source) heat pump, the geothermal heating and cooling system extracts heat from the earth and carries it to a building in the winter. An indoor unit compresses the heat to a higher temperature and distributes it throughout the structure. In the summer, the process reverses, and the system extracts heat from the building and rejects it to the earth. In both cases, the geothermal system delivers consistent temperatures and efficiencies that exceed those of conventional heating, ventilation and air-conditioning (HVAC) systems, offering savings as high as 70 percent for heating, cooling and hot water.

Prior to installing the geothermal system, the winery depended on a combination of propane, fuel oil and electricity to provide heating and cooling for the wine-making operation. In 2011, Hunt approached Kevin Moravec, owner

of Moravec Geothermal, Penn Yan, New York, with thoughts of installing a geothermal system at Hunt Country Vineyards. But it wasn't until 2012 that all the pieces fell into place, including a \$102,000 grant from New York State Energy & Development (NYSERDA) that helped fund the system.

Critical to the success of the project was Phoenix Energy Supply, in Auburn, New York, which provided piping materials, pumps and valves. Under the direction of John Manning, president of the company, Phoenix Energy Supply also helped with designing the system, laying out the loop field and doing subassembly work, while Moravec Geothermal coordinated the installation of the loop field and the GeoStar equipment that anchors the system.

Eight bore holes feed into 20-ton vertical closed loop

The loop field is a 20-ton vertical closed loop comprised of eight 375-foot-deep bore holes. “Although it’s commonly understood that laying a horizontal loop field is typically less costly than drilling bore holes for a vertical

loop, in this case we would have needed the better part of an acre to put in a loop field large enough to meet our needs,” said Hunt. “The bore holes only required a 20- by 40-foot piece of property. The 750 feet of piping that goes down and back up each bore amounts to a loop that contains approximately 6,000 feet of piping.”

All of this piping comes together in a single manifold that feeds into the tasting room building. From there it is distributed to two four-ton and four three-ton GeoStar Aston geothermal heat pumps and three GeoStar air handlers that provide heating and cooling to this building as well as the production building and the storage facility.

GeoStar Aston heat pumps use environmentally safe R-410A refrigerant and include dual capacity Copeland Scroll™ compressors to provide heating, cooling and hot water assist in a single unit. Dual capacity means the compressors can run at two speeds based on the needs of the system. So instead of bursts of air to allow a normal furnace to “catch up,” the Aston keeps the temperature and air flow regulated at a



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steadier, quieter rate for improved comfort and efficient operation.

“Historically, you might install a geo loop field for each of the buildings and bring each field to a heat pump that serves the building,” explained Manning. “What you lose when you do that is the benefit of having a large, consolidated loop field that can mix all the different thermal loads of the buildings. So, one building may need air conditioning, while another needs process heat. The design at Hunt Country Vineyards is like a mini energy node that allows heat or cooling to be moved around and shared from a consolidated loop.”

Two-stage cooling provides even, efficient comfort

According to Moravec, the six GeoStar heat pumps are stacked in pairs, creating two stages of operation for each of the three buildings. “We did this instead of installing three much larger units, whose full load would not be required most of the time. This design provides maximum conservation of energy. The more heat pumps that need heating or cooling, the faster the pumping system works.

“I wouldn’t say this system is unusual or unique,” Moravec continued. “But I would say that it’s rarely used because of the complexity of controlling flow across about an acre of property. That’s really the biggest challenge—that and the fact that in this case we were retrofitting a 100-year-old farm and weren’t sure what we were going to find as the work began. But once we got inside the buildings, there wasn’t much that separated what happens there from what happens in a typical residential set-up.”

Manning agrees that the system at Hunt Country Vineyards did not present any challenges out of the ordinary. But he did add, “I think in general, the practice of geothermal is a bit of an art. It’s not plug and play, and it’s not cookie cutter. You really have to pay attention to details and do your calculations carefully. Just as important, you must listen and gain an understanding of the wants and needs of each customer, because geothermal can address a variety of needs beyond heating and cooling.”

Geothermal heating critical to fermentation process

As an example, Manning points to Hunt Country Vineyards, where geothermal plays an important role in the fermentation process. According to Hunt, the winery harvests its red grapes late in the growing season to ensure maximum ripeness and the best red wines. That may mean leaving them on the vine until temperatures drop to 40° F.

“If you think about putting 10 tons of 40-degree grapes in a tank, that’s a huge thermal mass,” said Hunt. “They won’t ferment until the temperature in the tank rises above 60 degrees, preferably in the 70- to 80-degree range. So, we heat the grapes by running the warm glycol mixture supplied by heat pumps through jackets on the outside of the tanks. Once the temperature in the tank rises to 60 degrees, the yeast begins to ferment, producing additional heat to warm the grapes.”

The tanks are heated a second time to warm wine that has been cold stabilized to remove tartrate crystals and create a smoother wine. “If you run ice cold wine into a bottling line,

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you’ll get condensation on the outside of the bottle, and the labels won’t stick,” said Hunt. “So we pump the wine into a clean tank and warm it.”

“This demonstrates that systems like this work in all different types of applications,” said Moravec. “There’s not a situation out there that we can’t address with geothermal.” In the case of Hunt Country Vineyards, the geothermal system has saved the winery approximately \$10,000 to \$12,500 in annual propane/fuel oil/electricity bills, while providing increased comfort in summer and winter for all the winery facilities.

“We’re always looking for ways to increase sales and efficiencies, Hunt said. “So we’re just thrilled with the geothermal system.” But Hunt isn’t resting on his laurels. The

winery recently installed 348 photovoltaic solar panels on the roofs of the winery, workshop and tasting room. Hunt estimates the solar panels will supply 70 to 75 percent of the winery’s electricity needs. “We’re also replacing traditional light bulbs with LED lights, and at some point in the future, we’d like to replace our chillers, using the geothermal system to chill our wines.”

Each of these steps—the installation of the geothermal system and solar panels and the replacement of light bulbs along with agricultural practices that include cover crops to prevent soil erosion, the use of natural materials to enrich the soil and composting—stakes a claim for the future. “Sure, it’s important that we take steps to save money and improve profits,” said Hunt. “But as we conserve energy with geothermal

systems and solar panels and improve the land we farm, we’re really investing in our future—the seventh generation of Hunts already running around the property—so that one day they, too, can enjoy this land and the lifestyle it supports.”

