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Photos:  
**John Herr Photography**

# Old House Goes **GREEN** with geothermal retrofit

**M**aintaining the historical aesthetics of an old stone home while reaping the benefits of the newest geothermal technology can be a challenge. Especially if no central HVAC system preceded the arrival of new systems. Fortunately for the family of Susan and Spencer that's the type of work Pennsylvania based Vertex Mechanical specializes in.

The homeowners purchased the property and the old stone home-stead in 2001. Built in 1851, their 4,700-square foot, seven-bedroom home required a lot of TLC before it became the historical showcase it is today. When they decided to restore the home, they also wanted to maintain its old-world charm.

The task would require installing mechanical systems in a house that had no previous ductwork, all without ruining the historical feel and appearance of the home. Great diligence was required to hide ducts, and they had to deal with a fat fieldstone foundation and walls, in some places three-feet thick.

In the few years prior to the retrofit, the homeowners were paying between \$8,000 and \$10,000 a year for all electric and fuel oil. The number dropped to \$4,400 for the first year after the system was installed.

"The old home had its own bag of tricks for us to deal with, complicating the mission at every turn, but we eventually found a solution to all of the challenges," said Vincent Youndt, president of Vertex Mechanical.

"I was very impressed with Vince's eagerness to keep the integrity of our historic home intact," said Susan.



**717.335.2633**

[www.Vertex-Mechanical.com](http://www.Vertex-Mechanical.com)  
[www.geothermalPA.com](http://www.geothermalPA.com)

Vertex Mechanical Inc. began in 2002 with the merger of two companies, Ray Youndt & Son Heating and Cooling and Robert E. Martin Electrical Contracting, combining over two decades of mechanical experience and excellence. Company President, Vincent Youndt leads a hands-on management team and expert technical crew, providing the best in mechanical design, installation and service.

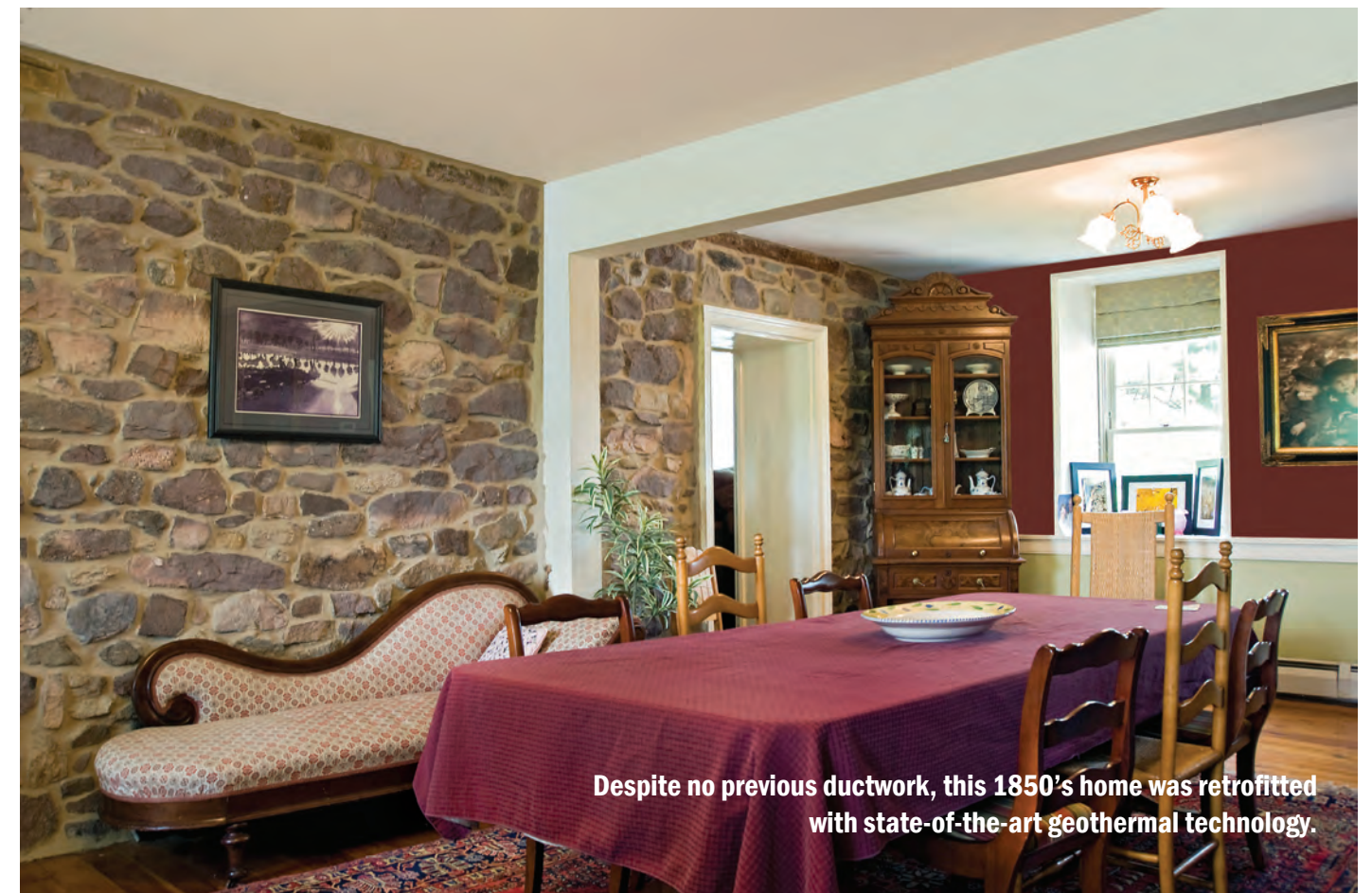
Vertex specializes in geothermal heating and cooling, custom solutions for homes without existing ductwork, heat pump replacements and furnace upgrades. We will work with the homeowner to ensure that the system we offer will be energy and cost efficient while providing optimum comfort for their family.

Before deciding on what system to install and what contractor to go with, Susan spent months researching new mechanical system possibilities for the home. Since Susan and her husband, Spencer own Abacus Sports Installations, a firm that installs green and U.S. Green Building Council LEED

accredited recycled rubber floors, they are both familiar with sustainable products and technology, and they are passionate about the environment too.

"I've always had a desire to do what's right for the environment," said Susan.

And so, she spent time researching mechanical systems on the web, spoke with several manufacturers and mechanical contracting firms, and visited regional home shows to learn about the variety of systems available. Her search led her to explore the possibility of geothermal heating



Despite no previous ductwork, this 1850's home was retrofitted with state-of-the-art geothermal technology.



and cooling. She knew that the installation she was looking for would be an important investment. Susan was adamant that the equipment, and the workmanship, be the best she could buy. After all, their new (old) home is one they plan to raise their family in (Susan and Spencer have four boys).

“We specialize in mechanical systems for historical homes and buildings,” explained Youndt. “We practice what we preach [the firm’s shop is an old, brick, five-story tobacco warehouse, renovated and outfitted with a **ClimateMaster** geothermal system].

Geothermal systems are so flexible. You can do almost anything with the variety of systems manufacturers offer today: forced air, hydronics, radiant heat, dehumidification, integration with solar and so much more.”

### Split Systems

The home has two **ClimateMaster Tranquility** geothermal water-to-air



Vince Youndt performing a routine service check on the system (above) as well as its air handler section (below).

systems. A three-ton TTV038 packaged system located in the basement takes care of the first floor while a three-ton TTS038 split system handles the upstairs. The gables are vented with a fan to evacuate warm air in the summer.

“We especially like using split systems,” said Youndt. “These enable us to place a condensing unit in the basement where it should be, and from there run refrigerant lines to an attic air handler which, as it turned out, worked perfectly.”

Both systems share a six-ton (total of 600 lineal feet) bore hole. What sets this apart from most geothermal applications is the way the systems are used.

According to Youndt, the home’s geo systems are not typically run simultaneously at full capacity. In the winter, the downstairs packaged system runs primarily in first stage cycling into second stage as temps go down. Using the entire six-ton capacity of the bore hole for the three-ton unit raises its maximum performance.

In the summer, the roles are reversed. The upstairs split-system runs full time in first stage, cycling into second stage as needed, utilizing the first floor mostly in first stage. In both cases, the opposing system is not running very hard, thus increasing entire system efficiency.

To run ducts, all floorboards were removed and the flexible duct was run against the floor joists. Blown insulation was used to fill the joist bays, and the flooring was laid back down.

“We use high quality flex duct,” said Youndt. “We can’t afford to use a duct that’s going to give out in 10 years.”

The walls remain stone on both sides, which was a key consideration when calculating the unusually high heat load of the old home. Compared to a modern stick built house, the retrofitted home is shedding as much thermal energy as a building twice its size.

### Going GREEN

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“It’s sure nice to have central air conditioning as well as being environmentally friendly and saving money,” said Susan. “We also have family overseas, and when they come to visit, they stay for a long time. We didn’t like the idea of running out of hot water.”

Domestic hot water is provided by a de-superheater and two 50-gallon **Bradford White** water heaters.

“The first water heater in line acts as the buffer tank for the geo, with no electrical power to it,” explained Youndt. “The second tank maintains the top end of the water heating temp, and is also there for shoulder season back-up heat when geo systems aren’t running steadily.”

“It’s been my dream to have a self-sustaining, off-the-grid house, some day complete with a power-generating wind turbine and photovoltaic panels, too,” said Susan. “The geothermal system is the first step in our plan for making renewable energy a bigger reality here. I guess that means we’re going green, all the way.”

R&A



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