
## Case Study

# 1920s Church Gets Geothermal HVAC Upgrade

In 1949, the historic 93-year old First Church of Christ, Scientist, in downtown Tampa, Fla., was upgraded to include an air conditioning and heating system. The beautiful architecture and stately appearance was enhanced by what it was missing: outdoor HVAC equipment. Most HVAC systems require an outdoor condenser, or cooling tower, to provide the cooling needed for the structure. But, the innovative engineers of that day found that instead of installing a thirsty cooling tower for the water cooled chiller located in the boiler room, they could use the abundant groundwater resources available. What they had stumbled on, whether they knew it or not, was perhaps the first geothermal HVAC system in the Tampa Bay area and perhaps all of Florida.

*The historic 93-year old First Church of Christ, Scientist, in downtown Tampa, Fla., was upgraded to include an air conditioning and heating system.*

The geothermal HVAC industry has been organized and recognized for over 30 years. Some of the first geothermal HVAC systems appeared 60 or more years ago. But, if you do the math, it becomes obvious that this geothermal HVAC system, circa 1949, has been in operation for 65 years. So, all good things must come to an end, right?

Well, not so quickly. The chiller for the air-conditioning system has indeed lived a fruitful life. When it came time to determine its replacement, the board of trustees for the church considered all of their options. They hired a geothermal HVAC consultant, and heard recommendations for installation of a standard air-cooled system or staying with a geothermal system. After having the geothermal well (class V pump to reinjection thermal exchange) tested, and determining that it remained capable of operation for another 50 years, they decided to move forward with the design of a geothermal HVAC replacement/upgrade.

When the dust settled, Tampa Bay's CGM Services emerged as the contractor of choice. Though the engineer had specified Trane equipment, FHP/Bosch geothermal HVAC equipment was chosen for the project because of the quality, reputation, customer support, and price of the Bosch/FHP geothermal products. CGM went right to work and installed two water-to-air heat pumps; the FHP 12.5 ton EC151-3VTC-FBT, and the 24-ton EC300-3VTC-FBT. Installation was guided under the careful watch of Mike Charles, president of CGM Services. The First Church of Christ, Scientist now has a state-of-the-art, modern geothermal heat pump installation

One of the best traits of geothermal HVAC systems is elimination of outdoor equipment and the associated noise. The systems also help with weather-related

equipment failure, general outside maintenance, and related storm/hurricane issues. It's fairly well known today that geothermal is the most energy efficient heating and cooling technology available. The factors that make geothermal even more valuable to owners has to do with other tangible benefits inherent only to geothermal HVAC systems, like elimination of outdoor equipment just mentioned.

The church leaders are happy with the install. Linda Doty, chairman of the committee for the HVAC replacement, said she is grateful that the church stayed with the geothermal HVAC system. Among the benefits gained by the church, she cites the following:

1. No outdoor condensers
2. Hurricane proof (HVAC equipment wise)
3. Excellent system longevity
4. Elimination of fossil fuel consumption (the original system used a boiler for heat)
5. Superior comfort in heating and cooling modes (a light and airy ambience, lower RH)
6. High system energy efficiency

How long will the new equipment last? Maybe not 65 years, but one can be reasonably sure that it will last much longer than a standard air conditioning and heating system. Plus, it will provide money saving energy efficiency over its operational life. Standard high-efficiency air-conditioning and heating systems are rated in Seasonal Energy Efficiency Ratings (SEER). The "seasonal" part of the rating has to do with fluctuations in outdoor air temperature to which standard air source equipment condensers are subjected. Geothermal HVAC systems are rated in Energy Efficiency Ratings (EER). The "seasonal" part is not an issue since the geothermal well source is stable at 76°F all year.

The rating systems are loosely related, and the Bosch/FHP geothermal heat pump equipment provides an equivalent of 14-15 EER (about 18 Seer equivalent in central Florida) compared with similar equipment at 10 SEER. Suffice it to say, this is a considerable savings in energy consumption.

*Geothermal heat pump systems remove between three and four times more energy from the electrical grid than solar and wind renewables provide to the electrical grid per dollar spent.*

*Geothermal HVAC technologies are recognized by the Department of Energy as "renewable energy technologies," much like solar photovoltaic and wind power.*

Geothermal HVAC technologies are recognized by the Department of Energy as "renewable energy technologies," much like solar photovoltaic and wind power. In a comparison between these renewables, geothermal heat pump systems remove between three and four times more energy from the electrical grid than solar and wind renewables provide to the electrical grid per dollar spent.

The First Church of Christ, Scientist is in good company with a geothermal system. Right across the Bay in Largo, the Pinellas Safety Complex and Emergency Operations Center (PSC) completed a geothermal HVAC chiller plant capable of producing 2,600 tons of cooling capacity. Sometimes things take a little while to catch on. But, 65 years is not that long in the big scheme of things; Pinellas County has two geothermal HVAC schools planned right on the heels of the Pinellas Safety Complex. The PSC is truly storm proof in that there are no outdoor cooling towers that could be damaged during a hurricane or other emergency event. On the environmental side of things, cooling towers use a lot of water. A facility the size of the PSC would evaporate about 220,000 gallons of fresh water on a hot day.

In the case of the Pinellas Safety Complex, the class V thermal exchange pump to reinjection well system actually costs about the same as stainless steel cooling towers. And does geothermal last longer? A cooling tower's lifespan is about 10 years, maybe 15. The church's well system is 65 years young and counting.

And then there are the tax credits/rebates available with geothermal. Geothermal system owners can claim expanded tax credits that amount to 30 percent of the entire installation for residential applications and up to 49 percent in the case of a business installation. See the website www.dsireusa.org, for more details. ■

*Information provided by Bosch Thermotechnology.*