

GEO OUTLOOK

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**Lipscomb
University:**
Nashville's First
Geo Star



EZELL CENTER

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YOU WILL KNOW THE TRUTH AND THE TRUTH WILL SET YOU FREE.
LIPSCOMB UNIVERSITY

Lipscomb's new 77,000-square-foot academic building generates big savings thanks to the use of ground source heat pumps.

Nashville's First Geo STAR

By Clarissa Gentry

The Tennessee Valley Authority (TVA) and the Nashville Electric Service (NES) have formed a partnership to assist businesses and institutions interested in the benefits provided by geothermal systems. With energy prices on the rise, concerned consumers are becoming more aware of the savings associated with energy-efficient and environmentally friendly technology. Lipscomb University located in Nashville, Tenn., is one such institution. With the installation of ground source heat pumps (GSHPs) in the university's new \$10.5 million Ezell Center, Lipscomb set the standard in the Nashville metropolitan area as the first university to install geothermal technology, according to a Lipscomb press release.

After receiving a donation from the Ezell family of Nashville to build the new 77,000-square-foot academic building, Lipscomb researched the various energy-efficient heating and cooling options. Then they contacted their local utility, NES, about geothermal. NES is one of 158 distributors of the TVA and purchases 100 percent of its power from the authority. TVA is the largest public power business in the U.S. and provides power to more than 8.7 million Tennessee Valley residents, according to the TVA Web site. Though supporters of

geothermal technology, NES does not have the manpower to fully serve those interested in geothermal; therefore, NES partners with the TVA.

"We strictly rely on the TVA for geothermal, however, we have 14 account managers that call on large customers to make expanding customers aware of geothermal," said Jim Purcell, energy services manager for NES. "We are constantly pushing geothermal, and we use TVA's leverage to get it accomplished."

Green Funding

There are several services provided by the TVA and NES as well as any local TVA powered utility to customers looking to use geothermal technology for their school or business. According to the TVA Web site, an independent engineering firm is hired to perform an on-site feasibility study. The study helps compare the different types of air conditioning systems and the various costs associated with each. Test bores drilled on-site gage pipe suitability. Thermal conductivity tests assess the capacity of energy transfer for the possible loop field. Other services include: technical assistance, a credit on the utility bill and leasing options for the system.



The Ezell center has large vaulted ceilings which add to the beauty of its design.

NES and the TVA funded a feasibility study and a conductivity test to ensure geothermal was the right choice for Lipscomb. Blake Neville, a geothermal consultant with Neville Engineering, assisted in the design of the geothermal bore field on the project.

“We like to approach jobs like this to be certain that the geothermal system is designed properly; so that it is a successful installation and we have a happy customer in the end,” Jeromy Cotten, regional marketing manager for the TVA said.

The total for all the testing and Neville’s consulting was \$12,000 paid by the TVA and NES. “We want to do what’s best for our customers because our top 50 customers give us 25 percent of our revenue and for that reason alone we feel it’s important to do what we can to satisfy those customers,” said Purcell. “By connecting them with the TVA, we feel it is a win-win for everyone.”

A Home Run Design

To maximize space, Neville designed the loop field to fit under a new softball field that was relocated near the Ezell Center site. The vertical installation consists of 144 boreholes drilled to a depth of 300 feet with two 30-horsepower circulating pumps. Don Johnson, director of facilities at Lipscomb, said the boreholes were buried 25 feet apart to minimize ground warming and increase the longevity of the system.

The 210-ton system is powered by 94 Trane Tracer Summit heat pumps and was installed by Lee Mechanical Company of Nashville. The Lee Company was also the mechanical and plumbing design engineers for the project. Johnson said the Trane

system monitors the temperature, humidity and status of each heat pump and the building. Also, the system is divided into 72 heating and cooling zones with thermostats for each.

“The comfort levels are much higher throughout the building and people are much more satisfied,” said Johnson. “They have control of their own space.”

Michael Fulks, the director of campus services, said Lipscomb is saving between \$70,000 to \$90,000 a year and estimates a five to seven year payback. Johnson

said because the system is so efficient they estimate a 40 to 60 percent operational savings as compared to conventional systems.

Another benefit for Lipscomb is this project was a true design build arrangement. Mike Saunders of Lee Mechanical Company said that from the beginning they sat down with the Lipscomb representatives to determine the university's needs and long-term plan for the project. Lipscomb was able to review and add input to ensure they were getting what they wanted. The Lee Company guaranteed the accurate performance of the system when the project was completed. The Lee Company was also recognized for their mechanical and plumbing work by the Associated Builders and Contractors.

"The one point of contact and responsibility gives the owner peace of mind knowing that if any problems arise, Lee Company will take care of them quickly," said Saunders.

Other Collaborations

The first TVA geothermal project was in 1989 and the TVA and its local utilities began providing geothermal technical assistance to commercial buildings in 1996. There were only 10 projects prior to the heat pump initiative in 1996, according to the TVA Web site. Thanks to the assistance the TVA offers there are currently 278 successful commercial geothermal installations in its service area.

The TVA and NES are building momentum in the Nashville area with the completion of many high-profile projects. Purcell said the governor's mansion recently installed GSHPs, and NES is planning a promo-



Stained glass windows serve as a tranquil art piece for the faculty and staff.

tional event after its completion around Earth Day. Cotten said the conductivity test results are completed for Palm Industries, which is one of the TVA's first geothermal industrial customers. The Tennessee Board of Realtors and the Concrete Association are also testing for geo-systems. And the city of Nashville school system is interested in installing a geothermal system in a portion of an area school in order to compare its perfor-



Faculty and staff enjoy the freedom to heat and cool their own space with the system's 72 heating and cooling zones.

mance to another system. Purcell said a neighboring county in NES's service area has made the decision to go geothermal in all its schools, which led to interest in geothermal from Nashville city schools.

Victory for All

This program offers benefits to all involved. NES is able to provide excellent customer service by acting as the liaison between its customers and the TVA. The TVA, as an energy supplier, benefits because the efficiency of geothermal technology balances out the peaks that occur in generation load throughout the year. And Lipscomb University gains an efficient system that is quiet, reduces operational costs and simplifies work load. Lipscomb is looking to become more "green" in the future and geothermal is being considered for all renovations. Fulks said a mandate to evaluate geothermal for any new building

has already been established.

"We have a soccer field and a baseball field adjacent to buildings to possibly utilize," said Johnson. "Now talking the coaches into letting us dig up the fields is one thing."

But, with the successful track record; anything is possible.



The Ezell family, Lipscomb representatives, the builder and architect take part in ground breaking ceremonies.



Don Johnson, director of facilities at Lipscomb, displays the equipment room.

All photos courtesy of Lipscomb University.

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