

CAMPUS HIGHLIGHTS

RENEWABLE ENERGY NEWS

Control Technology & Solutions Taps Earth, Wind & Sun

TURNKEY PROJECT CONVERTS LAKE LAND COLLEGE TO FIRST SELF-SUSTAINING CAMPUS IN ILLINOIS



Lighting retrofits in the Field House gymnasium drastically cut energy consumption by replacing all fixtures with new T8 fluorescent lighting and adding motion sensors.

"You're tilting at windmills," was the response of several firms when Lake Land College leaders set a vision for becoming Illinois' first self-sustaining college campus by 2012.

Now wind turbines – along with geothermal and solar energy systems – are part of achieving the college's carbon-reducing

vision, thanks to turnkey engineering and construction services by **Control Technology and Solutions (CTS)** of St. Louis, Mo.

AGING INFRASTRUCTURE SPURS VISION

Lake Land College took the opportunity presented by aging infrastructure to make

By 2012, Control Technology and Solutions' work will save Lake Land College about 850,000 kilowatt hours (kWh) of electricity – for a carbon reduction of 556 metric tons annually – and nearly 70,000 therms of natural gas each year.

CTS' totally renewable geothermal system is designed to supply 100 percent of Lake Land College's heating and cooling needs while adding cooling to key spaces.

environmentally smart decisions as original equipment and systems neared the end of their useful life. The college's effort to become self-sustaining was shaped by three primary goals:

1. Reduce energy consumption, counteract rising energy demand, and upgrade heating, cooling, lighting and controls campus-wide.
2. Modernize aging facilities dating to 1968 without disrupting college operations.
3. Model best practices and serve as a laboratory for the college's new renewable energy curriculum, preparing students for the rapid growth in "green jobs" projected for Illinois.



Well pipes in the first of three geothermal well fields – 140 wells, each reaching 350 feet deep – work to generate the first 240 tons of what will grow to generate 1,200 tons of cooling.

"Our discovery process led us to seek a long-term solution in light of fast-rising energy costs," says **Raymond E. Rieck**, vice president for business services at Lake Land College. "While we anticipated about a 10 percent rise in energy costs over five years, our decision was affirmed when they rose 17 percent in year one alone."

Rieck adds, "Our team thought geothermal energy might work for us, but the national companies we consulted said it could not be done on our large scale. There is no other known Midwestern college campus using geothermal power campus-wide."

Lake Land College also wanted a turnkey solution with guaranteed performance to avoid the hidden costs of growing its own permanent staff. "The demands of our current campus with existing staff meant we needed a resource that would be responsible and accountable for every detail of this project, and add expertise to ours to

develop a valuable program," Rieck notes.

Those project parameters led Lake Land College's team to CTS, which helps colleges, universities, schools and other public entities throughout the Midwest with infrastructure management programs and alternative energy solutions that pay for themselves through ongoing operational and energy savings. CTS also helps facility owners obtain funding and rebates to cover upfront costs, which are then paid off from the savings generated by CTS' solutions.

MASTER PLAN FOR COST SAVINGS AND CARBON NEUTRALITY

Guided by the Lake Land College team, CTS developed a four-phase, five-year plan totaling \$20 million. Recognizing the entire infrastructure had to be replaced, CTS and Lake Land College agreed that the extra investment for sustainable solutions best aligned with the college's goals. In fact, the extra investment will pay for itself in energy savings after only five years. Rieck and Lake Land College's **Mike Kasdorf**, director of public safety and facilities planning, **Durb Askew**, director of physical plant operations, and **Joe Tillman**, electrical engineer and safety trainer, are working closely with CTS team members **Jay Hesskamp**, **Mark Graves** and **John Loraine** to achieve their carbon neutral vision.

At completion in 2012, CTS' work will save about 850,000 kilowatt hours (kWh) of electricity – for a carbon reduction of 556 metric tons annually – and nearly 70,000 therms of natural gas each year.

LAKE LAND COLLEGE FAST FACTS

Lake Land College is a public community college in a 4,000-square-mile area in East Central Illinois.

Founded	1966
Campus	308-acre campus hosts nine buildings, two campus ponds, a 160-acre arboretum, labs, CAD lab, child care lab
Serving	7,400 students
Location	Mattoon, Ill. at 5001 Lake Land College Blvd.
Website	www.lakelandcollege.edu

Phase I, completed in 84 days during the 2008 summer break, included installation of the central plant's 12-inch diameter heat pump diversification loop, running 3,000 feet around the circle-shaped campus perimeter. The loop allows for load diversification and provides flexibility for locating future well fields. The closed loop geothermal heat pump system works by piping water deep into the earth via wells that capture the earth's heat in winter and dissipate heat in summer. The loop then re-circulates water to the campus-wide perimeter loop.

The geothermal system alone will cut energy demand by more than 42,000 therms of natural gas, or 40 percent, and reduce electricity use by at least 580,000 kWh. Every kWh saved reduces carbon production by 1.34 pounds. At project completion, the goal is for the system to supply 100 percent of the campus' heating and cooling. The geothermal system offers the added advantage of a long life with reduced equipment maintenance costs.

In Phase I, CTS also installed the first of three geothermal well fields – 140 wells, situated 20 feet apart and reaching 350 feet deep – to generate the first 240 tons of what will grow to generate 1,200 tons – or 75 percent – of the required condenser capacity. For extreme conditions, an existing cooling tower and two existing high efficiency boilers will be available for supplementary needs.

Future phases will expand the number of geothermal wells and upgrade all campus buildings and connect them to the geothermal loop.

FIELD HOUSE AND VO-TECH MODERNIZE WITH SOLAR PANELS AND MORE

Atop the 42,000-square-foot Field House, constructed in 1974, CTS installed 10 rooftop solar panels to power the closed loop solar domestic water heating system. One small tank, located inside to eliminate freezing risk, now works in tandem with a small heat exchanger to transfer heat from the glycol-infused solar system to the domestic hot water system. Two 250-gallon storage tanks hold the solar-heated water for the high-demand uses of the Field House.

CTS also modernized original systems and finishes by:

- Replacing all original lighting with new T8 fluorescent lighting and adding motion sensors in select building spaces to cut energy use dramatically.
- Abating all sprayed-on asbestos in 12 classrooms and hallways, installing new acoustical ceilings in classrooms and painting the gym ceiling.
- Replacing carpet in classrooms and offices, and tile in bathrooms.



The geothermal system will cut energy demand by more than 42,000 therms of natural gas and at least 580,000 kWh of electricity annually.

CTS also installed new five-inch geothermal system loop and related equipment in both the Field House and the 19,000-square-foot Vo-Tech Building to begin harvesting the geothermal system's production. Asbestos abatement and modernization work was completed in the Vo-Tech building.

The Field House gym and classrooms and the Vo-Tech Building, both built without air conditioning, gained cooling systems with

CTS' unique wind turbine proposal taps lower wind speeds typical of Mattoon, Ill. – between 12.5 and 14.5 miles per hour – to generate electricity for the campus.

college serving residents of 15 counties
Illinois, with a population of 203,000.

major buildings plus six support buildings,
agriculture land laboratory, computer
cosmetology clinic and dental clinic.

and Blvd. (U.S. Route 45) near Interstate 57.

“Control Technology and Solutions is a valuable partner and we commend their great facility solutions and service.” – Ray Rieck, vice president for business services, Lake Land College

the renovations without any rise in carbon-producing energy demand. “Our solution is clean and quiet, plus it moves the proper amount of air,” describes CTS Project Manager **Jay Hesskamp**. “In both buildings, students and teachers have been delighted by the move from hot and dark spaces with stale air to cool, well lit classrooms. That helps the college better fulfill its mission.”



A one-year wind study - using an anemometer - is under way at Lake Land College to maximize the efficiency of an initial 100-kilowatt wind turbine.

WIND TURBINE GENERATES ELECTRICITY

The final third of CTS' solution – wind power – uses rights under federal law (PURPA, Section 210) to generate electricity for lights and HVAC systems to offset electricity that would otherwise be purchased from the local utility at retail pricing.

CTS proposed a wind turbine solution that operates at wind speeds averaging 12.5 to

14.5 miles per hour (mph) typical to the Mattoon, Ill., region. Wind turbines traditionally require average wind speeds of 14.5 mph or more, but CTS' design taps lower wind speeds for reliable electricity production. About 80 percent of the United States experiences average wind speeds in the same range as Mattoon.

Located adjacent to the campus' West Building, the first 100-kilowatt wind turbine will generate electricity for the college campus.

WINNING THE ENERGY BATTLE

Lake Land College's comprehensive approach, combined with a vision that stretched beyond easy solutions, is already paying dividends.

“It is a great honor to work with a facility owner that tapped the opportunity posed by needed infrastructure upgrades to devise a long-term, environmentally-wise solution,” CTS' Hesskamp says. “We are pleased to play a key role in fulfilling that vision, and hope to help others at a similar crossroads.”

For Rieck and team, the future is energizing. “We are proud to be well on our way to becoming the first self-sustaining college campus in Illinois. It is our hope that this model will motivate our students who are preparing to become the future work force for the green industry in the state,” he says. “Control Technology and Solutions is a valuable partner and we commend their great facility solutions and service.”



15933 Clayton Rd., Suite 110
St. Louis, MO 63011
(636) 230-0843
www.thectsgroup.com



5001 Lake Land Blvd.
Mattoon, IL 61938
(217) 234-5253
www.lakelandcollege.edu