

## Livingston County Courthouse

Chillicothe, Missouri



Livingston County Commission will dramatically reduce their utility bills by taking advantage of the earth's temperature to help heat and cool the courthouse.



*"We are pleased with CTS. They helped us develop a high quality project with maximum guaranteed energy savings and very little upfront cost."* Eva Danner, Presiding Commissioner  
(L-R: Commissioners Ken Lauhoff, Eva Danner, Kenneth Warren)

Constructed in 1914, the Courthouse was placed on the National Register of Historical Places in 2002 for its architectural and engineering qualities. The CTS project ensures that the building's historical integrity is maintained. This town square site has served as the location of Livingston County's courthouse since 1839.

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### Project Overview

The Commission contracted with Control Technology and Solutions (CTS) of St. Louis to install a ground source heat pump (GSHP) heating and cooling system. The installation of the new system is guaranteed by CTS to cut the county's energy bill in more than half by saving \$18,000 annually. The term of the agreement with CTS is 15 years resulting in \$270,000 of energy savings alone. Additionally, the improvements are projected to save over \$60,000 in repair costs to the existing steam boiler system which was at the end of its life cycle. The previous steam boiler system had undergone major repairs and was in need of additional extensive repair in the near future. The combined energy and repair savings will be used to fund over half of the project cost.

Both the Department of Energy and the Environmental Protection Agency have endorsed GSHP technology as the most efficient and environmentally friendly heating and cooling system available. GSHPs are electrically powered systems that tap the stored energy of the greatest solar collector in existence: the earth. These systems use the earth's relatively constant temperature to provide heating and cooling. The way it works is simple. In winter, warmth is drawn from the earth through a series of pipes, called a loop, installed beneath the ground. A water solution circulating through this piping loop carries the earth's natural warmth to a heat pump inside the building. The heat pump then concentrates the earth's thermal energy and transfers it to air to provide heating or cooling as needed. In the summer the process is reversed; heat is extracted from air inside the building and transferred to the biggest "heat sink" of all – Mother Earth – by way of the ground loop piping.

The new Livingston County Courthouse system included the drilling of 32 geothermal wells, each 200 feet deep. The vertical closed loop well field was installed in the parking lot closest to the existing boiler room of the courthouse. The system allows simultaneous heating or cooling of the rooms with individual thermostats. Energy efficiency and comfort within the courthouse had not been possible with the previous heating and cooling system. There were no individual temperature controls for the old radiator heating units, and cooling was only provided by window air conditioning units which were both extremely inefficient and noisy. The fiscally sound decision of the County Commissioners to install the GSHP system provides both comfort and energy efficiency for the courthouse.