



Geothermal Heat Pump Systems: Freeing Up Critical Resources For Correctional Facilities

Housing prisoners is an expensive business. From an energy perspective, the cost of electricity, fuel (i.e., natural gas, propane), water, and maintenance of equipment are big challenges to a correctional facility's bottom line.

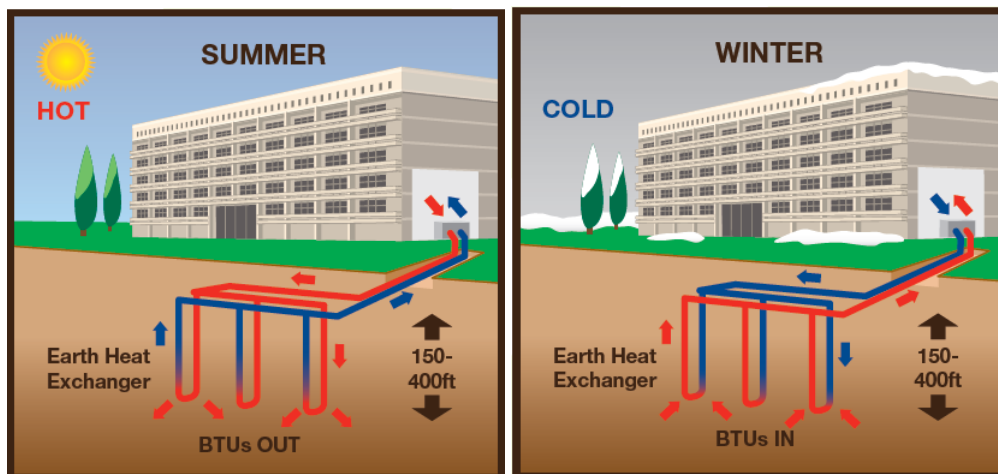
Geothermal heat pump (GHP) systems offer a "get out of jail card" to facility administrators. At least 50 percent of energy costs in existing buildings could be reduced by changing out traditional HVAC equipment. For newly constructed facilities, GHPs offer an opportunity to begin saving energy *and* water "from the ground up."

Prisons, jails and related facilities are often considered ideal candidates for GHP systems. Around the clock operations, heavy heating and cooling loads, and hot water needs are a perfect fit for GHPs. Third party financing and availability of generous federal and state tax incentives make these systems particularly attractive by significantly reducing pay back periods (see below for more information).

For these reasons the U.S. Department of Energy considers GHPs "the most efficient technology available."

What are Geothermal Heat Pump (GHP) Systems?

GHP systems are highly efficient air conditioning and heating systems powered by the moderate and stable temperature of the ground beginning just a few feet below the surface. Also known as ground source heat pumps, GHP systems are considered both a renewable and demand side efficiency technology. No conventional chillers or boilers are required. According to the U.S. Department of Energy, GHP systems can save up to 70% of the energy used to heat and cool buildings compared with a conventional HVAC system. GHP systems have been in use for over 50 years, their efficiencies and benefits are well documented and they can be used for all building types. In addition to the energy savings, benefits include: water savings; no on-site use of water or fossil fuels; reduced peak demand; environmentally friendly; and reduced operating and maintenance costs.



The systems consist of an outside, underground portion called the earth-heat exchanger, which is a set of connected buried pipes circulating water. This portion is what utilizes the earth's power and replaces conventional chillers or boilers. The inside part of the system consists of standard air handling equipment and the geothermal heat pumps.

Visit www.enlinkgeoenergy.com and see our animated primer "How Geothermal Works" for more information.

GHPs in Correctional Facilities

Numerous local, state and federal penal facilities have installed GHPs and experienced tremendous energy and water savings. From Ft. Leavenworth's Midwest Joint Regional Correctional Facility in Kansas to Mendota Federal Correctional Facility in California, GHPs are significantly reducing energy use and saving precious dollars. Jail facilities like the Kent County Fuller Complex in Grand Rapids, Michigan and Cambria County Prison in Pennsylvania are additional examples of where this technology is helping to conserve energy and provide other important benefits.

And, the director of Lancaster County Department of Corrections (Nebraska) noted of their 2010, 1,000 "bed core" GHP-installed facility: "Because the jail does run all the time, it is good to be energy efficient." The county property manager remarked "(The percentage of savings) is a pretty substantial amount of money."

Why are savings so significant in correctional facilities? As noted above, constant operation of buildings with many people inside requires day to day heating and/or cooling. A GHP also operates around the clock, but by using the natural, constant temperature of the earth as either the heat sink (cooling mode), or heat source, there is no need for on and off-again chiller and boiler systems. The earth does all the work...with a little help from the heat pump. In addition, during the cooling mode waste heat is captured and used to heat water. This, then, eliminates the need for the facility director to crank up the fuel source to do the same thing – at a pricey proposition. Showers, dishwasher, laundry rooms all benefit from this "free" resource.

Finally, maintenance on equipment is rare. The geothermal heat exchange system (which is located underground), has no moving parts and consists of high density polyethylene. Inside the building the actual geothermal heat pump has an ASHRAE life expectancy of close to 30 years. Between the exchanger underground and the heat pump inside the building, there is little need for maintenance professionals.

Financing of GHPs

As previously mentioned, third party financing is available with an array of options to suit either the tax-exempt or tax-paying entity's needs. For those wishing to self-finance federal and state incentives are available to assist in paying down the installation costs. However, federal programs that provide 100 percent depreciation requires that projects must be "in-service" before December 31, 2011. In 20102, that amount is halved to 50 percent. Visit www.enlinkgeoenergy.com and click on "Financing GHPs" for more information.

Conclusion

GHPs are a big energy and money savers. EnLink can help assess whether your facility is a good candidate for this technology. Please contact EnLink's Albert Escobedo at 424-242-1219, or aescobedo@enlinkgeoenergy for more information.