

Benefits of Geothermal Systems

Affordable Installation Cost

The relative installed cost for a geothermal system is competitive with other systems. The largest portion of the installed cost is the installation of the ground loop. However, in areas where more and more contractors and installers are being trained, the cost of installing the ground loop is decreasing. On the average, the installation cost for a geothermal system is equal to or less than a central station VAV system and slightly more than a conventional boiler/ tower heat pump system.

The important thing to remember is that once installed, the geothermal system requires minimal maintenance and offers superior savings for the life of the system.



Low Operating and Maintenance Costs

Geothermal systems have one of the lowest relative operating and maintenance costs of any HVAC system available. Annual operating costs are often lower than conventional systems such as built-up air handlers, rooftop units or VAV applications. Maintenance and service are easy and do not require specialized training, giving the owner more options for maintaining and servicing their equipment.

High Efficiency

Geothermal systems are one of the most efficient systems available for heating and cooling. For every 1 btu of electricity used to heat or cool your building, the geothermal heat pump unit produces 3-5 btu's. That's 300-500% more efficient than using electric resistance heat and 20-30% more efficient than typical boiler/tower systems. The constant temperature of the ground and colder design loop temperature mean that the geothermal heat pump units don't have to work as hard, and are therefore more efficient than most other systems. Geothermal heat pump units can also be provided with a load shedding device on the control board to further reduce energy requirements. The device creates a greater deadband, which enables the unit to "idle" for an extended period of time while maintaining a relative constant temperature setting. This feature allows the building's peak to be shaved without compromising overall comfort.

Decentralized Design

Each water source heat pump resides in close proximity to the zone it serves. This avoids the large duct runs associated with central air systems. In addition, an equipment failure only affects the zone where the failed unit is located. Central system equipment failures can drastically affect large portions of the building.

Equipment can be changed to meet the specific needs of the occupant. For instance, in a retail environment, the unit can be sized to meet the load of a new tenant. In addition, individual power metering is possible, allowing the occupant to control and pay their own energy costs. As the building is constructed, only a minimum amount of equipment needs to be provided until an occupant is found and the tenant design complete.

Environmentally Responsible

The Department of Energy (DOE) applauds geothermal systems as being among the most environmentally responsible heating/cooling systems available today. The ground loop is completely sealed to eliminate the risk of soil and aquifer contamination. In addition, units are available using HFC-410A or HFC-407C refrigerants with no ozone depletion potential in support of the Montreal Protocol and the elimination of ozone depleting substances.

The high efficiency of geothermal systems helps reduce the requirement for utilities to burn fossil fuels, which in turn decreases CO₂ emissions to the environment. Rebate programs, available through many utilities and government agencies, are a testament to the outstanding efficiency of geothermal systems.



Easy To Service

Water source heat pumps are easy to service and do not require specialized training, giving the owner many more options regarding maintenance and service. The refrigerant volumes are small, which helps reduce safety requirements within the building.

Small Mechanical Rooms

Water source heat pump systems generally require smaller mechanical rooms than many other HVAC systems. Geothermal systems require smaller, requiring space for only the circulating pumps, the main header and some chemical treatment equipment. This frees up more useable/leasable space for tenants or occupants.



Freeze Protection

In Northern climates, a typical water loop may contain a small amount of antifreeze (10%-30% by volume) to prevent the water in the ground loop from freezing up. The majority of the antifreeze products available pose no threat of polluting, even if there is a leak into the ground. The chances of an antifreeze leak into the ground is significantly reduced due to the strength and flexibility of the pipe used in today's ground loops. If the pipe is pulled hard enough, it will actually be squeezed shut at its weakest point before a break would occur, thus sealing the system off to the surrounding ground.

Aesthetically Pleasing

Geothermal units are usually located inside the building space with the exception of a geothermal rooftop unit, which resides on the roof or along side the building. Inside the building, where space is often a premium commodity, units can be installed in the ceiling, a closet or along an outside wall to allow maximum use of floor space for tenant purposes. Since the ground loop acts as a heat transfer device, there is no need for an unsightly, noisy, outside condensing unit or cooling tower.

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