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# Your Questions are Answered!!

## What makes a geothermal heat pump better than other systems?

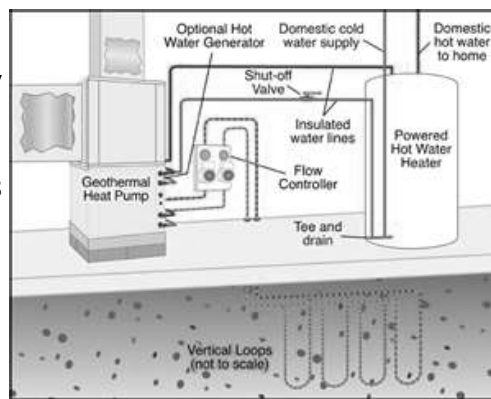
- Transfers heat from the earth which is heated by the sun, not burning a fuel to create heat
- Can be over 5 times more efficient for heating than propane or natural gas furnaces
- Lower maintenance costs with no outside equipment that can be damaged or affected by extreme weather conditions
- Most environmentally friendly heating & cooling system
- Constant comfort—humidity levels are ideal with no blasts of hot air or cold air
- Safety—no burning fuel so no carbon monoxide or explosion concerns
- A desuperheater may be added to system that allows reduced hot water heating costs
- Very quiet operation

## How does a geothermal heat pump work?

- Transfers heat either from or to the ground through an open or closed loop system
- Since the temperature of the

soil below 10 feet is constant, around 55 degrees in Nebraska, efficiencies of up to 500% can be achieved

- Three main parts of a system—the equipment, loops (open or closed) and duct-work
- All of the equipment is located indoors
- Electric heat strips are usually part of geothermal heat pumps for emergency back up needs



## Can a geothermal heat pump also heat water?

- Can add a desuperheater which uses excess heat to provide hot water for your home
- Can provide up to 50% savings on your water heating

bill

- During the summer when heat is transferred from your home, water heating is free
- During the winter a portion of your water heating needs will be met

## How efficient is a geothermal heat pump?

- Can achieve over 500% efficiency compared to 98% efficiency for the best natural gas or propane systems during the heating season
- Provides reduced hot water heating costs with a desuperheater
- Cooling efficiencies are 20 to 40% higher than air conditioners

## How can I save money with a geothermal heat pump?

- In both operating and maintenance costs, since both will be lower than what you are now paying
- Investment payback is usually around 5-7 years without incentives or tax credits
- Positive cash flow because of savings experienced
- Incentives available from

Twin Valleys Public Power District

- 30% tax credit available for the entire installation cost of a geothermal heat pump system
- Equipment lasts longer, often up to 20 years

### What are factors that may affect the cost of a geothermal heat pump?

- Size of your house
- Quality of insulation
- Size, location and quality of your windows
- Air infiltration of the house
- Size and terrain of the building lot
- Soil type

### Do geothermal heat pump systems require much maintenance?

- Practically maintenance free.
- The unit's equipment is housed inside the house so it is protected from the weather and other contaminants.
- Contains fewer mechanical components
- The buried loops have a 50 year warranty on the pipe.
- Periodic checks and filter changes are usually the required maintenance.

### What does a geothermal heat pump mean for the environment?



- Uses less energy
- Consumes fewer natural resources
- There is no fuel being burned so there is no pollutants, carbon monoxide or odor
- Minimizes the threat of acid rain, air pollution and greenhouse gases
- Use the new R-410A refrigerant that will not harm the earth's ozone layer
- Works with the environment, not against it

### Should I buy a geothermal heat pump large enough to heat without supplemental heat?

- Geothermal heat pumps are normally sized to meet your cooling requirements
- Normally a geothermal heat pump will supply 80% to 100% of your heating needs
- Sizing the heat pump to meet all the heating needs will cost more for larger equipment and more loops
- Added cost normally will not be offset by efficiency gains
- An oversized unit can cause dehumidification problems in the cooling mode

### Do I need to increase the size of my electrical service?

- A geothermal heat pump doesn't use a large amount of resistance heat
- Generally a 200-amp service will have enough capacity

### Are all geothermal heat pumps alike?

- There are many different kinds designed for specific applications
- Can be used to provide in

floor radiant heat

- Some use newer, more efficient motors

### Do I need an underground loop?

- Is the most important part of a geothermal heat pump
- Transfers the heat to and from the earth



### Are there different types of loops?

- Two different types—open or closed loop
- Closed loop type offers several options

### How does a closed loop system work?

- A water and anti-freeze mix is circulated in the plastic pipe loop to transfer the heat from the ground or from the house
- There is normally one loop per ton of heat pump capacity
- The loops can be vertical, horizontal or rolled up in a pond

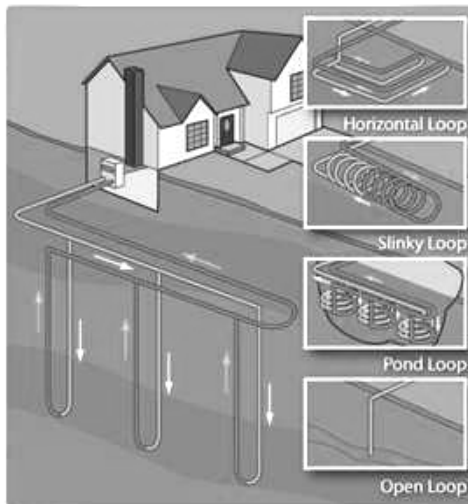
### What are the different types of closed loops?

- There are vertical, horizontal and pond loops

- A continuous loop of plastic pipe that is connected to the indoor heat pump unit
- Vertical loops—drilled vertically into the ground with two plastic pipes, connected with a u-bend, inserted into each well
- The depth of the well will vary depending on the soil type, but normally is around 175-225 feet in depth for our area
- Horizontal loops can be straight pipe in an open trench, a coiled (slinky design) pipe in a trench or horizontally bored similar to vertical bored loops
- Pond loops are usually set at the bottom of a pond that has a constant depth of at least 8 foot

- take the most plastic pipe
- Horizontal loops take more land space, usually 100 to 400 feet in length, with the slinky design requiring less space than the straight pipe
- Performance can be affected by the season, rainfall, and burial depth
- Drought potential needs to be considered

- issues
- Water quality—water needs to be tested to make sure it will not damage the heat pump equipment
  - Water quantity—will need at least 1½ gals per minute per ton of heat pump capacity
  - Maintenance issues—water quality will have an affect on how well certain portions of the heat pump will last. There will need to be precautions taken that require scheduled maintenance.
  - Pumping costs are usually higher
  - Installation costs are usually lower due to closed loops not being installed



**What are the advantages and disadvantages of vertical closed loops?**

- Works good if land is limited
- May be more expensive to install
- With the loops being deeper into the ground where the temperature is the most constant they can be more efficient to operate
- There is less pipe used with a vertical loop

**What are the advantages and disadvantages of a horizontal closed loop?**

- Simpler to install and more expensive equipment is not needed to install
- Trench depths are usually 6-8 feet
- More pipe is needed for these loop options
- Straight pipe loops take more pipe than vertical loops
- Coiled or slinky design loops

**How does an open loop system work?**

- Utilizes the water from a well which is at a relative constant temperature year round
- The water is discharged into another well, pond, river, creek or stock tanks, not causing any problem for the environment
- The discharged water is safe to be used
- Does not require any plastic pipe filled with an anti-freeze mix

**What are the advantages and disadvantages of an open loop?**

- Three things need to be considered—water quality, water quantity, and maintenance

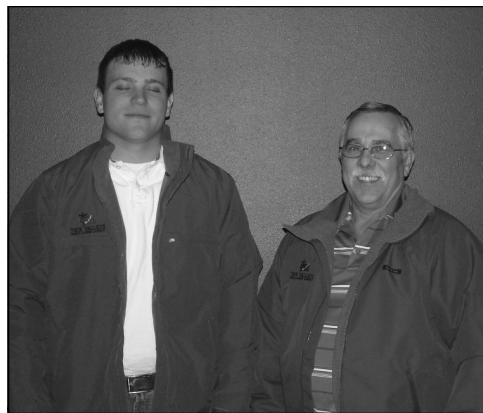
**How do I know if the dealer and/or loop installer are qualified?**

- Ask for references from people who have had a geothermal heat pump installed by dealer or loops by the loop installer
- Expect a home evaluation from the dealer to determine the size & type of loops and size of the system
- Check training credentials—should have continued training each year
- The dealer should also be trained by the manufacturer of the unit he is installing

*Geothermal heat pump technology is proven, safe and reliable*

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**Website: [www.twinvalleysppd.com](http://www.twinvalleysppd.com)**

**Notice of Board Meeting**

The regular meeting of the Board of Directors of Twin Valleys Public Power District is scheduled for 2:00 p.m. the third Monday of each month at the District Office in Cambridge, Nebraska.

**Office Hours: 8:00 a.m. to 4:30 p.m.  
 Monday - Friday**

**Service Calls After Hours**

Please call 800-658-4266 or 697-3315 at all times to report outages or service calls after normal business hours. A Twin Valleys' dispatcher will take down the necessary information.

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- Bob Bergquist, Lease Town Meter Reader
- David Custer, Apparatus Supervisor
- Todd Eitzmann, Apprentice Lineman
- Derek Galusha, Apprentice Lineman
- David Garcia, Load Mgmt & Info Technology Specialist
- Gary Groshong, Construction Layout Tech
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- Karen Werkmeister, Billing Clerk
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