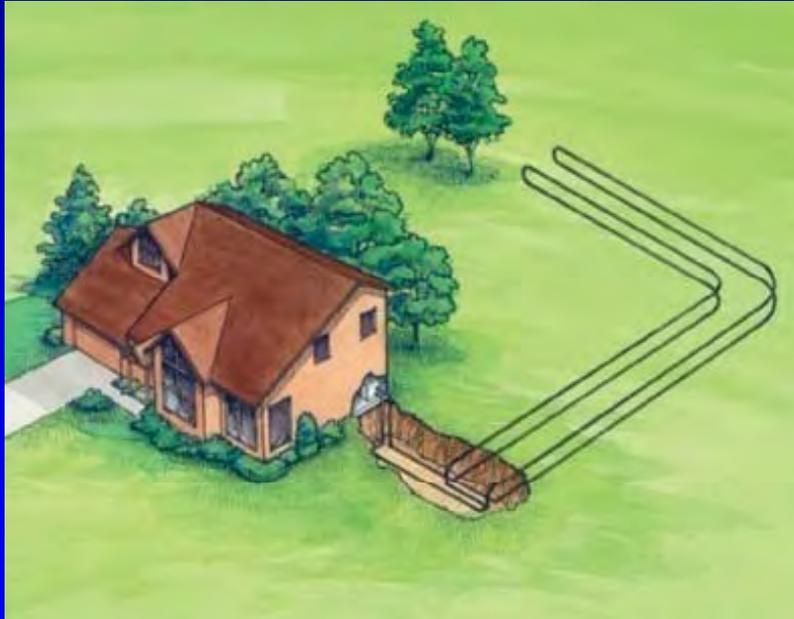


Horizontal Loop



- ✓ 150' – 230' long
- ✓ Trenches are 2' – 3' wide
- ✓ 4' – 6' deep, 600' of pipe per trench
- ✓ 10' apart from each other
- ✓ 10' away from buildings, wells, septic, etc
- ✓ Each produces 12,000 btu



Horizontal Loop Installation





Slinky Loop Installation





Large (pit) Slinky Loop Installation





Directional Bore Horizontal

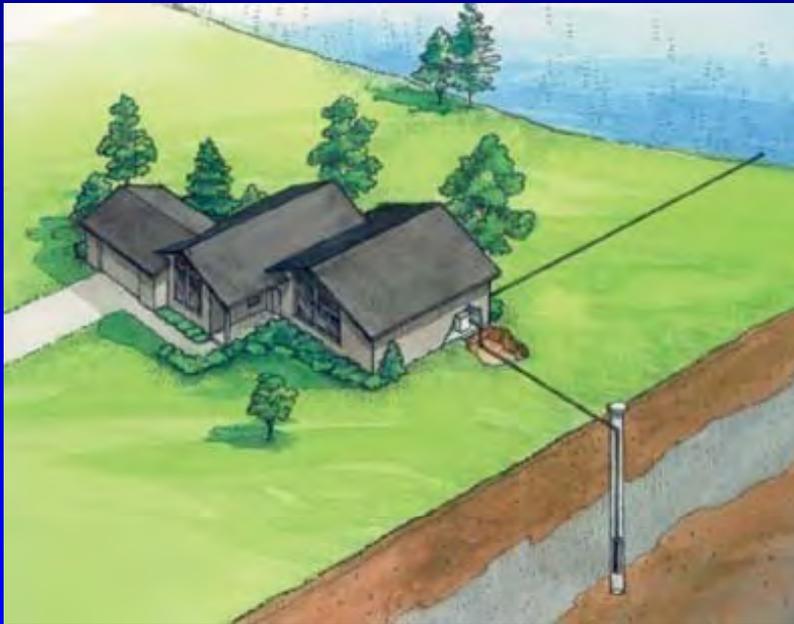




Directional Bore Horizontal



Open Loop



- Adequate supply of water
- Usually 4" – 6" well producing 15 to 30 gal/min
- Good quality water
- Place to discharge
- Usually a pond, ditch, stream, or dry well



Typical Open Loop

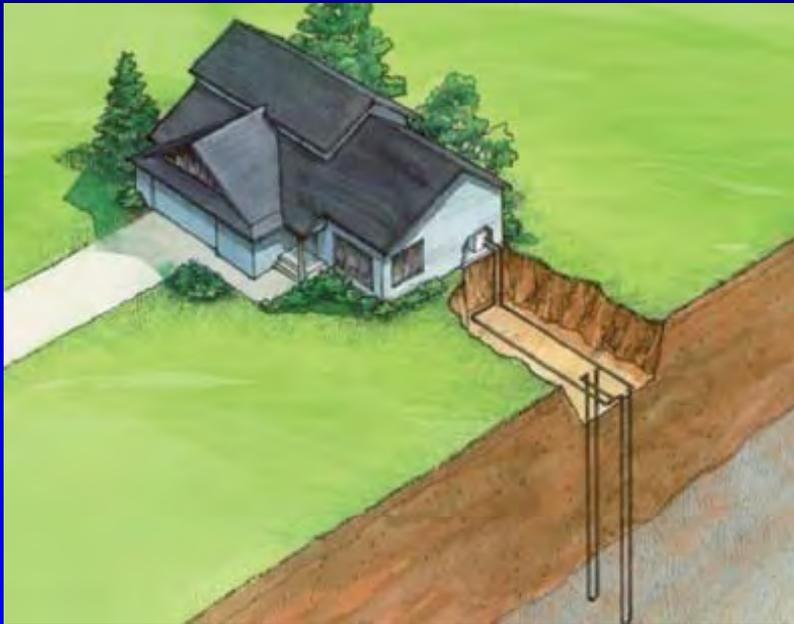




Open loop in old farm house



Vertical Loop



- 150' – 250' deep
- 10' apart
- 10' away from buildings, wells, septic, etc.
- Each well produces 12,000 btu or more



Vertical Closed Loop



Pond Loop



- Minimum of $\frac{1}{2}$ acre surface area
- No more than 100' – 150' away from structure
- 10' deep at the shallowest time of year (usually August – September)

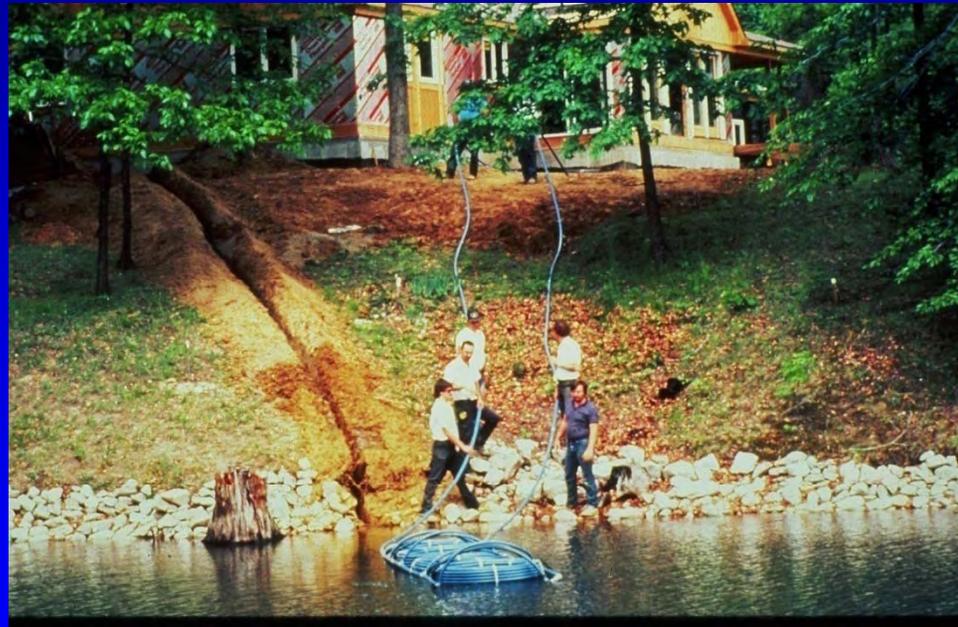


Large Pond Loop Installation



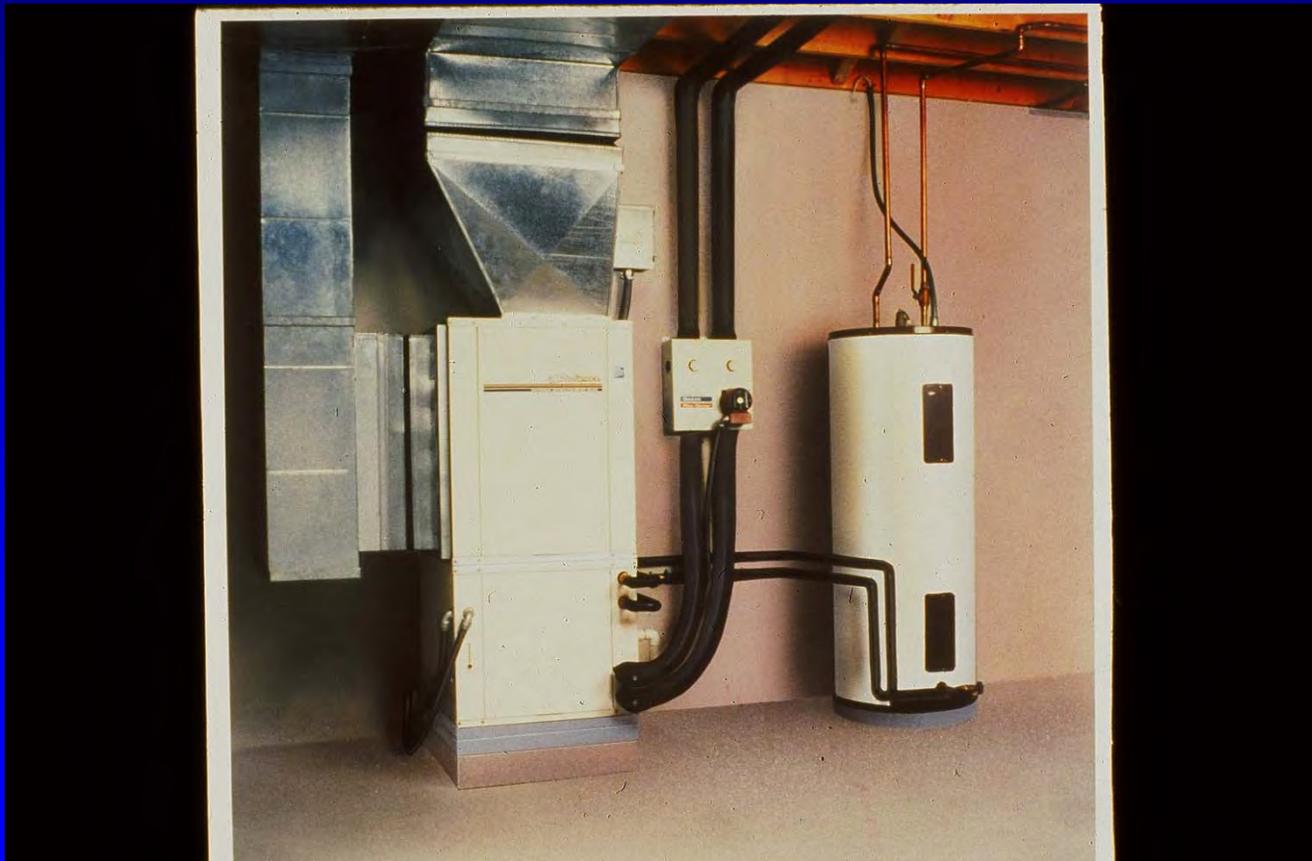


Individual Pond Loop



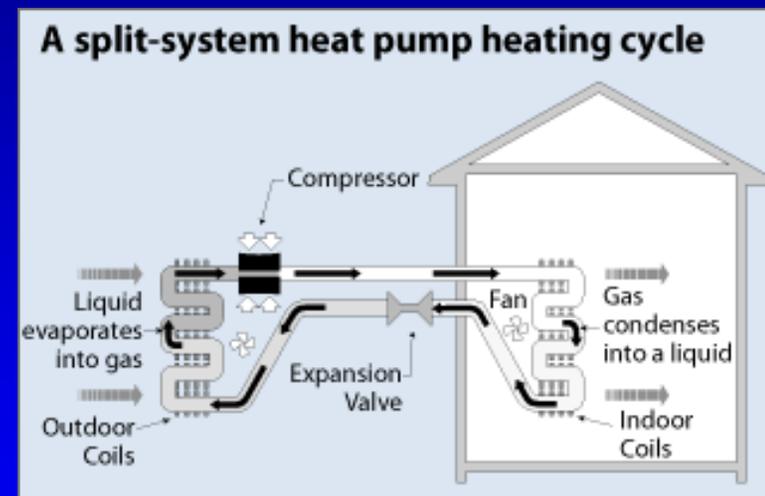


Typical Installation



Air-Source Heat Pumps

- Similar concept to Geothermal, but moving heat from the air instead of from the earth
- Works like a 2-way Air Conditioner - cooling in warm weather, heating in cool weather
- Delivers more than 3 times as much heat as it consumes in energy





Air-Source HP Advantages

- Typically draws approximately 1/2 to 1/3 of the electricity of a standard resistance heater for the same amount of heating, reducing utility bills. This typical efficiency compares to 70-95% for a fossil fuel-powered boiler.
- Few moving parts, reducing maintenance requirements. However, it should be ensured that the outdoor heat exchanger and fan is kept free from leaves and debris.
- As an electric system, no flammable or potentially asphyxiating fuel is used at the point of heating, reducing the potential danger to users, and removing the need to obtain gas or fuel supplies (except for electricity).



Air-Source HP Advantages

- May be used to heat air, or water.
- The same system may be used for air conditioning in summer, as well as a heating system in winter.
- Lower running costs than other fossil fuel furnaces.



Air-Source HP Disadvantages

- Heat pumps lose their efficiency as external temperatures fall. In colder climates the system needs to be installed with an auxiliary source of heat to providing heat at low temperatures.
- The cost of installment is higher (though less than a Ground Source heat pump).