

# Ground and Water Source Heat Pumps

This document will provide an overview of the main types of residential heat pumps – how they work, their distribution types, and possible configurations. While our core training focuses on air source heat pumps and this document covers ground source heat pumps and water source heat pumps, there are other technologies such as air to water heat pumps that are not included in our materials at this time.

## Ground source heat pumps

Ground source heat pumps, also called **geothermal** heat pumps, **use buried pipes to extract heating or cooling form below ground**. Compared to air source heat pumps, ground source heat pumps are more efficient and do not require outdoor units (condensers). They are typically more expensive and time consuming to install as compared to air source heat pumps.

### System distribution types and configurations

While ground source heat pumps do not require outdoor units (condensers), they most commonly distribute air through a ducted system.

There are two different types of ground loops that can be installed.

- Vertical wells, which can be hundreds of feet deep.
- Horizontal fields, which have coils placed in a more shallow but larger area.

The type and size of the ground loop can depend on the available land area, type of rock or soil, and the heating and cooling needs of the home.

## Water source heat pumps

Water source heat pumps are very similar to ground source heat pumps. They **use buried pipes to extract heating or cooling from a water source** rather than the ground. They are also more efficient than air source heat pumps and do not require outdoor units (condensers). Water source systems are also typically more expensive and time consuming to install as compared to air source heat pumps.

## System distribution types and configurations

The location and size of the water loop depends on the body of water at the site horizontal field shown in the ground source heat pump diagram above. In cold climates, the coils are placed at least eight feet under the surface to prevent freezing.

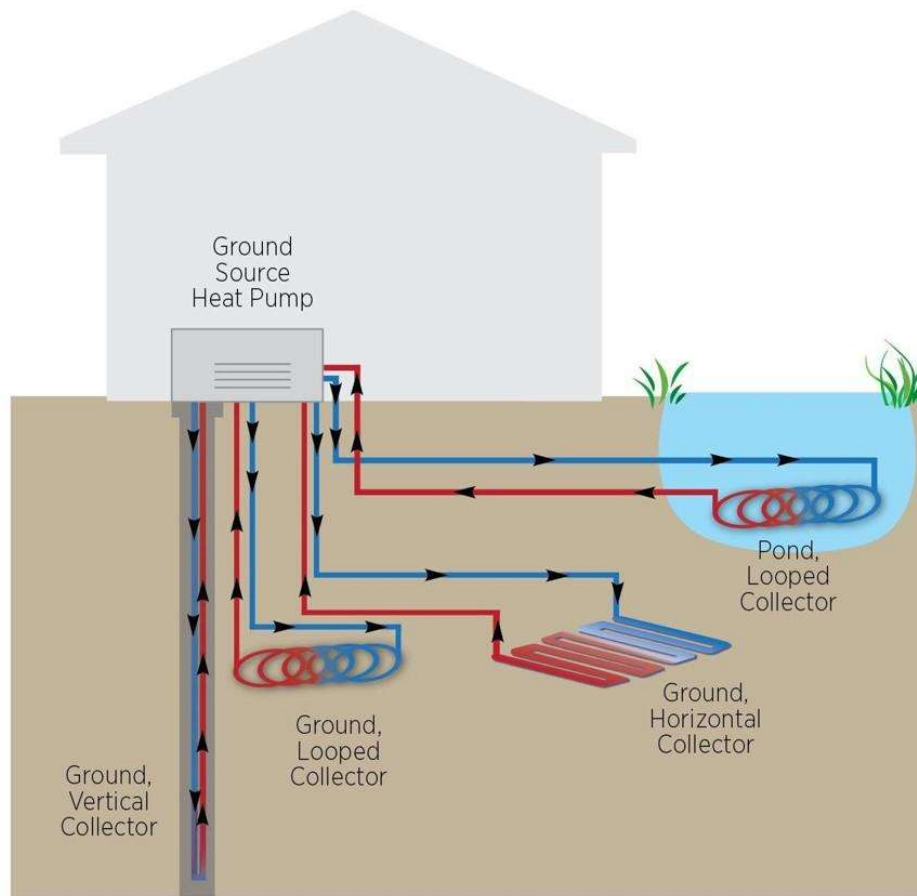


Image By: [Building Science Education Solution Center](#)

## Sources:

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