



Bosch Geothermal Heat Pump Residential Installation Case Study



BOSCH
Invented for life

Greensource CDi Series Model SM036-1 VTC-SLTA

Project Goals:

- ▶ Replace competitive faulty geothermal unit
- ▶ Energy Savings
- ▶ Eco-Friendly
- ▶ Reliability

Background

Mr. Tim Stout of Van Buren, Arkansas, owned a geothermal heat pump from another manufacturer. Over the past three years he experienced multiple refrigerant leaks and system failures, so in January 2013 he decided to replace it with a Bosch Greensource geothermal heat pump system in his 1700 square foot Arkansas home.

Installation Summary

Installation was done by American Energy Guard, an experienced heating/cooling and geothermal contractor also located in Van Buren. Tim's brother Joel and Joel's son Dustin performed the installation work over two days in January 2013. According to Tim, installation went smoothly, using the existing vertical geothermal ground loop and connecting Greensource to the home's existing ductwork. Some upgrades to the home's insulation were accomplished earlier in the year.

Ecologically Friendly - Saves Energy

The Bosch Greensource geothermal heat pump requires less energy to produce the equivalent heating and cooling output of water to air heat pumps. This reduces cost while maintaining comfort in the home. Greensource is recognized as the most efficient heat pump system by ENERGY STAR in 2013 and is rated for Tier 3, making it eligible for a 30% tax credit (see details at www.bosch-climate.us). With a geothermal heat pump system, a typical homeowner can expect to save up to 70% on energy bills, plus realize payback on investment in as little as 5 to 7 years.

Technical Specs of the Home:

Geothermal Heat Pump:

- ▶ Greensource CDi Series
Model SM036-1 VTC-SLTA
- ▶ COP: 1st stage: 4.4, 2nd stage: 3.9
- ▶ EER: 1st stage: 26.5, 2nd stage: 18.9

Economics:

- ▶ Cooling Size: Nominal Capacity 36,000 Btu/h
- ▶ Cooling full load capacity:
40,800 BTU @ 77°F Ground Loop
- ▶ Heating full load capacity: 28,400 BTU at 32°F
- ▶ Typical payback on initial investment: 5-7 years

Temperatures in this region of Arkansas range from below freezing in winter to over 100°F in summer. However, ground water maintains consistent average temperature of about 62°F, so geothermal energy can be harnessed and transferred to the home water loop using the efficient Greensource system. In its first 30 days of use, Tim reported that his home's power consumption (measured in kilowatt-hours) was cut by 10% with the new Greensource. The geothermal system maintains a high comfort level even when outdoor temperatures drop well below freezing, requiring no supplemental source of heat. Tim reports that the system ordinarily runs at its first stage of compressor operation, and rarely requires the higher power of its second stage, thus further reducing energy consumption.

Optional Geo-Prime tank protects the geothermal loop from temperature fluctuations

Tim chose to install an optional Geo-Prime tank offered by Bosch. Geo-Prime is an accessory that can be added to a standard flow center to create a non-pressurized flow center system. The Geo-Prime tank consists of a reservoir, two bypass valves and an air-eliminating dip tube inside an insulated cabinet. The tank includes a sealing cap with integrated pressure and vacuum relief to prevent the reservoir from being over-pressurized or collapsing.

For example, when water temperature drops in winter, loop piping contracts, causing higher fluid pressure. In summer,

when temperatures climb and the pipes expand, this results in lower water volume in the loop. Geo-Prime tank regulates the volume of water to maintain optimal fluid level and pressure throughout the geothermal system, thus preventing the possibility of damage or even water pump burnout.



Benefits and Conclusion

The Stout family is enjoying the comfort and instant response of their Greensource system. Tim chose to purchase an optional Bosch wireless thermostat. He commented "it works great, provides instant response to temperature changes and a comfortable environment in my home."

With the benefit of improved reliability and system comfort plus lower energy costs over their previous system, the family is pleased with the performance of the Bosch Greensource geothermal home comfort system.



- ▶ **Project Name:**
Bosch Geothermal Heat Pump Residential Installation
- ▶ **Installer:**
Joel Stout, American Energy Guard, Van Buren, AR
- ▶ **Model Installed:**
Geothermal Heat Pump Greensource CDi Series Model SM036-1 VTC-SLTA
- ▶ **Installation Location:**
Van Buren, AR
- ▶ **Installation Date:**
Jan 30-31, 2013