

Geothermal 101: How It Works



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OK, OK – you asked for it so I’m going to do it. It seems like about three million of you have asked me to explain how a geothermal system works. Well, maybe not three million, but it’s a bunch of you and I’m honored that I have the opportunity to do it. Now you’ve probably already

figured out that I’m not smart enough to be real technical, but I do have some common sense. So I will use a common-sense approach to explain how the most efficient heating and cooling system available today can help you.

Actually you could get the Oct. 25, 1948, issue of *Life* magazine and get a great explanation. That’s correct, 1948. Geothermal units are not new, but it has only been in recent years that they’ve gained in popularity. It just takes awhile for adults to embrace new ideas, especially if they cost more money. Notice that I said adults. When I show high school students how you can spend \$50 more per month on installing a geothermal unit and save \$75 per month on your utility bill, they simply say “cool.” No discussion or argument. They would take it in a minute.

OK, OK – here’s how it works. All energy comes from the sun. Mr. Sunshine has provided a lot of BTU for a lot of years and Mother Earth has absorbed and stored that energy. A closed-loop geothermal system simply removes those BTU from Mother Earth in the winter and gives them back in the summer. At depths of five feet or more, the earth temperature in Arkansas remains close to 57 degrees, as evidenced by a cave’s temperature.

There are two basic ways to install a geothermal unit. If digging a trench is difficult or if space is limited, geothermal contractors drill holes into the ground vertically to install small-diameter polyethylene pipe. If digging a horizontal trench is feasible, the pipe is installed in a horizontal trench.

A very small pump then circulates water from

the earth to the geothermal unit and back to the ground in the closed-loop pipe. Actually, geothermal is not the best name for this unit. A better name is ground-coupled heat pump or water-to-air heat pump. A heat pump doesn’t create heat, it just moves heat from one location to another using a compressor. Example: A window air conditioner blows cool air inside and hot air outside. If you turn the air conditioner around, it will blow hot air inside and cool air outside.

As it circulates 57-degree water in the winter, the geothermal unit, using the compressor to remove heat from the water, provides 105-degree air into the house. As the water goes back to the ground loop, it immediately starts absorbing BTU from the earth. In the summer, a reversing valve simply reverses the process and the compressor pumps BTU into the ground loop. The water returns to the earth and immediately starts cooling off again. It’s all about heat transfer. Here’s another example – a blacksmith heats a horseshoe to red hot. To cool it, he doesn’t wave the horseshoe into the air. Instead, he simply dips it in water. It cools off a lot faster and takes a lot less energy.

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Folks, I have been responsible for the installation of many thousands of geothermal units and I have had no disappointed customers. My wife and I have had geothermal heating and cooling for 18 years and we simply would not have any other system. Geothermal gives good hot air in the winter and really cold air in the summer and uses less energy than any other central heating and cooling system. So don’t be a tightwad. Buy the best there is – you, your family and your house deserve it.

Doug Rye, a licensed architect living in Saline County, Ark., is the popular host of the “Home Remedies” radio show and a promoter of energy efficiency building. To reach Doug, call him at 501-653-7931.

Save Energy at Work

This fall, EPA is encouraging everyone to look for ENERGY STAR® qualified computers, monitors, printers and other products to avoid adding “pay high utility bill” to your list of things to do this season. ENERGY STAR qualified office products and power management practices can save energy, save money, and help fight global warming. In fact, if every home office product purchased in the U.S. this year were ENERGY STAR qualified, we would save \$200 million in annual energy costs while preventing almost 3 billion pounds of greenhouse gases equivalent to the emissions of 250,000 cars!

• At the end of your work, homework or Internet session, be sure to turn your computer and monitor off. Contrary to what most people believe, turning computers and monitors off saves a lot of energy and will not hurt the equipment or waste energy by having to boot up again.

• Be careful with screen savers. They actually might be screen wasters as they may keep your monitor from powering down. Just make sure that your screen saver is not programmed to overlap your computer's sleep mode, since then it won't go to sleep but will instead stay on to run the screen saver.

• Above all, if you are planning to purchase any office equipment, look for the ENERGY STAR. Then be sure to take the ENERGY STAR Pledge at energystar.gov/changetheworld to make your official contribution to our growing movement to fight global warming. You can also share your story of what you do to save energy and make ENERGY STAR news of your own!



USDA Awards \$1.3 Billion In Electric Loans

Funds Will Help Nearly 85,000 Rural Customers

In October, Agriculture Secretary Ed Schafer announced the selection of 44 rural utilities and cooperatives to receive \$1.3 billion in loans to build and repair nearly 11,000 miles of distribution and transmission lines serving almost 85,000 customers in 24 states.

“USDA investments in the nation's rural electric system provide safe, reliable electricity to power homes and businesses,” Schafer said. “These loans help strengthen rural communities.”

The funding is being awarded through USDA Rural Development's Utilities Programs, which Congress authorized under the Rural Electrification Act of 1936.

For example in South Dakota:

• West Central Electric Cooperative, Inc. in Murdo has been selected for an \$8,276,000 loan to serve 631 new and existing consumers, build 27 miles of new distribution line and make improvements to 11 miles of distribution lines and other system improvements.

• Charles Mix Electric Cooperative, Inc. in Lake Andes has been selected for

a \$4,770,000 loan to serve 300 new and existing consumers, build 18 miles of new distribution line, 48 miles of improved distribution lines and make other system improvements.

• FEM Electric Association, Inc. in Ipswich has been selected for a \$3,531,000 loan to build 22 miles of new distribution line, make improvements to 24 miles of distribution line and make other system improvements to serve 87 new and existing consumers.

• Clay Union Electric Corporation in Vermillion has been selected for a \$4,880,000 loan to serve 246 new and existing consumers, build 32 miles of new distribution line, make improvements to 89 miles of distribution lines and make other system improvements.

Funding of each recipient is contingent upon their meeting the conditions of the loan agreement.

A complete list of the selected recipients is posted on the USDA Rural Development Web site at <http://www.rurdev.usda.gov/rd/newsroom/2008/09-25-2008-ElecLoan.pdf>.

Dry Fork Station Construction

After months of ground work and foundation pours, work on the Dry Fork Station has now moved above ground. The first

structural steel columns and cross beams have been set for the plant's boiler house and air-cooled condenser building.

Tom Stalcup, Dry Fork Station plant manager, said about 1,100 tons of steel have now been erected for the first tier of the boiler house and other areas of the plant. The first piece of structural steel was set on Aug. 1.

“There will be five tiers of steel columns and cross beams to house the



boiler, which is scheduled to be complete in January,” Stalcup said.

Stalcup stressed that with almost 500 employees assigned to the Dry Fork Station project, work has progressed throughout the plant site. He said the concrete foundation pours continue. “So far we've poured about 55 percent of the total concrete or about 37,000 cubic yards. That work is scheduled to be complete in spring 2009.”