U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Residential Geothermal Heat Pump Systems B-Roll

Scene-by-Scene Description

Get the facts behind the footage available on the U.S. Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy (EERE) B-Roll Web site at **eere.energy.gov/news/b_roll.cfm**.

Video Title: Residential Geothermal Heat Pump B-Roll
Video Only/No Audio
Location: Arvada, Colorado
Shoot Date: May 7, 2010
Total Running Time: 4:03

Scene 1: 00:05: Professional installers dig a horizontal trench for installation of geothermal heat exchanger pipes. There are a variety of configurations for heat exchanger pipes, depending on property characteristics. Homeowners are recouping upfront expenses in as little as 2 to 10 years.

Scene 2: 01:15: Installing "socket fuse" joints in heat exchanger pipes. High density polyethylene (HDPE) pipe is used for geothermal heat exchanger loops because it is tough, yet flexible, resists corrosion, and possesses excellent heat transfer properties. In addition, pieces are welded together at 500°F to create long-term leak-free joints.

Scene 3: 02:25: The geothermal heat exchanger pipe loop is buried 4 to 6 feet below the surface in this common horizontal configuration. Vertical configurations (100-400 feet deep) are often used for existing homes or sites with limited usable ground space. Other configuration styles include pipes submerged in ponds or "open loops" that draw water from ponds or wells.

Scene 4: 03:16: This heat pump unit installed in a residential garage connects to the home's existing ductwork. In the summer, the system acts identically to an air conditioner or refrigerator, using refrigerant creating cold air, while transferring the heat created in the process to the underground water coils. In the winter, the system works in reverse, transferring the heat into the home.

Learn More about Residential Geothermal Heat Pumps

Just below the surface of the earth lies a vast resource for heating and cooling our homes. Between 4 and 6 feet down, the ground maintains a relatively constant temperature of about 55°F depending on the geographic location. In the winter, this stable ground temperature can be used as an effective heat source. In the summer, it can act as a heat sink, displacing the heat from a home to the cooler ground below. Geothermal heat pump systems (GHPs) move heat from the ground to the home (or from the home to the ground) through a series of flexible pipe "loops" containing water. Heat pump systems are so efficient that they have proven to lower energy bills by up to 70% over traditional types of home heating systems. In addition to space heating, GHPs

can also be used to provide hot water to the home at similar efficiencies. The Recovery Act has committed up to $50 million for the deployment of GHPs in both residential and commercial buildings.

For more information on the residential application of geothermal heat pumps and other energy-efficient heating and cooling technologies, visit the EERE *Energy Savers* Web site at **energysavers.gov**.