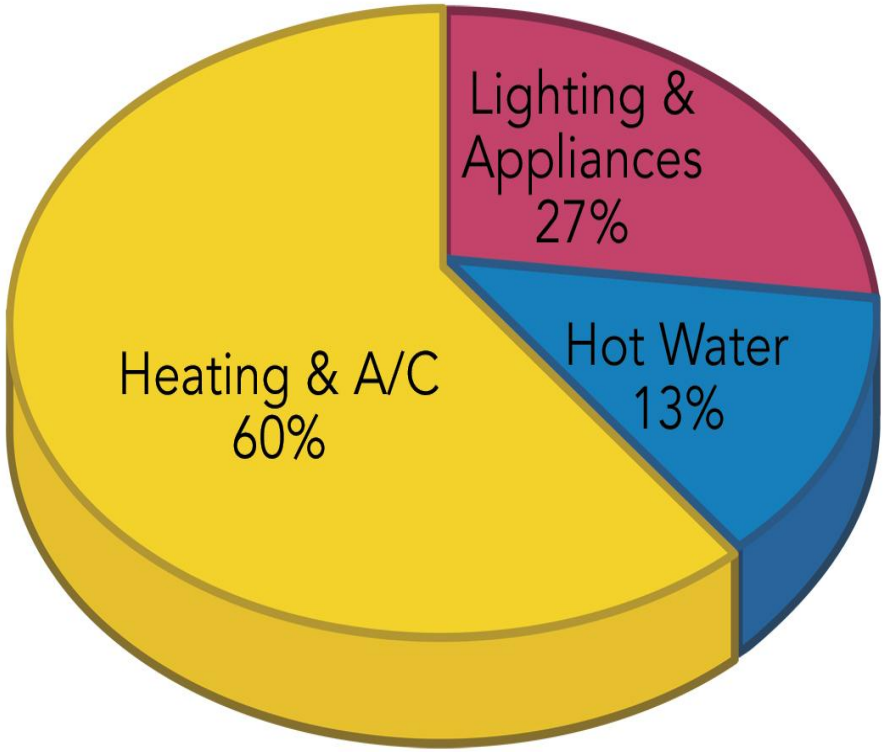
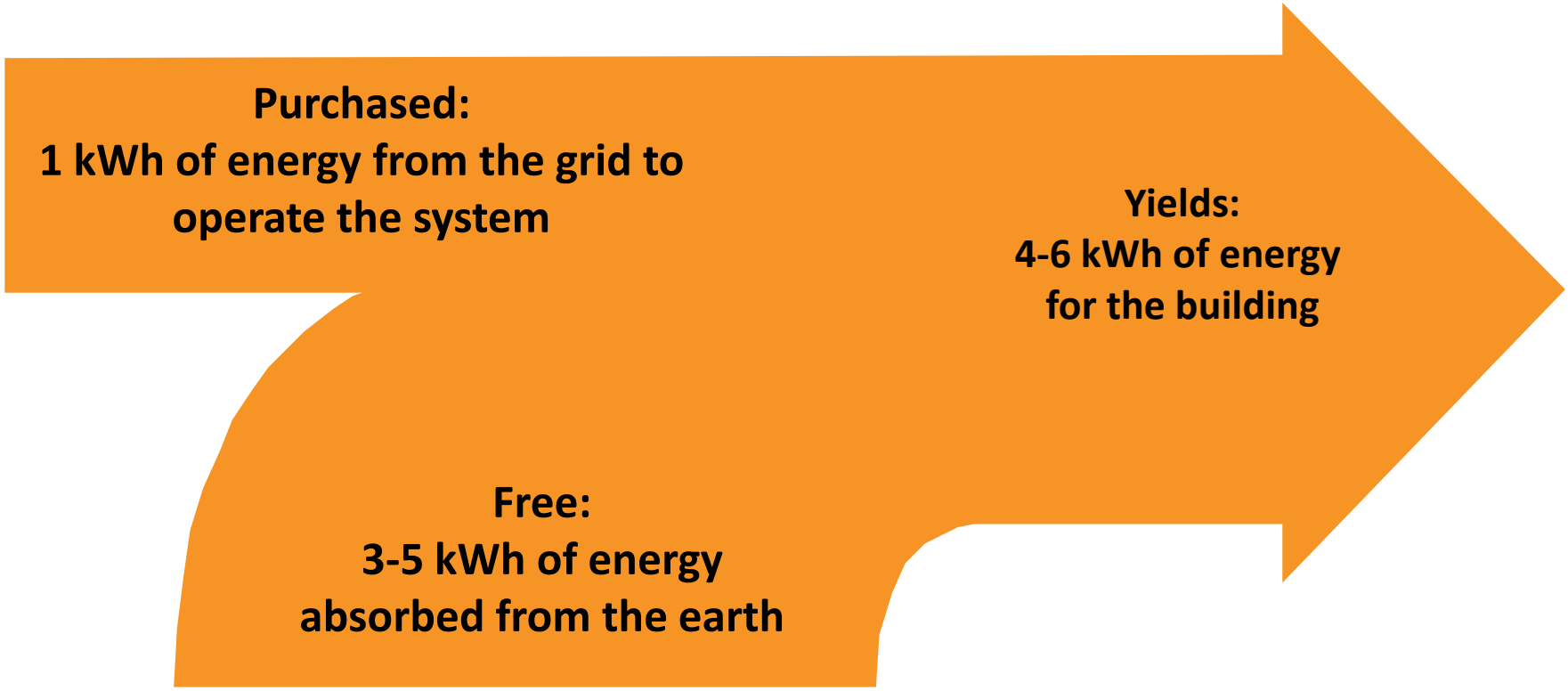
Residential Site Energy

Conventional System

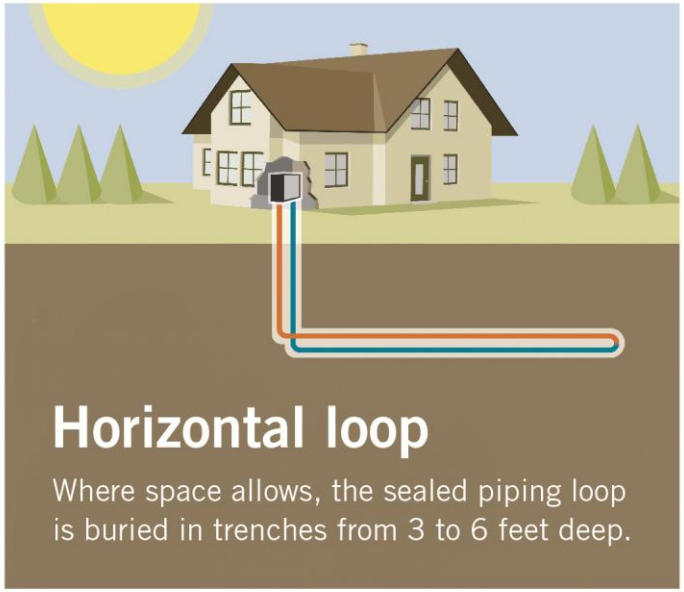


Over 70% of the energy consumed by a typical single-family home is used to meet thermal loads

Geothermal Heat Pumps Transfer Heat Efficiently

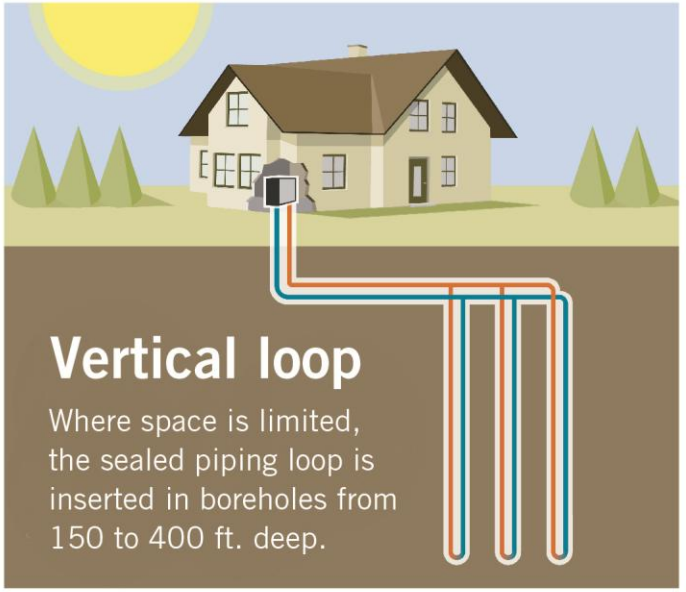


400-600% Efficient



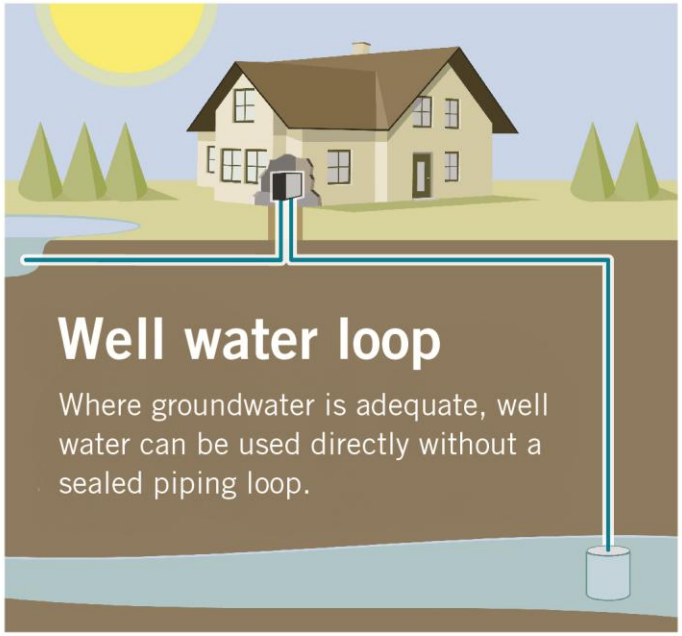
Horizontal loop

Where space allows, the sealed piping loop is buried in trenches from 3 to 6 feet deep.



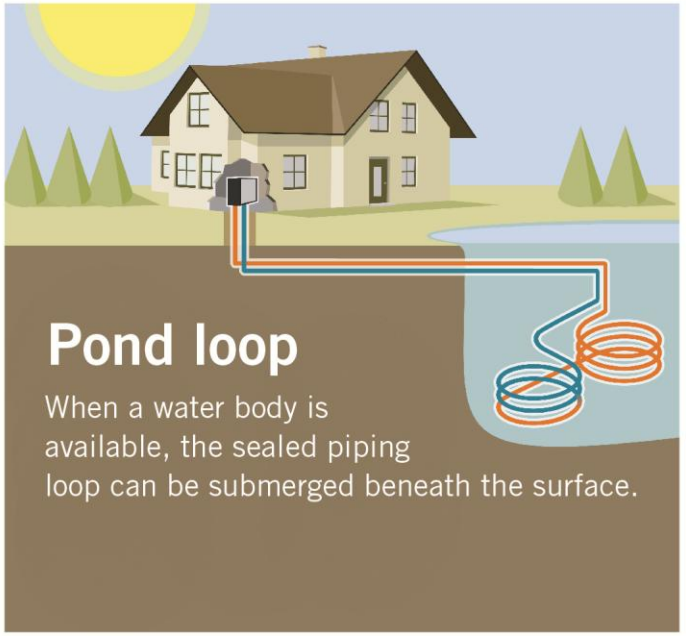
Vertical loop

Where space is limited, the sealed piping loop is inserted in boreholes from 150 to 400 ft. deep.



Well water loop

Where groundwater is adequate, well water can be used directly without a sealed piping loop.



Pond loop

When a water body is available, the sealed piping loop can be submerged beneath the surface.

Testimony of Douglas A. Dougherty
President and CEO
The Geothermal Exchange Organization

on S. 1142, The Geothermal Exploration and Technology Act

Before the

Committee on Energy and Natural Resources

July 12, 2011

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Good morning. I am Doug Dougherty, President and CEO of the Geothermal Exchange Organization, a non-profit trade association representing the U.S. geothermal heat pump industry.

On behalf of GEO and our more than 200 members, I would like to thank Chairman Bingaman, Ranking Member Murkowski, and the other distinguished members of the Committee for the opportunity to share our views on S. 1142, the Geothermal Exploration and Technology Act.

GEO strongly supports S. 1142 and its many provisions to expand the use of geothermal energy. We are especially interested in those that deal with geothermal heating and cooling technologies.

A geothermal heat pump is a 50-State, clean, renewable energy technology that uses solar energy stored just below the earth's surface to heat and cool residential and commercial buildings and to provide hot water.

Let me briefly describe how the technology works. Unlike conventional systems that use the outside air to take and release heat, geothermal heat pumps transfer heat from and to the ground. They do that through closed loops of fluid filled, plastic pipes buried either horizontally or vertically in the ground below the frost line where the temperature is consistently between 40 to 75 degrees year round. While a conventional air source heat pump struggles to scavenge heat from freezing winter air or dump it into the summer swelter, the ground source heat pump utilizes that constant temperature for fluid circulating through its loop in the ground. Once installed, the ground loop lasts indefinitely and the inside unit has a lifespan of greater than 20 years.

Geothermal heat pumps use 25 to 50 percent less electricity than conventional heating or cooling systems, and according to the Environmental Protection Agency, they can reduce energy consumption—and corresponding emissions—by 44 to 72 percent compared to traditional heating and cooling equipment.

Geothermal heat pumps are a fully scalable technology. They are effective in residential homes and commercial buildings. The largest project in the country is currently underway at Ball State University in Indiana, where more than 4,000 boreholes will host ground loops to heat and cool 45 buildings, for annual energy savings of $2 million per year.

Despite the well-documented energy efficiency, our industry is still relatively nascent, with less than a five-percent market penetration for new construction. GEO agrees with Senators Tester and Murkowski that geothermal heat pumps can make a significant contribution to the use of renewable energy but are underrepresented in research, development, demonstration, and commercialization.

The primary barriers to expanding the industry include: lack of consumer awareness; high initial cost, primarily due to the installation of the underground loop; need for more qualified design and installation professionals; need for builders, developers, realtors, lenders, and appraisers to value energy savings; and lack of a "home" at DOE.

GEO is pleased that the geothermal heat pump efforts specified in S. 1142 will focus on cost, a key barrier to wider geothermal heat pump installations. We agree that research should be directed at:

- Improving ground loop efficiency through more efficient heat transfer fluids and thermal grouts, better loop design, and improved variable pumping rates;
- Reducing ground loop installation cost through improved drilling techniques and equipment;
- Exploring innovative uses of wastewater and mine water for geothermal systems;
- Demonstrating the viability of large-scale commercial and residential neighborhood projects; and,
- Integrating geothermal with solar systems to balance loads and to store energy.

The Geothermal Exploration and Technology Act will help drive down the cost of installing geothermal heat pumps. It will also fuel a U.S.-based industry that generates thousands of jobs. The installation of the ground loop creates well-paid jobs not found in the conventional heating, ventilation, and air conditioning industry. We estimate that expanding our industry 10 times – to a million installations per year – by 2017 would create more than 100,000 jobs.

S. 1142 will help us reach this goal by making geothermal heat pumps more affordable and further demonstrating the efficiency of the technology in large scale projects. GEO strongly urges the Committee to support this legislation.

We also hope to work with the Committee to address the other barriers that have limited the growth of our industry, particularly the lack of a home for our industry at the Department of Energy. Over the years, we have been moved from one program to another within the Office of Energy Efficiency and Renewable Energy. We believe it is important for the Department to have dedicated staff to promote geothermal heat pumps and to provide technical assistance to other agencies such as the Environmental

Protection Agency, Department of Defense, Department of Education, National Park Service, and the General Services Administration that are considering geothermal heat pump projects.

Thank you again for the opportunity to testify this morning.