



**Mike Hammond**

Technical Trainer  
ClimateMaster



# Residential Installations and Training

CAUTION  
DO NOT OPERATE UNIT WITHOUT PROPERLY  
INSTALLED FILTERS

# What's wrong with this install?



# What's wrong with this install?

Wet Rotor Shaft Pump  
Mounted Vertical.

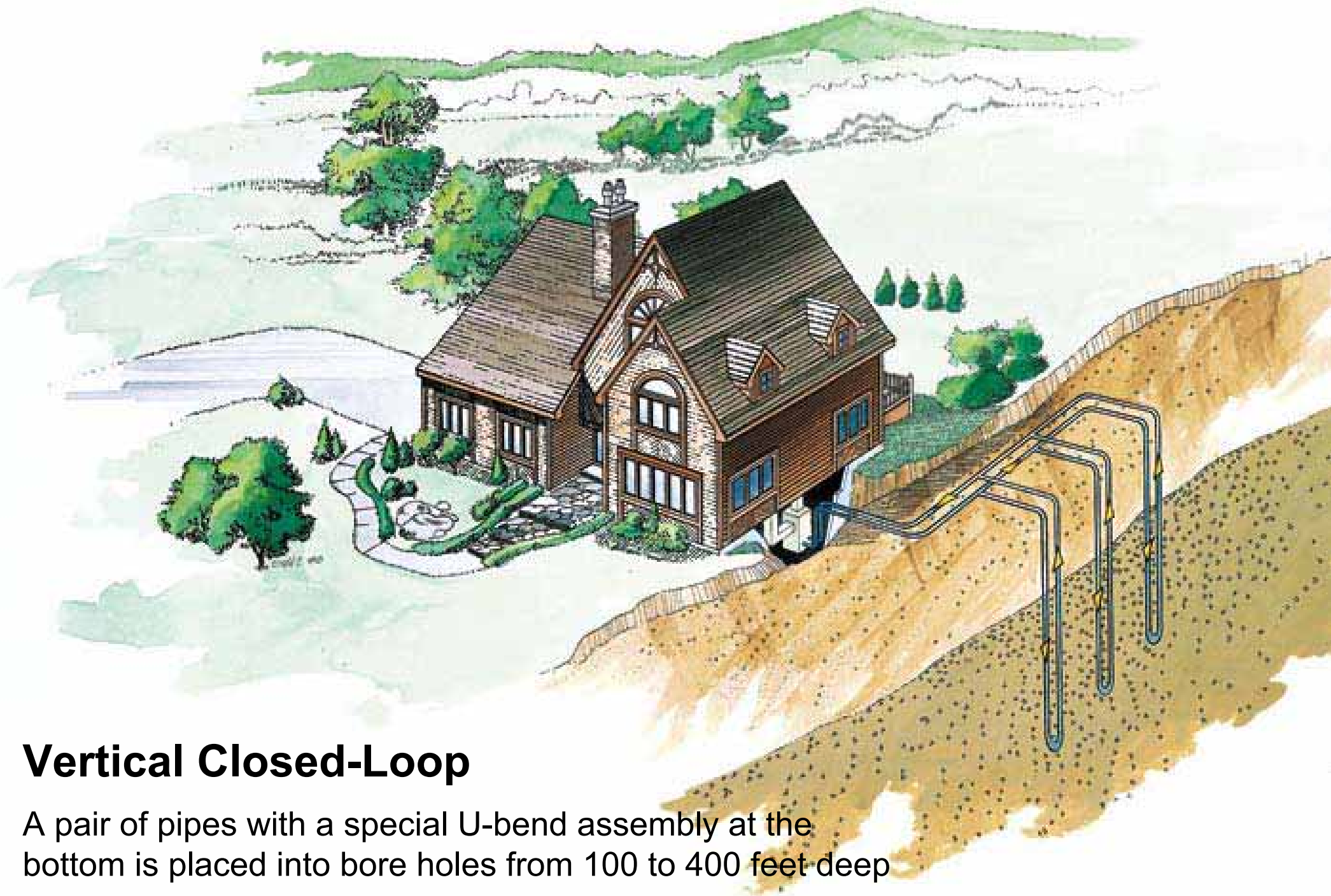
No Pressure  
Temperature Ports.

# Good Installation



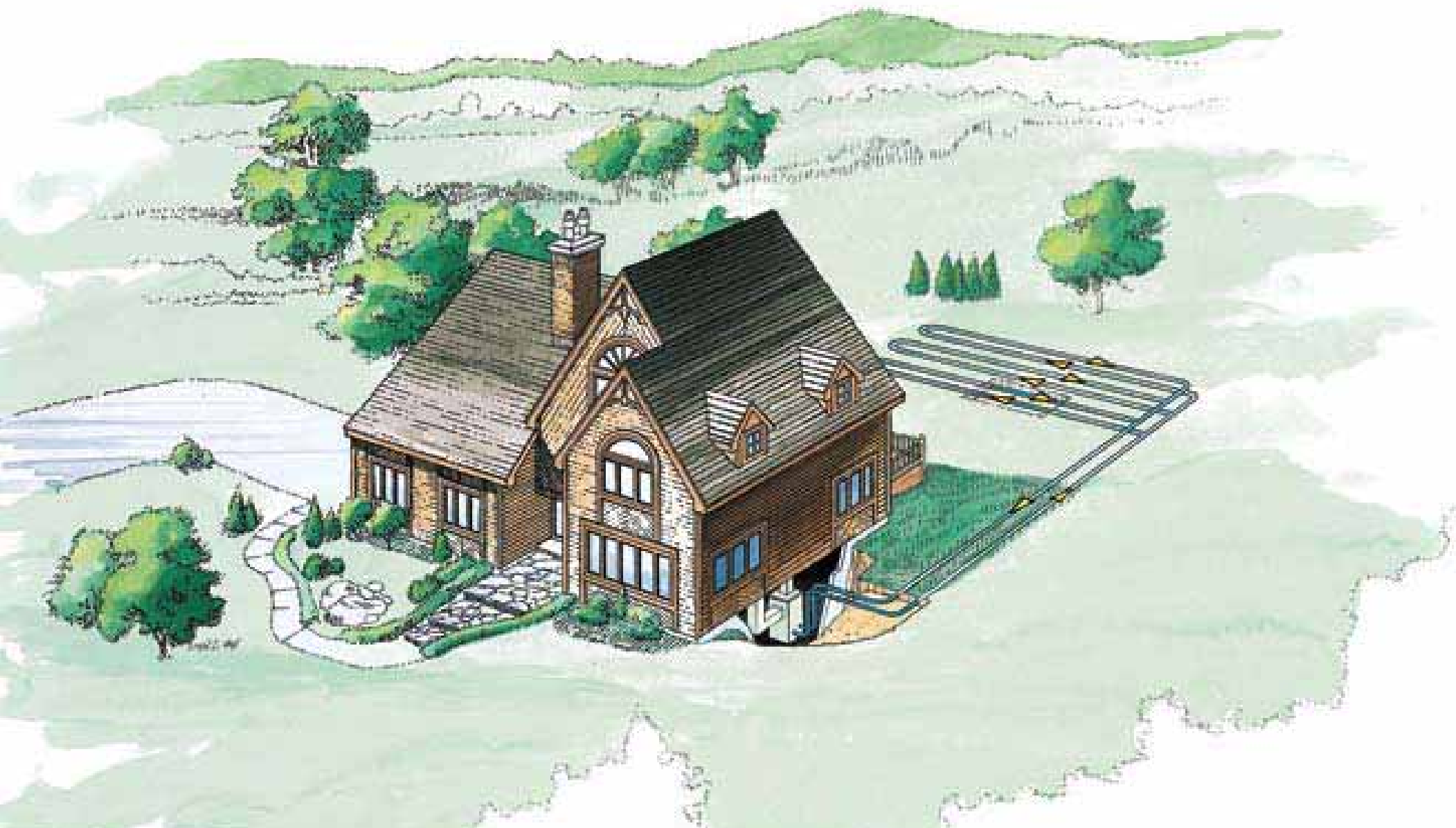
# Good Installation





## Vertical Closed-Loop

A pair of pipes with a special U-bend assembly at the bottom is placed into bore holes from 100 to 400 feet deep



## Horizontal Closed-Loop

A piping array is installed in trenches cut 3 to 5 feet deep and hundreds of feet in length



## **Surface Water Closed-Loop**

A piping array is submerged in a pond or lake at least 8 feet deep

# Vertical Closed-Loop Installation



**Drilling**



**Pipe Loop  
Insertion**



**Heat Fusing**



**Inside  
Connection**

A photograph of a ClimateMaster geothermal heat pump unit. The unit is white with a grey control panel on the right side. The ClimateMaster logo is visible at the top center of the unit. The control panel has several circular ports and a caution label. The background is a plain wall.

# Geothermal Heat Pumps Are a Scalable Technology

# Geothermal Heat Pumps



1300 Sq. Ft. Low Energy Habitat for Humanity Homes

# Habitat for Humanity

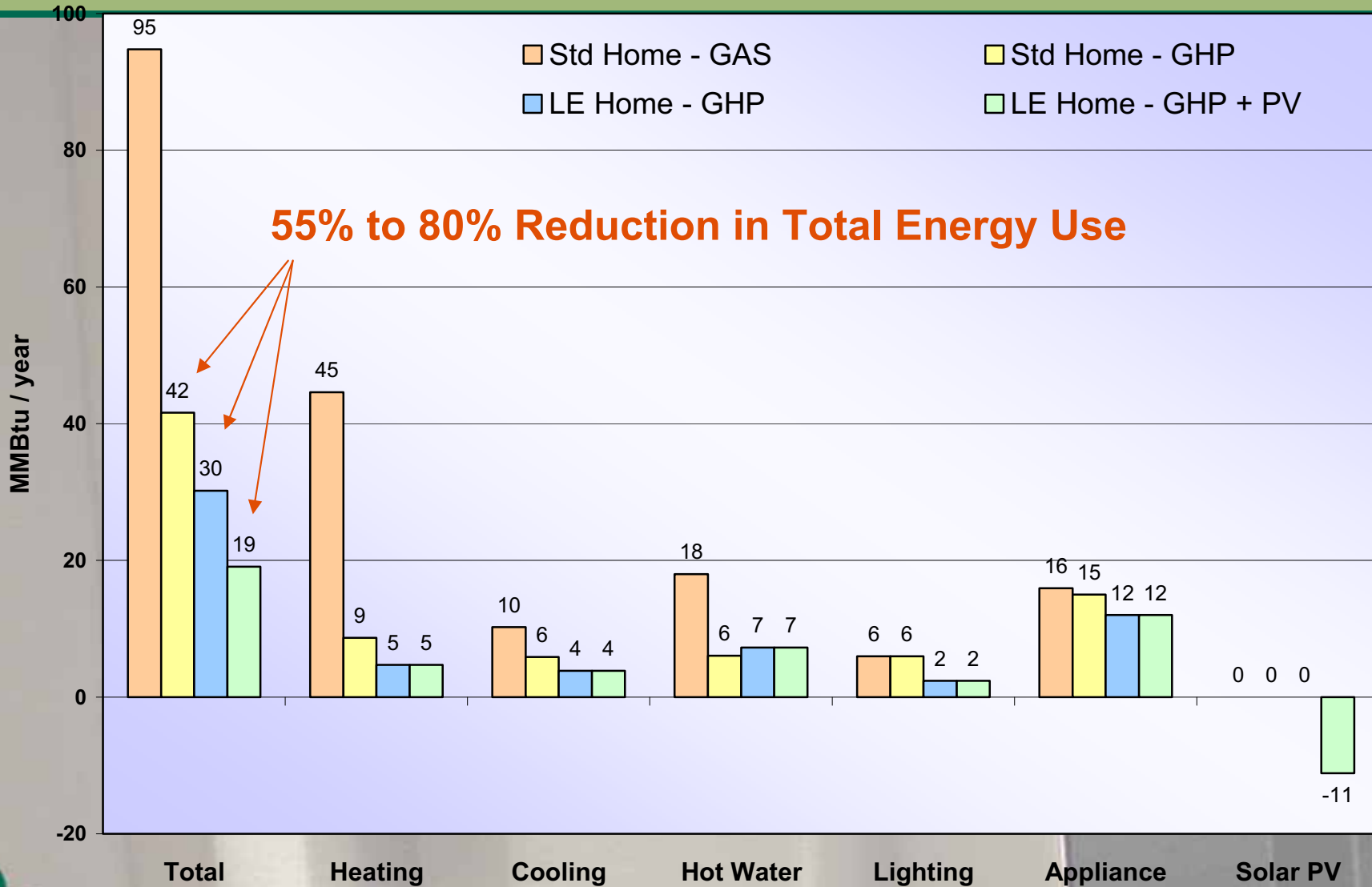
## Low Energy Home Construction Details



Geothermal Heat Pump / Foam Insulation / Low-E Glass / CFL Lighting / Energy Star Appliances

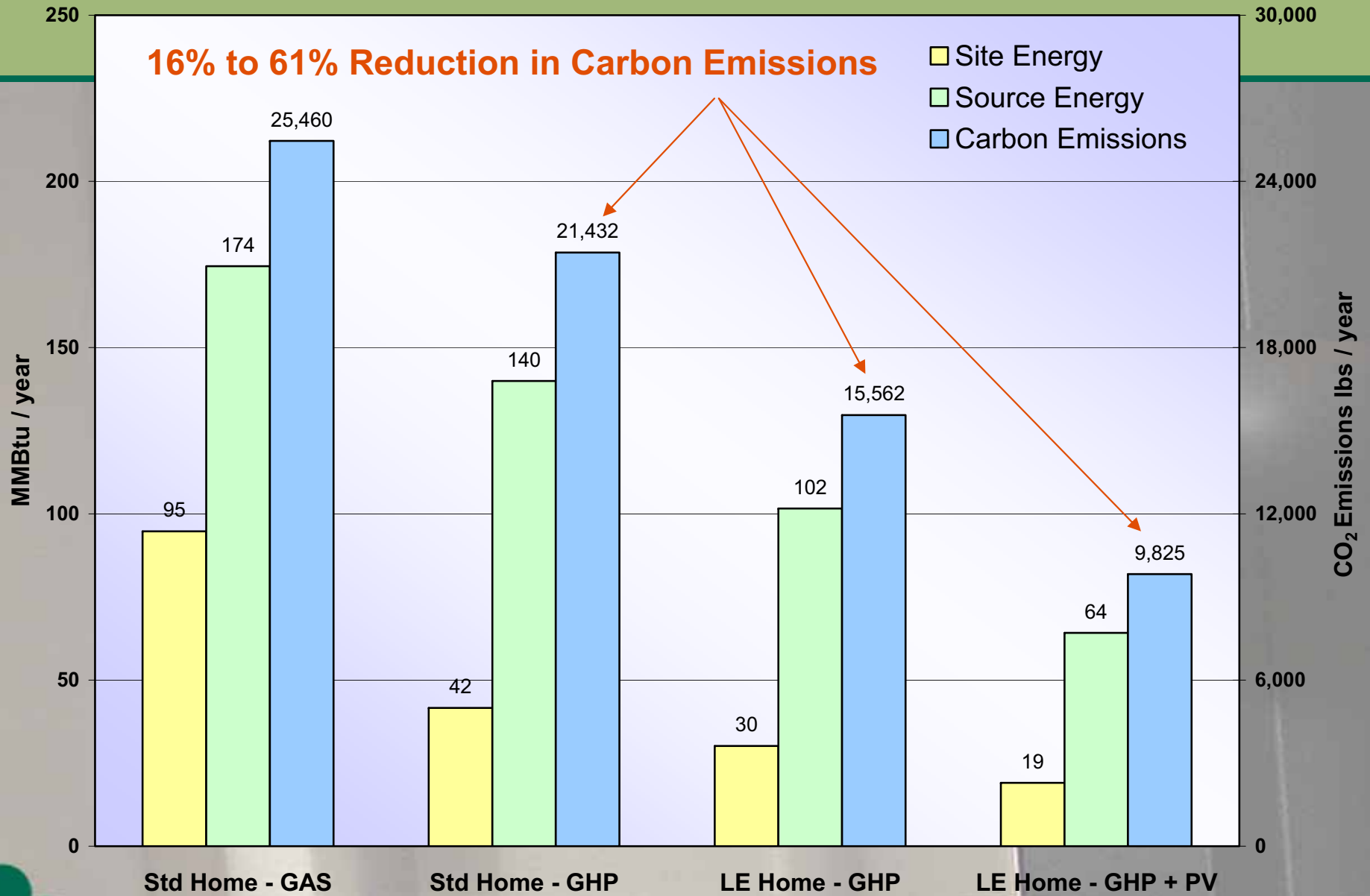
# Habitat for Humanity

## Site Energy Consumption by End Use – Std and Low Energy Homes



# Habitat for Humanity

## Total Energy Consumption and Carbon Emissions



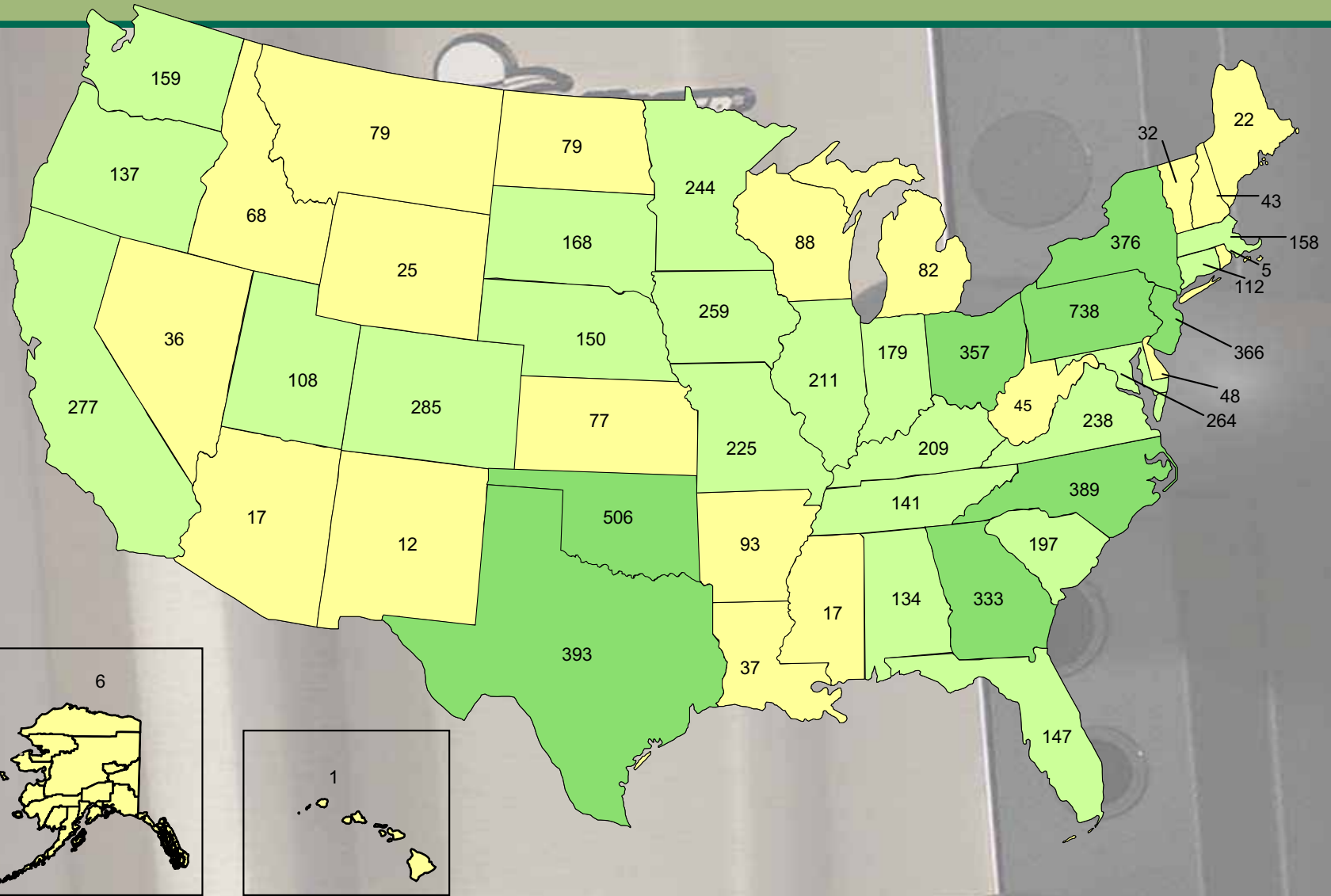
A photograph of a ClimateMaster Tranquility 27 Two-Stage EarthPac heat pump unit. The unit is white with a black control panel on the right side. The text "CLIMATEMASTER" is prominently displayed at the top, with "TRANQUILITY 27 Two-Stage EarthPac" below it. A caution label is visible on the control panel. The background is a plain, light-colored wall.

# We Need Well Trained Installers

# How Do We Get Trained?

- From the manufacturer. ClimateMaster, Florida Heat Pump, WaterFurnace, ETC.
- IGSPHA. Installers course.
- Local College?
- Trade school?

# Industry-Trained Geothermal Installers



# ClimateMaster Service and Install Training



# The Typical Attendee

- Dealer with 2-30 years HVAC experience.
- Some have some previous Geo Exp.
- Mixture of small and large organizations.
- Most are eager to attend.
- They see the benefit to there business.

# Service Install Training Day 1

- Review basics of a geothermal system.
- Water side check HE/HR.
- Basic review of refrigeration.
- Installation procedures.
- Hot water generator.
- Controls.
- Start up procedures.

# Service Install Training Day2

- Closed loop definition.
- Closed loop types.
- Flow rates.
- Flushing procedures.
- Antifreeze protection.
- Loop design software.
- Testing.



# Training in 2009

- Trained all across the country.
- Had training classes at the factory.

Trained **962** students.

This is just one manufacturer.

# We need good Geo Drillers



# Converting Well Drillers to Geothermal drillers

- ClimateMaster Drillers Training.
- Have 18 classes scheduled in 2010.
- Had one in Austin had a great turn out of drillers interested in getting into geothermal drilling.
- IGSHPA accredited vertical loop installer training.
- Partnership with driller and installer.

# Geothermal Heat Pumps



Statue of Liberty Gift Shop



ASHRAE Headquarters - Atlanta, GA



Galt House Hotel - Louisville, KY



Black Point Inn - Prouts Neck, ME



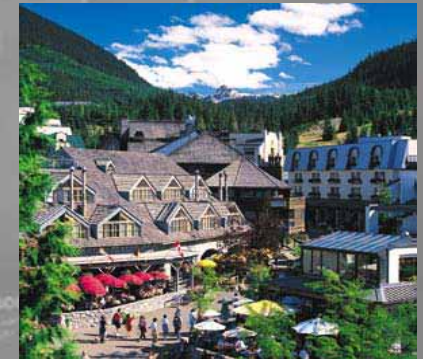
Alta Condos, Washington DC



Harvard Library - Cambridge, MA



French Laundry Rest. - Napa, CA



Whistler Village - BC, Canada



Yale Art Bld. - New Haven, CT



Gaillardia Offices - Okla. City



California University of PA



Hirschfeld Towers - Denver, CO



**The Oklahoma State Capitol uses over 600 geothermal heat pumps**