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Green Movement Energizes Growth  
at ClimateMaster

Product Focus: Heating and Cooling

Company Profiles

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## Geothermal Systems: The Ultimate for Efficiency and Comfort

# Green Movement Energizes Growth at ClimateMaster

It's every manufacturer's dream. Suddenly, market demand for products and technology flourishes and thrives. And if that wasn't enough, the government steps in with tax incentives, like sprinkling fertilizer in an already well-nourished garden.

The green movement, and now generous Federal enticements, have indeed turned America's attention toward the need for renewable home heating and cooling technology.

"We're on the edge of something very exciting here, and yet our focus needs to be – more than ever before – on our relationships with wholesalers and installing contractors, and in delivering the best technology available," said John Bailey, ClimateMaster's senior vice president of sales and marketing. "This is why we are here right now, to be sure we move toward this goal continuously."

Bailey's words were spoken to a large audience earlier this month. Wholesale distributors from across the country attended ClimateMaster's annual sales meeting in Oklahoma City, OK.

Headquartered there, the world's largest manufacturer of water-sourced and geothermal heat pumps directed its attention to much smaller things, key among which is how best to



*This new geothermal system meets a large home's HVAC needs year 'round while supplying most of the domestic water heat as well.*

exceed the needs and expectations of installing contractors. "This is a time when consumer demand is pushing for greater volume, and though we are attending to those needs, the greatest need of all is to see that product development moves at a pace that assures unerring quality," added Tony Landers, director of marketing.

Serving commercial/industrial and residential markets for more than half a century, millions of ClimateMaster heat pumps have been installed in places where people work, live and shop – including schools, churches, homes, office buildings, high-rise buildings, hospitals, sports venues and assisted living facilities.

### Broadest line of geothermal equipment

For years, ClimateMaster has maintained its strong focus on innovation and quality. "Almost any application you can throw at us, we'll have a product for it," says Landers.

ClimateMaster offers the broadest product line of any water-sourced heat pump (WSHP) manufacturer worldwide. Its units include packaged, vertical stack, rooftop, console, water-to-water and water-to-air geothermal, and split systems, and offer the most options in terms of size, configuration, performance and cost. "No other manu-

facturer provides as many options," said Bailey.

As a result of its product line and forward-looking approach, ClimateMaster has achieved the highest percentage of market share in the residential and commercial/industrial markets. According to Bailey, geothermal heat pump sales at ClimateMaster have tripled in the last five years.

ClimateMaster's products provide substantial benefits over conventional air-conditioner systems. Advantages offered by WSHPs include lower maintenance and operating costs, longer life expectancy, higher comfort levels and quieter operation.

"Simple and efficient" is how

## Cover Story



Larger geothermal and water-sourced heat pump systems can also meet the HVAC needs of very large buildings.

ClimateMaster sums up the water-source concept. Energy- and cost-effective, the technology saves money while conserving energy. Essentially, ClimateMaster heat pumps recover potentially wasted energy and direct it to where it can be more fully utilized and, in turn, provide a less expensive heating/cooling alternative for commercial buildings and homes.

Simplicity of design not only reduces operating and maintenance costs, it makes ClimateMaster products easier to install, as they take up less space and need less piping than conventional systems. In addition, they're easier to service.

#### Up to 450%+ efficiency

"Most geothermal systems operate at ranges of 300 to 400 percent efficiency," said Jay Egg, president of Egg Geothermal, a wholesaler distributor based in Port Richey, FL. "Systems of even higher efficiency are available for residential and commercial application. With the variety of options available for installation of the earth field, and the highest operational system efficiencies, up into the 400% to 450% range, geo systems are a great choice for many homes or buildings, especially now as

energy rates skyrocket."

Contractors like Dan Foley, president of Alexandria, VA-based Foley Mechanical, Inc. have seen the development of a trend during the past few years. "Homeowners with gas-fired furnaces are fed up with increasing fuel costs, so they're asking about geothermal split system retrofits. A lot of existing residential fan units are used as the new geothermal system's air handler, and the gas burners only need to operate for supplemental heat in the very coldest weather."

Surveys of ground-source owners conducted by the Geothermal Heat Pump Consortium show that they rank their systems higher in comfort than do the owners of other heating and cooling systems. More than 95 percent state that they would recommend ground-source to friends and family members.

Typically, geothermal systems provide service for up to 25 to 30 years, which is twice the life expectancy of air source heat pumps. This is because the stable heat source avoids thermal stresses to the compressor and the enclosed unit is out of the weather. And, it's green: no fossil fuel is burned by the system.

#### Water-source systems – a popular choice for many

Although not yet familiar to everyone, ground-source heat pumps have been installed for more than thirty years and are recognized as the most highly efficient heating and cooling systems available today. Geothermal heat pump technology offers a renewable energy solution that's right for almost any home. Thermal energy of sufficient temperatures anywhere in the US and Canada is harvested from the earth and transferred into buildings by a heat pump that provides heating and cooling.

#### Geo-to-radiant? You bet.

Some call it a "geothermal boiler." It's a dream come true for die-hard hydronic pros and radiant-ready homeowners alike. ClimateMaster's new THW water-to-water geothermal system produces an unprecedented water temperature of 145°F, making it ideal as a heat source for ultra-efficient radiant heat systems.



The new systems are currently available in 3-ton (36,000 BTU) capacities (10kW) with ground loop efficiencies 25% higher than other units on the market. "Tranquility" heat pumps are rated for water loop heat pump, ground loop heat pump and ground water heat pump applications.

New scroll compressors within the Tranquility units make it possible to generate the high water temps, even at ground loop minimum temperatures. They are also among the quietest units on the market due to features such as a double-isolated compressor mounting, discharge and suction mufflers, and fully insulated compressor section. All Tranquility heat pumps systems use EarthPure® (HFC-410A) zero ozone depletion refrigerant.

The new high-temp heat pumps are ideally suited to replace natural gas, propane, or fuel oil boilers.

## Cover Story

### Geo-exchange Illustrations

#### Horizontal Loops

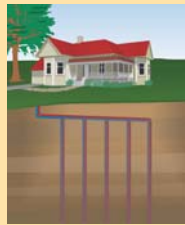
Horizontal Loops are installed in areas where the soil conditions allow for economical excavation. Taking up more land area than any other loop type, they are used where space permits. Trenches are normally 5 feet deep. Normally, several hundred feet of trench is required.



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#### Vertical Loops

Vertical Loops are used extensively where land area is limited. A pair of pipes with a special U-Bend assembly at the bottom are inserted into a bore hole that averages between 150 to 250 feet in depth per ton of equipment.



#### Lake Loops

Lake Loops are usually very economical to install. If a pond or lake at least 8 feet deep is available, lake loops can utilize the water (rather than soil) for heat transfer. Reduced installation costs are characteristic of this type of loop system.



#### Open Loop

Open Loop installations actually pump water from an underground aquifer through the geothermal unit and then discharge that water to a drainage ditch or pond. Discharging water to a pond or lake is considered ideal.



With just an acre or more of land to excavate a horizontal geo-exchange bed, or the much more space-conserving ability to drill holes or tap an existing water source (pond or lake), chances are it's your customer's best hedge against an energy crisis that creeps closer to home each day.

A geothermal unit works like a conventional heat pump to cool a home in the summer, and heat it in the winter. The key difference between an air source heat pump (which can't heat a home efficiently when outdoor temperatures dip below 30°F) and a geothermal heat pump is that the geothermal unit harvests the stable and renewable heat from beneath the earth's surface. In the summertime, the cycle is reversed and heat is released into the ground. As a result, a geothermal unit saves energy, which reduces greenhouse gas emissions and can cut utility bills by up to 70%.

Geothermal systems work so much more efficiently than air-source heat pumps because conventional heat pumps use the outdoor air as their heat source, or heat sink. And, typically, the air that's put to the task comes in at extreme temperatures: low in the winter and hot during the summer months, defeating operational efficiency. It's no surprise that most people who have had experience with air-to-air heat pumps grumble about the cost to operate them, and the lack of comfort.

#### Renewable energy: the best choice

"Only a small amount of electricity is needed to power geothermal systems," said Egg. "The rest of the process uses the free, clean and renewable energy that's tapped just below the earth's surface."

There are two basic types of water-source geo systems: open-loop and closed-loop (see illustrations). An open-loop system typically pumps water out of a deep well, extracts heat from it (or, in the summer, rejects heat

into it), and then moves that water back into another well, or a pond or river.

A closed-loop system uses a continuous loop of buried plastic tubing as a heat exchanger. The tubing is connected to the indoor heat pump to form a sealed, underground loop through which an antifreeze solution is circulated. Unlike an open-loop system that consumes water from a well, a closed-loop system recirculates its heat-transferring solution in the pressurized pipe. Many closed-loops are trenched horizontally in yards adjacent to the home, set in vertical well bores, or submerged into a pond.



*This light commercial application places a geothermal air handler just above ceiling tiles in a new restaurant.*

Comparing the two water-source units, an open-loop system tends to be more efficient because it simply transfers thermal energy to and from a steady stream of subterranean water. It's not recirculated as with a closed-loop system.

For Southern states installations, ClimateMaster's geothermal product line offers a wide variety of environmentally-responsible systems. Among them are their Tranquility 27 water-to-air systems, offering 27 SEER efficiency. This equipment easily meets a home's or business' air conditioning, heating and hot water requirements, offered in a variety of configurations to easily meet the toughest – or the simplest – installation challenge.



Geothermal lines are trenched from a lake loop into a home.

Heating is accomplished with no fumes, gases or flames during its operation, thus keeping it clean and safe at all times. Also, there's no need for an outdoor fan, and two-stage compression within the unit assures gradual, steady, quiet provision of comfort at all times.

The air coils of the system are also treated, offering a long service life, typically twice that of an air-to-air heat pump. The system also filters the air, providing clean and healthy indoor air quality.

#### All-in-one system for low cost hot water

Many geothermal systems also offer the ability to heat domestic water by one of two means: through integrated full-time water preheating, or through "desuperheating" water heating.

Integrated water heating (on demand) uses the heat pump system to heat water at any time of the year. Its first cost is higher, but it provides operating savings all year.

Because this water heating option has the full heat pump system capacity available to heat water, it can provide quicker recovery (going from cold to hot) than an electric resistance water heater.

A desuperheater reclaims heat from the air conditioning cycle to heat water.

Its first cost is lower. Savings are realized in the cooling season by transferring waste heat to your hot water storage tank. Even in the heating mode the desuperheater can provide pre-heating to the water heater, reducing the work required of the electric resistance elements.

A desuperheater provides free water heating throughout the summer season. The average year-round savings is typically in the 40 to 60 percent range.

#### Most small properties will do

There are still broad misconceptions about what a geothermal system is. The earliest systems tapped heat that comes from areas of geothermal activity through pits or fissures that actually push hot water onto the surface of the earth.

"But technology has vastly improved since then, permitting efficient geo-exchange from virtually any plot of land anywhere in the U.S.," said Egg. "A modern geothermal system harvests heat from the earth through a liquid transfer medium such as ground water or an earth-friendly antifreeze solution."

A geo system uses ground water or the earth as a source of building heat in the winter and as a place to "sink" or bury that heat in the summer. The final process of thermal exchange takes place in mechanical equipment that serves both heating and cooling needs for homes and commercial buildings alike.

"We install a lot of geothermal for homeowners and businesses that want to save on energy expenses, but who also want to do what's responsible for generations to come," concluded Foley. "It's the fastest growing segment of the HVAC industry, and for good reason. The green movement is finally hitting its stride, and Federal and state incentives – while they last – are helping to encourage the spread of this remarkable technology." ■

#### An interview with Tony Landers, ClimateMaster marketing director.

Tony, even though geothermal systems have been around for a long time, there are still a lot of questions out there about them. Could you please explain how a geothermal system is different than a standard HVAC system? Does it look or sound any different?

*To begin with, the equipment is located in the house where it's secure and unexposed. Systems are also typically a lot quieter, and all of the underground components are buried and invisible.*

Please explain the difference between a water-to-air geothermal system and a water to water system.

*Water-to-air means that the equipment circulates fluid within a geothermal or "geexchange" loop which then exchanges that energy through a refrigerant which is compressed, and then given off in the form of cooled or warmed air. A water-to-water system does this similarly, but even more efficiently, because it exchanges the thermal energy with water which is a better conductor. That water is then used for hydronic or radiant heat, or even heat-exchanged with domestic water for use in the home, substantially reducing the cost of heating water for showers and laundry, etc. (There are also ways for an air-to-air geothermal system to produce domestic hot water with great efficiency).*

Please explain what maintenance is needed, and the projected life of the unit . . . and do you need a special HVAC team to maintain it or install it?

*There is less maintenance with a geothermal system when compared to a typical air-to-air system due to the removal of the outdoor condensing coil and fan system. Just as with any home or building systems technology, it's best to hire a firm with experience installing and maintaining them.*