



# GeoThermal Solutions



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**A** pool is ultimately useless if the water is not maintained at a comfortable temperature. Year-round pool heating solutions are widely diverse in their heat sources, performance, and efficiency. The various methods to heat a swimming pool include gas, solar, air source heat pumps, and water source heat pumps—commonly referred to as GeoThermal.

Gas pool heaters work by heat generation. The pool heater's combustion chamber ignites the gas, heating metal tubes arranged above the burner tray. As the water passes through, the heat from these metal tubes is conducted to the water, increasing the water temperature. The water then



returns to the pool and re-circulates. Though gas pool heaters have a lower initial cost of installation, they have a reduced life expectancy as they are subjected to corrosive environments, particularly in coastal applications like Florida. Gas pool heaters cannot cool the pool, and they have a high annual cost dependent on the price of gas, making them a less energy-efficient heating option.

Solar pool heating systems, relying only on available sunshine, are not practical for year-round swimming because they are much less effective in the winter months when days are shorter. The pool loses the most heat at night because the colder air tends to cool the water in the panels. Although solar pool heating systems are energy efficient and can be maintained with low operating costs, poor performance requires an additional back-up source of heat.

The air source heat pump requires an outdoor installation, and the energy efficiency of such heating pumps is entirely dependent on the ambient air temperature, which is the largest factor and cannot be controlled. The pump is least efficient at night when the air temperature is coldest. For that reason, air source heat pumps are typically sized for mild weather conditions and installed with the addition of a back-up gas pool heater.

Heat pumps that transfer heat through water rather than air are the most energy-efficient heating method. GeoThermal heat pumps can both heat and cool, a necessity for competition pools and an added benefit for condominiums in the summer months. GeoThermal units can be installed either inside or out, they are stackable, and face no air flow limitations. While all heat pumps use a refrigerant vapor compression cycle to extract heat from one place and deliver it to another, GeoThermal heat pumps use water as their source of heat. The consistency of source temperature differentiates water source and air source heat pumps.

The most common sources of water for an open-loop system are aquifer wells or freshwater lakes. Local aquifer wells provide a constant source of water that maintain a median temperature of approximately 75 degrees all year round, and while lake temperatures do fluctuate, they are still more consistent than shifting air temperatures. Closed-loop systems can be horizontal, vertical, or use a pond or lake, although the initial cost of closed-loop systems is often too high to justify the installation compared to open-loop systems. Closed-loop systems are more commonly used for residential air conditioning systems requiring smaller volumes of water while open loops are more cost-effective on large-scale projects and maintain more efficient temperatures.

To perform effectively, solar and air source heat pumps require an additional back-up heat source due to inclement outdoor weather conditions. GeoThermal and gas heaters are high-performance systems and maintain the ability to heat without a back-up source. The following case study, as provided by Fern Tirone, Manager of Mystic Pointe Master Association, Inc., showcases a locally installed GeoThermal system and explores the many benefits of converting a gas heating system to GeoThermal.

The Mystic Pointe Tower, Building 100-200 Pool Recreation Facility located just off Dumbfoundling Bay in Aventura, Florida, features a very windy, very open pool area, making it almost impossible to heat the pool to anything above 80 degrees in the winter or after a heavy rain. During cold winters, the pool was never able to keep a constant level of heat and became practically unusable for those months. For the 86,000-gallon pool, the facility was spending approximately \$60,000 or



more a year for a propane gas heating system. In October 2010, their new GeoThermal system was installed, and since then, the pool temperature has been kept at a constant 84 degrees. For the past three years, the savings have been \$55,000–\$60,000 per year. The electrical usage for the entire facility did increase by \$200–\$300 per month, but the overall savings have been dramatic, having a positive effect on budget and maintenance fees. Since the installation, the unit owners within Mystic Pointe have enjoyed the warm temperatures of their pool regardless of the outside weather. As the system runs on-demand, the individual heaters are used only as needed to keep the pool temperature at a constant 84 degrees. The only maintenance the units have required has been a yearly maintenance visit to

ensure every component is in good working condition.

Tirone says, “This has been a wonderful experience for me as the manager and most importantly for our unit owners who want to have the use of their pool in summer and winter. The best part is we have been able to improve the lifestyles and property values of our community for the betterment of all.”

The funds saved as a result of the GeoThermal installation have been used to make additional improvements to the facility with no special assessments to the owners.

GeoThermal is the most cost-effective heating system with the longest serviceable life expectancy. GeoThermal is also an environmentally friendly alternative to gas because the system works through heat transfer from the source water with minimal energy consumption rather than heat generation, thus a lesser carbon footprint and zero harmful emissions. It is also the most effective method of heating a pool as it maintains the pool’s temperature without relying on the sun or air temperature, resulting in substantially lower operating costs than any other available system—all without sacrificing performance. When considering return on investment, dependability, lower maintenance costs, and environmental responsibility, GeoThermal systems have no competition.

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