Industry Leader Interview: GHP According to Mark Mizrahi, President and CEO of EnLink Geoenergy Services

Date: Jul 07, 2011

According to Enlink Geoenergy Services President and CEO Mark Mizrahi, ***geothermal or "ground source" heat pumps (GHPs)*** are the most energy -efficient heating and cooling systems around. Find out if you agree with him.

Alliance: Can you give our readers a quick primer on GHP systems and what makes them ideal for improving energy efficiency?

Mizrahi: GHP systems are highly efficient air conditioning and heating systems utilizing up to **70% less energy** to heat and cool buildings compared to conventional systems.

The systems utilize the stored energy in the shallow layers of the earth to heat and cool buildings and rely on the earth's ability to absorb and release heat, coupled with a highly efficient and reliable heat pump. GHP systems circulate fluid – usually water – through piping buried beneath the ground and brought into the building where the heat pumps use it to heat or cool the building.

Because of the great efficiencies of these systems, and since **heating and cooling accounts for more than half of a building's total energy consumption**, the savings for overall energy use are very significant. Geothermal heat pump systems should not be confused with geothermal energy, whereby deep drilling of hot rocks activity harnesses steam to produce electricity.

Alliance: What are the benefits of a GHP system?

Mizrahi: Energy savings are one of the most significant benefits of GHP systems. As we mentioned, they will reduce energy consumption by up to 70%. That can translate into **big reductions on your utility bill**.

Another key benefit is the **reduced maintenance, operating and replacement costs**. With very few moving parts, and an ASHRAE-rated 26-year lifespan on the indoor heat pumps, the systems have very low operating costs.

GHP systems also **eliminate water use** since they are closed loop systems and require no cooling towers or chillers; an average size elementary school will consume hundreds of thousands of gallons of water per year with a traditional HVAC system.

There are numerous additional benefits including improved **air quality**, no on-site use of **fossil fuels** or other combustible materials and **no outside equipment** subject to weather damage or vandalism. GHP systems also provide significant credits toward **LEED certification** and are a key component to **zero net energy buildings**.

The short version is they are cheaper, more environmental friendly and make great economic sense for a building owner and operator.

Alliance: Are there any regions or types of customers that would benefit more than others from the use of geothermal resources?

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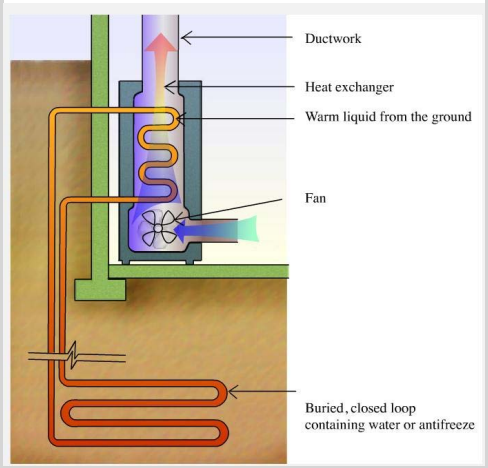
Mizrahi: GHP systems work the **same in all regions**, are the only renewable available at point of use, 24/7 and are never depleted. The earth itself does all the work and does not require special geological activity, the sun to shine or the wind to blow.

The most important factors impacting the feasibility of a system are **the building type, use patterns and utility pricing**. GHP systems are utilized everywhere from frigid regions in Canada to the scorching deserts of the southwest. The systems are in use by schools, military bases, retail establishments, office buildings, hotels, residential spaces and many other building types.

- *Photo Caption: Geothermal or ground source heat pumps, picture provided by California Energy Commission*



Alliance: Given their energy savings and long life, why do you think geothermal heat pumps are not as widely used as they could be?

Mizrahi: The main reason is a lack of awareness. Despite having been in use for over 40 years, with over 1 million installations in the U.S., and documented by the U.S. Department of Energy as "the most efficient heating and cooling systems available," their use has not been well publicized. As a result, many **developers, builders, architects, engineers and building owners are not aware of the option**.

Another reason has been a traditionally higher **up-front cost** compared to conventional HVAC systems. But now, with enhanced design and install techniques, with energy costs rising and uncertain and new financing models being used, the **cost differential has dropped substantially or even disappeared** all together. In addition, numerous federal, state and local **incentives and rebates** enhance the economics even more. At a time when there is increased emphasis on sustainability, net zero energy, LEED certification, emissions reduction and lifecycle analysis, GHP systems are becoming the best choice for achieving these economic and environmental goals.

Alliance: Your company, EnLink Geoenergy, has notably completed several projects for new buildings and facilities. What, if any, challenges are presented in retrofitting GHP systems into existing structures?

Mizrahi: EnLink has conducted work throughout the U.S. for over 15 years for all building types, in all climate zones and geological formations, and for new construction and retrofits. Examples of our projects include **schools, military bases, prisons, museums, office buildings**, and more.

Retrofits can pose an added challenge based on the surrounding land uses and whether there is available space for drilling for the underground earth heat exchanger. However, **as long as there is a parking lot or open area available, GHP is a very good candidate for retrofitting a building**. The underground portion of the system can be placed under a playground, a surface parking lot, and in some cases even under the building itself. As an example, EnLink undertook a very challenging retrofit of a historic courthouse in Nevada. EnLink not only protected the building's façade, but we were able to complete the retrofit without interrupting legal proceedings or other business being conducted inside the building. While not all retrofits are so demanding, they all require great skill and experience for a successful on-time, on-budget and quality project.

Alliance: What is the potential for this technology on a large scale – how big can you go?

Mizrahi: Large-scale systems are already being built. Ball State University is in the process of installing a GHP system which will furnish heating and cooling for the entire campus – over 50 buildings. It will be one of the largest GHP systems in the U.S.

GHP is versatile so lends itself to a wide variety of applications and energy programs and thus very suitable for large-scale deployment. It is compatible with any energy source – conventional or alternative – so it can integrate well into any program. It is a point-of-use application and does not require transmission lines, so it can be installed for each building. Alternatively, it can furnish multiple buildings through a central plant. So for new, planned developments, one central earth heat exchanger can provide heating and cooling to all surrounding buildings. Several large-scale systems are under consideration and we expect to see more of them.

Topics: Homes and Buildings, Industry, Utilities and Distribution
Blog Type: Efficiency News
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Submitted by Michael Reyes (not verified) on July 18, 2011 - 4:23pm.

Great Interview! GHP systems are an excellent technology. With efficiencies reaching up to 600%, you can't go wrong with these systems. And, as far as initial costs are concerned, pay back periods for GHP systems are generally lower than those for other renewables like solar or wind.

- reply

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Submitted by Eric Schalcks (not verified) on July 12, 2011 - 5:15pm.

Geothermal Heat pumps are a great technology when natural gas is not available to heat homes. Here in Northern Minnesota most electricity is generated with coal. The green house gas emissions of a GHP for heating and cooling are higher than a high efficiency natural gas furnace/electric air conditioner combination. The first cost for ground source heat pumps are over $20,000 for single family homes in this area. And there must be enough property and the proper soil conditions to site the coil field. High efficiency natural gas furnaces and electric air conditioners can be installed for $8000 to $11,000 dollars here. And there are no site design issues. With natural gas prices under $9 per million Btus and electricity prices at $0.10 per killowatt hour the annual operating costs are about the same. Before accepting blanket statements about ground source heat pumps it is important to know the local generation sources of electricity and its cost.

reply

Submitted by Mickey Linn (not verified) on July 18, 2011 - 1:59pm.

Your numbers are out of date with advanced geothermal technology. We are currently downsizing geothermal HVAC systems by 40%, or more using advanced technology. For community power systems, we can reduce the energy consumption by 65 to 75% vs ASHRAE 90.1 2007. ASHRAE now gives geothermal 26 year life expectancy vs. outdoor units at 15. With the government tax credits for geo, the economics have swung very strongly toward geo.

reply

Submitted by Al Cobb (not verified) on July 12, 2011 - 2:16pm.

Geothermal plants that produce energy are one form of "Alternative Energy" with the wind, water , and solar rounding out the top four. However, Ground source heat pumps are not a form of alternative energy. They don't produce energy, they consume energy. The terminology used to describe these systems as geothermal has allowed the GSHP industry to sneak its way into the line for tax credits along with wind and solar. As an informed energy efficient builder, I know that my best dollar spent is that which improves the performance of the building's envelope. If I strive for envelope performance that is on par with metrics demanded by Passive House, my heating and cooling load is reduced to the point that I can't possibly justify the upfront expense of GSHP. If I work on a retrofit project that has a terribly inefficient and irreparable envelope, I then look to GSHP as a way to to improve the efficiency of delivering affordable HVAC. If I'm shooting for net zero, I strive for perfect envelope performance so as to reduce the amount of alternative energy needed. I like to say the cheapest alternative energy you'll ever buy is that which you don't need. Efficiency first! Then bring on the eco-bling. Al

reply

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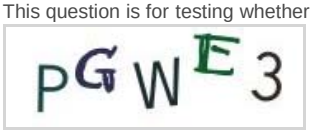

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