



Jack DiEnna

Executive Director

The Geothermal National & International Initiative

HOUSEKEEPING

What do we call it... **Geothermal, Ground Source, GeoExchange.**

The feds call it **geothermal heat pumps (GHP).**

They are ground loops, boreholes not **WELLS** (unless you are doing an open system)



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The Road to 30%!

Why Geothermal Heat Pumps?

The US Department of Energy states, **36%** of the **primary energy** used in the US is from energy use in buildings. This is more than the energy used by the transportation industry.

AND

40% of the total energy used in a building is for space conditioning and water heating.



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Environmental Stability.

The US Environmental Protection Agency states that GHPs reduce Greenhouse Gas Emissions (the leading contributor to Climate Change) by up to **40%** over convention HVAC systems.



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Geothermal Heat Pumps

Use the earth's **thermal properties** (ground source energy) , in conjunction with electricity, to provide **space conditioning** (heating and cooling) and **water heating** to institutional, commercial and residential facilities both nationally & Internationally.

A report by Navigant Research predicts that the geothermal heat pump (GHP) market will nearly **triple to \$17.2 billion** by 2020.

Remember, **NOTHING** is more **POWERFUL** than an **idea** whose time has **COME!!!**



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Geothermal Heat Pump Technology

The States of MD and NH have approved Bills, which effectively makes GHPs an accepted technology available for Renewable Energy Credits (RECs) under the state's **Renewable Portfolio Standard (RPS)**, recognizing GHPs as a renewable energy source.



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Geothermal Heat Pump Technology

The New York State Energy Research Development Authority (NYSERDA) as part of its **\$5 billion Clean Energy Fund** has determined that GHPs are a **renewable thermal** solution along with solar thermal & Biomass. In a recent development, NYSERDA announced that they have appointed a Director to head the **Renewable Thermal Initiative** and lead the effort to **develop markets** that support clean, high efficiency, renewable thermal systems.



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PEAK LOAD / DEMAND REDUCTION

In a report by the National Renewable Energy Laboratory (NREL) they determined that every installed ton of GHP capacity reduced peak load by **.55 - .88 kW** so GHPs can provide a cost effective, environmentally responsible solution to a utility's "*peak load*" energy problem.

Western Farmer's Cooperative based in OK & NM, in a program that they have been running since 2013, has captured metrics that support that finding. Participating homes in their program saw the **peak demand** for their HVAC system drop **by 38%** or a **reduction of .55 kW** per ton of installed capacity.



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Peak Load Reduction---Utilities

The Western Farmer's program also pointed to the fact that **every kW** saved equals **\$2,000** of energy generation resources that does not have to be built and that if **20%** of their customer base changed to GHPs, **one half billion dollars** of generation infrastructure would not be needed.

This would allow for a **major reduction** in the planned new generation that must be built in the coming years.



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RECENT DEVELOPMENTS!

- US EPA issues it's Clean Power Plan (CPP) which requires States to collectively **reduce carbon emissions** from the electricity sector by **32% below 2005** levels in the next 15 years.
- On **August 25th 2015**, President Obama announced a Clean Energy Incentive Program (CEIP) to complement the CPP. In it he proposes to “unlock” the residential **Property-Assessed Clean Energy (PACE)** financing for single family housing which will make it easier for homeowners to invest in clean energy technologies such as GHPs.
- In **July**, the MD PSC approved one of the most aggressive energy efficiency targets in the nation, requiring utilities to **cut retail sales by 2% each year**.



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Geothermal Technology in Wisconsin.

As a member of DOE's Visionary Team, I can share with you the **preliminary** results from an assessment done by ORNL indicating that GHPs have the potential to **save 6.7 Quads of primary energy, avoid 433.3 Million tons of CO2 emissions and cut energy costs by \$80.4 Billion annually**, along with reducing peak demand and creating jobs.



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