GeoEnergy Enterprises™

The GeoColumn™ Geothermal Heat Pump Company

Geothermal Energy Workshop

April 13, 2011

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STONY BROOK STATE UNIVERSITY OF NEW YORK

nyserda Energy. Innovation. Solutions.

U.S. Small Business Administration SBA Your Small Business Resource

NYS Small Business Development Center

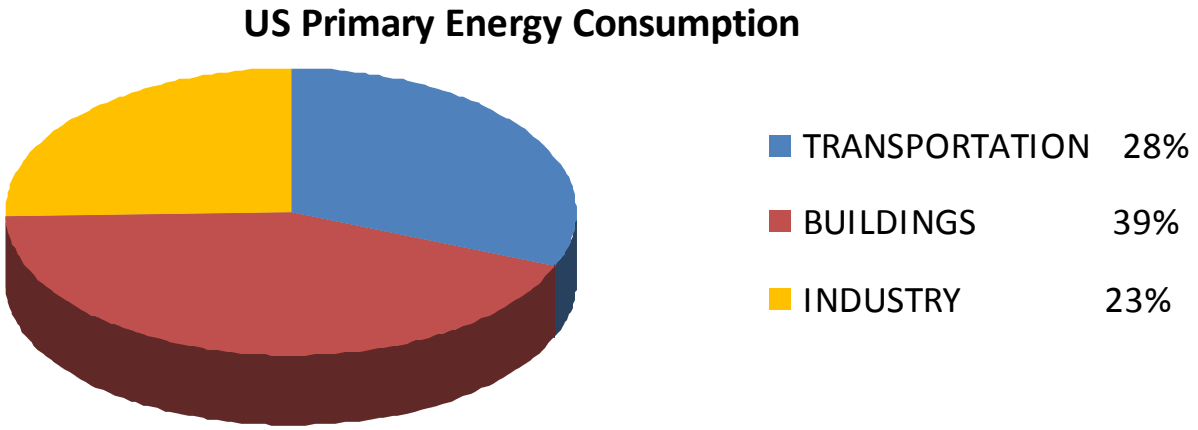
Introduction

- GeoEnergy Enterprises, LLC
  - An Early Stage Business
  - Corporate, Manufacturing, Sales Offices located in New York, Research & Development Labs – Tennessee
  - Developed & Patented a novel, high-efficiency Geothermal HVAC System for use in residential and light commercial applications.
- SBU SBDC Client
- NYSERDA Grant Recipient
- Presenter and Program Committee Member for the AERTC Advanced Energy Conference
- LIPA Rebate Qualified Supplier of Geothermal HVAC Systems

Energy Demand is Growing at an "Unsustainable" Pace

Energy

- Conventional sources are unsustainable
- Costs continue to increase
- Conventional sources impact the environment
- Buildings consume a lot of it



We need a "SUSTAINABLE" Solution!

THE ENERGY BALANCE

- An Oak Ridge National Lab (ORNL) study claims that Geothermal Heat Pumps have the ability to offset 35-40% of the projected growth in building energy consumption between now and 2030
- DOE is tasking its teams with facilitating the deployment of 1,000,000 geothermal heat pumps per year by 2016 – as compared to the current roughly 100,000 units.
- The primary barriers to broad acceptance are high installed cost, uncertainty of scope of cost, and errors in design and installation.
  - ORNL study also sites the *"lack of new technologies and techniques to improve GHP system cost and performance"*.

STATE OF THE ART

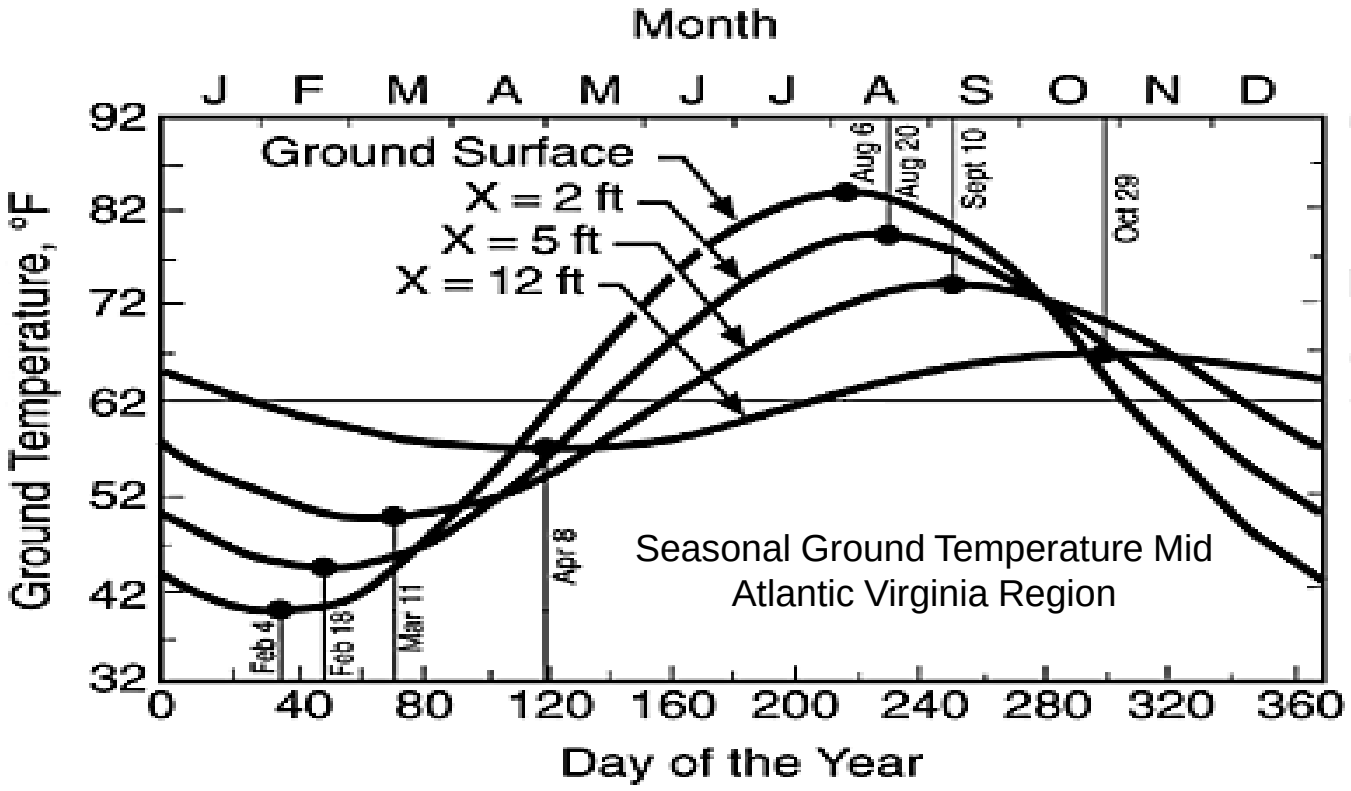
- All heat pumps work on the principal of the Carnot cycle and have essentially the same four components:
  - Compressor
  - Condenser
  - Evaporator
  - Expansion Device
- The vast majority of heat pumps in the market are Air-to-Air systems which suffer from the outdoor location of the evaporator or condenser coils.
  - Efficiencies of Carnot systems with various refrigerants as the working fluid decrease as the condensing / evaporating temperatures go to the extremes.

The Hidden Resource!

Just below the surface of the earth, the temperature is virtually constant!

The World needs a System to Utilize this Energy!

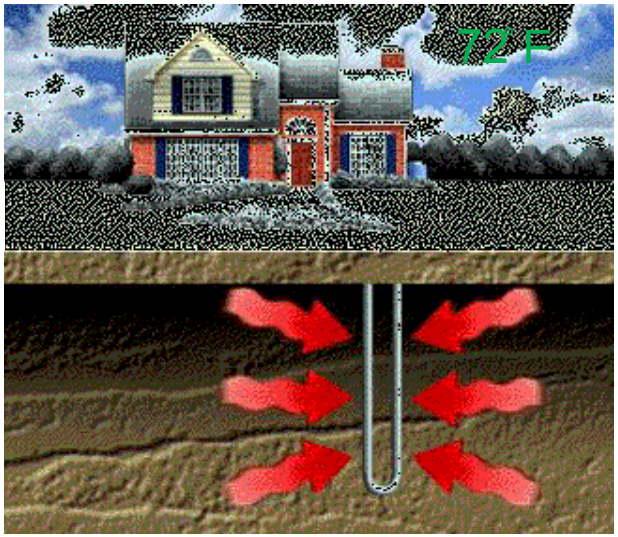
Is Geothermal a Solution?



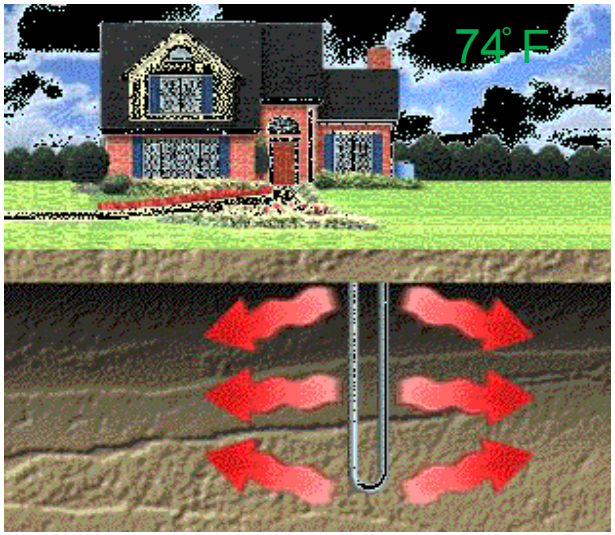
12’ Below the Grounds Surface, is an Untapped Constant Source of Energy.

The Geothermal Equation

Air Temp 0˚ F in Winter



Air Temp 95˚ F in Summer

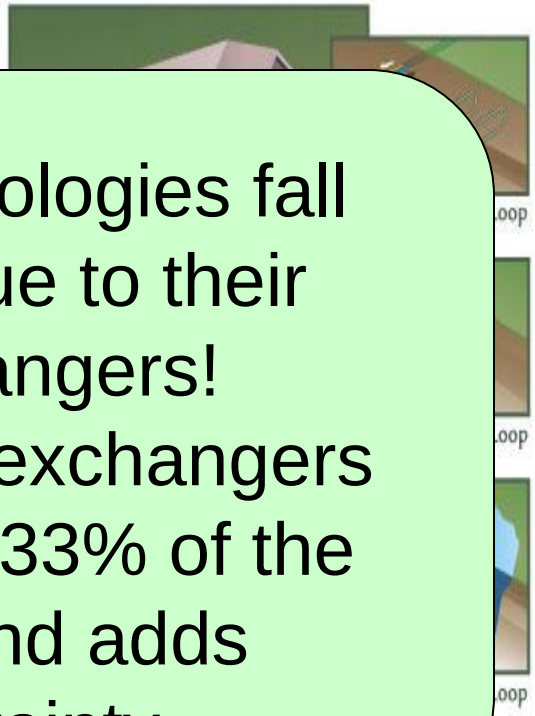


Ground Temp 55-65˚ F

1 Unit of Electrical Energy = 4–6 Units of Geothermal Energy Produced

The Evolution of Geothermal

1st Generation - Open Loop Water Source - Pump and Dump Groundwater



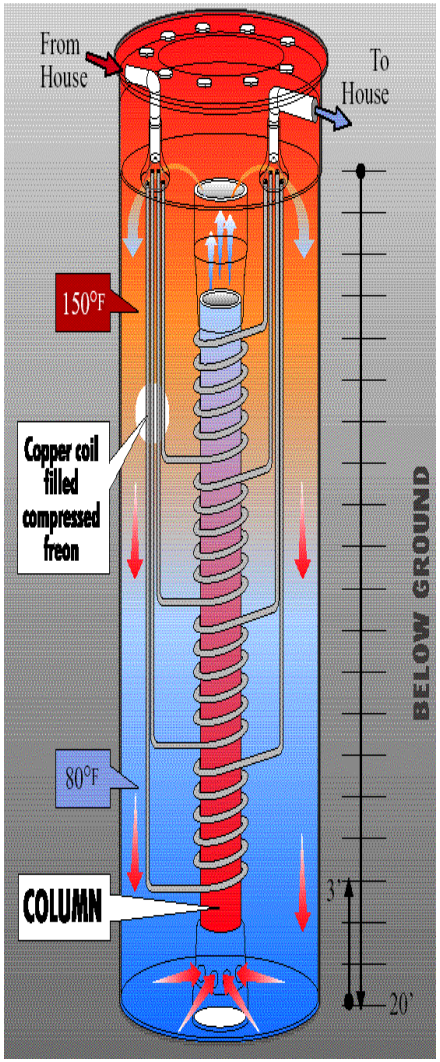
Existing Geothermal Technologies fall short of broad adoption due to their ground loop heat exchangers!
The adoption of these heat exchangers typically accounts for over 33% of the entire installation cost and adds complexity and uncertainty.

Standard heat pump compressor is used to move Freon through arrays of long (100') copper tubing to interact directly with a land mass

Requires large excavation or deep drilling (100'+) and grouting

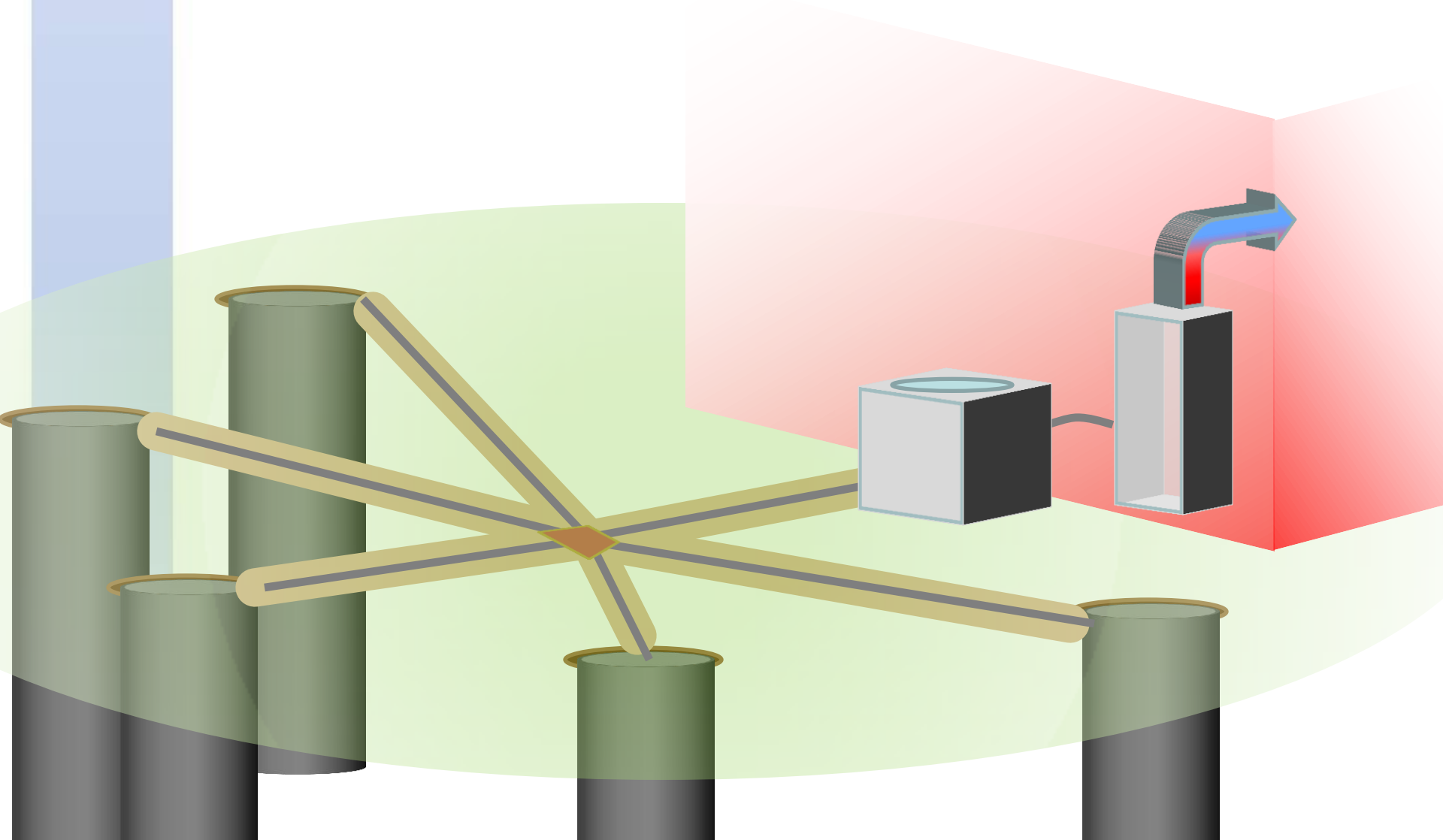
Leak in underground ACR pipe requires HX reinstallation

GeoEnergy's Patented GeoColumn is the Critical Difference!



- ✓2 - 3 Day Full System Deployment
- ✓Predictable Performance
- ✓High efficiency
- ✓25% Less System Cost
- ✓Simple Payback: 3-7 years
- ✓Environmentally Friendly
  - •No glycol
  - •No aquifer impact

The GeoEnergy GeoColumn System



GeoEnergy's Residential Simple Payback Estimate

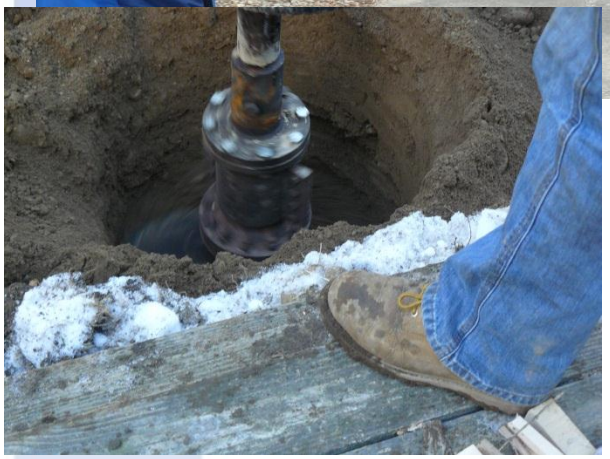
	Standard System (SEER 13-16)	GeoEnergy Enterprises System
Installed Cost to Cust	$15,000	$30,000
30% Federal Tax Credit		$9,000
Less Tax Credit	$15,000	$21,000
Avg. Utl. Bill mo./yr.	$500/$6,000	$300/$3,600
Annual Savings	0	$2,400
Simple Payback		3 years
Carbon Saved	0	9 metric tons (1.5 cars)

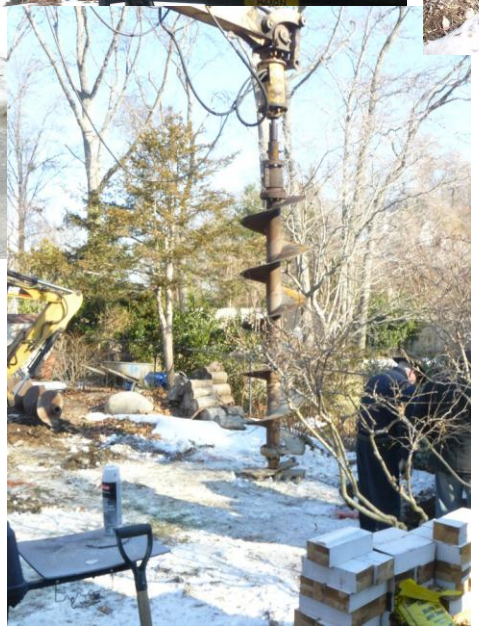
Long Island New York, 2000 sq. ft. home

MILESTONES and PROJECTIONS

- ✓ Key Patent - Granted
- ✓ Prototypes - Phase II complete
- ✓ Field Tests – Excellent results
- ✓ Utility Rebates – LIPA in place
- ✓ NYSERDA Agreement in place
- ✓ Supply Chain – Vendors identified and participated in prototype phase
- ✓ UL/ETL Intertek Safety Listing
- ✓ AHRI/Energy Star Intertek 3 ton Unit Testing Complete
- ✓ First Order Installed – Data Monitoring underway
- ➢ Acquire AHRI/Energy Star for Entire Product Family
- ➢ Install Additional Data Acquisition Sites
- ➢ Production Capable

First Installation Pictures





Thank You!

For more Information about the Groundbreaking Geothermal GeoColumn HVAC Systems Visit our Website at:
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