



# PRESENTS GEOTHERMAL



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# Geothermal Simplified

- The most environmentally responsible heating and cooling alternative according to the EPA
- Lowest HVAC system available in greenhouse emissions
- Highly energy efficient
- Requires a relatively small amount of electricity to harness the renewable energy in the Earth



# How It Works



# Why Geothermal?

- It is proven technology.
- The most energy efficient and environmentally friendly hvac systems available
- Federal, State and local tax incentives
- No outdoor units
- Certain systems can be retrofitted
- Can be used to provide free hot water
- No fossil fuels used
- Reduction in utility bills
- Long equipment life

# Geothermal Options



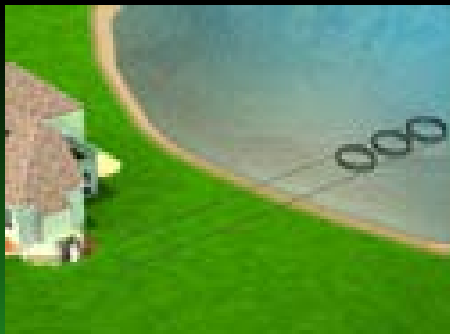
Vertical



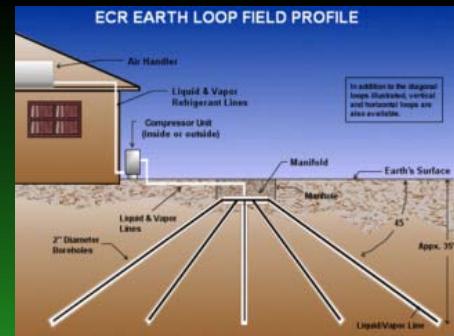
Open Loops



Horizontal

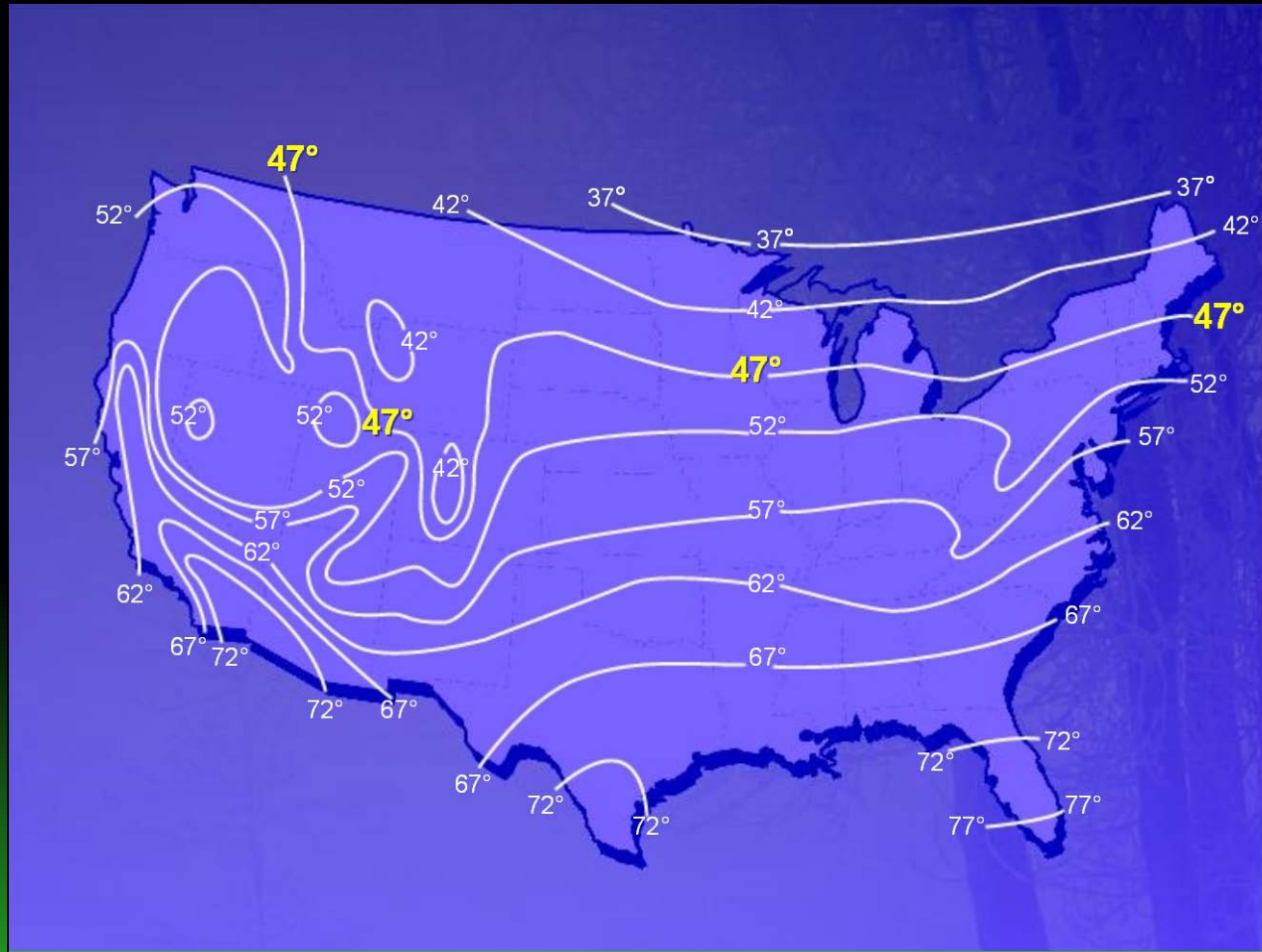


Pond Loops



Diagonal

# US Mean Temperatures



# Diagonal Earth Loop



- Small footprint (3 to 8 feet diameter)
- 1, 1.5, 2, 3, or 4 loops per ton
- 50 foot drilling depth per loop
- 15 to 45 drilling angle for D<sub>1</sub>, D<sub>1.5</sub>, D<sub>2</sub> loops from vertical
- 30 to 45 drilling angle for D<sub>3</sub> and D<sub>4</sub> loops.
- 3 inch (min.) bore hole diameter

# Horizontal Earth Loop



- 5 loops per ton
- 100 feet length per loop
- 4 to 6 feet typical depth of pit.

# My Geo Thermal Unit



# Differences in Systems

Water based:

Plastic ground loops

Water & refig used

Pumps required

Water Well drill or grader

Large size equipment

Low CO2 emissions

Closed or open loop systems

Pond systems available

Direct Exchange:

Copper Ground loops

Refrig only as transfer media

No pumps

Dedicated Geo driller needed

Can fit in a very small area

Minimal disturbance to yard

Closed loop only

25-40% more efficient

# Hot Water Advantage

- Domestic potable hot water is required every day of the year
- Heating water is a significant portion of your total energy costs
- Energy costs continue to soar
- Geothermal systems **SAVE MONEY**
  - **400%** Efficiency Rating
  - Harvests earth's abundant and FREE thermal energy
  - Protects property owners from volatile energy cost swings
- Geothermal systems provide CLEAN, RENEWABLE energy with a LOW CARBON footprint

# Advantages

## Potable Hot Water Considerations

- System designed to meet U.S. Department of Health & Human Services (HHS) guidelines
- Hot Water Cost Consumption Based on Non Heating Months
- Water Heating Requirements To Kill Bacteria with Mixing valves to reduce to non-scalding temperature as per HHS
- Hybrid Geothermal system will deliver up to 120 F water
- Hi-Efficiency Bradford White Boiler for temperature boost

# Simpson Properties Analysis

- **Assumptions:**
  - COSTS and SAVINGS Estimates are Subject to Prohibitive Existing Structural and/or Sub-Surface Conditions
  - Building demographic characteristics
    - Approx 3.5 people per unit
    - DHW Usage factor – Low to Medium – based upon residents being a mix of working-class families, middle income, some seniors, some public assistance, some single-parent households = approx 20 gallons per person per day
  - DHW costs derived from property fuel bills in June, July & August 2008
  - All properties use Dual-Fuel Boilers providing BOTH Heating and Year-round Domestic Hot Water at 120°F
  - NG costs @ \$1.845
  - Electricity @ \$0.26KWh
  - DID NOT include Oil costs as they appeared negligible

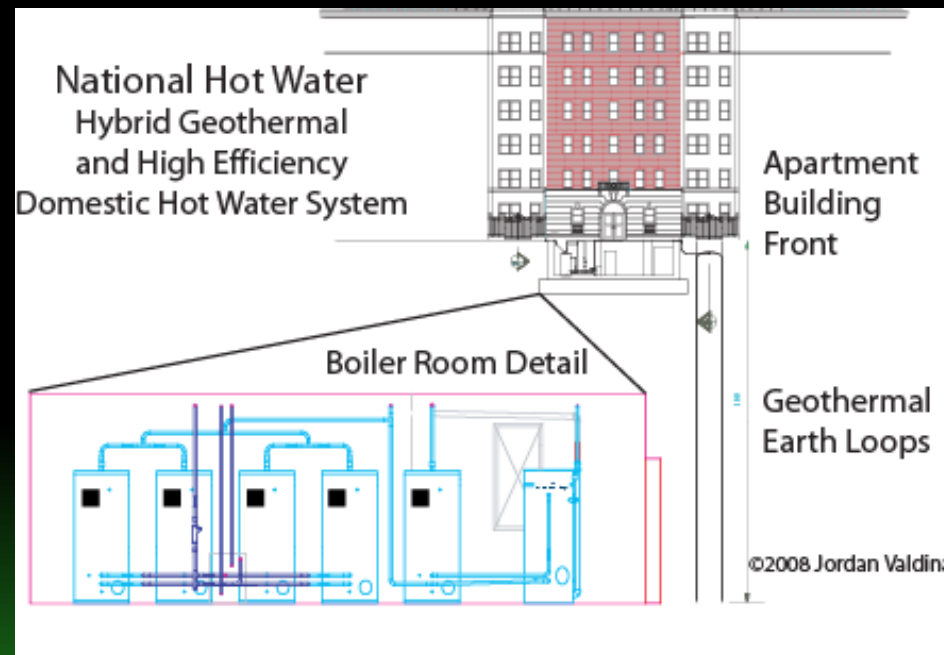
# Simpson Properties

- Approx 1,029 people @ 3.5 people per unit using 20 Gallons of DHW per day per person
  - Daily Hot Water Usage - 20,580 Gallons
- OLD Hot Water Annual Operating Cost: \$167,608
- NEW Geothermal System Annual Operating Cost: \$ 72,516
  - Elec. @\$0.26KWh, NG @ \$1.845
- 57% Annual Operating Cost Reduction - \$95,092
- **ESTIMATED ANNUAL SAVINGS: \$95,092**
- Estimated System Cost: \$405,875
- Estimated ROI: 4.27 Years

# Simpson Properties

- 3 buildings
- 294 units
- Simpson spent approx \$389,256 on Natural Gas in 2008 of which approx \$167,608 was to heat DHW
  - DHW % of overall energy costs – 43%

# Hybrid Geothermal



# Video

- <http://www.youtube.com/watch?v=FC6gVc-mcaQ>



**THANK YOU!**