





For More Information

- Would you like to know more about this session?
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Don't forget to fill out and drop off your session evaluations!



Will Geo Work For Me? Geographically and Building Type?

- | Successful Installations in 23 countries
- | 1 Degree Off Equator
- | 117 Miles North of Arctic Circle
- | List of 88 + Types of Applications
- | Project Size: 1/2 Ton to ~ 18,000 Tons



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Systems Tailored For

- | Hotel/Motel
- | Restaurants
- | Health Care
- | Educational Facilities
- | Government Buildings
- | Office Buildings
- | Yachts/Boats
- | New Construction or Retrofit

The Perfect HVAC System:

- Reliable
- Easy To Install
- Applicable To Most Building Types
- Simple To Maintain
- Isolated From Extreme Environments
- Energy Efficient
- Utilize Energy in Building (Diversity)
- Long System Life
- Environmentally Sound

**Report
Card**

A+



WSHP Features and Benefits

- I High EER
- I High COP
- I Emission Free
- I 25 + years Service Life
- I Reduced Use of Refrigerants
- I Refrigerants: Phasing in R410A
- I Quiet Operation
- I Many sizes and configurations available

What is a Heat Pump?

A heat pump is a traditional compressor driven air conditioner with a refrigerant reversing valve. When engaged the reversing valve reverses the flow of the refrigerant through the liquid line changing the evaporator into the condenser and vice versa.



ENVISION COMMERCIAL PRODUCT



COMMERCIAL PRODUCT





REVERSIBLE CHILLERS

REVERSIBLE CHILLERS

(36 AND 540 MBTUH CAPACITIES)

(3 TO 50 NOMINAL TONS)



- STRUCTURAL STEEL FRAME
- OPTIONAL POWDER COAT PAINTED ACOUSTICAL CABINET
- STANDARD FX10 DDC CONTROLS
 - ACOUSTICAL COMPRESSOR BLANKET STANDARD
- STANDARD 2" VICTAULIC TYPE WATER CONNECTIONS

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Unit Fan

Operating Mode

- 1 -- Continuous
- 2 -- Cycle Heating Only
- 3 -- Cycle Heating and Cooling

Previous

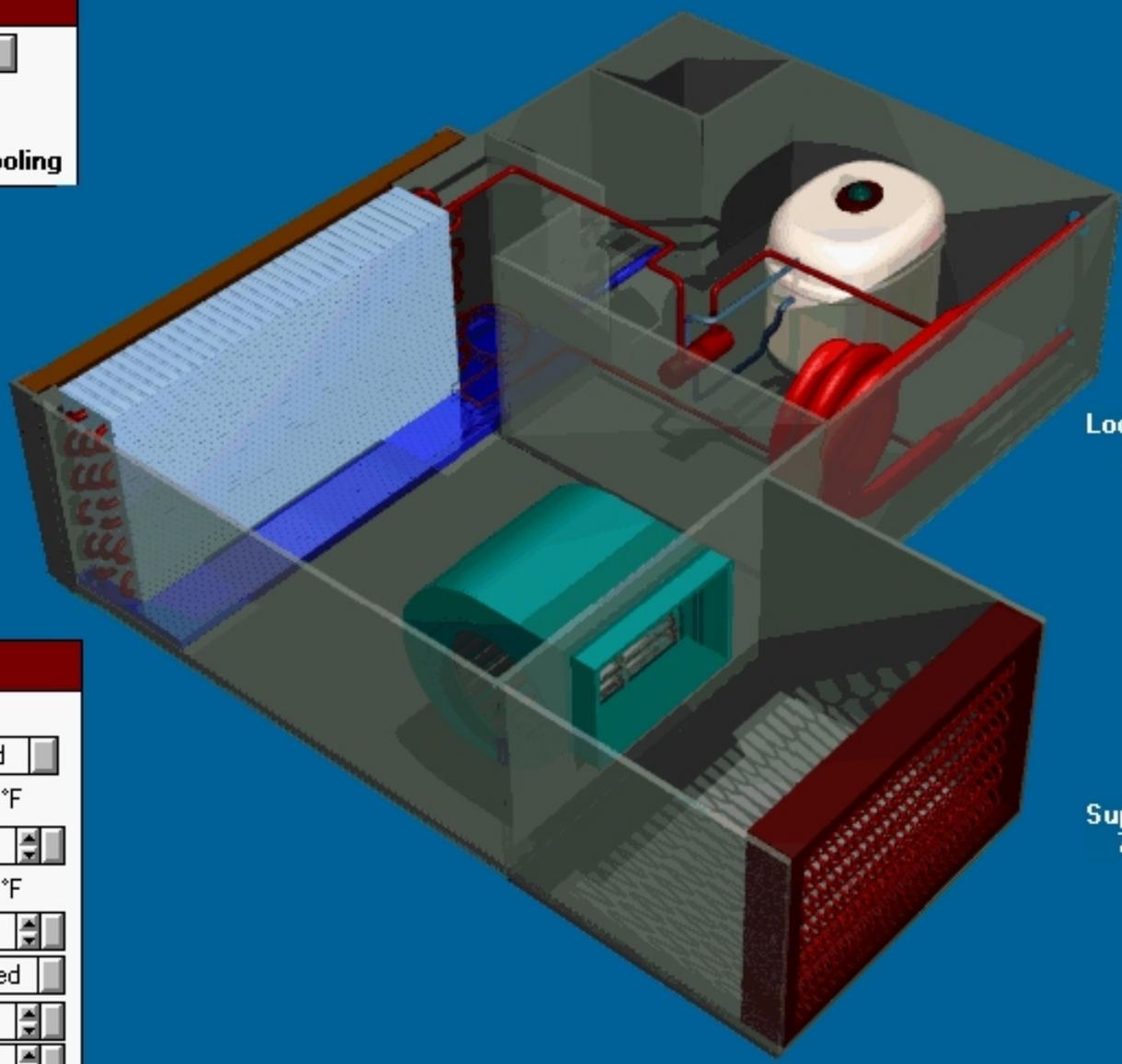
Text

Runtimes

OSA Temp.
72.0 °F

Loop Water Temp.
72.0 °F

Supply Temp.
75.0 °F



Zone Control

Disable Unit

Command Mode

Space Temperature 65.5 °F

Occupied Setpoint

Current Microtouch Bias 0.0 °F

Microtouch Bias Limit

Microset OFF Button

Heating Offset

Cooling Offset



Temperature Controls & BAS

- Factory Installed:
 - Lon
 - BACNet
 - Tridium
- Front End Integration
- Master Controller Development

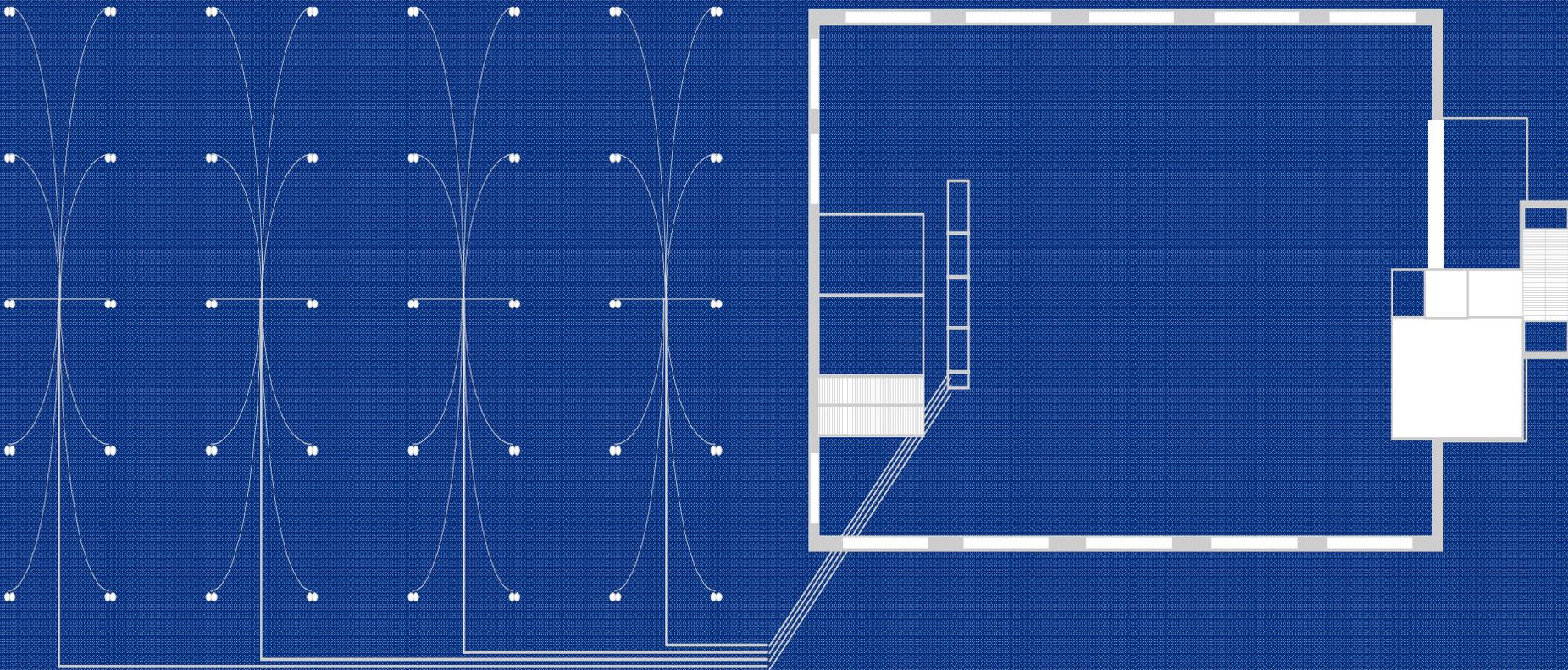
Garrett Office Buildings



Loop Field Overview



GeoThermal Building Loop Field Site Plan



GeoThermal Building - Roof View



VAV Building - Roof View





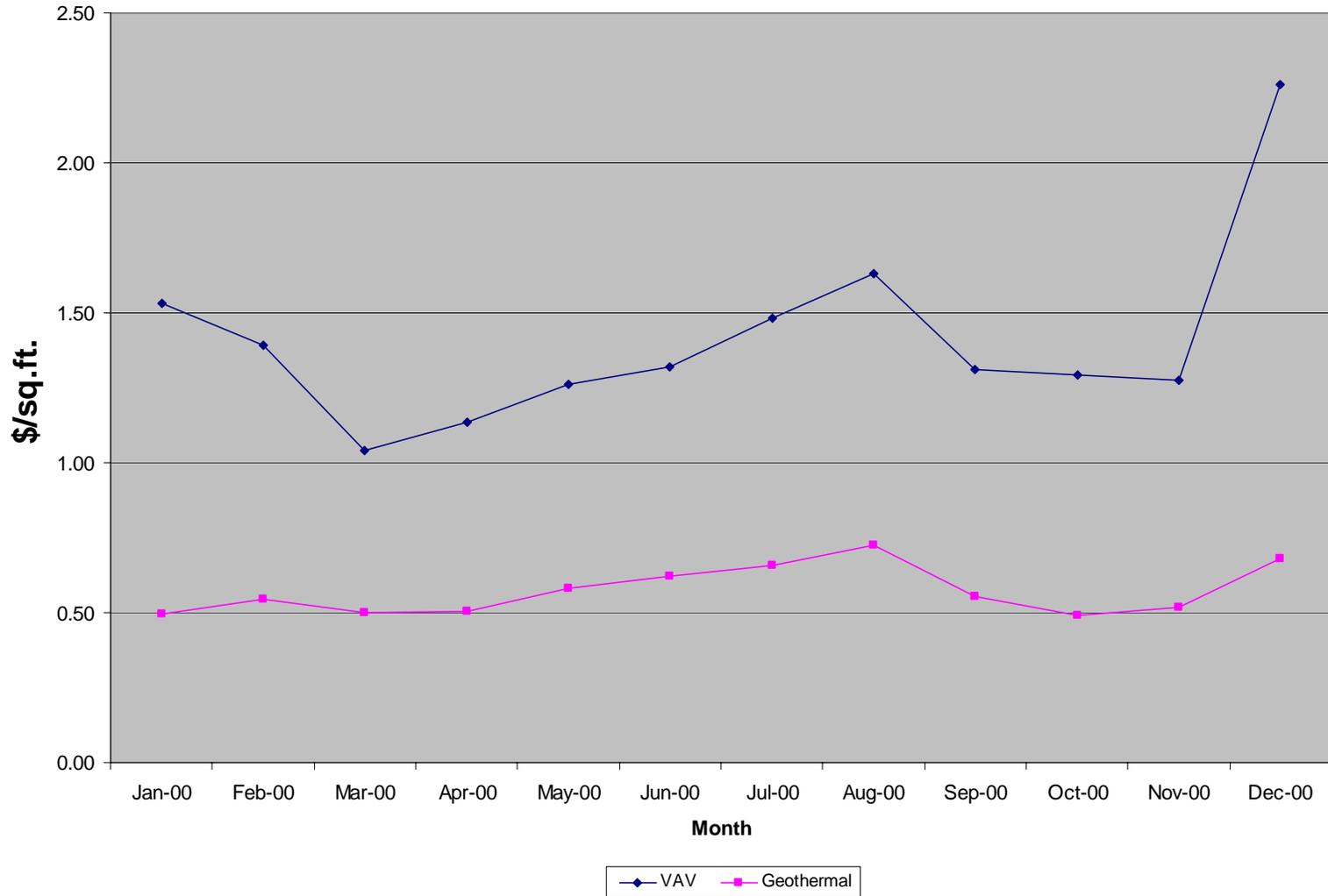
VAV Building Central Air Handler



Garrett Office Buildings 2000 Energy Consumption

Month	VAV 15,000 ft ²		Geothermal 20,000 ft ²	
	Gas Mcf	Elec kWh	Gas Mcf	Elec kWh
Jan-00	36.2	12,400	0.0	9,920
Feb-00	21.0	14,720	0.0	10,880
Mar-00	6.9	13,600	0.0	9,960
Apr-00	4.3	15,760	0.0	10,120
May-00	3.5	17,920	0.0	11,600
Jun-00	4.2	18,560	0.0	12,400
Jul-00	3.2	21,280	0.0	13,120
Aug-00	3.2	23,520	0.0	14,480
Sep-00	3.2	18,720	0.0	11,120
Oct-00	11.2	16,080	0.0	9,840
Nov-00	21.9	12,720	0.0	10,360
Dec-00	69.4	13,600	0.0	13,600
Total	188.2	198,880	0.0	137,400
\$ Cost	\$ 1,882	\$ 17,899	\$	\$ 10,992
\$/ft²	1.32		0.55	

Garrett Office Buildings 2000 Energy Consumption Profile



Trinity River Vision Authority Projects



Tarrant County Community College
New Downtown Campus
Geothermal Cooling, Solar Energy,
Wind Energy

Trinity River Area Parks
Solar Lighting for park trails & public
areas

Long Term
Potential for a variety of new
construction projects.



Renewable Energy Solutions

Fort Polk Project - US Army Base

- | 4003 Living Units
- | 1,000 to 2,700 sq/ft
- | 1296 buildings
- | Replaced: 80% a/c heat pump, 20% a/c with gas heat
- | Service Calls: 90/day reduced to 18/month
- | 32 Million kWh/year savings
- | 20,000 MMBtu gas savings
- | \$3.3 Million savings in operating costs annually



Oklahoma State Capitol Building

- | 855 Nominal Tons
- | 1/2 Ton to 30 Ton Equipment
- | Horizontal, Vertical, Console, WWHP
- | Improved IAQ
- | Replaced 138 Different HVAC Units
- | Reduced HVAC Maintenance Staff (16 to 3)
- | Reclaimed 15,000 sq.ft. of Office Space
- | Operating Savings: \$ 1/4 Million/yr..

Western Heights School District



High School:

- 410,000 sq/ft
- Mechanical System:
 - RTU's
 - 4-Pipe Fan Coils
 - Air Cooled Chiller
 - Cooling Tower & Boiler
- Annual operating costs:
\$689,640
- Operating Costs per sq/ft:
\$1.68

Middle School:

- 440,200 sq/ft
- Mechanical System:
 - GSHP's, WWHP's
 - ERV's
 - GHEX: Vertical loops under soccer field
 - BacNet BAS System
- Annual Operating Cost:
\$242,110
- Operating Costs per sq/ft:
\$0.58

Hale Irwin Golf Course Community-Briar Creek



- Emissions saved over system life (20 yrs), 1100 units
- SO₂ Sulfur Dioxide 680,000 pounds saved
- NO_x Nitrogen Oxide 246,200 pounds saved
- CO₂ Carbon Dioxide 66,500,000 pounds saved
- The above savings in pollution is equivalent to:
- Planting 12840 acres of trees or
- Removing 5860 cars from our roads
- By utilizing our system, approximately 232,000 tons of coal, need not be burned to generate energy.
- Equals 3220 railcars of coal

Comments on Good Renewable Stewardship



- | Focus has been on utilizing PV/Solar and Wind in order to provide renewable energy – Great!
- | Due to cost – only about 25% of building energy can be provided with PV or Wind
- | When combined with GeoThermal – 50% to 60% of required energy to operate building can be provided with same amount of PV or Wind
- | We seem content with efficiently filling a leaking bucket but not fixing the leaks.

Questions?

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