



3/18/2021

Oelwein Police Department
501 Rock Island Rd.
Oelwein, IA 50662

Prepared by:
Brian Irvine
Kens Electric Inc

Calculations provided by ...





Operating Cost Comparison

3/18/2021

Oelwein Police Department
 501 Rock Island Rd. Oelwein, IA 50662
 Weather Data Location: Waterloo Municipal Ap IA

Annual Cost / Unit	System 1
	Geo System GZS (PSC) Horz Pkg, 1 spd 21 tons
Heating	\$3,834
Cooling	\$1,801
Water Heating	\$232
Constant Fan	\$0
Total Annual Operating	\$5,866
Energy Credit	\$0
Installed Cost after Credit	\$224,900
Annual Htg Energy (Million Btu)	70.7
	Reference Unit
Operating Cost Savings	
Additional Installed Cost	
Payback	
Return on Investment *	
Htg Energy Savings (Million Btu)	
CO₂ Savings (metric tons / year)	
Automobiles removed from road	

* ROI for 20 years and ignoring financing

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System 1 - Geo System

Oelwein Police Department
501 Rock Island Rd. Oelwein, IA 50662
Weather Data Location: Waterloo Municipal Ap IA

Heating
Annual Heating Load: 268.1 MMBtu
Electricity (GeoComfort): 20722 kWh
Electricity (Auxiliary): 0 kWh
% by GeoComfort: 100.0 %
Average Efficiency: 3.79 COP
Annual Cost: \$3834

Cooling
Annual Cooling Load 180.1 MMBtu
Electricity (GeoComfort): 9734 kWh
Average Efficiency: 18.5 EER
Annual Cost: \$1801

Estimated Annual Operating Costs	
Heating:	\$3834
Cooling:	\$1801
Hot Water:	\$232
Total ^{1,2,3}	\$5866

Hot Water
Annual DHW Load: 18.7 MMBtu
Electricity: 1253 kWh
% by GeoComfort: 81.3 %
Average Efficiency: 4.38 COP
Annual Cost: \$232

Design Heating Load: 175000 Btu/hr
Indoor Design Temperature: 70 °F
Outdoor Design Temperature: -9 °F
Heating Electric Rate: 0.19 \$/kwh
Hot Water Electric Rate (Htg): 0.19 \$/kwh
Winter Peak Electrical Demand: 19.20 kW

Design Cooling Load: 175000 Btu/hr
Indoor Design Temperature: 75 °F
Outdoor Design Temperature: 90 °F
Cooling Electric Rate: 0.19 \$/kwh
Hot Water Electric Rate (Clg): 0.19 \$/kwh
Summer Peak Electric Demand: 15.97 kW

GeoComfort Model: 21 Tons of Element with hot water generator
Water Heater: Electric
Water Heater EF: 0.9
Auxiliary Heat: 0.00 kW

Emergency Heat: 50.64 kW
Balance Point: N/A
Circulating Pump: Magna 32-140
Pump Watts High speed: 745.5 Low speed: 499.8
Annual Pump Operating Cost: \$240

Loop Type / Soil: One Vertical U-Tube, Polyethylene SDR-11 3/4" / Average Rock
Bore Depth: 150 ft
Total Bore / Pipe: 6820 / 13640 ft
Minimum Loop Temp: 41 °F
Maximum Loop Temp: 65 °F
Average Heating Loop Temp: 48.0 °F
Average Cooling Loop Temp: 58.4 °F

Deep Earth Temp: 50 °F
Annual Temperature Swing: 27 °F
Phase Shift: 36 Days
Soil Conductivity: 1.4 Btu/hr-ft-F
Soil Diffusivity: 0.04 ft²/hr
Pipe Conductivity: 0.226 btu/hr-ft-F

¹ Total estimated annual operating costs includes heating, cooling and hot water. Base electric use (electric use other than heating, cooling and hot water) is not included, and will vary depending upon lifestyle. Total annual utilities equals heating, cooling and hot water costs plus base electric use.

² The operating costs shown above are considered to be an estimate due to the variability of living habits, weather, and system installation.

³ This software uses the latest algorithms from IGSHPA (International Ground Source Heat Pump Association) for ground loop sizing. Operating costs are based upon IGSHPA and ASHRAE (American Society of Heating, Refrigerating, and Air Conditioning Engineers) algorithms. All calculations are based upon Enertech equipment, and may not be comparable for other manufacturer's equipment.

Calculations provided by ...

