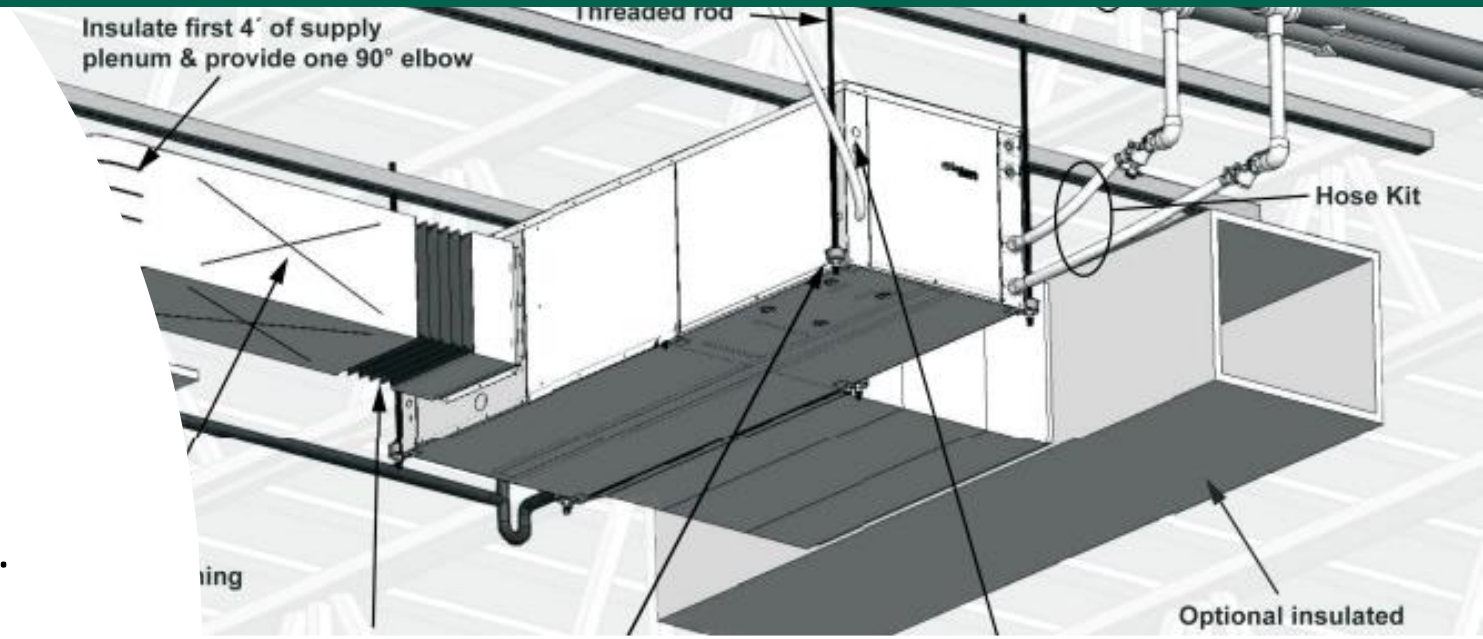
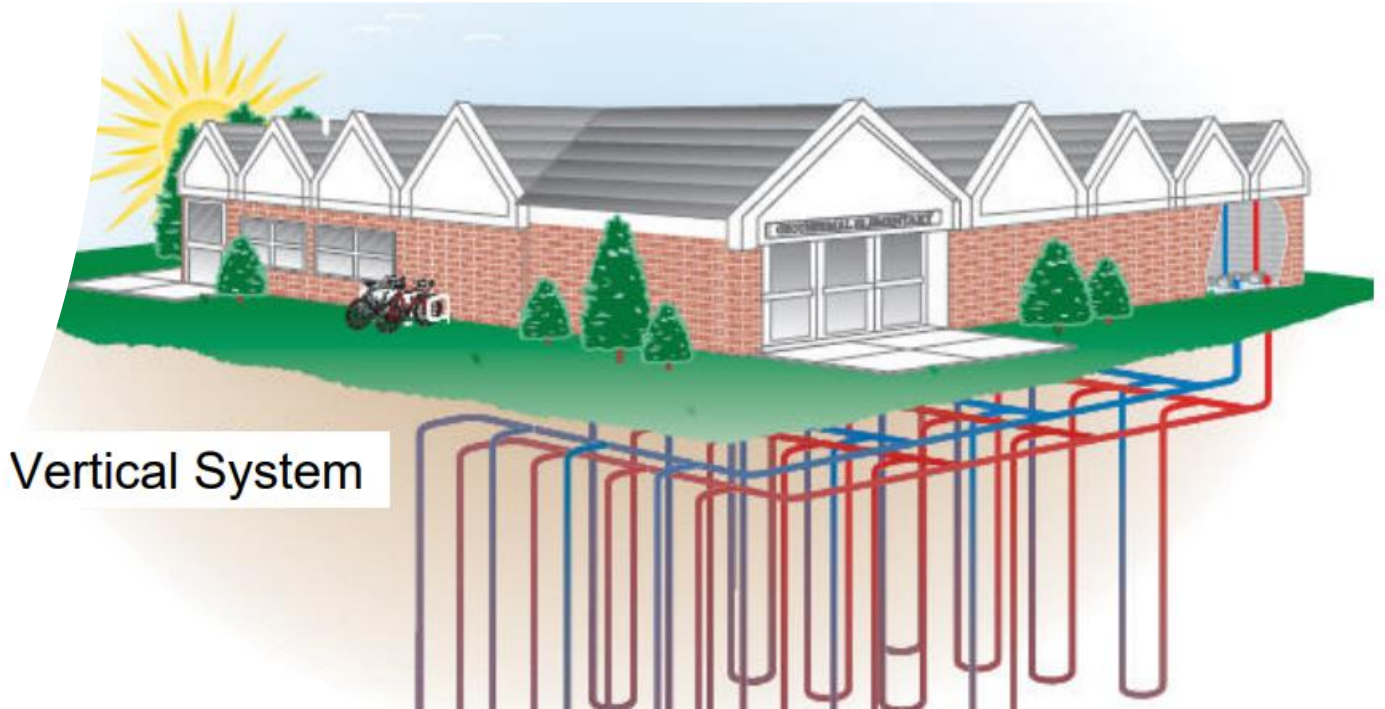
General Overview of the Geothermal System

- **Geothermal Bore Field:** 24 bores @ 800 ft deep, spaced 25 ft apart under parking lot.
- **Piping runs 5 feet below grade,** routed to mechanical room.
- **Circulation System:** Redundant pumps circulate 25% glycol solution to heat pump units.
- **Heat Pump Units:** Geothermal/Water-Source HP located above ceiling.
- **Ventilation:** Dedicated Outdoor Air Supply (DOAS) Units, 3 units, 4,000 CFM each



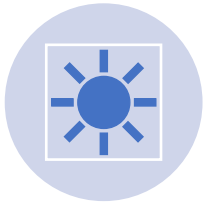


Why Choose a Geothermal Option?

Federal Elective Pay and National Grid rebates make costs comparable.

Initial cost covered by Library; incentives available post-construction.

Building Energy Efficiency: 15% + above Energy Code



Geothermal systems are the most efficient HVAC option; Lowest electric usage & lowest peak demand.

Carbon Footprint Reduction: Fully electric system with no onsite fossil fuel usage.

Long-Term Energy Reliability: Aligns with future energy trends for NY.

Why Choose a Geothermal Option?

Division 23 (HVAC) Cost: $5,000,000 (rounded)

- **Geothermal Sub-System Cost**: $1,700,000 (rounded)

Federal GHP Direct Payment: 30% × $5,000,000 = $1,500,000

National Grid Rebate: $180,000 (Estimated)

Total Incentive: $1,500,000 + $180,000 = $1,680,000

Net Geothermal Cost After Incentive: $1,700,000−$1,680,000 = $20,000

Negligible Cost Difference

Federal **Tax Incentives**

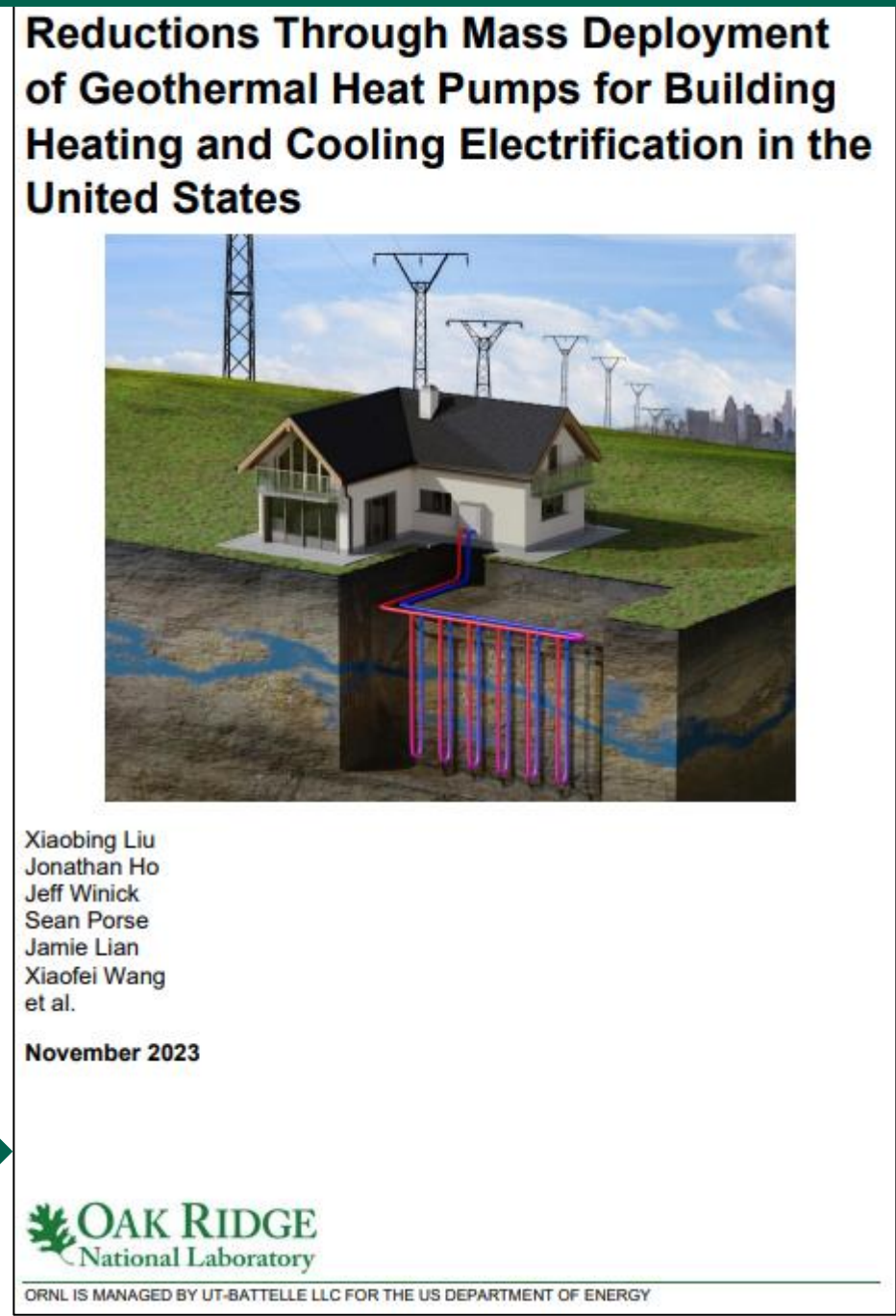
For Commercial Geothermal Heat Pumps

NEW YORK STATE OF OPPORTUNITY. | NYS Clean Heat Program

Why Geothermal Outperforms Alternatives

Comparison with Air-Source Heat Pumps (ASHPs):

- GHP Utility & Federal **Incentives level first costs** relative to ASHP installations.
- GHP **efficiency** is nearly **double** ASHP.
  - *Heating: Coefficient of Performance (COP)*
  - *Cooling: Energy Efficiency Ratios (EER)*
  - GSHP's COP 3.5 – 5.0 & EER 15 – 30
  - ASHP's COP 2.0 – 3.0 & EER 10 – 15
- Supporting Analysis: **DOE report** highlights geothermal as the pathway to decarbonization



Reductions Through Mass Deployment of Geothermal Heat Pumps for Building Heating and Cooling Electrification in the United States

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OAK RIDGE National Laboratory
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