Brightcore

BUILDING ENERGY PERFORMANCE™

GEOTHERMAL HEATING & COOLING

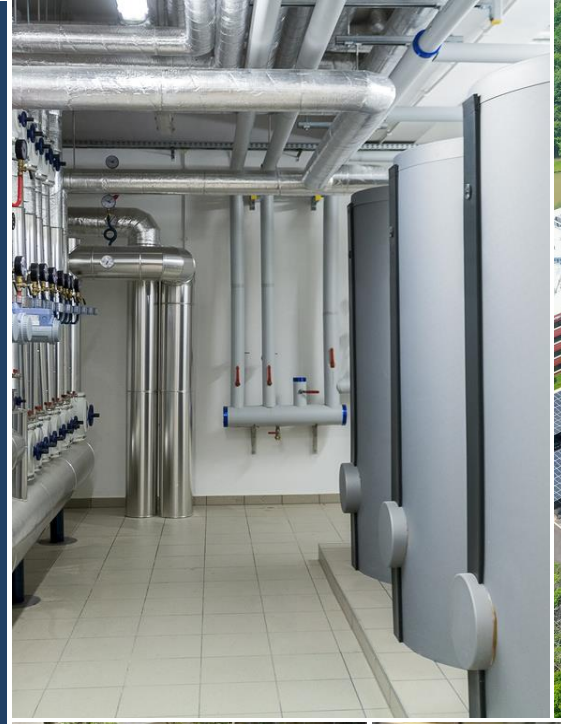
LED LIGHTING & CONTROLS

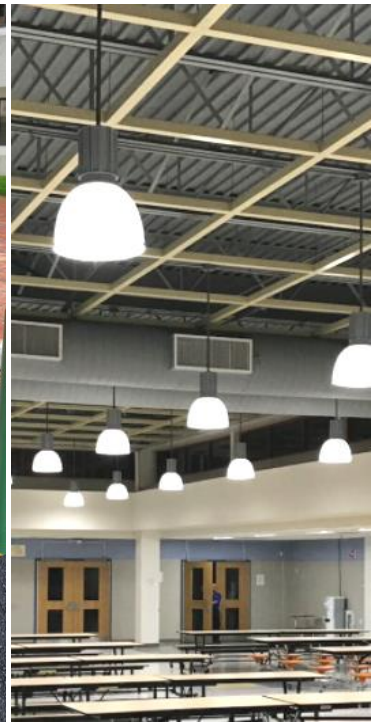
COMMERCIAL & COMMUNITY SOLAR

BATTERY ENERGY STORAGE

ELECTRIC VEHICLE CHARGING

- ARMONK, NY
- NEWBURGH, NY
- BROOKLYN, NY
- STOCKHOLM, SE





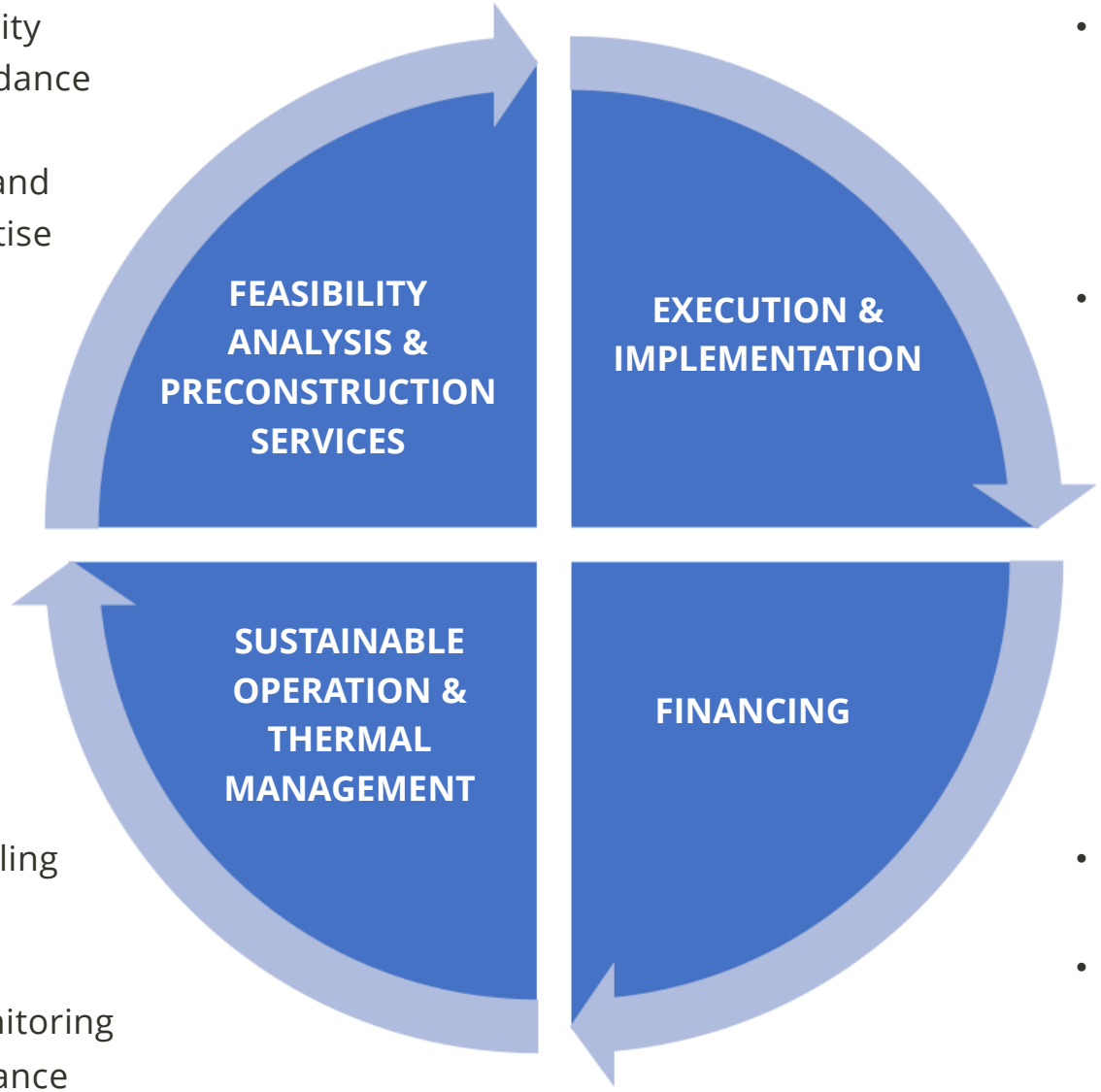
Brightcore
BUILDING ENERGY PERFORMANCE™

- ✓ TURNKEY MODEL
- ✓ TECHNICAL EXPERTISE
- ✓ IN-HOUSE DRILLING
- ✓ INNOVATION
- ✓ ENERGY AS A SERVICE
- ✓ FINANCIAL STRENGH
- ✓ LOCAL PRESENCE

UNIQUE GEOTHERMAL BUSINESS MODEL

IN-HOUSE ENGINEERING & DESIGN, DRILLING, FINANCE AND ONGOING O&M

- Initial feasibility
- Incentive guidance
- In-house engineering and design expertise



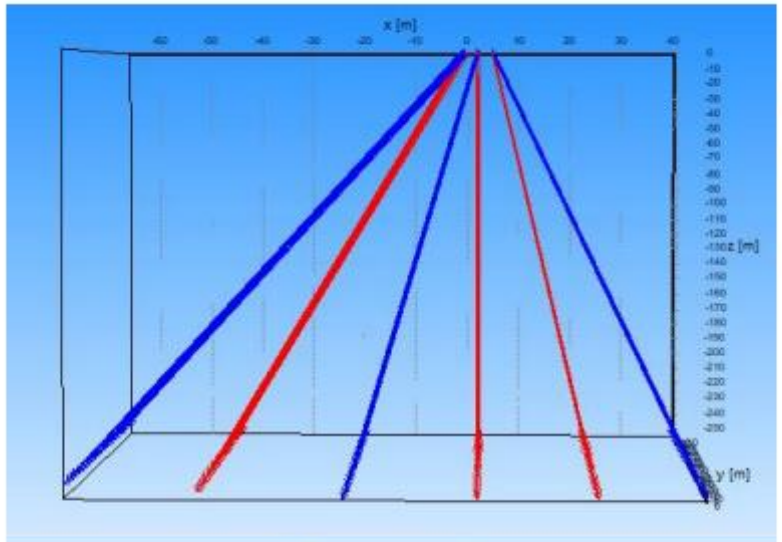
- Brightcore drill rigs: conventional and innovative (incline, water hammer, electric, etc.)
- In-house licensed master drillers

- Energy modeling and asset optimization
- Ongoing monitoring and maintenance

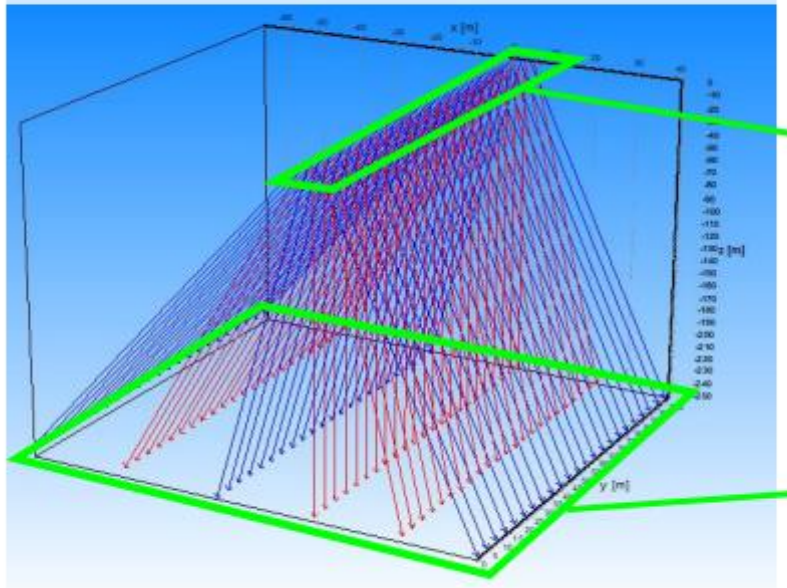
- Geothermal-as-a-service
- In-house capital

GEOTHERMAL INNOVATION

Angled Drilling



- 138 Boreholes
- 850’ Depth
- 5°, 10°, 15° Inclinations
- 7.5’ & 15’ Spacing



25,000 FT²

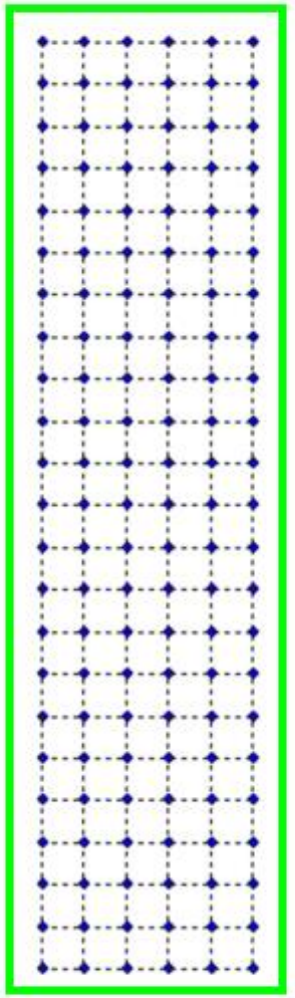
290,000 FT²

VS

Conventional Drilling

- 138 Boreholes
- 850’ Depth
- Vertical Boreholes
- 21’ Spacing

60,000 FT²

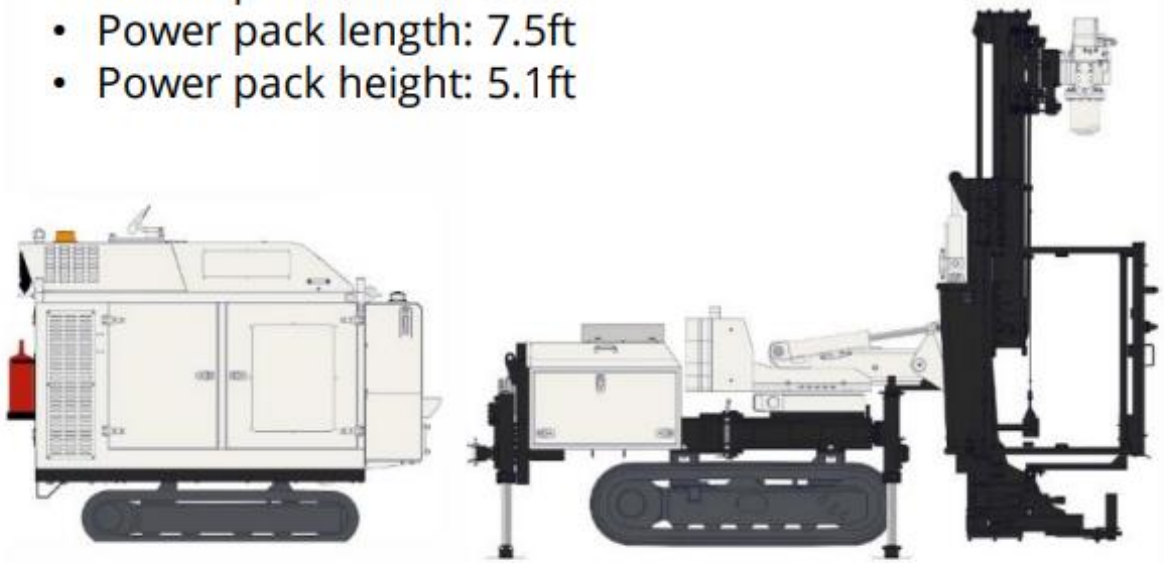


GEOTHERMAL INNOVATION

Limit Access Drill Rig

- Great for installations in difficult terrain and low - clearance spaces

- Rig width: 3.4 ft
- Rig Length: 10 ft
- Height (rig derrick up): 9.5 ft
- Power pack width: 5.3 ft
- Power pack length: 7.5ft
- Power pack height: 5.1ft



VS

Conventional Drill Rig

- Great for installations in large open areas in certain geological settings

- Height (rig derrick up): 30-33 ft
- Length of 6x4 truck: 29.5 ft
- Width of 6x4 truck: 8.4 ft
- Height of 6x4 truck: 11.2 ft

ENABLING GEOTHERMAL IN

EXISTING BUILDINGS

CLEAN BUILDING RETROFITS

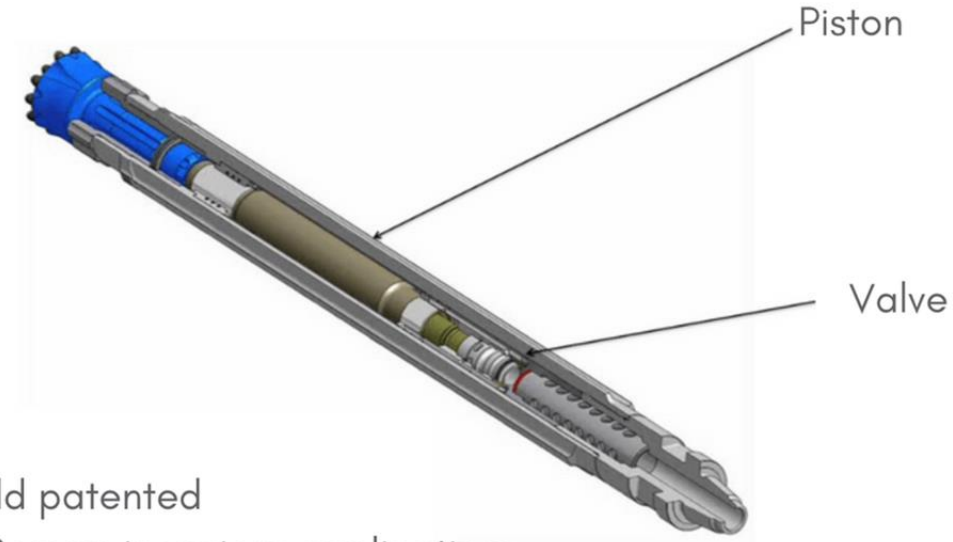
Low noise, low vibrations & NO DUST! System retrofits can be completed in small spaces with low overhead clearance.

UrbanGeo™

INNOVATIVE DRILLING TECHNOLOGY

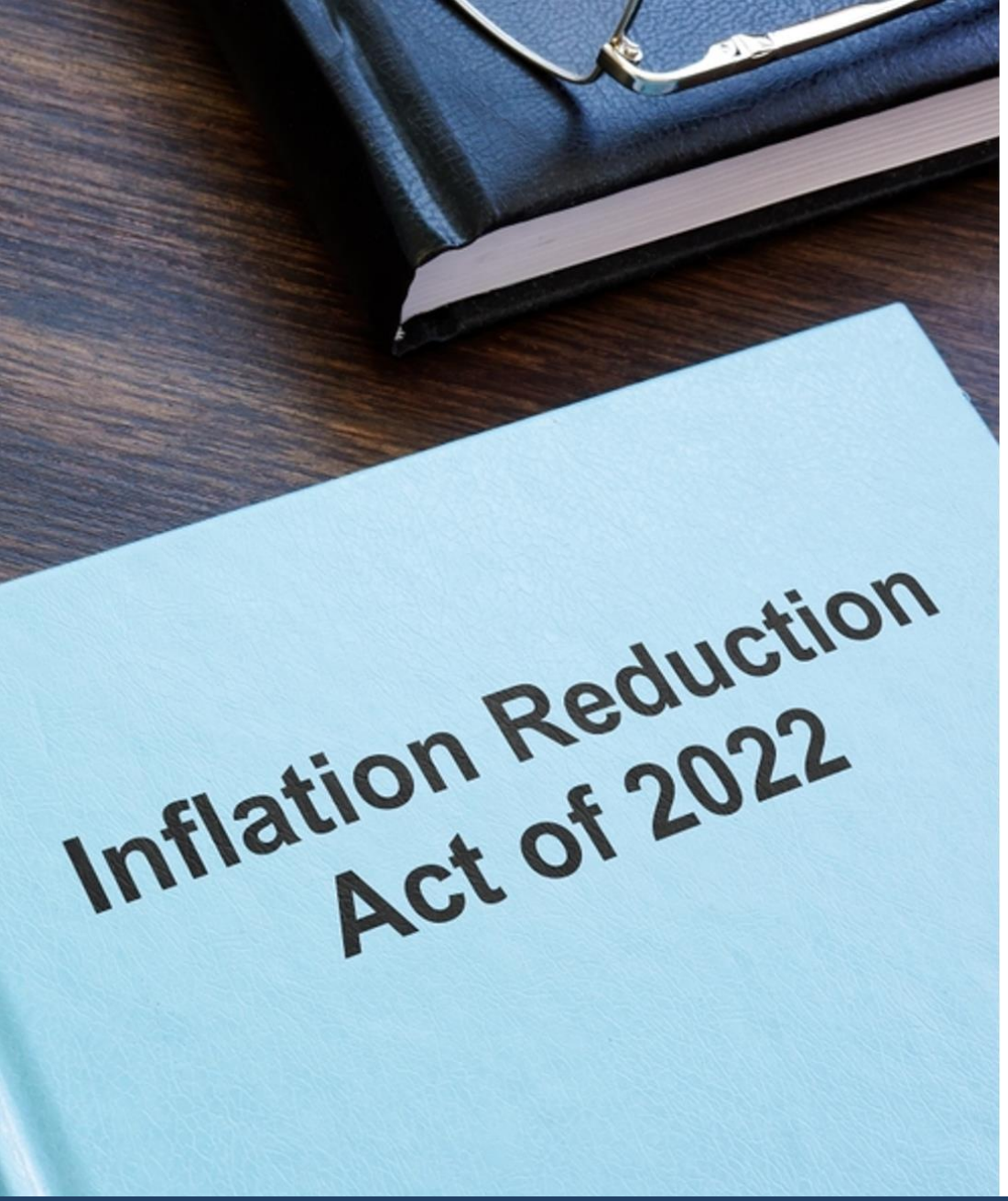
Utilizing the Wassara Water Down-the-Hole (WDTH) drilling technology, boreholes are capable of being drilled at inclined angles from very small footprints.

Wassara Water Powered DTH Hammer



- World patented
- > 20 years in various applications
- > 25 million meters drilled in-house by LKAB

Brightcore
BUILDING ENERGY PERFORMANCE™



THE BUSINESS CASE

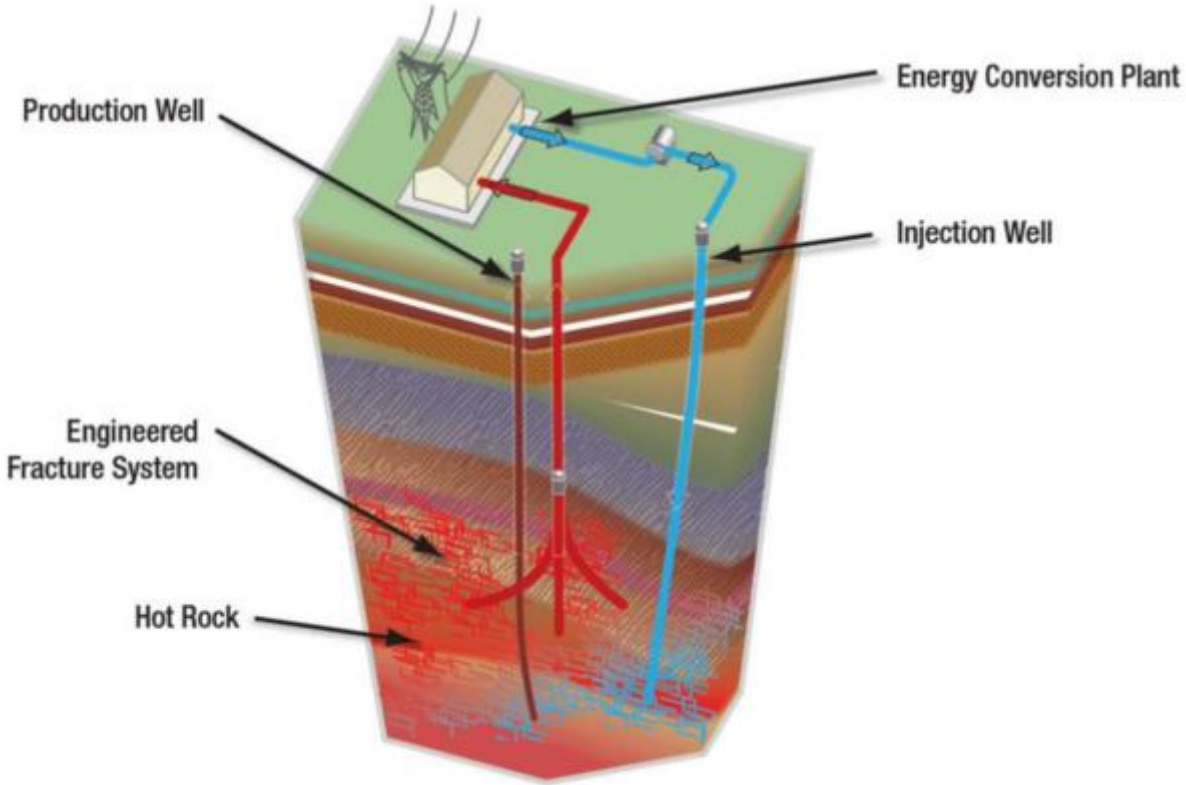
FEDERAL INCENTIVES

UNDER THE INFLATION REDUCTION ACT (IRA):

- The Investment Tax Credit (ITC) for geothermal has gone from 10% to **40-50%**
- This credit applies to the **entire cost** of the system, including interior equipment
- The credit is redeemable through **direct payment** for non-profit entities

GEOTHERMAL BASICS

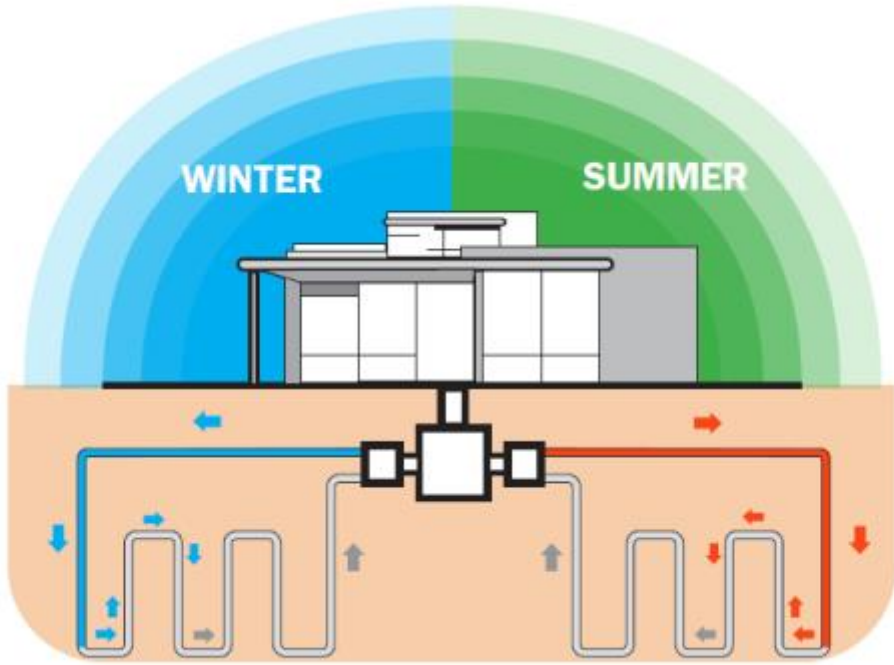
Geothermal Energy



- Geothermal uses naturally regenerating & residual heat from the earth to for power generation
- Large wellbore, deep drilling depths (>>5000')

VS

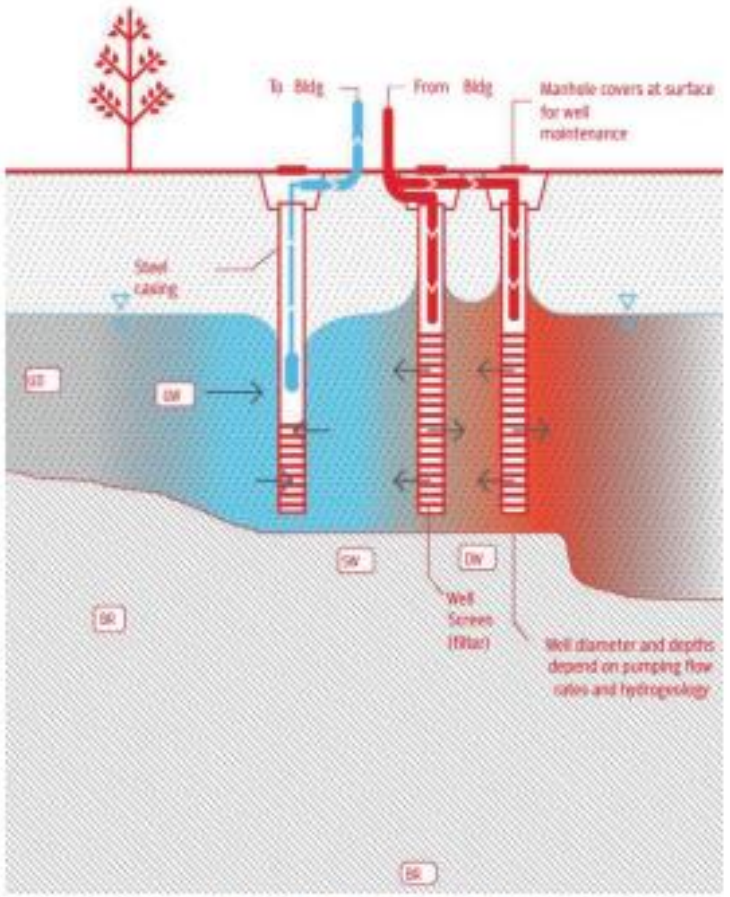
Geo-Exchange



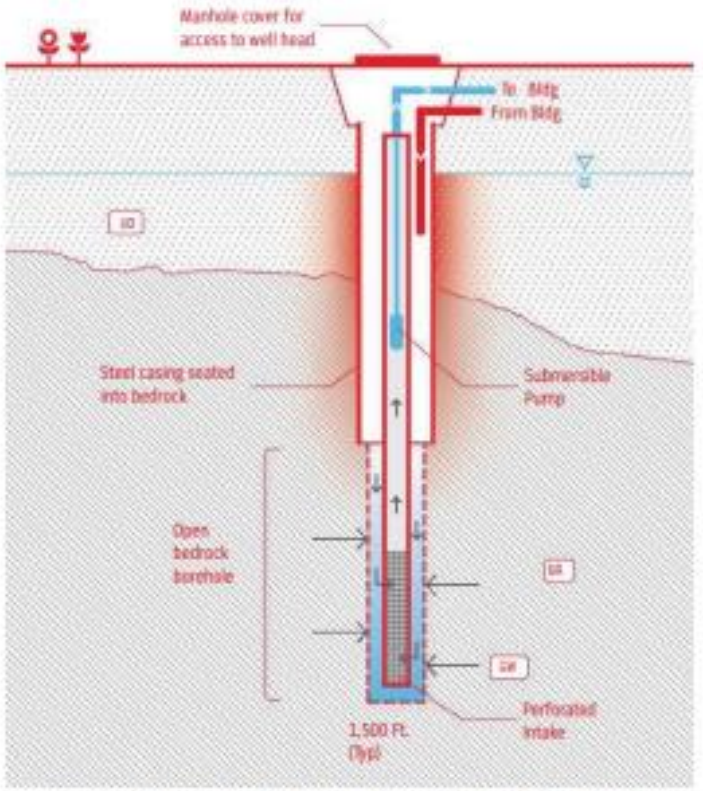
- Geo-Exchange (Ground Source Geothermal or Geo) systems use the earth to store and retrieve heat for HVAC (heat pumps)
- Relatively shallow drilling depths (up to ~850')

GEOTHERMAL BASICS

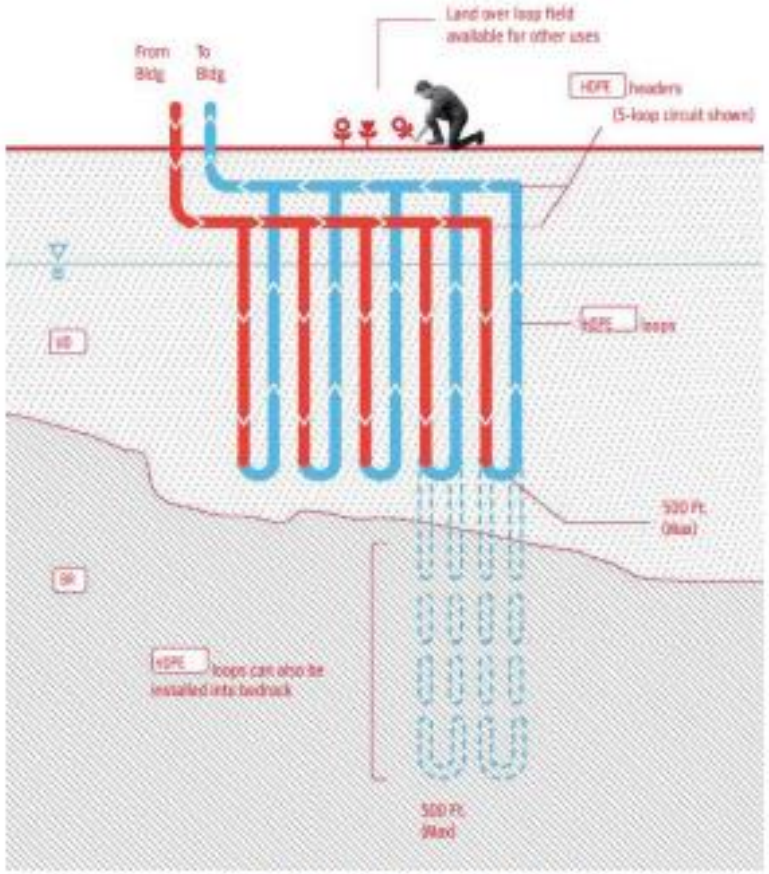
Types of Geo-exchange Geothermal



OPEN-LOOP



STANDING COLUMN WELL

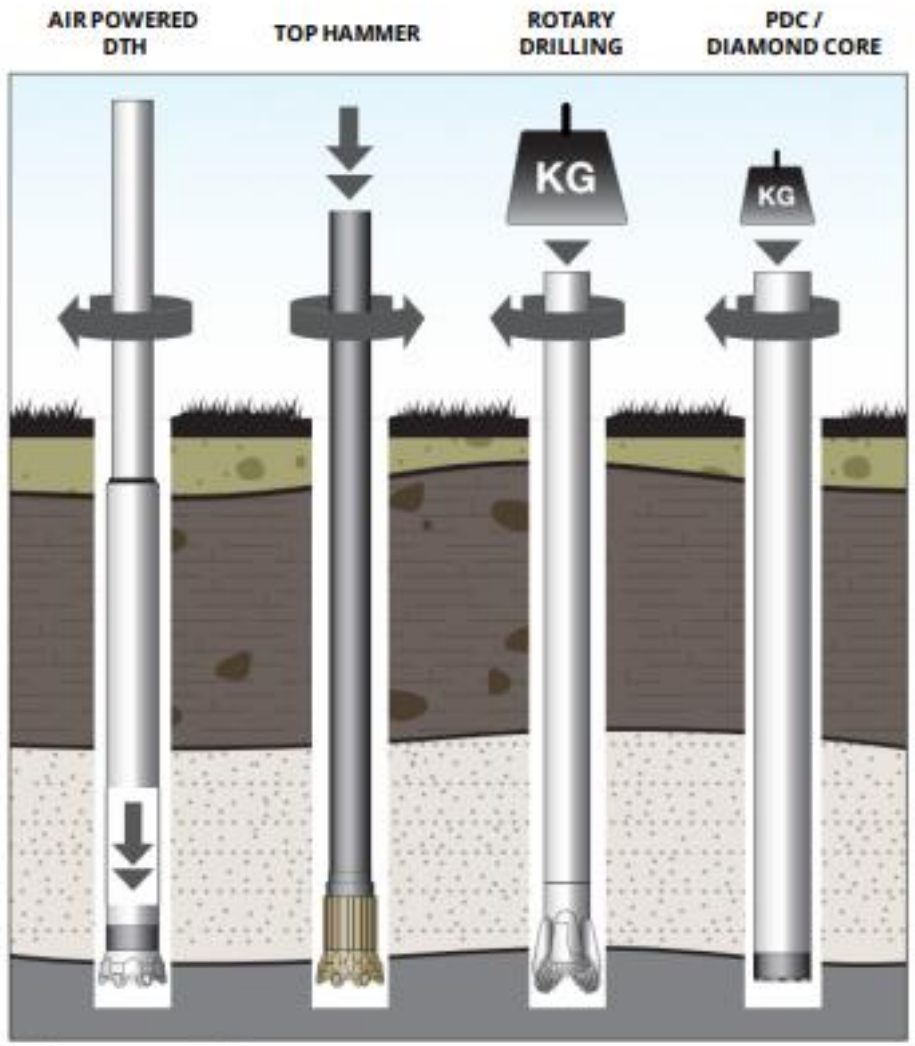


CLOSED-LOOP

SOURCE: Geothermal Systems and their Application in New York City, February 2015
https://www.nyc.gov/html/planyc/downloads/pdf/publications/2015_Geothermal.pdf

GEOTHERMAL BASICS

Drilling Methods



SOURCE: UAB Wassara
https://www.wassara.com

Table 6.2 Relative Drilling Rate in Various Formations

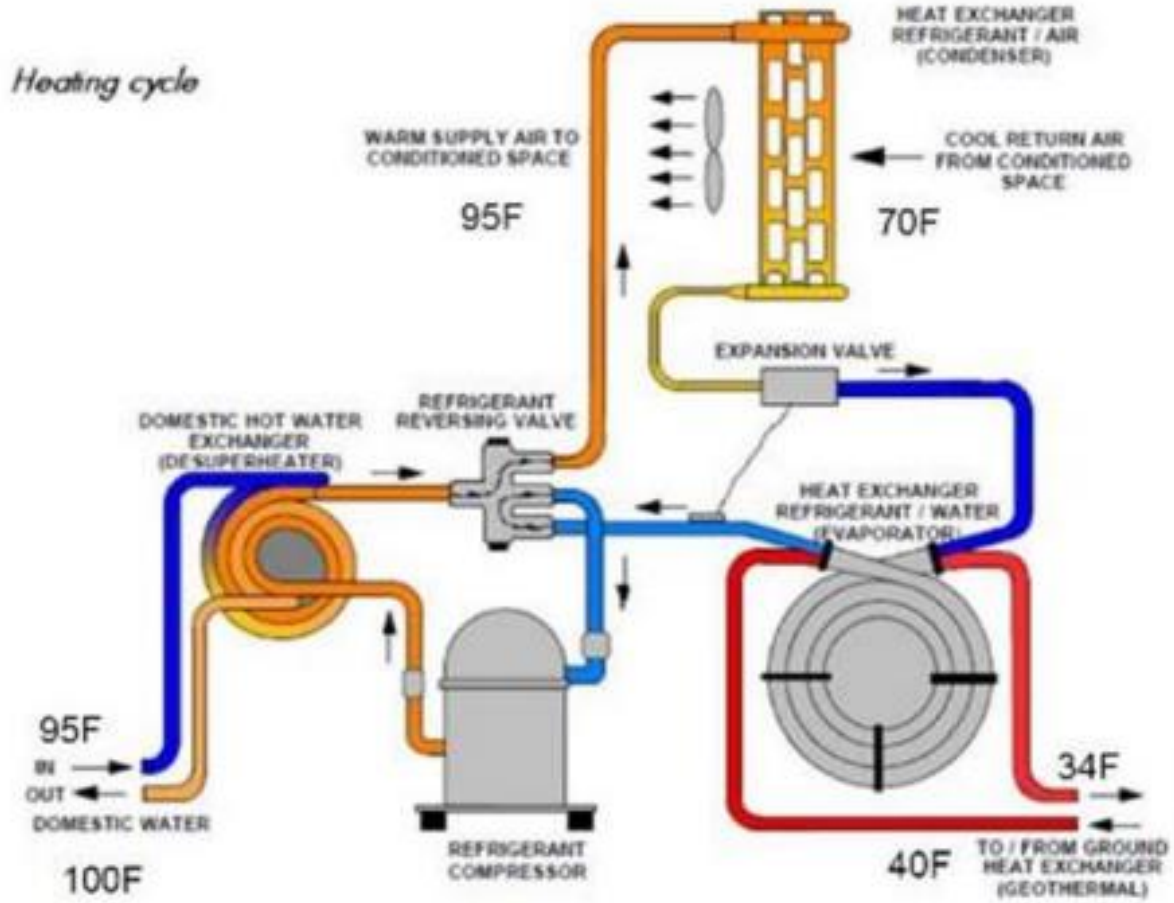
	Loose Sand Gravel	Alluvial Fans, Glacial Drift with Loose Boulders	Clay, Silt Shale	Sandstone Cemented Conglomerates	Limestone	Limestone Cavernous	Basalt Layers	Basalt-Highly Fractured-Lost Circulation Zones	Granite & Other Non-Fractured Metamorphics
Cable tool	Slow	Slow-difficult	Slow, medium in brittle shale	Slow	Slow	Medium	Slow to medium	Slow, sometimes difficult	Slow
Direct rotary (air)	(----------NOT RECOMMENDED----------)			Fast	Fast	Slow,	Fast	Medium	Med. to fast
Direct rotary (fluid)	Fast	Impossible to very slow	Fast	Med. to fast	Med. to fast	Slow to impossible	Slow to medium	Slow to impossible	Slow to medium
Air hammer	(----------NOT RECOMMENDED----------)			Harder types Fast	Very fast	Fast	Fast	Medium to fast	Fast
Reverse rotary	Fast	Medium	Fast	Med. to fast	Medium	Slow to impossible	Slow to medium	Slow to impossible	Slow to medium
Drill thru-casing driver	Very fast	Medium to difficult	Fast	(----------NOT APPLICABLE----------)					

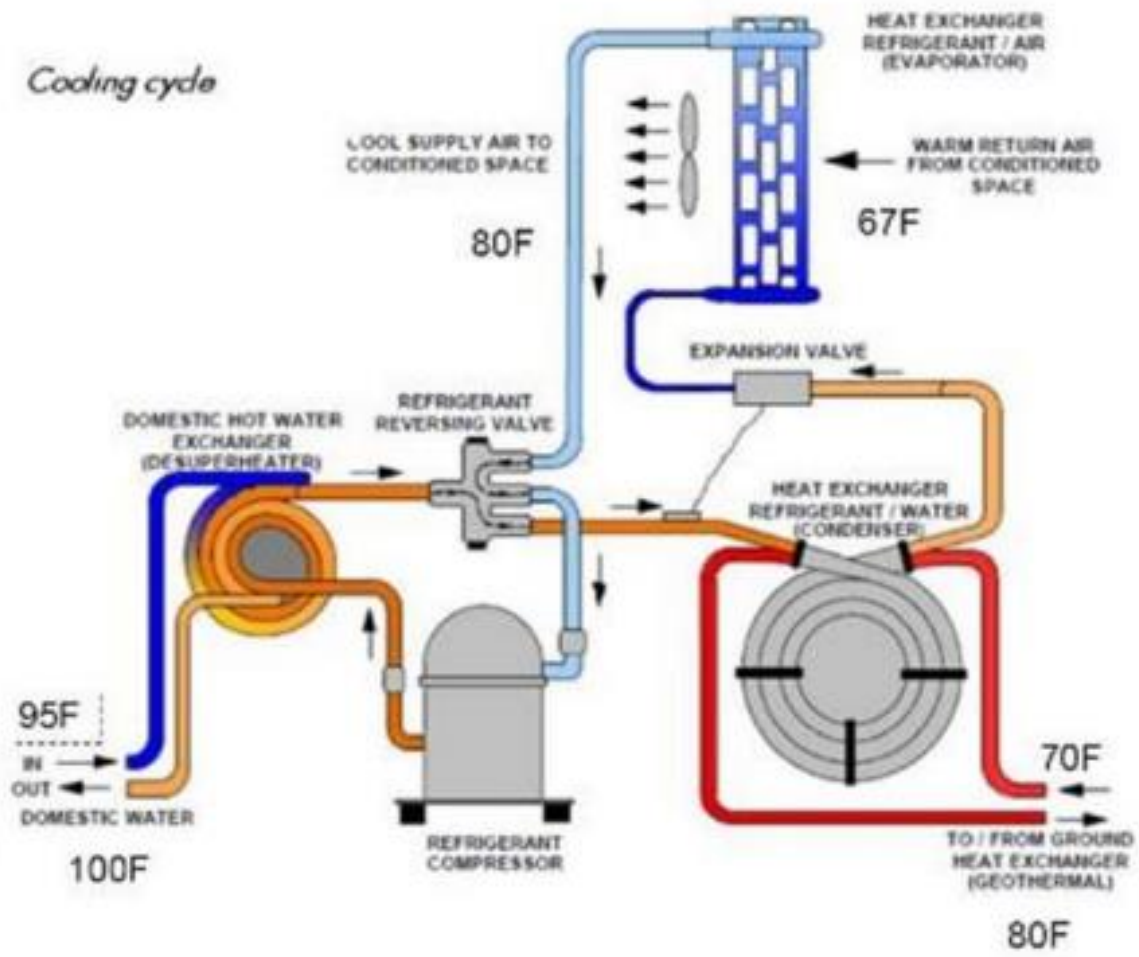
SOURCE: Drilling and Well Construction, Geo-Heat Center, Oregon Institute of Technology, Klamath Falls, OR (USA)
https://www.osti.gov/servlets/purl/895127

SOURCE: Handbook of Best Practices for Geothermal Drilling, 2010, Sandia National Laboratories, Albuquerque, New Mexico
https://www1.eere.energy.gov/geothermal/pdfs/drillinghandbook.pdf

GEOTHERMAL BASICS

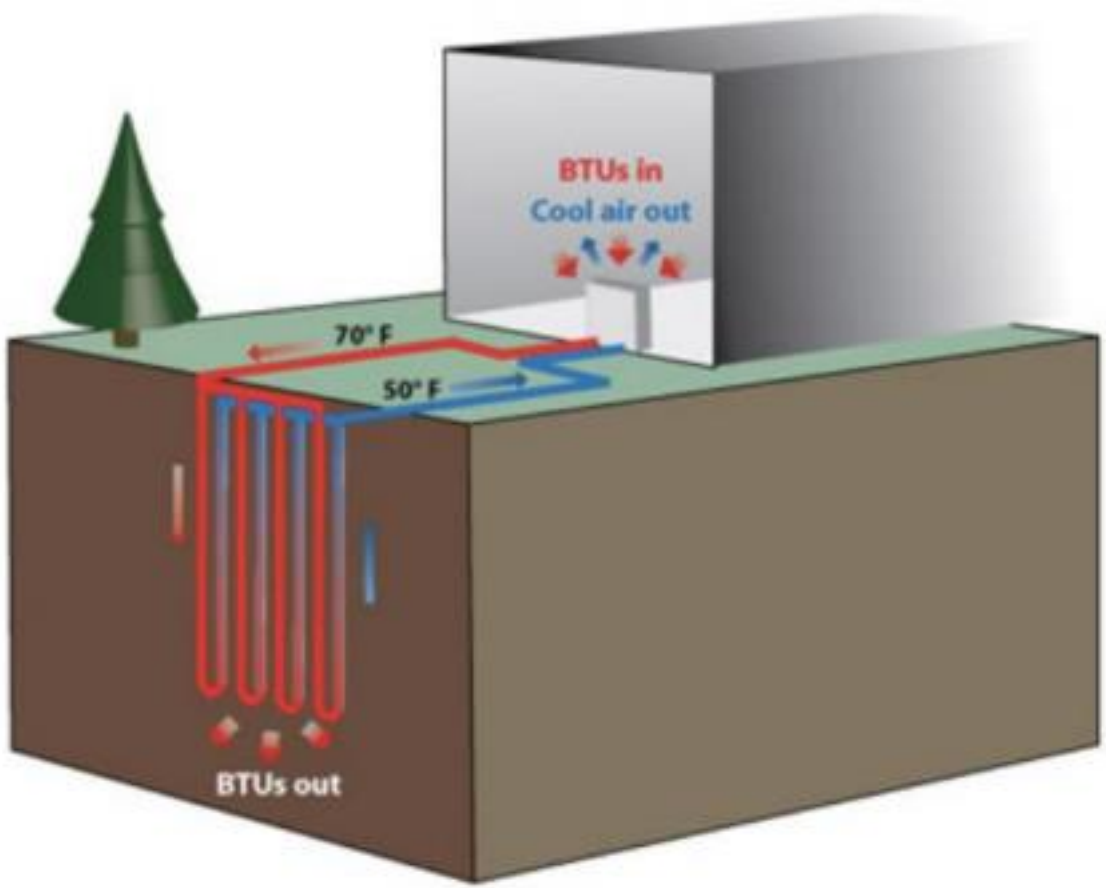
Geothermal Heat Pump Operation

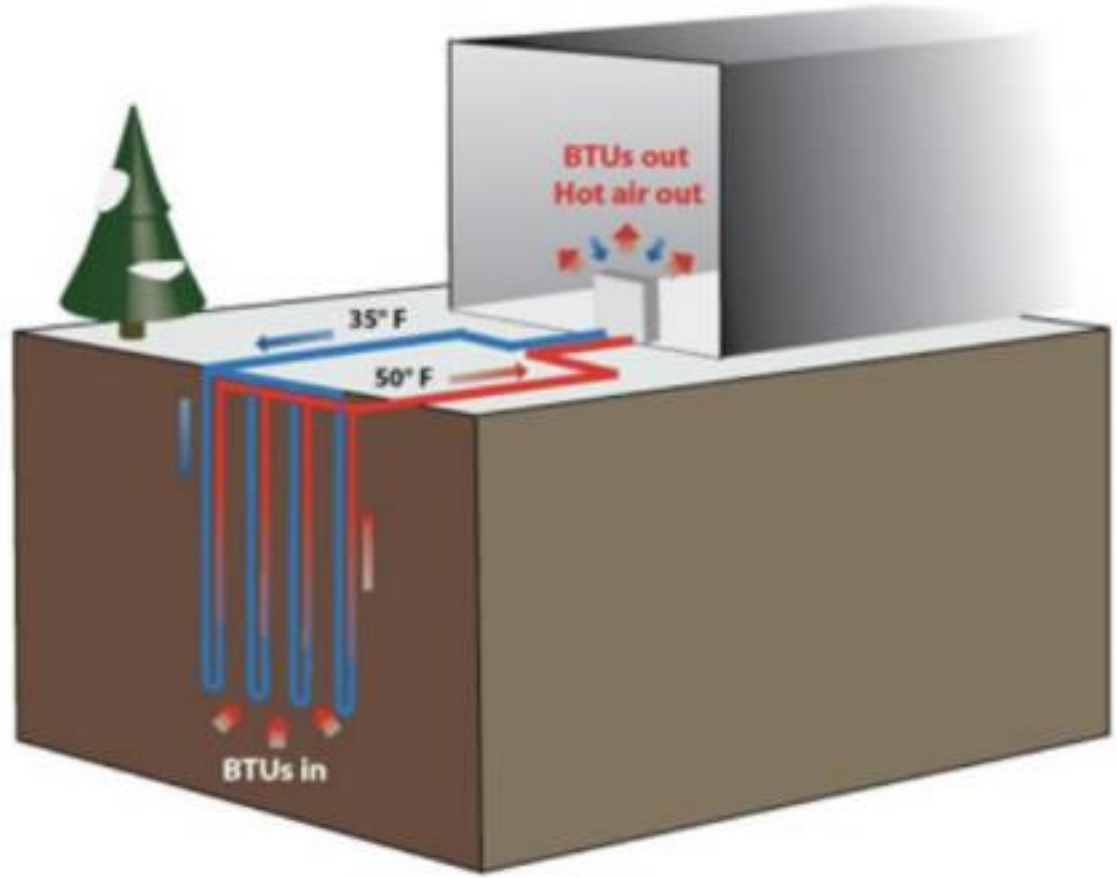




GEOTHERMAL BASICS

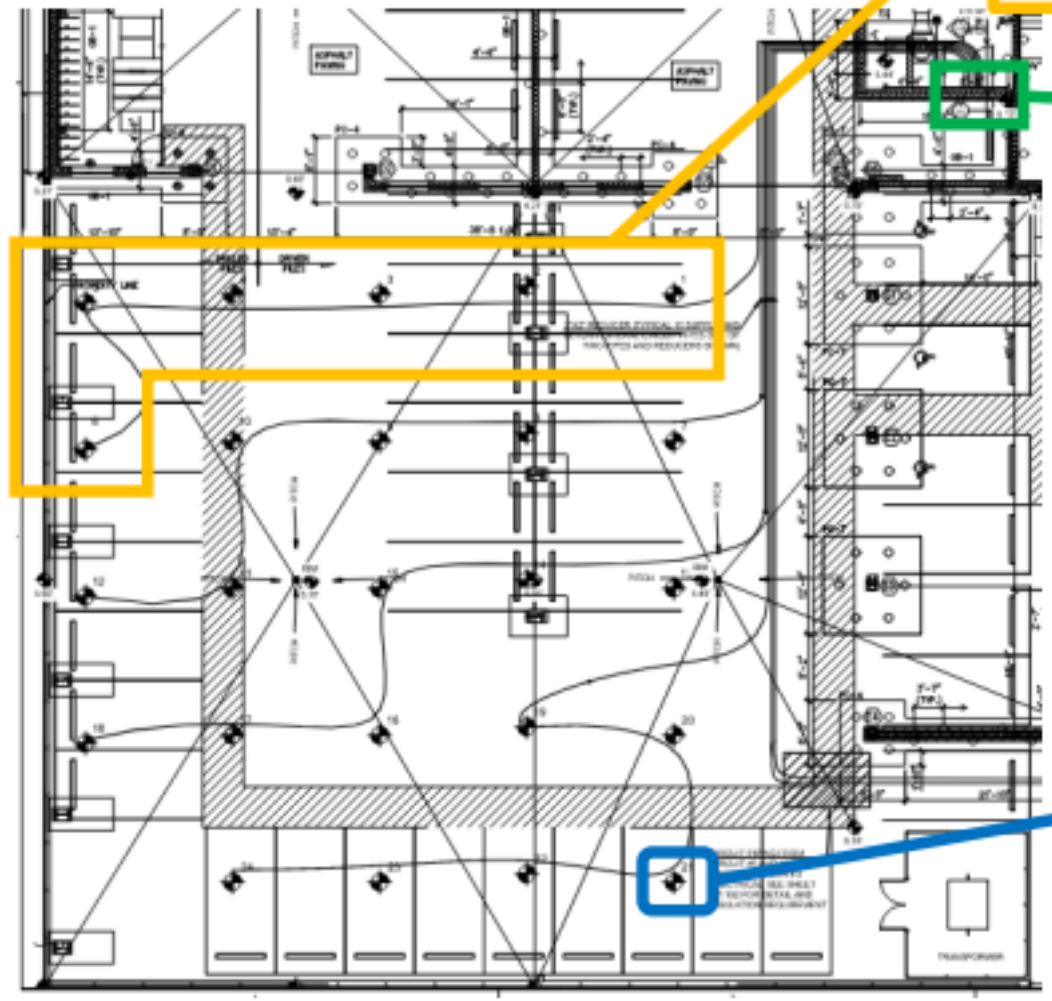
Geothermal Heat Pump Operation

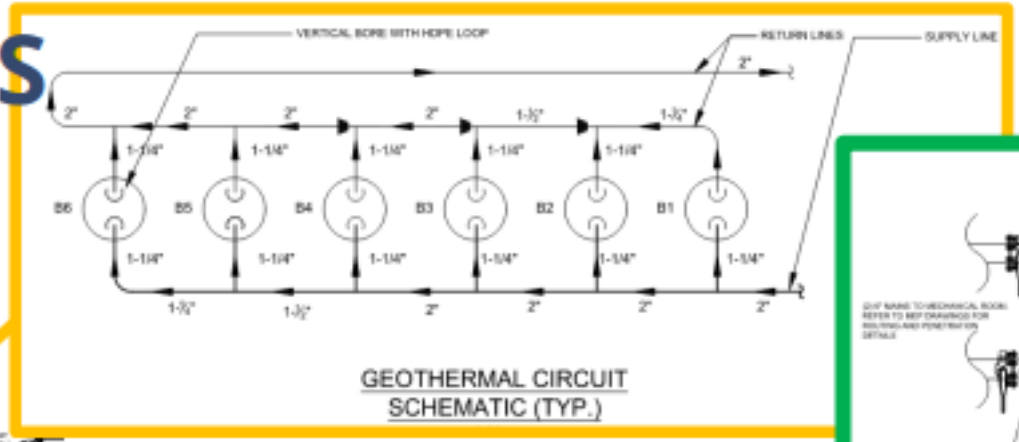




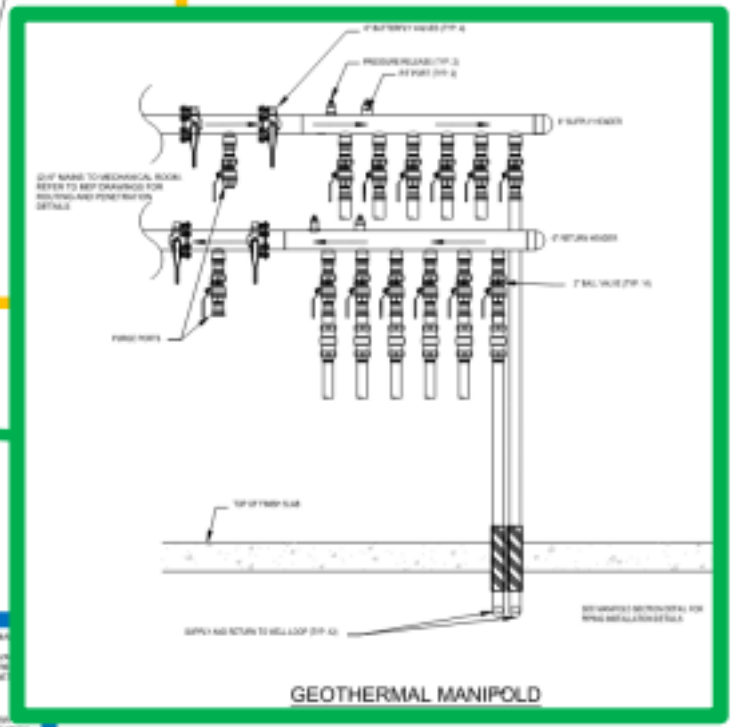
GEOTHERMAL BASICS

Typical Layout Details

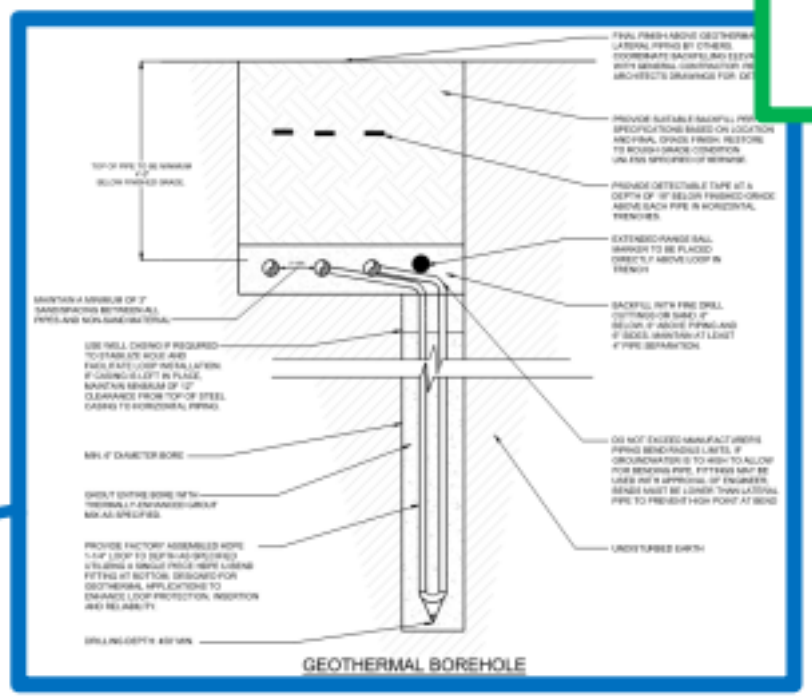




GEOTHERMAL CIRCUIT
SCHEMATIC (TYP.)



GEOTHERMAL MANIPOLD



GEOTHERMAL BOREHOLE

GEOTHERMAL BASICS

Robust Incentive Landscape is Reducing Financial Barriers

Federal Incentive Program Inflation Reduction Act (H.R. 5376)

Investment Tax Credits (§ 48)	Base	Bonus Rate (5x)
Base Credit	6%	30%
Domestic Content Adder	2%	10%
Energy Community Adder	2%	10%

Best Statewide Incentive Programs

1. Massachusetts
2. New York
3. Maryland
4. Rhode Island
5. Connecticut
6. New Jersey

Program Highlights

- MA, RI, CT – $/ton incentive
- NY, NJ – *Incentives based on energy savings*
- MD, MA – *Geothermal Renewable Energy Certificates*