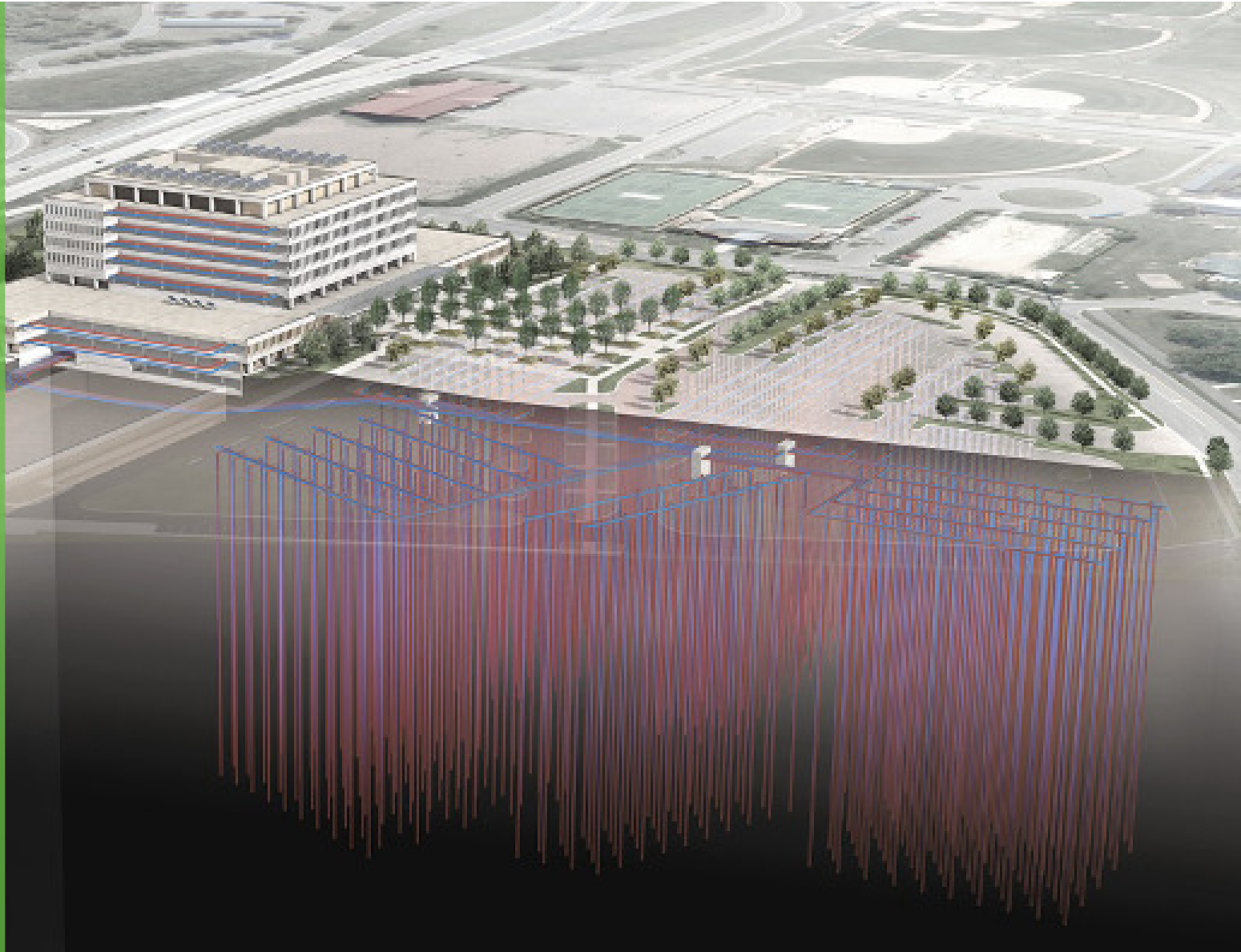




Making Net-
Zero Energy
Buildings Cost
Effective

Seth Parker
Director,
sparker@melinkcorp.com
513-965-7365





OUR NET-ZERO HEADQUARTERS

Walking the talk in environmental stewardship

Technologies used to save approx. \$60,000 per year in energy costs and earn an Energy Star Rating of 99:

Geothermal, Natural Lighting, Building Automation Software, Waterless Urinals, Solar Photovoltaic, Wind Energy, Solar Thermal, Conservation Habits

See our *Annual Sustainability Report* at melinkcorp.com

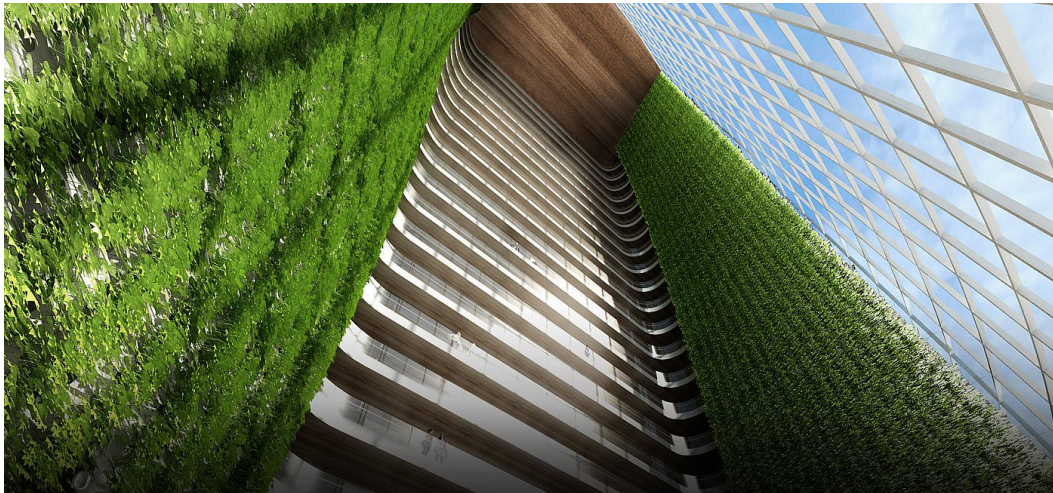


MELINK | ABOUT US

CHALLENGES

Creating sustainable buildings

...with positive economic returns



CHALLENGES

Creating inspiring buildings

...while supporting basic building functions



WHAT IF...

Installing a “more expensive”, more **sustainable** HVAC system created **positive** economic benefits



=



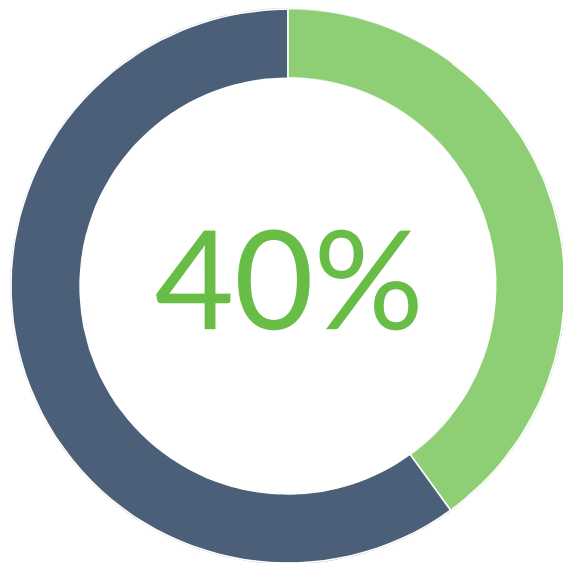
WHAT IF...

An HVAC system actually improved architectural aesthetics



WHY DOES IT MATTER?

HVAC % of energy load
in commercial buildings



1.85 Million

Square feet being LEED Certified daily

20

LEED Points available for optimizing
energy performance and water use

WHY DOES IT MATTER?

152 Companies

Committed to going 100% renewable



FIFTH THIRD BANK



WHY DOES IT MATTER?

631 Universities

Committed to going carbon neutral



UNIVERSITY OF
LOUISVILLE®



wittenberg
UNIVERSITY



THE OHIO STATE
UNIVERSITY



XAVIER
UNIVERSITY



OHIO
UNIVERSITY

SO WHAT'S STOPPING YOU?



Ugly, inefficient, loud, space hogging, traditional HVAC systems

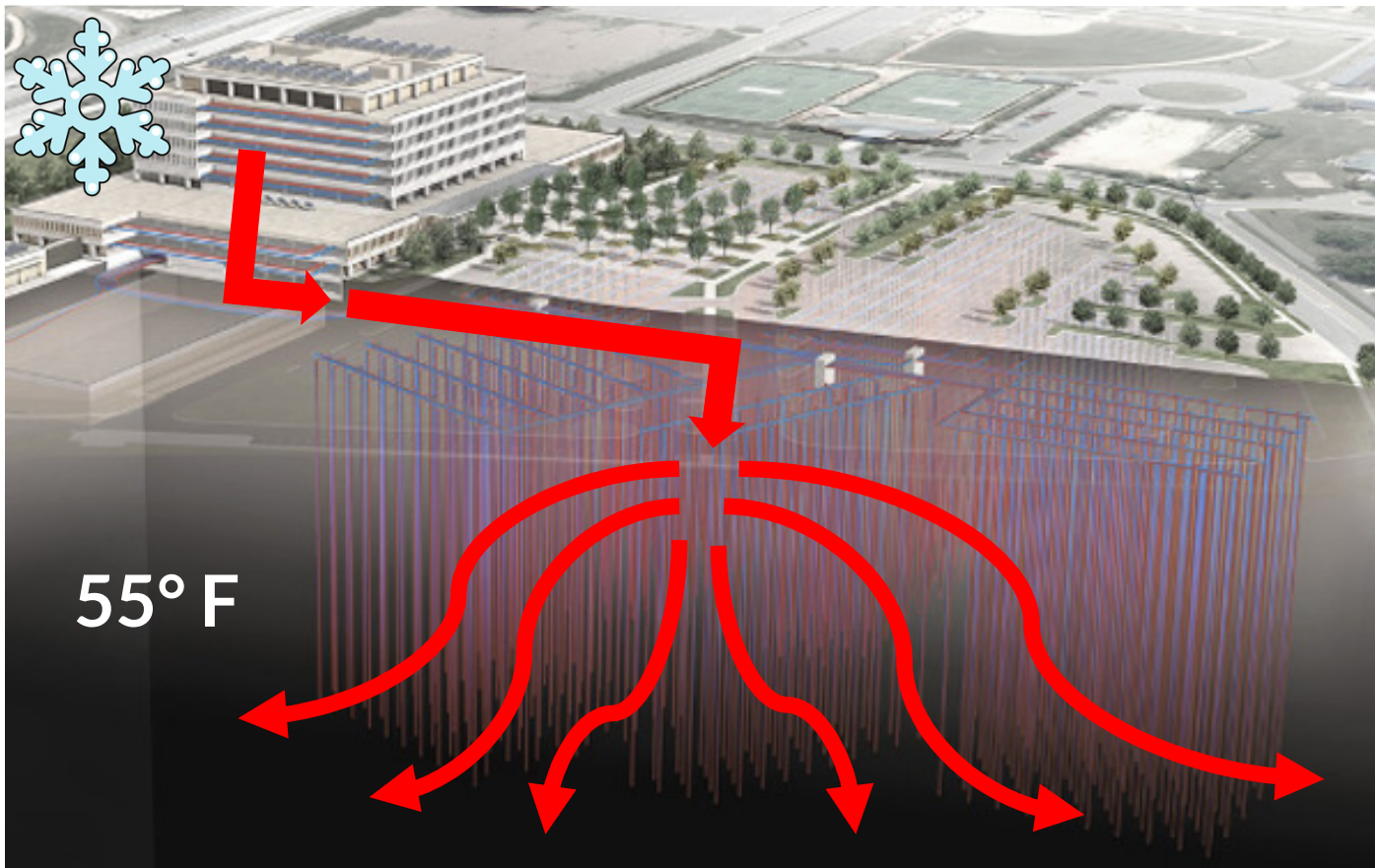


THE SOLUTION: Geothermal HVAC

Proven. Reliable. Efficient.

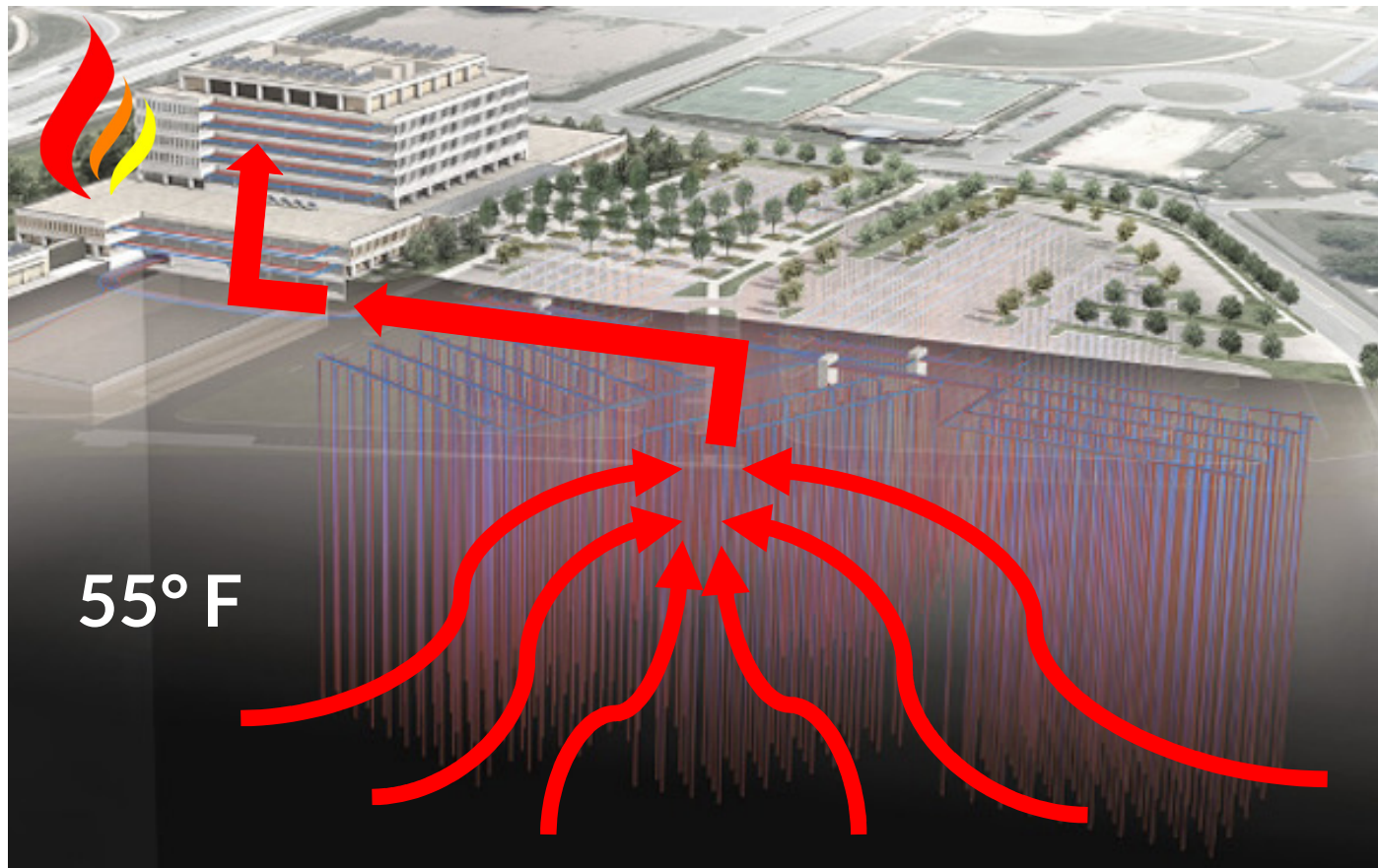
WHAT IS GEOTHERMAL?

Summer



WHAT IS GEOTHERMAL?

Winter



WHY GEOTHERMAL?

VALUE

ECONOMIC:



Reduce energy cost by 25-50%
Reduce kW demand



Reduce water usage and cost
Meet portion of domestic hot water loads



Reduced maintenance cost



Extended equipment lifetime (GHX =
50+ year lifetime)

ARCHITECTURAL:



Green and sustainable
marketability



LEED points

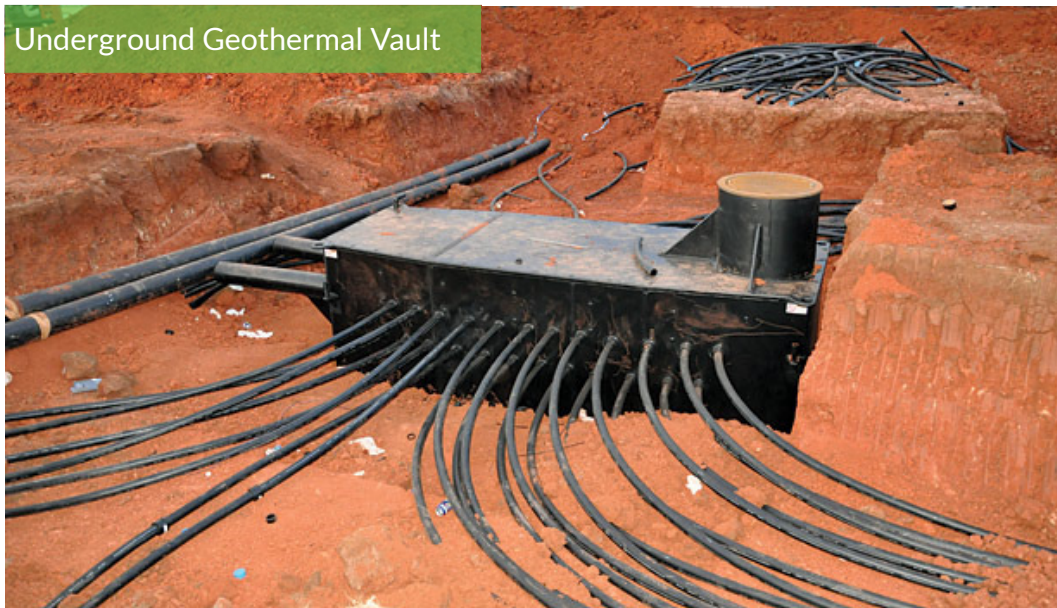


Improved aesthetics (No cooling tower)



GHX does not impede future
expansion or landscaping

SPACE SAVINGS - INTERNAL



NO DISTRACTING EQUIPMENT

Unsightly Traditional HVAC Components



Cooling Tower Maintenance



SPACE SAVINGS - ROOFTOP

Traditional HVAC Rooftop



Geothermal HVAC Rooftop

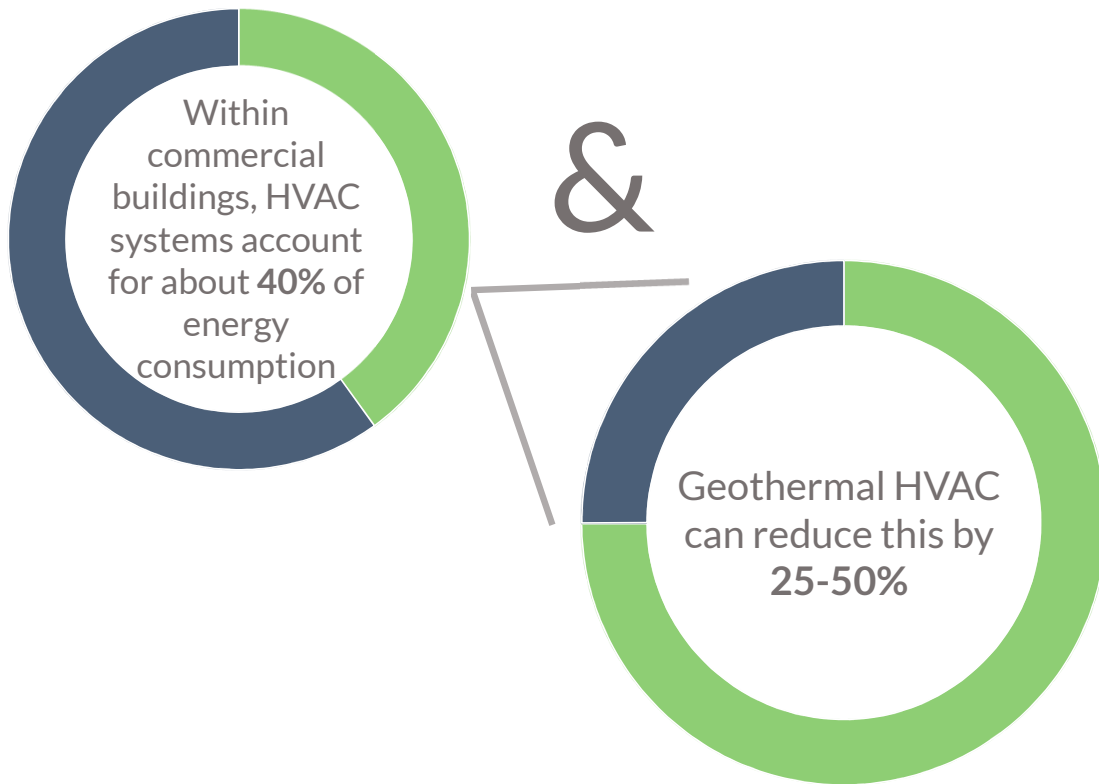


SPACE SAVINGS - ROOFTOP



DID YOU KNOW?

COMMERCIAL BUILDING STATS



“The most energy efficient, environmentally clean, and cost effective space conditioning system available today”

Only 1% of HVAC Market is Geothermal

There's so much more **energy saving** to be had!

*International Ground Source Heat Pump Association (IGSHPA)

WHY ISN'T GEOTHERMAL MAINSTREAM YET?

MARKET BARRIERS

1. High first cost due to GHX
2. Lack of awareness/education on GHX design and benefits
3. Past mistakes due to “rules of thumb” and poorly designed/installed systems





Breaking Down Barriers

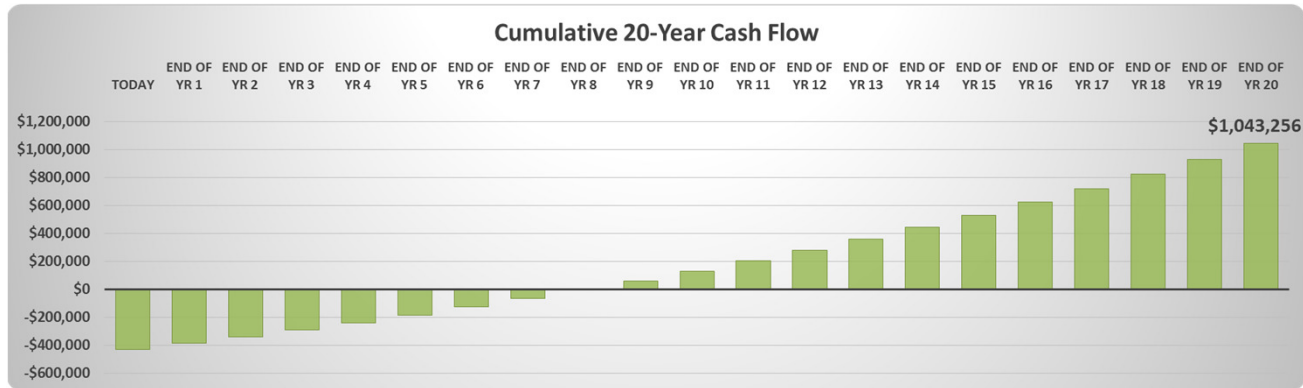
Making a Geothermal project work



Financing

Making the Cash Flows Work

- Third party financing
 - Operating leases
 - Ground loop leases
- PACE
- COPs (Certificates of Participation)
- Utility rebates
- 10% Tax Credit
- 100% Expensing





Financing

Understanding the Tax Incentives

Assumptions

- \$1,000,000 Project Cost
- 21% Tax Bracket

10% Investment Tax Credit = \$100,000

Depreciation Benefit = \$199,00

Total tax benefit = \$299,500!





GHX DESIGN

The Basics:



Borehole Size: 5-6 in.

Borehole Depth: 300-500 ft.

U-bend Size: $\frac{3}{4}$ - $1 \frac{1}{4}$ in.

Borehole Spacing: 15-30 ft.

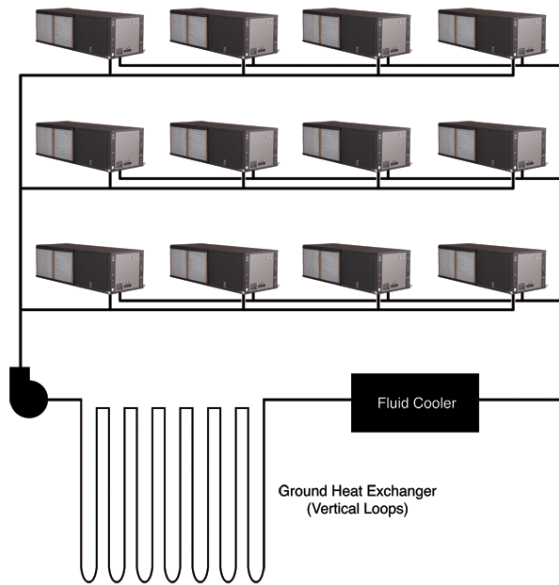
Header Depth: 4-5 ft.





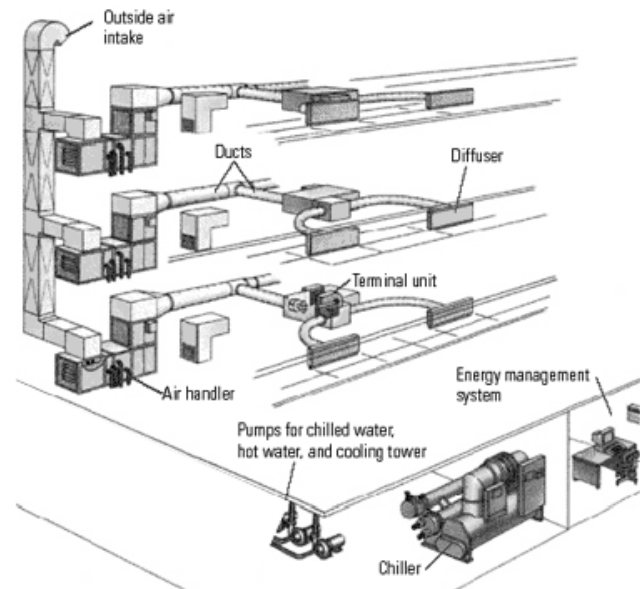
GHX DESIGN

Flexibility



Distributed Geothermal Heat Pumps

OR

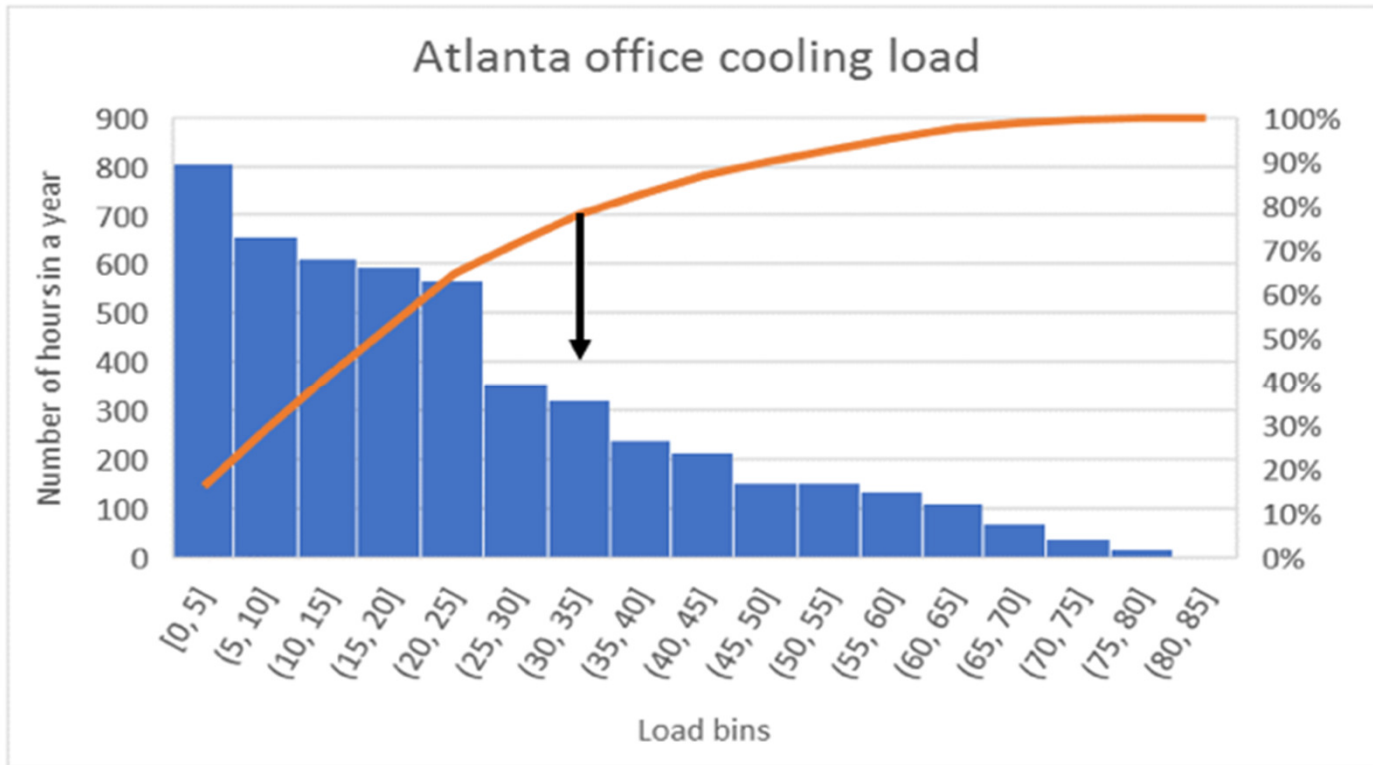


Central Geothermal Chiller



GHX DESIGN

Hybrid Design



Peak Cooling Load: 85 Tons

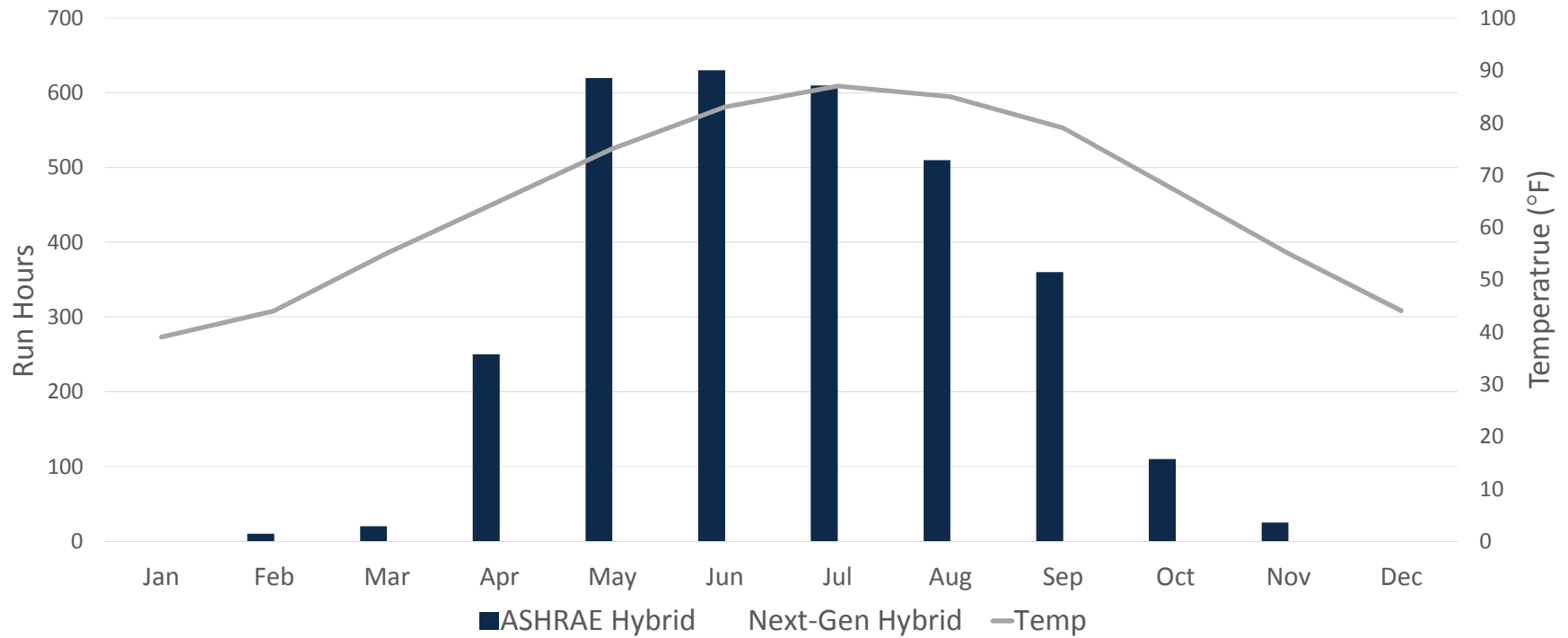
80% of the year, load < 35 Tons



GHX DESIGN

Hybrid Systems

Hybrid Geothermal Systems - Cooling Tower Run Hours

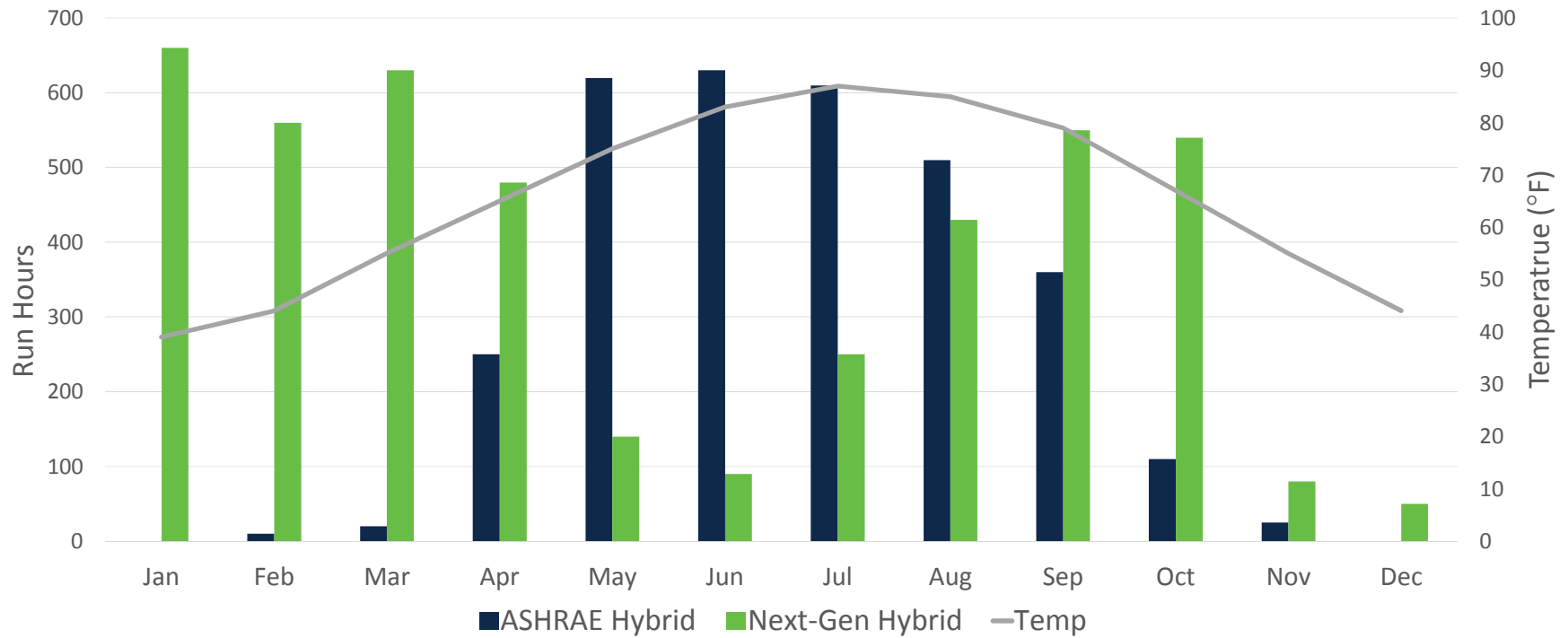




GHX DESIGN

Hybrid Systems

Hybrid Geothermal Systems - Cooling Tower Run Hours





THIRD-PARTY COMMISSIONING

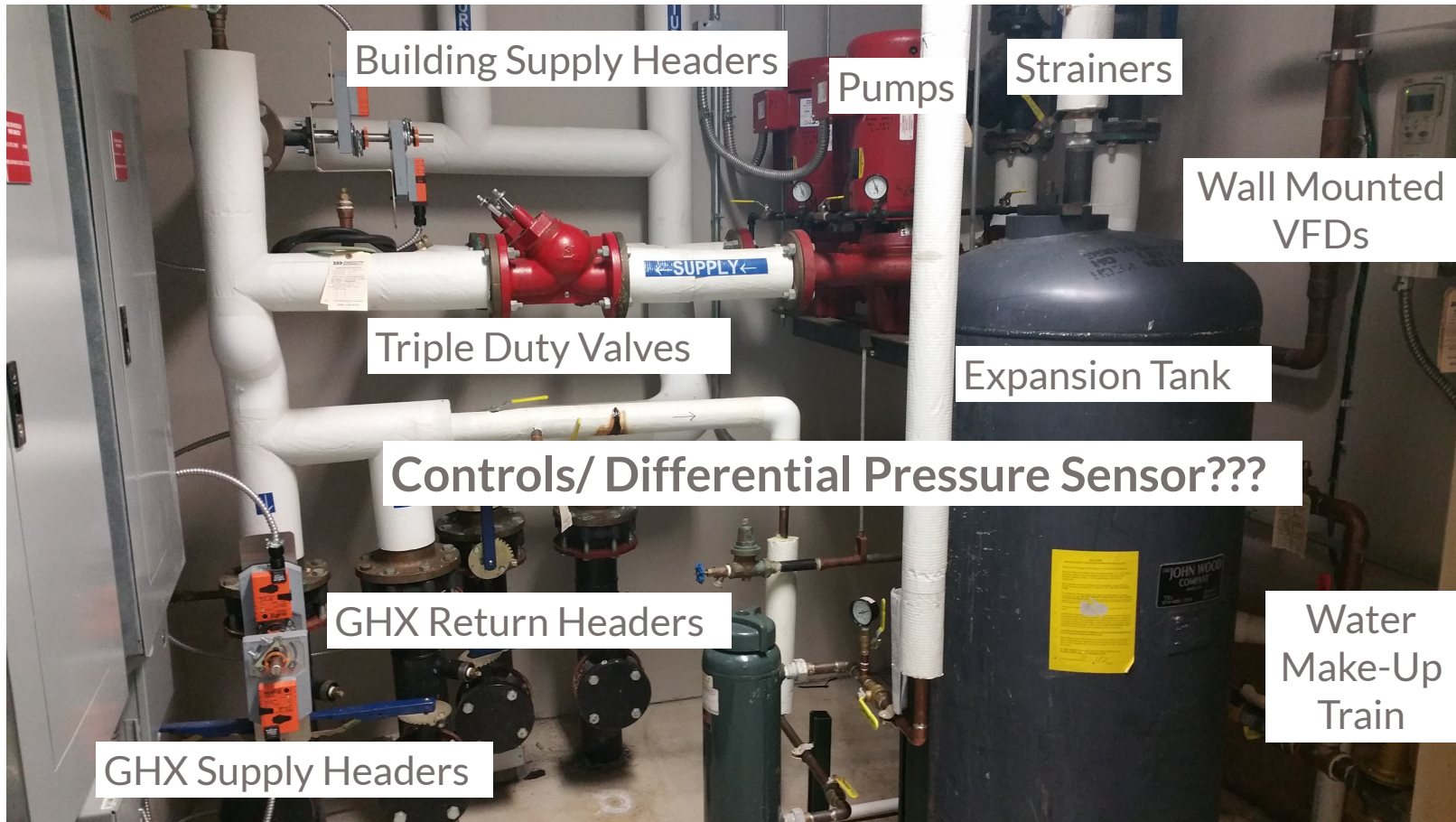
Ensuring Peace of Mind

- Verification that ground loop is installed to engineers specification





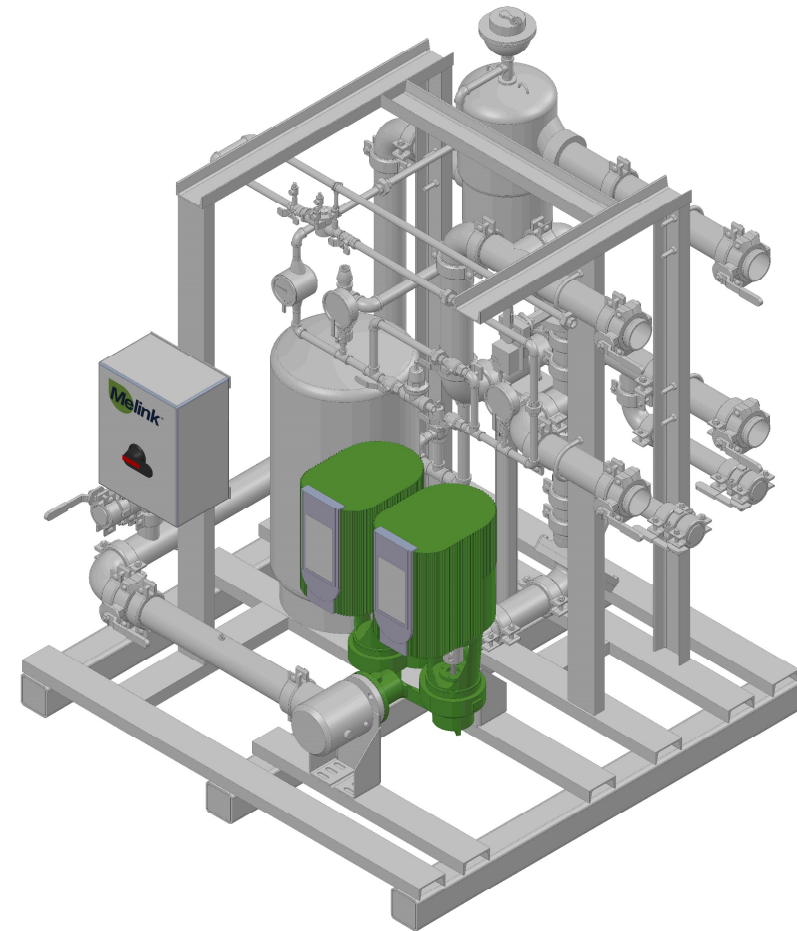
TYPICAL PUMPING STATIONS





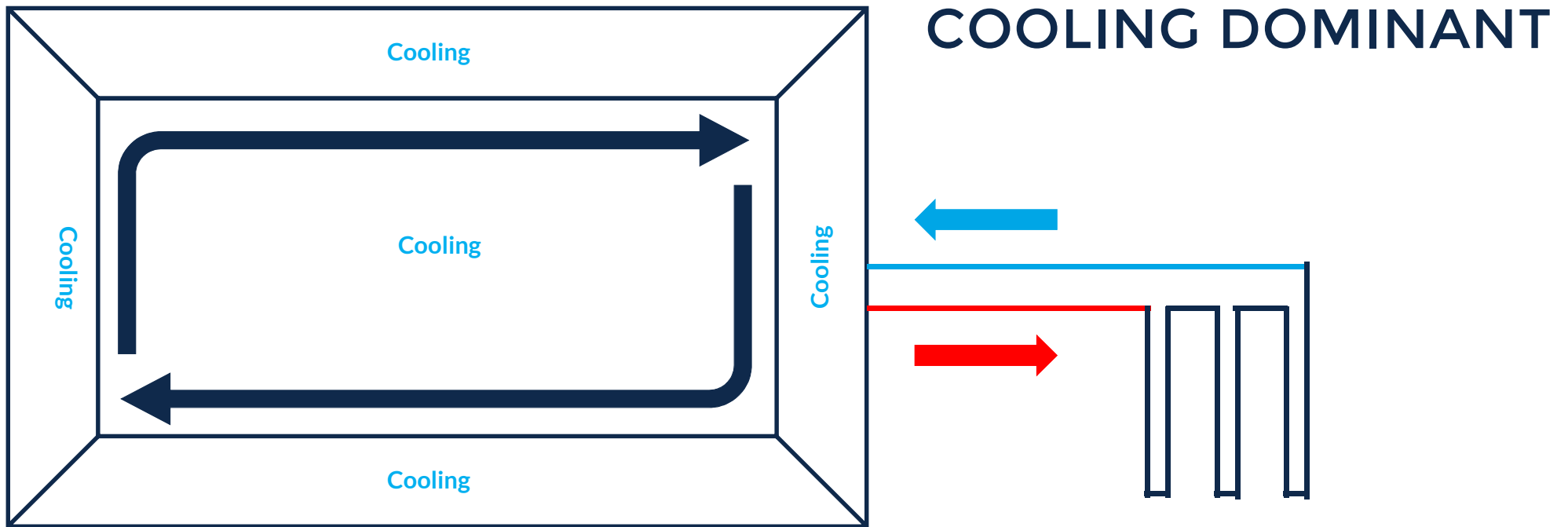
MANIFEST™

- Pre-Engineered & Factory-Assembled + Tested
- Standard Package Sizes for Easy Selection (100-800 GPM)
- Compact Dimensions for Space Savings
- Plug-n-Play Electrical & Plumbing Connections
- Web-Enabled Remote Monitoring & Control
- Intelligent Variable-Speed Drives & Bypass for Optimal Savings



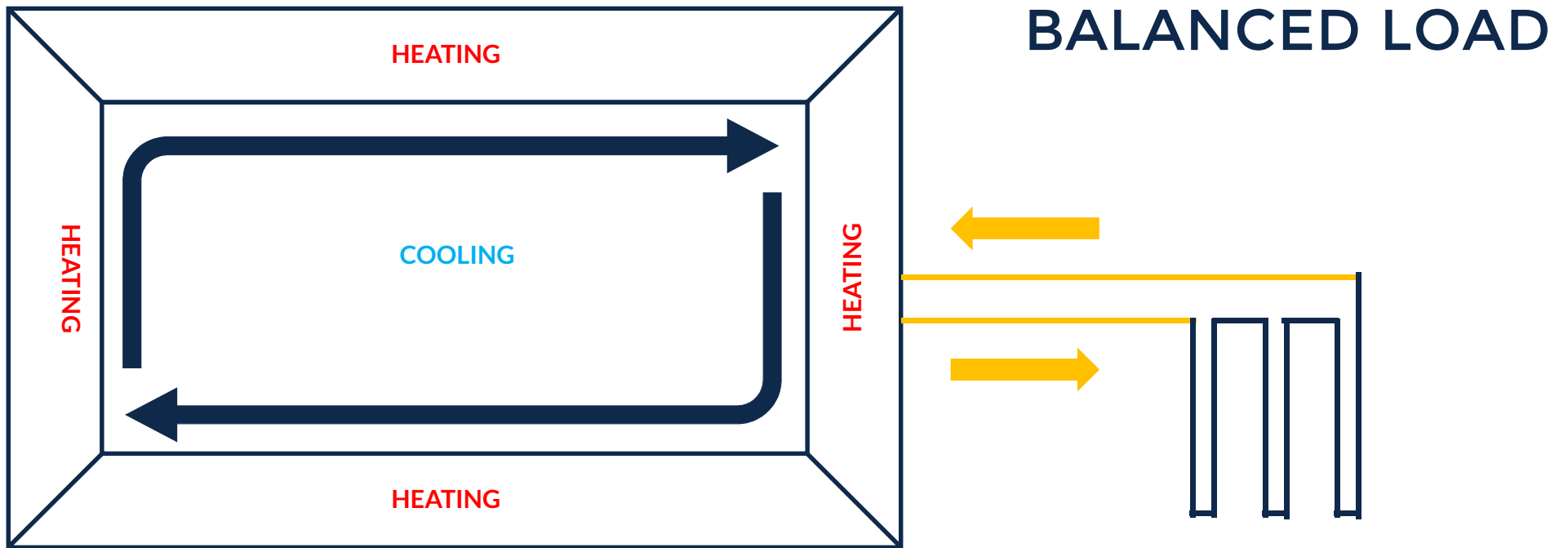


BYPASS ENERGY SAVINGS



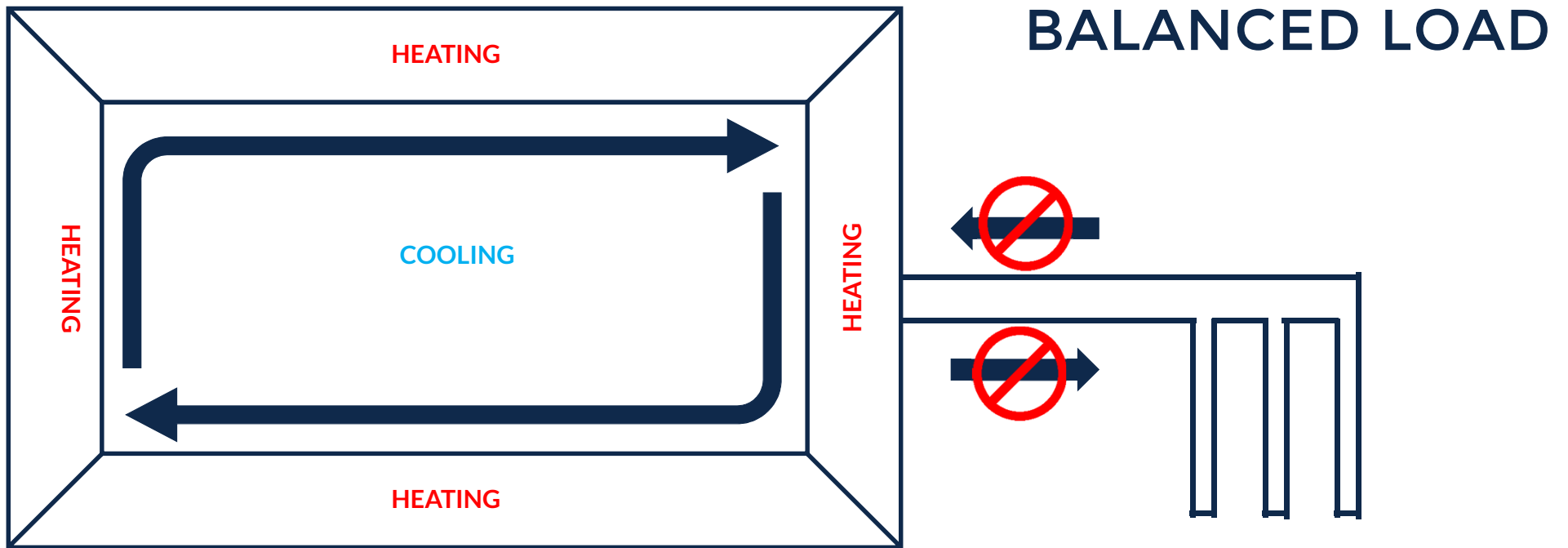


BYPASS ENERGY SAVINGS



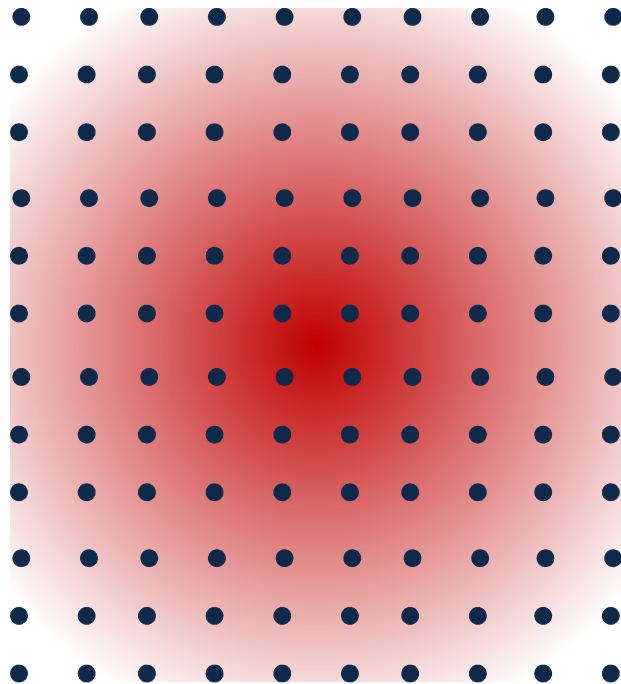


BYPASS ENERGY SAVINGS

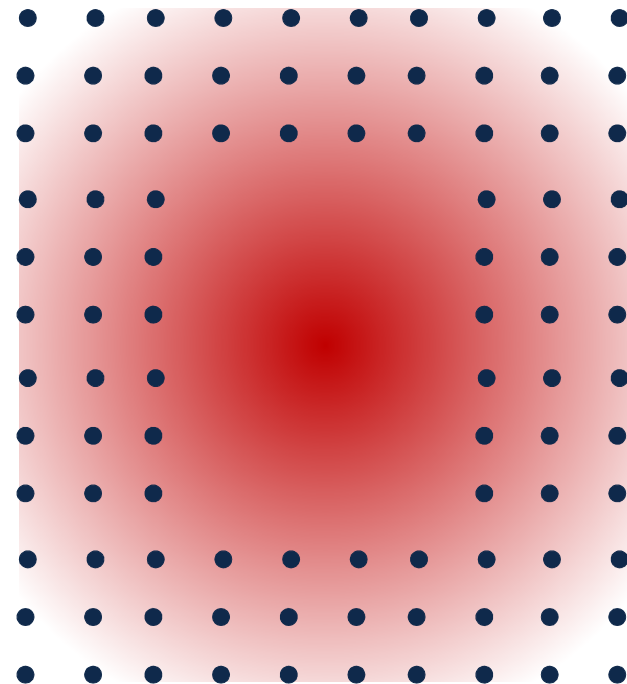


U.S. DOE – Small Business Innovation Research

Phase 1 Research: **18 -36%** GHX size reduction
Phase 2 Research: **TBD**



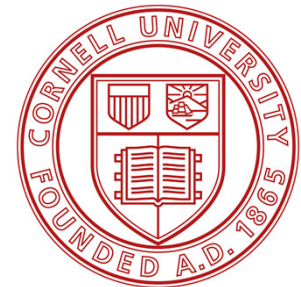
STANDARD DESIGN



NEW OPTIMAL LAYOUT

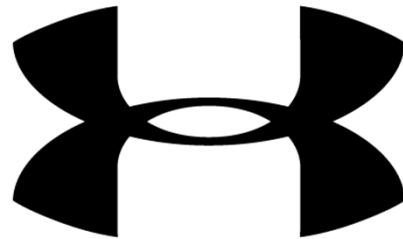
WHO IS DOING GEOTHERMAL?

Universities



WHO IS DOING GEOTHERMAL?

Large Corporations



UNDER ARMOUR



WHO IS DOING GEOTHERMAL?

Other Applications

- K-12 Schools
- Restaurants
- Government / Military Facilities
- Multifamily Housing
- Retail / Shopping Centers
- Hotels
- Corporate Offices

Summary:

- Geothermal will reduce your HVAC energy use by **25-50%**
- It is the most energy-efficient and sustainable HVAC system available today
 - Including VRF
- Innovation has/is driving the cost of geothermal down
- Creative financing solutions are making geothermal affordable
- Geothermal is now being adopted by fortune 500 companies across the U.S.

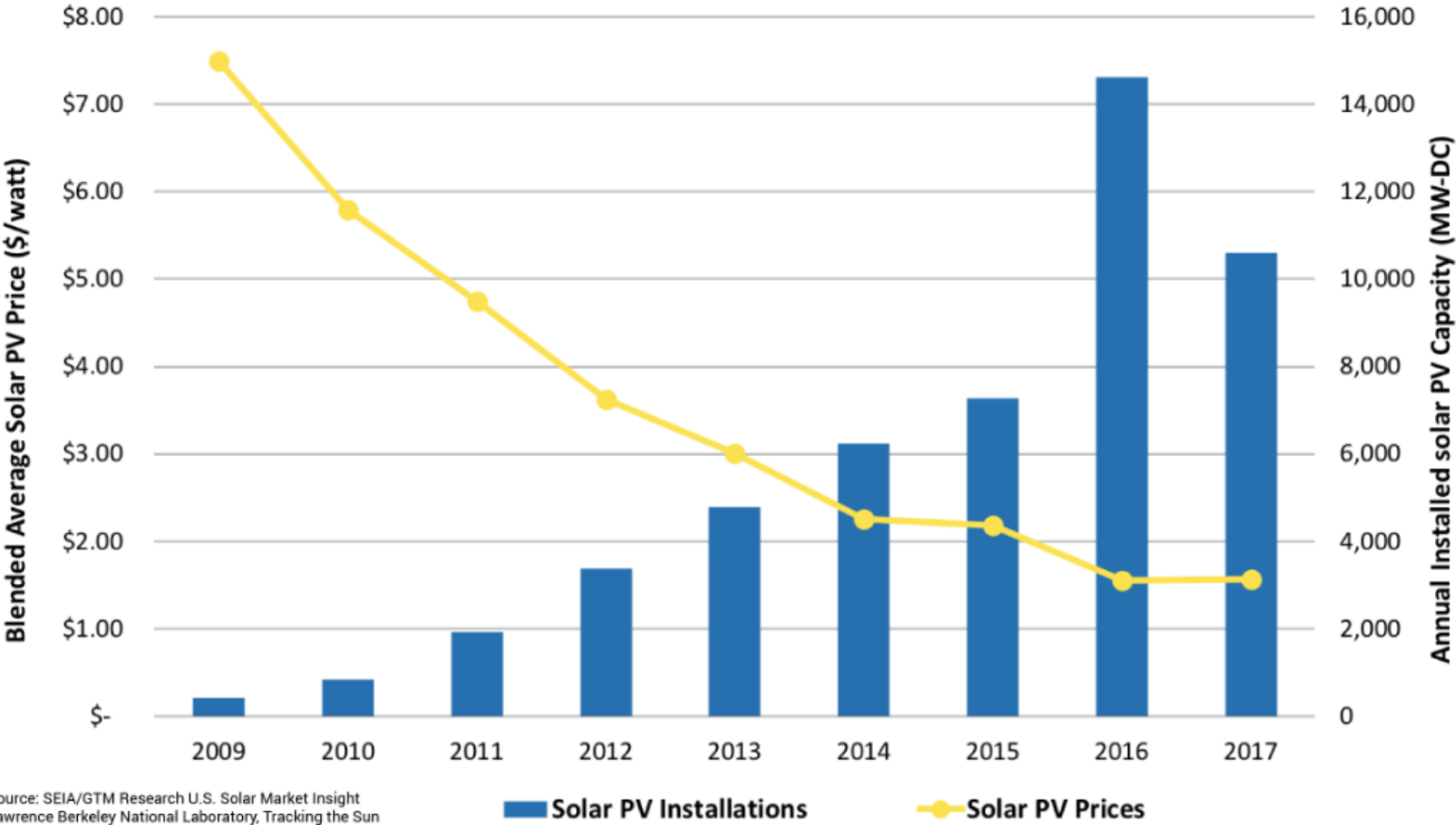
IS GEOTHERMAL RIGHT FOR YOU?

THINGS TO CONSIDER

- Does you need an HVAC system?
- Do you want to have both heating and A/C?
- Do you have available land space for the GHX?
- Do you want to save energy, reduce maintenance cost, hedge against future energy price increase, and become more sustainable?



Electrification: Getting to Net-Zero Energy





Questions?