



**NY - GEO 2026**  
March 24-25, 2026 | Brooklyn, NY



# **Data Centers:**

## ***Can Geothermal Reduce Grid & Water Use?***

**Moderator:** Dmitry Kuravskiy / *GeoStellar Engineering*

**Panel:** Brian Urlaub / *Salas O'Brien*

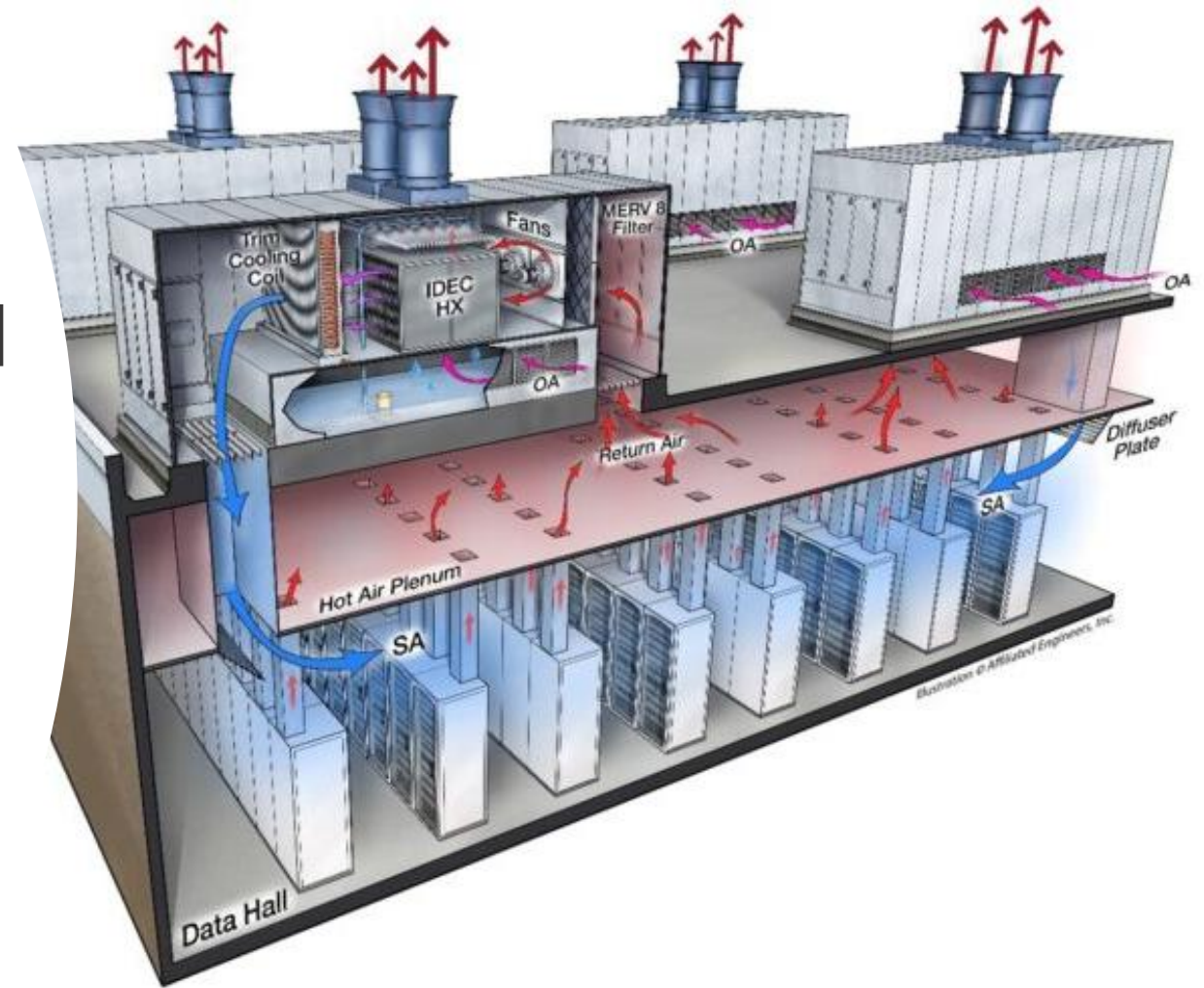
Daniel Audette / *Wendel*

Saranya Anbarasu / *Jacobs*

Michael Albertson / *SHARC Energy*

# Data Centers & Geothermal

- Is this a possibility?



PRESENTED BY:

Brian Urlaub

Principal

Brian.Urlaub@salasobrien.com

# Data Center Developer Drivers:

- How fast can they get through permitting and connection to electric provider.
- Cooling utility costs are not a concern. The standard rule is 70/30 – whatever they are going to be provided in electric peak demand (1MW for instance) 70% would be for computing power and 30% is for cooling systems. A 5% decrease in cooling can be added to computing is a large net revenue stream.
- The cooling reduction is only needed on peak or demand periods. This is what can allow for additional computing.

# Data Center Market Changes

- Evaporative Cooling is very minimal now across the industry due to permitting and push back from environmental agencies.
- Most developers are moving from air cooling to water cooled computer racks. This allows for more CPU's per rack which increases cooling density and amount of CPU's per SF of centers.
- Major chip manufacturer is pushing industry to move from 30°C to 45°C on the cooling water supply to chips which would allow for more efficient systems, less cooling load vs. computing load per center. Data center developers are reluctant yet to move on this.

# Can Geothermal be a Solution

- Data Centers are 24/7/365 cooling loads
- Closed loop GLHE's cannot handle 100% heat rejection for the entire year without being grossly oversized for future temperature build up. Strategies to either re-balance the bore field each year or use the ground as more of a peaking system to flatten peak loads could decrease total cooling peaks demands.
- DOE & National Labs have working group to try and use the ground as a Cold Thermal Storage system for either seasonal or diurnal asset.

# Brian Urlaub

Brian.Urlaub@salasobrien.com

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**Thank You for your Participation!**





# DATA CENTERS

**How Can Geothermal Counteract Grid & Water Use Impacts?**

*Data Centers and Campus Geothermal*

# About Wendel

**85** year-old

architecture, engineering, energy efficiency and construction management firm



**4**

Main practice areas



**350+**

Employees, nationwide.



**15**

Offices Nationwide

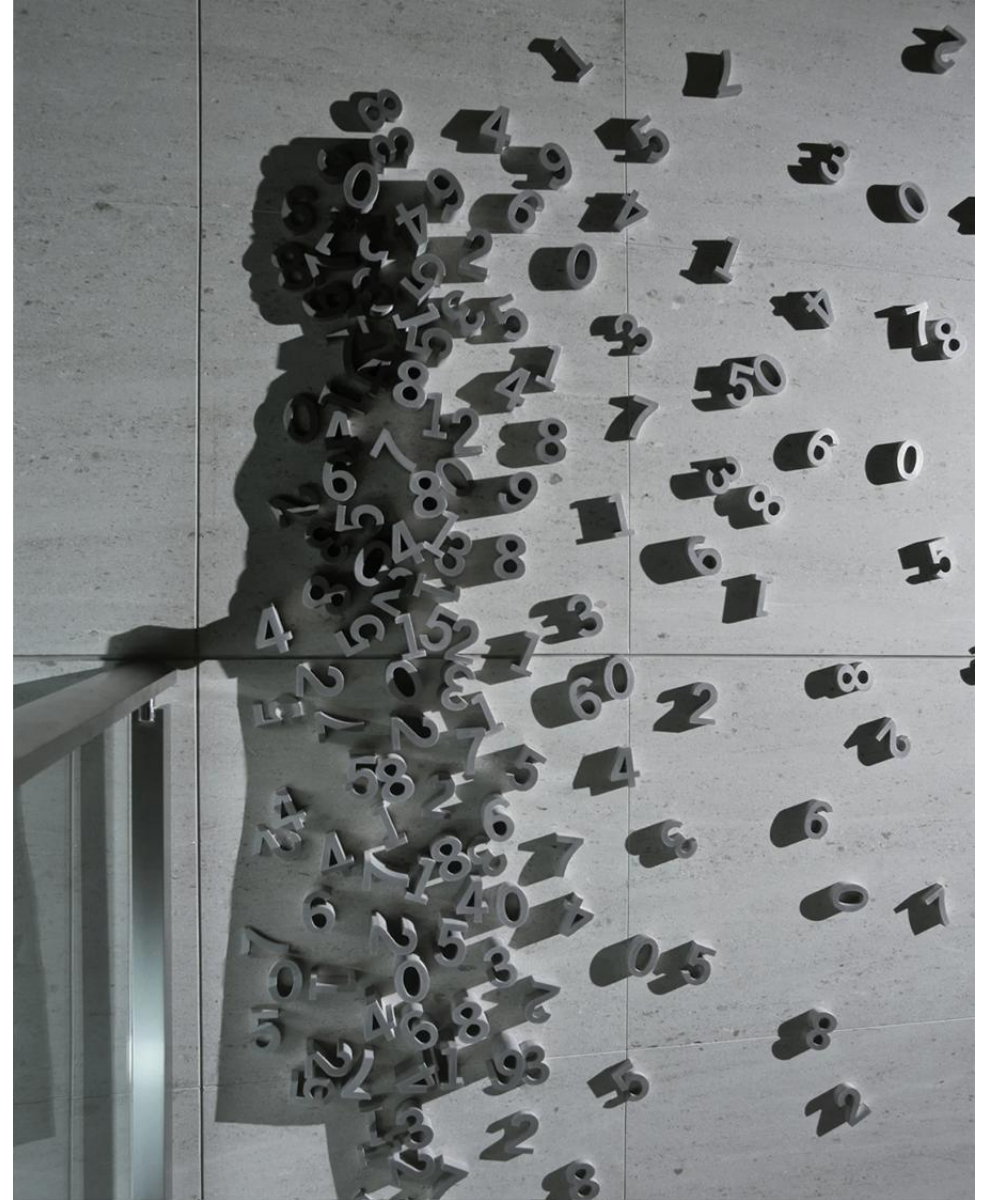


# PERSPECTIVE

Data centers are energy hogs and will hinder our goals of decarbonization.



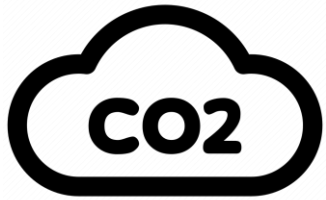
Data centers will be a thermal energy source to get away from fossil fuels.





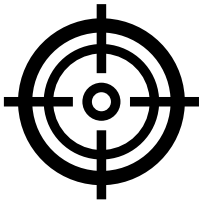
**197** Buildings

**13M** GSF



**38,220** MTDCE

Scope 1&2



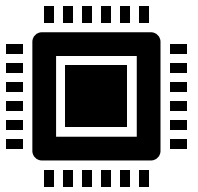
**Goal**

Electrification of Heating System





**6** New Buildings



**10** MW New Data Center

# UB NORTH CAMPUS

Computing Center

Cooke & Hochstetter Halls

Interdisciplinary Research & AI & Society

Agrusa Hall

10 MW Data Center

Lockwood Memorial Library

- Existing Buildings
- Large Scale Capital Renovations
- New Construction

Computing Center

Cooke & Hochstetter Halls

Interdisciplinary Research & AI & Society

Agrusa Hall

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- New Construction

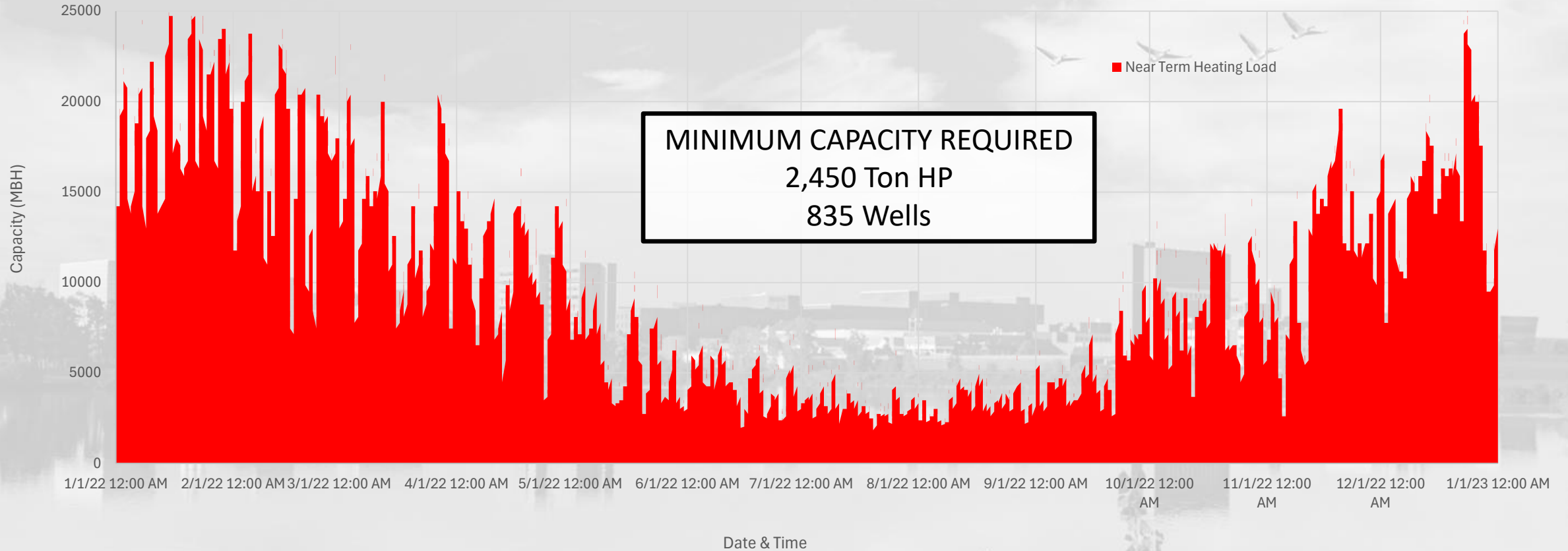
# \$35Million

The estimate cost of independent geothermal wellfields to only services these buildings

10 MW Data Center

Lockwood Memorial Library

## Near Term Heating Capacity (MBH)



### NEAR TERM CAMPUS PLANNING

AGRUSA HALL | New Construction, Heat Source Required

AI & SOCIETY BUILDING | New Construction, Heat Source Required

LOCKWOOD LIBRARY | Renovation / Addition, Heat Source Required

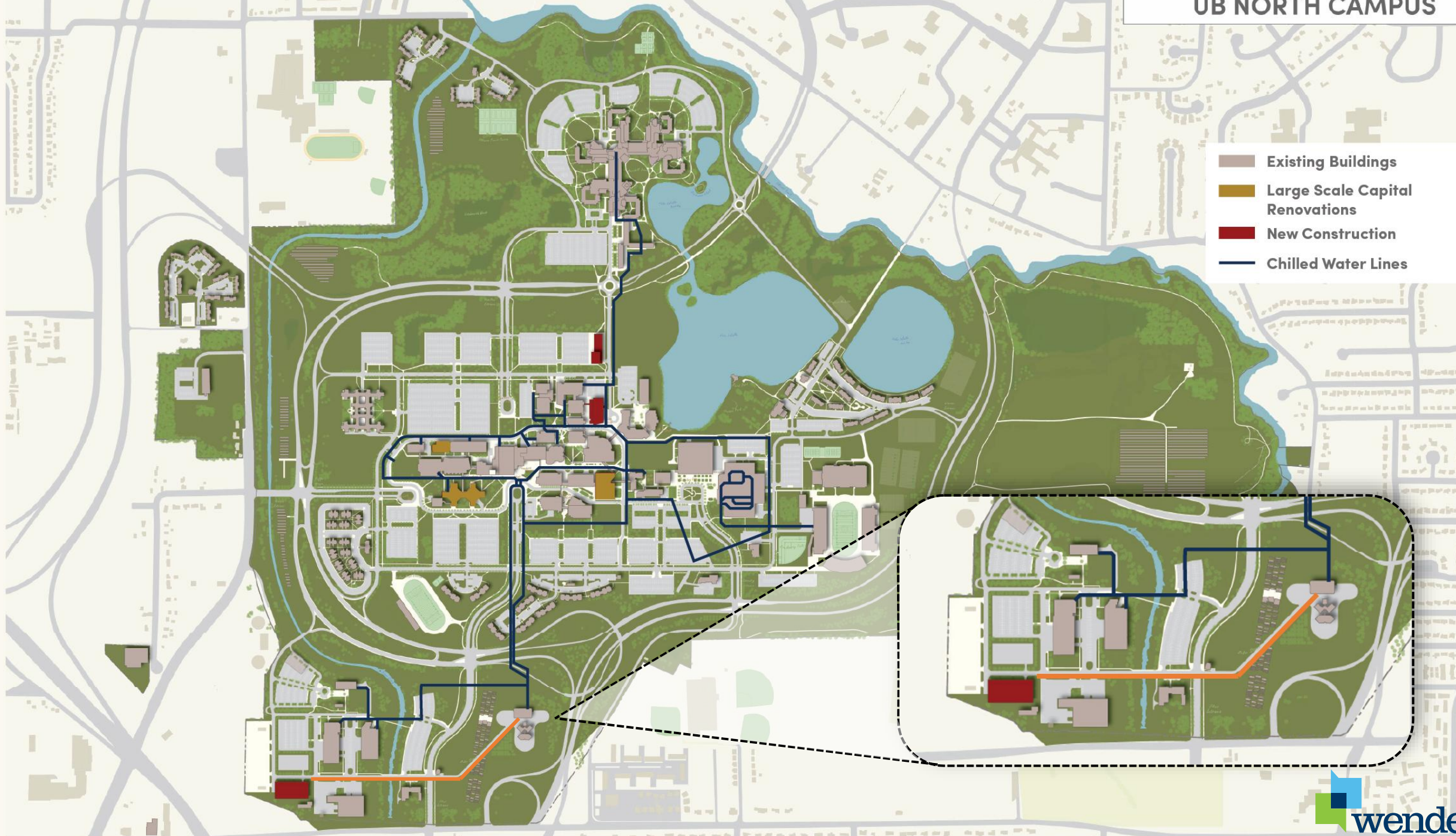
COOKE HALL | Renovation, Heat Source Required

HOCHSTETTER HALL | Renovation, Heat Source Required

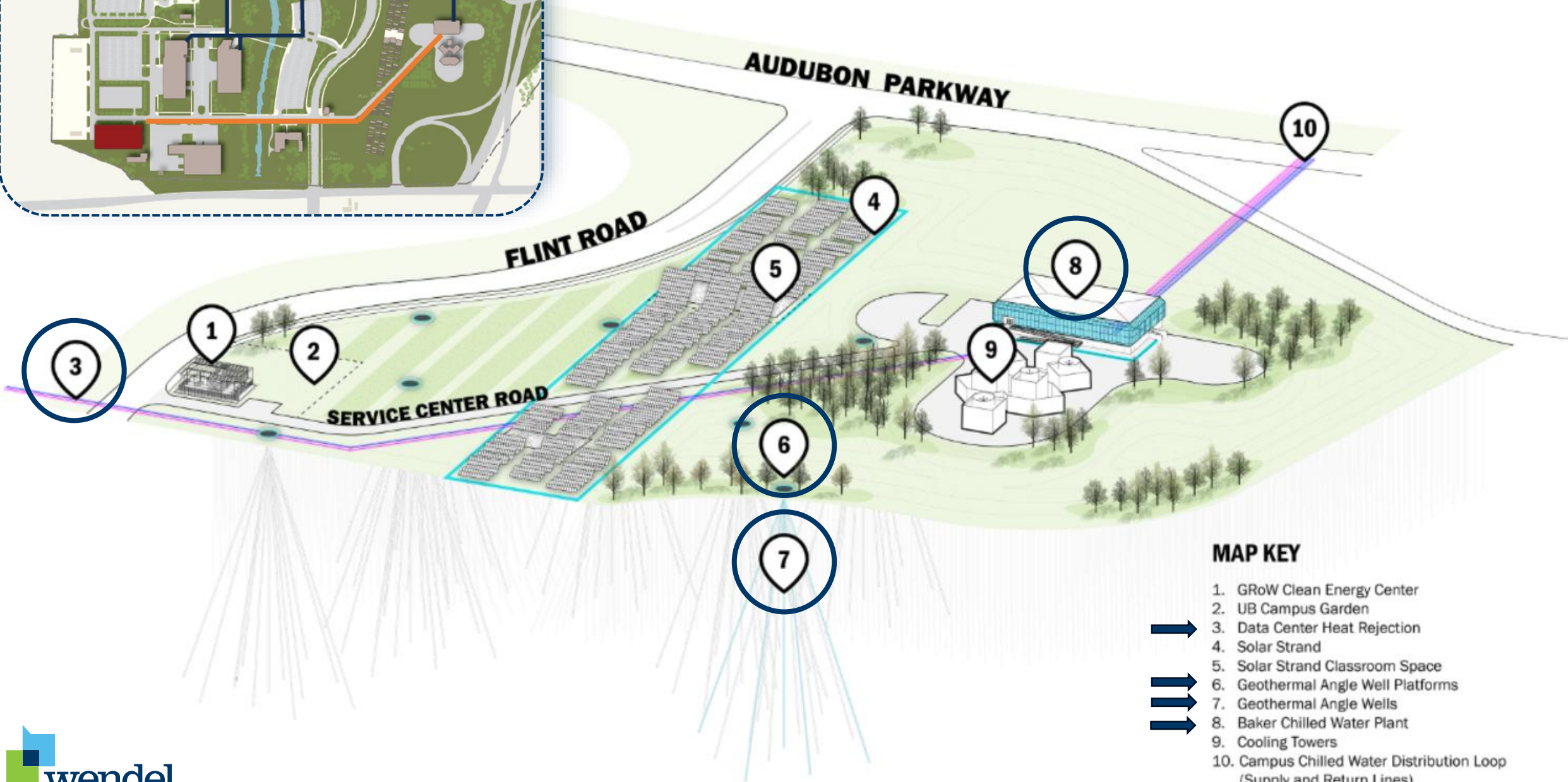
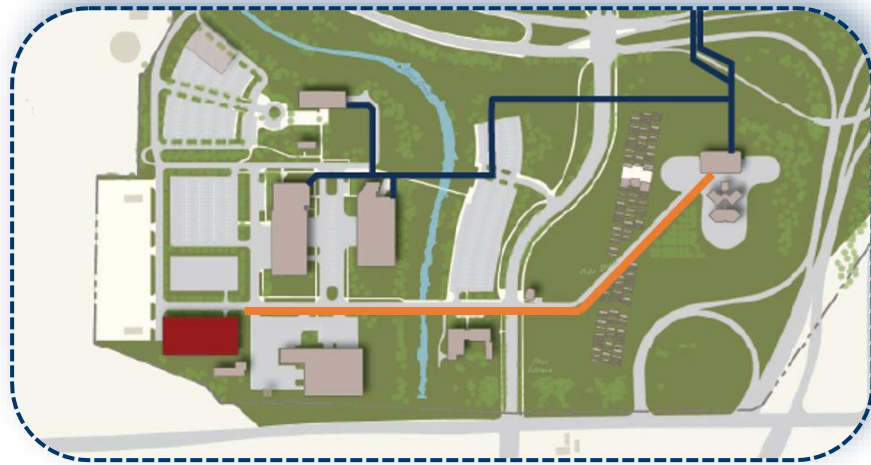
TEACHING CENTER | Renovation, Heat Source Required

# UB NORTH CAMPUS

- Existing Buildings
- Large Scale Capital Renovations
- New Construction
- Chilled Water Lines



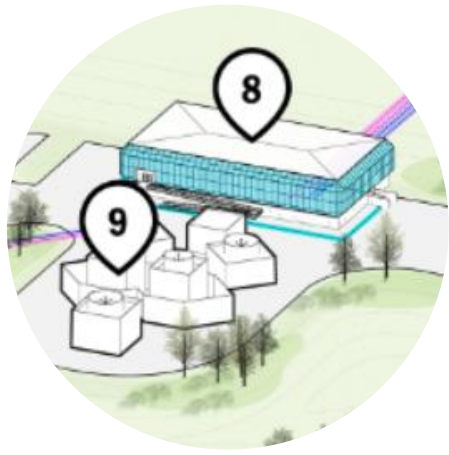
# BAKER PHASE 1 PROJECT



## MAP KEY

- 1. GRoW Clean Energy Center
- 2. UB Campus Garden
- 3. Data Center Heat Rejection
- 4. Solar Strand
- 5. Solar Strand Classroom Space
- 6. Geothermal Angle Well Platforms
- 7. Geothermal Angle Wells
- 8. Baker Chilled Water Plant
- 9. Cooling Towers
- 10. Campus Chilled Water Distribution Loop (Supply and Return Lines)





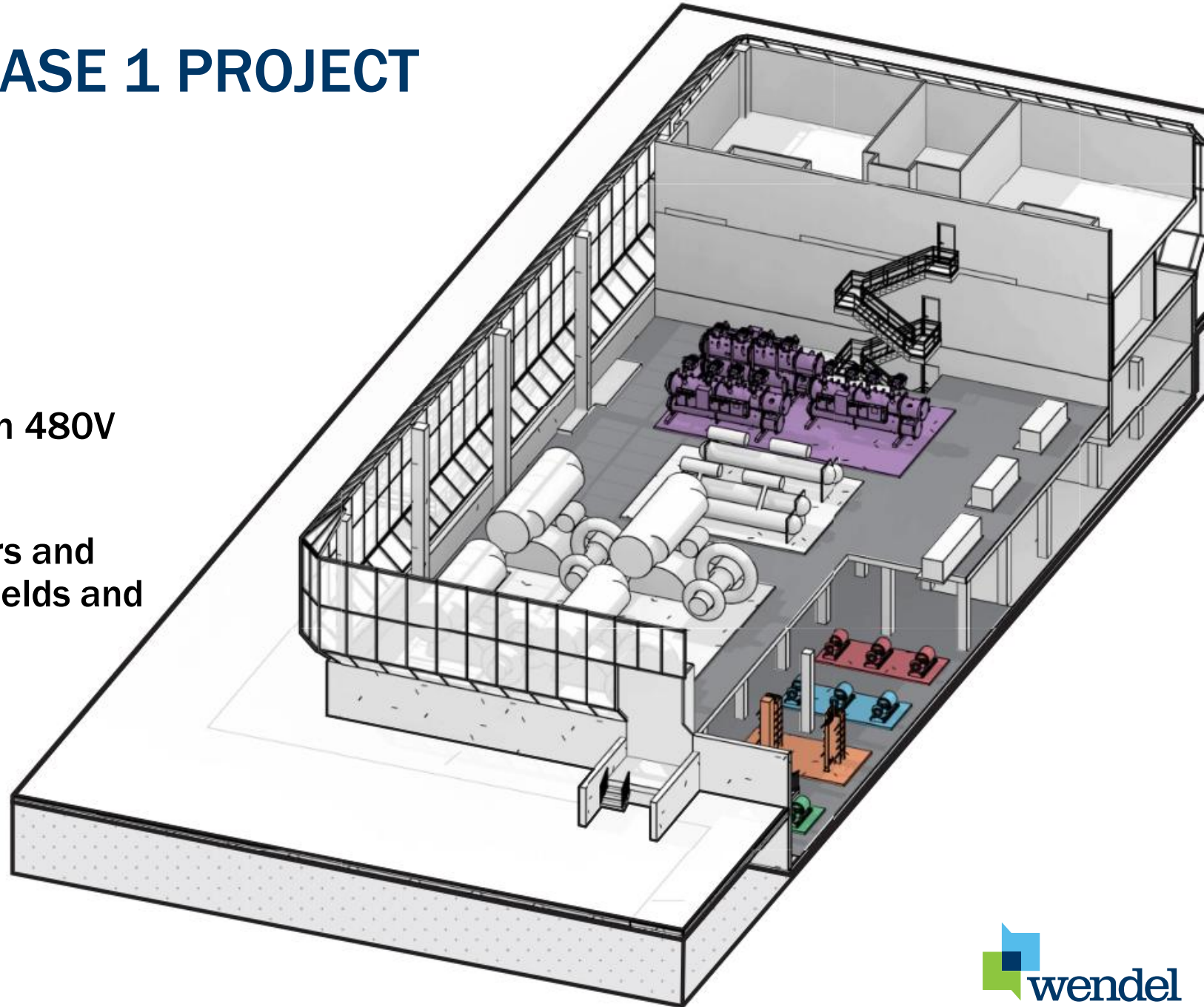
# BAKER PHASE 1 PROJECT

**Heat Pumps:** Add new heat pumps

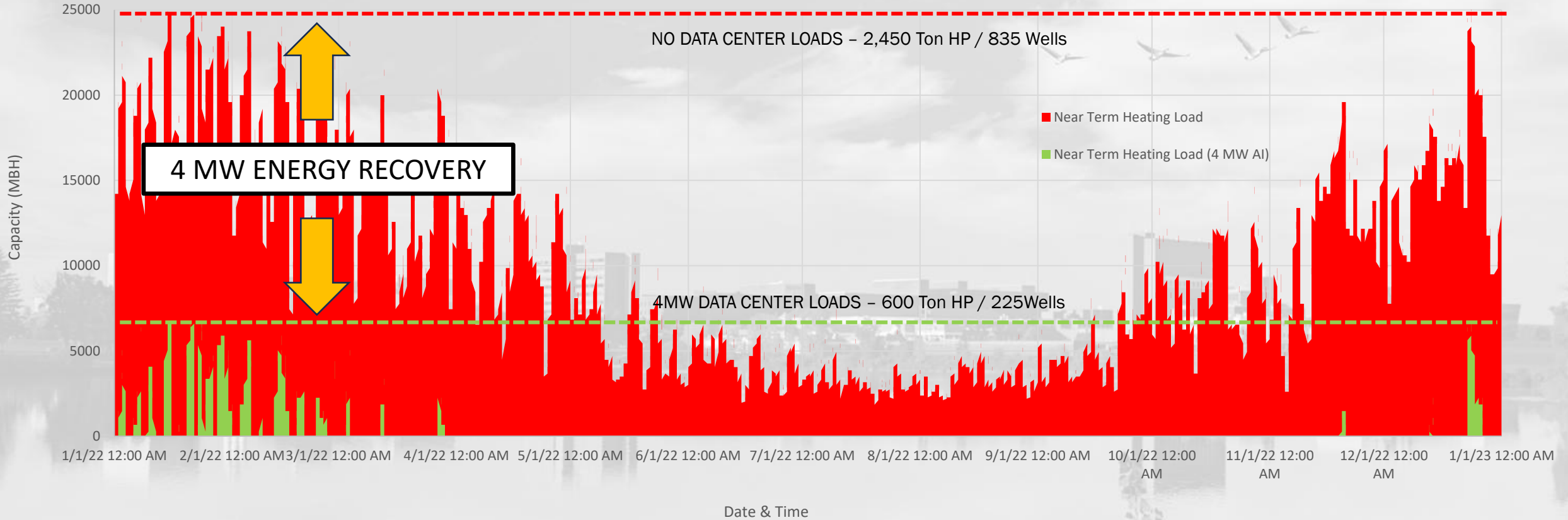
**Electrical:** Retrofit existing service with 480V

**Pumps:** Add three new pump sets

**Heat Exchangers:** Add heat exchangers and piping to connect to geothermal wellfields and Data Center.



## Near Term Heating Capacity (MBH)



### NEAR TERM CAMPUS PLANNING

AGRUSA HALL | New Construction, Heat Source Required

AI & SOCIETY BUILDING | New Construction, Heat Source Required

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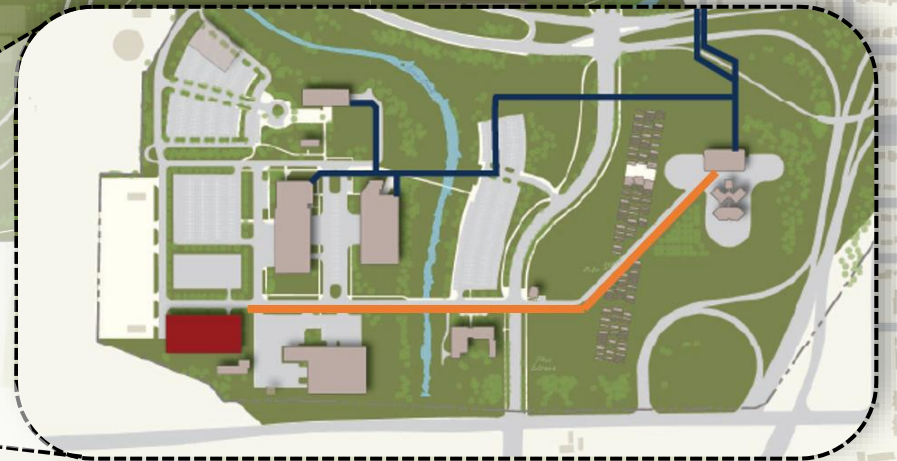
HOCHSTETTER HALL | Renovation, Heat Source Required

TEACHING CENTER | Renovation, Heat Source Required

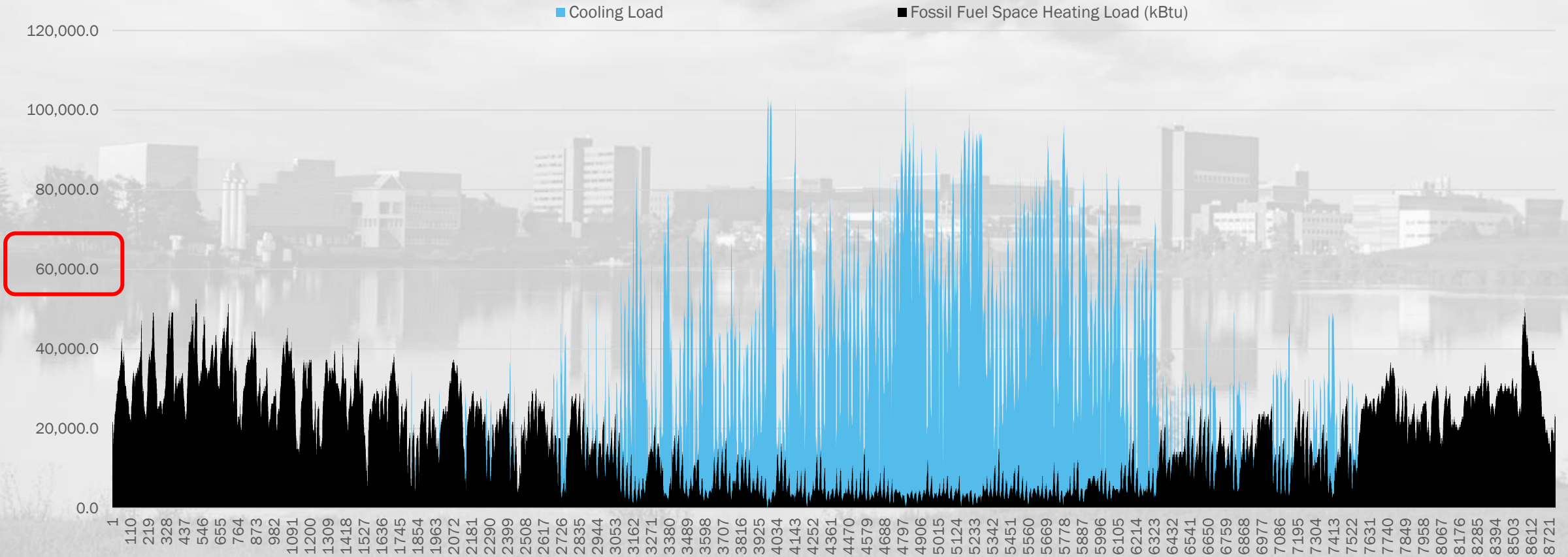
- Existing Buildings
- Large Scale Capital Renovations
- New Construction
- Chilled Water Lines

**\$22Million**

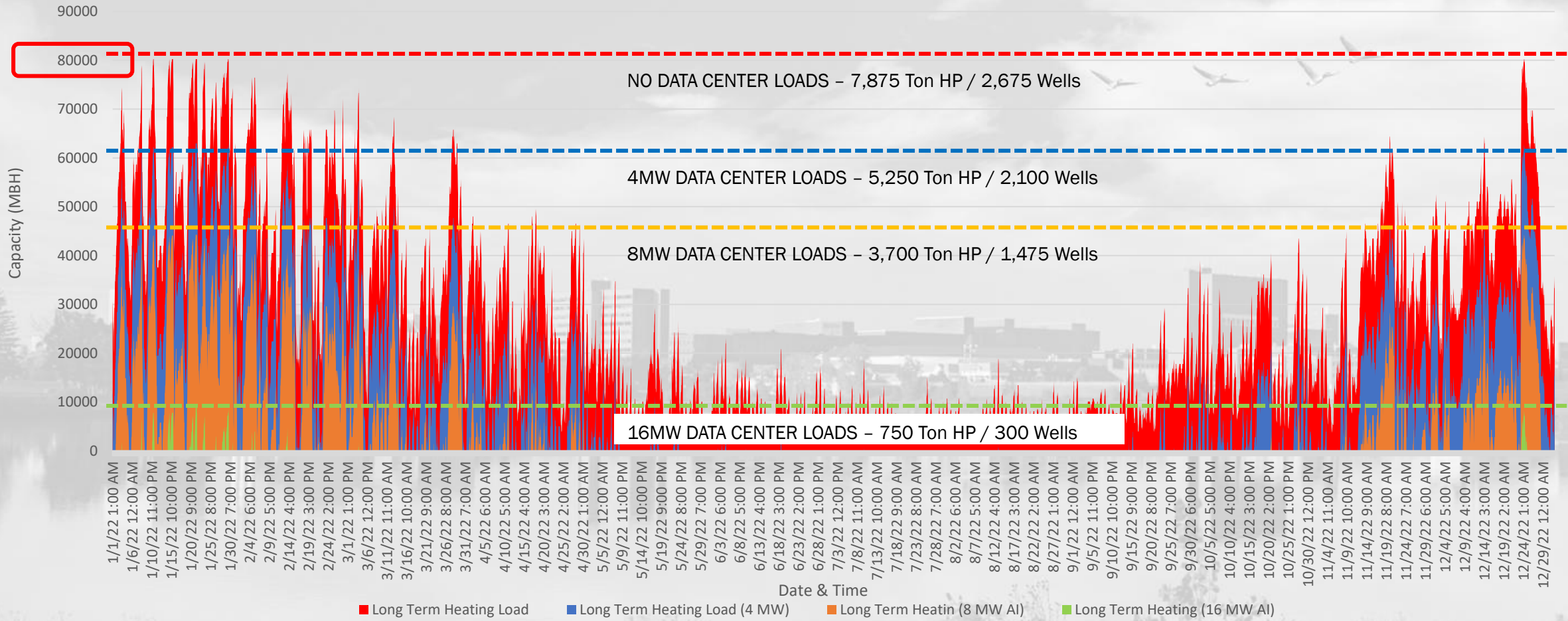
The estimate cost of heat recovery interconnection



# Campus Heating & Cooling Loads



# Long Term Heating Capacity (MBH)



An aerial photograph of a university campus. In the foreground, a geothermal drilling rig is positioned on a grassy field, with a white truck and a red truck nearby. Several workers in safety gear are visible near the rig. To the left, there are rows of solar panels. In the background, a large, multi-story brick university building is visible, along with other campus buildings and green spaces under a clear blue sky.

**THE USE OF DATA CENTER  
HEAT RECOVERY WILL  
REDUCE THE NUMBER OF  
REQUIRED GEOTHERMAL  
WELLS BY 89%**

# CONCLUSION

~~“Let's build a datacenter to replace our boilers.”~~



“Data centers can make a geothermal campus more feasible.”

# Unlocking the Geothermal Advantage for Data Centers

Saranya Anbarasu, PhD  
Geothermal and District Energy Engineer,  
Energy & Power, Jacobs

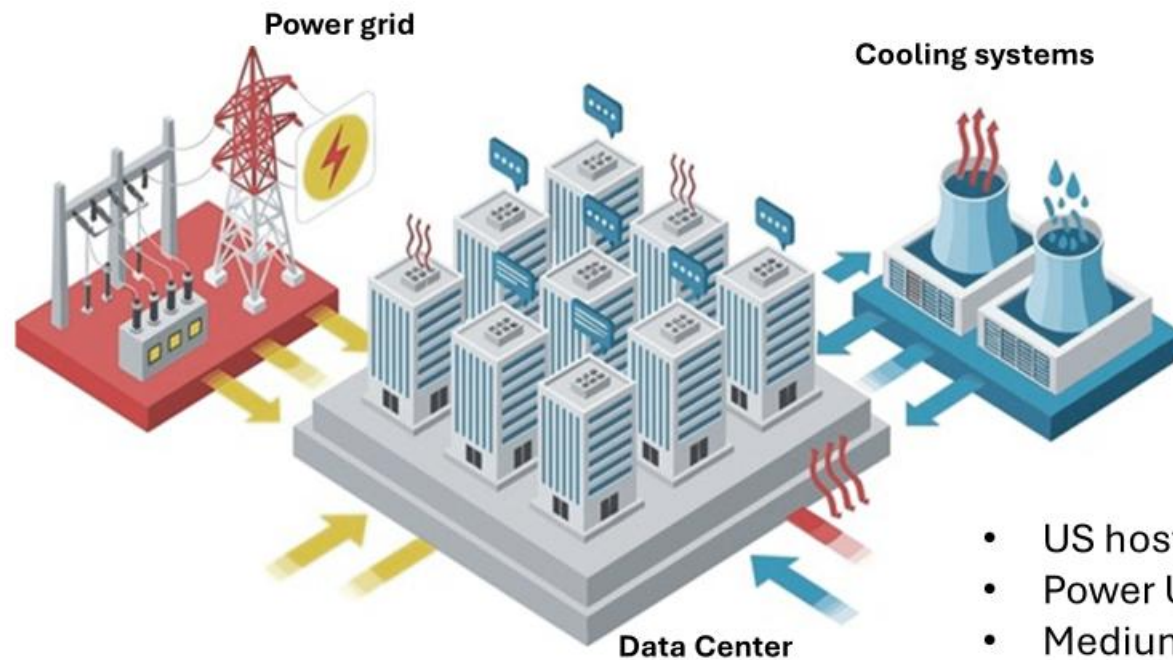


## Delivering sustainable, reliable data center solutions

Largest Data Center Design Firm

5 GW of data center space delivered

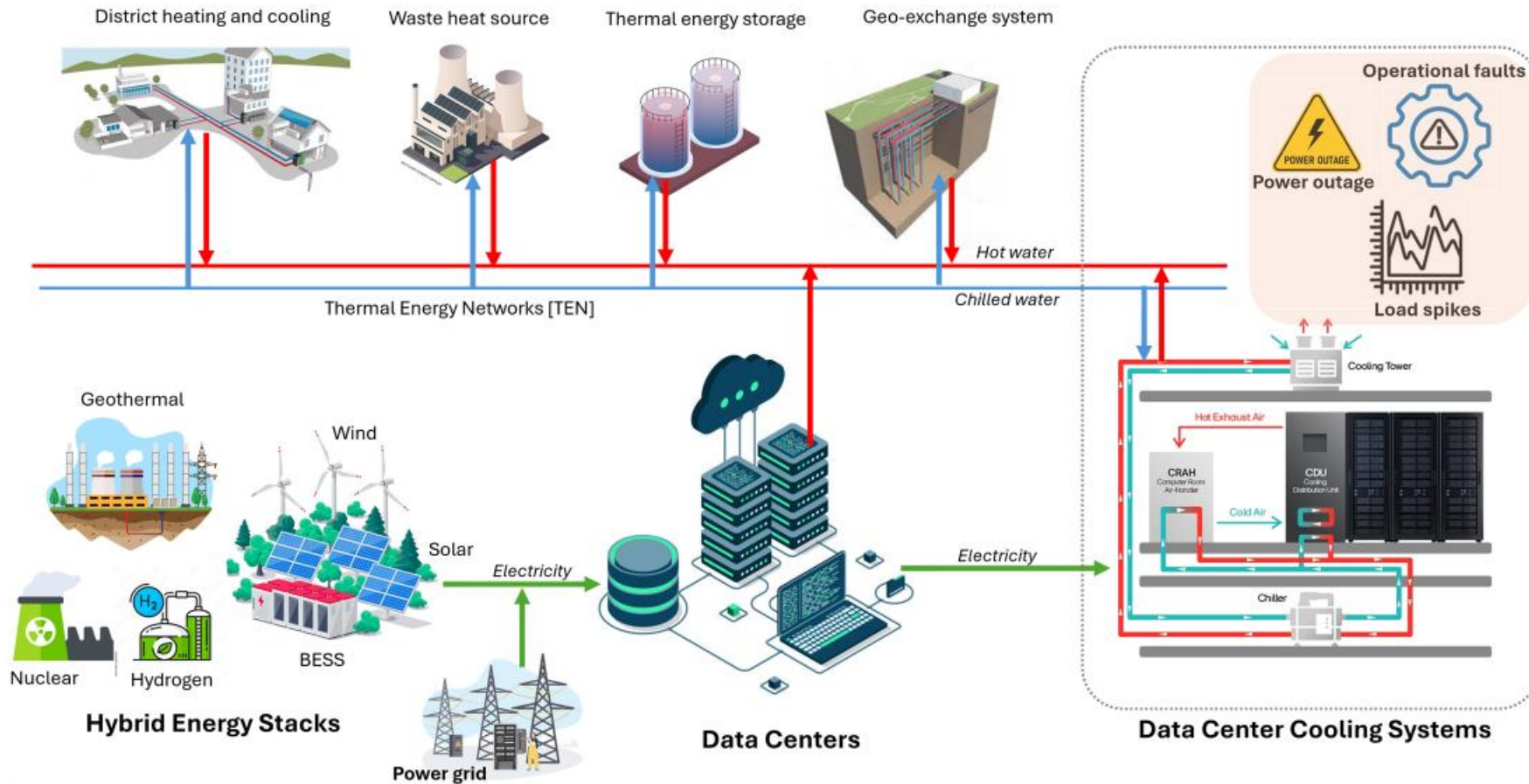
Collaborating with Nvidia Omniverse Digital twins



- US hosts >2,500 data centers consuming >200 TWh electricity
- Power Usage Effectiveness (PUE) : 2.7 to 1.5
- Medium-sized data centers withdraw 110 million gallons water annually (~1000 houses)

**Jacobs**

# Re-thinking Data Center Energy Systems - INTEGRATION



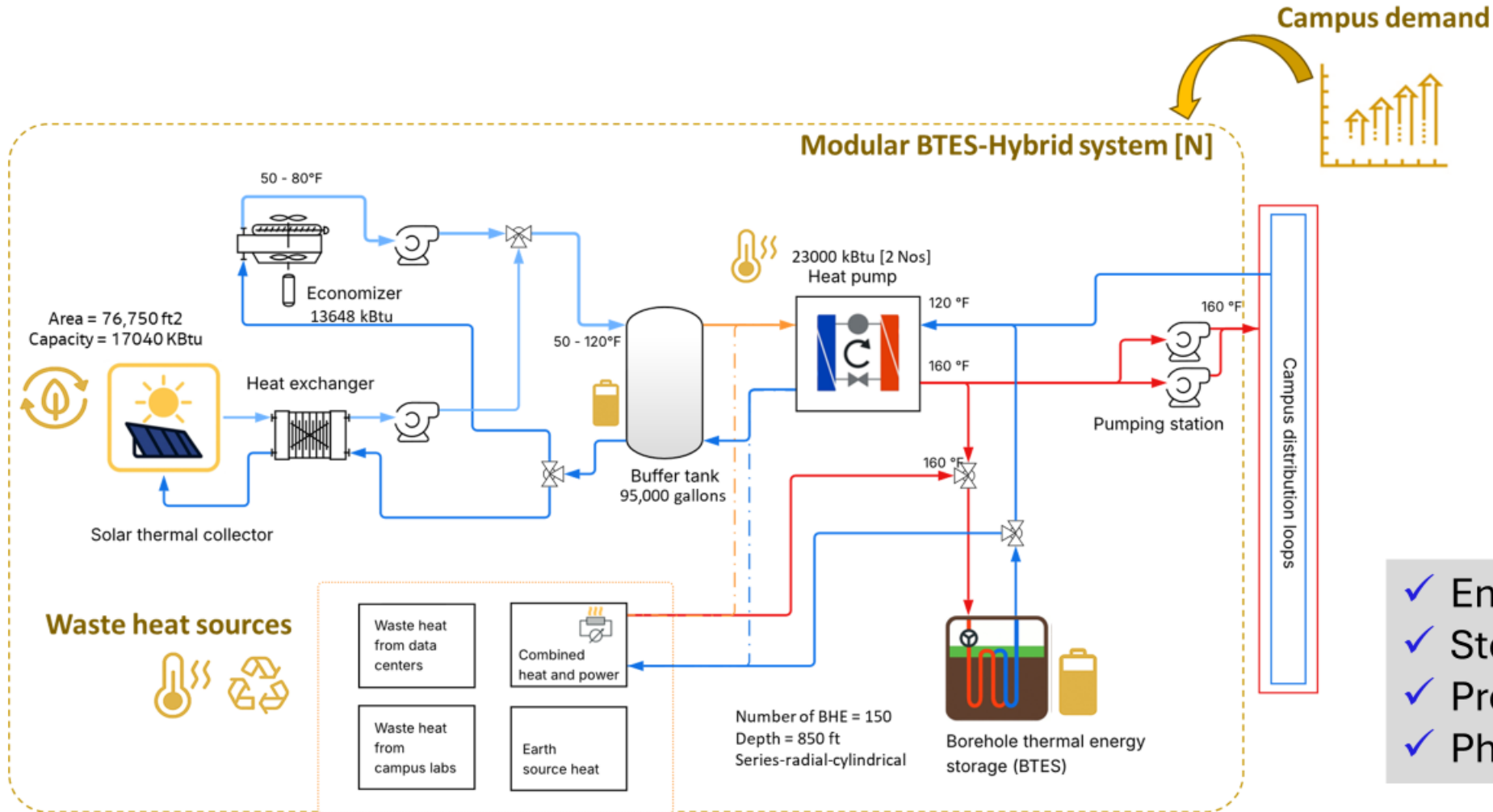
- ✓ Design approaches
- ✓ Modeling and simulation tools
- ✓ Digital twins – Omniverse
- ✓ Techno-Economic-Environmental

System of Systems

Jacobs

# Hybrid Energy System - Cornell University

Imbalanced heating and cooling demand



- ✓ Energy Conservation
- ✓ Storage and reuse
- ✓ Production configurations
- ✓ Phased Implementation

# Seasonal Thermal Banking- Cornell University

Imbalanced heating and cooling demand

**BTES**

62% seasonal recovery

Adapted from: Underground Energy

9 Modules (150 BHE/Module)

CapEx	71%	<b>COP</b> <b>3.67</b>
OpEx	-45%	
LCCA	-9%	

**GSHP**

Source: Earth Energy Designer

3700 BHEs

CapEx	89%	<b>COP</b> <b>6.29</b>
OpEx	-33%	
LCCA	-10%	

**BTES + GSHP**

6 Modules + 600 BHEs [1500]

CapEx	42%	<b>COP</b> <b>4.43</b>
OpEx	-33%	
LCCA	-15%	

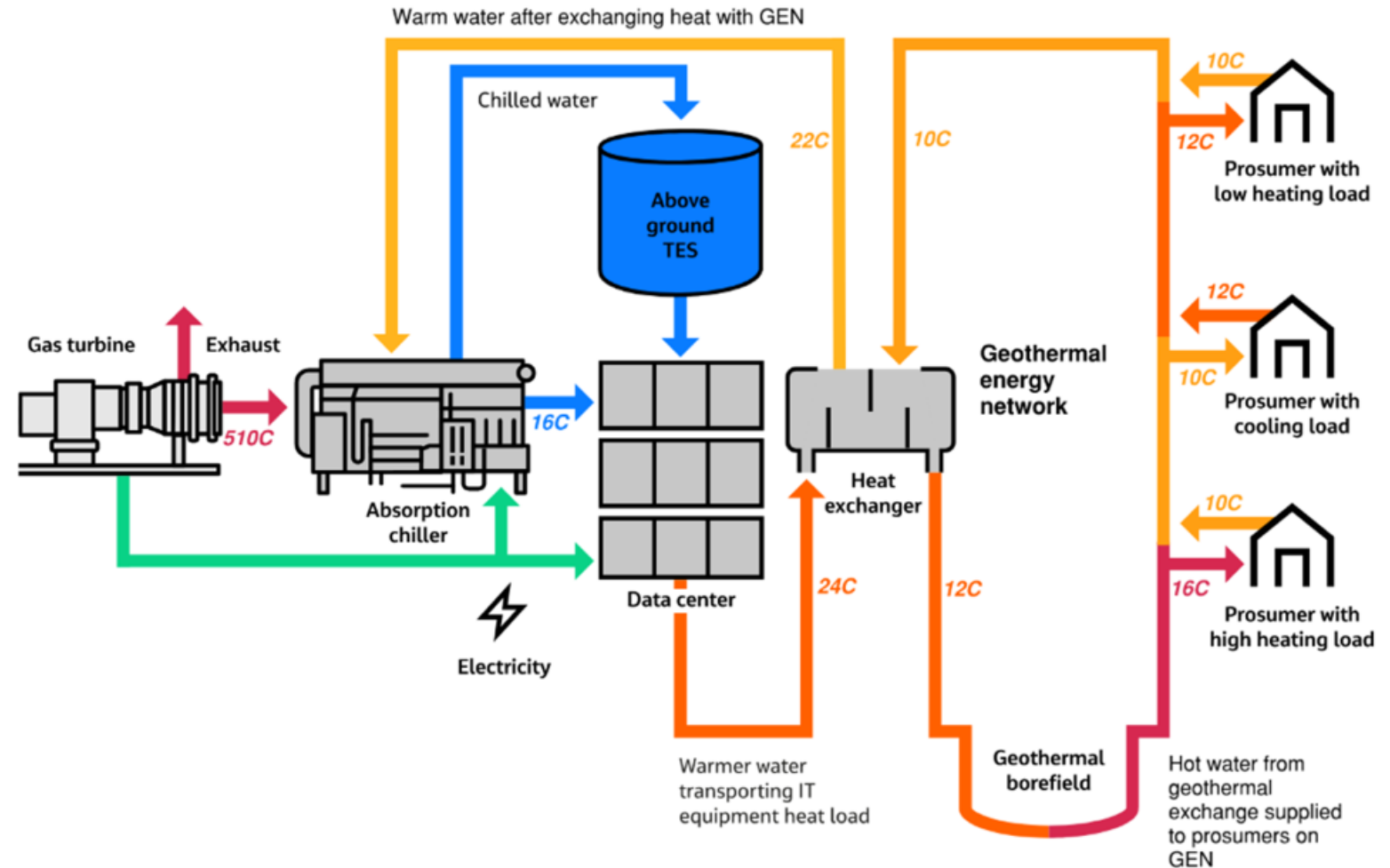
# Utilizing Low-Temperature Geothermal Resources

Binary power

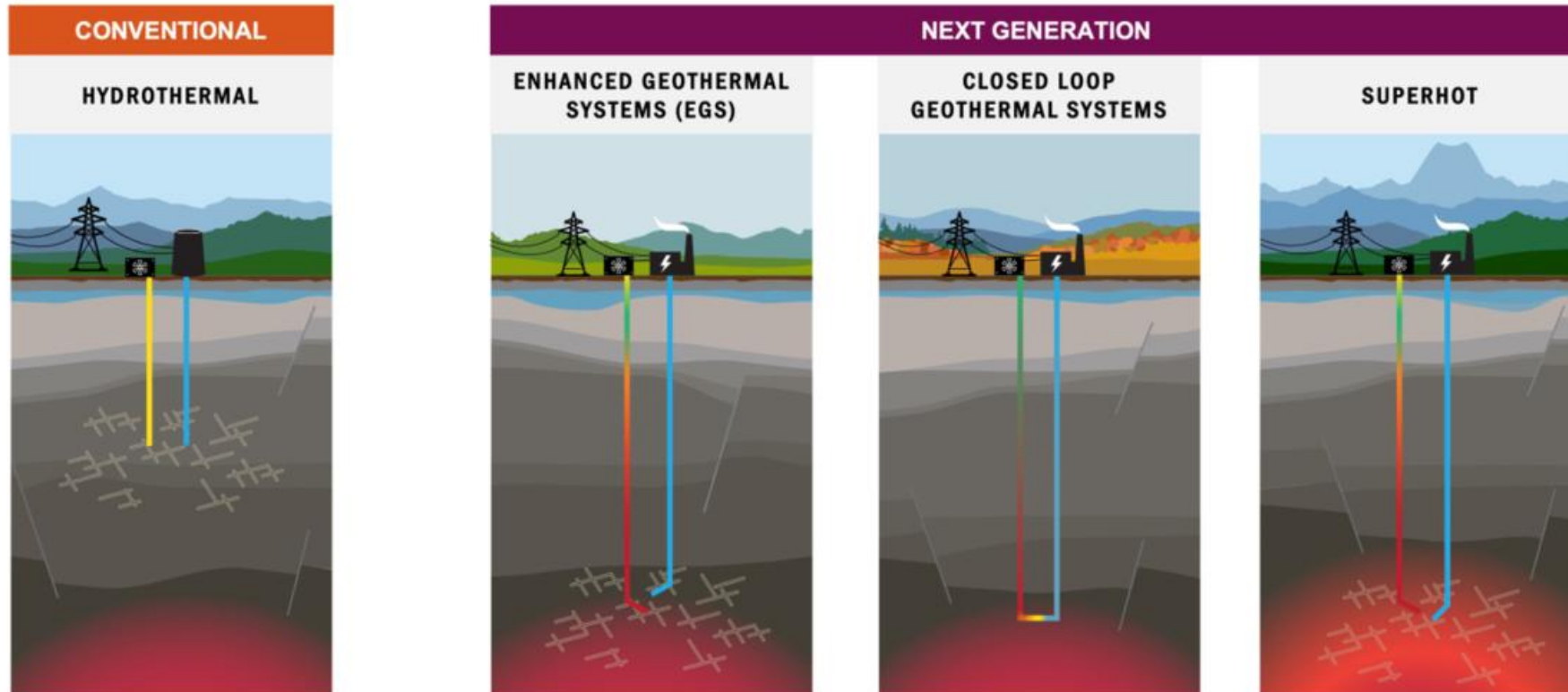
Absorption Cooling

Geo-exchange  
Cooling

Topping-Augmented  
Waste Heat  
Bottoming Cycles



# Enhanced Geothermal System (EGS) Power for AI Data Centers

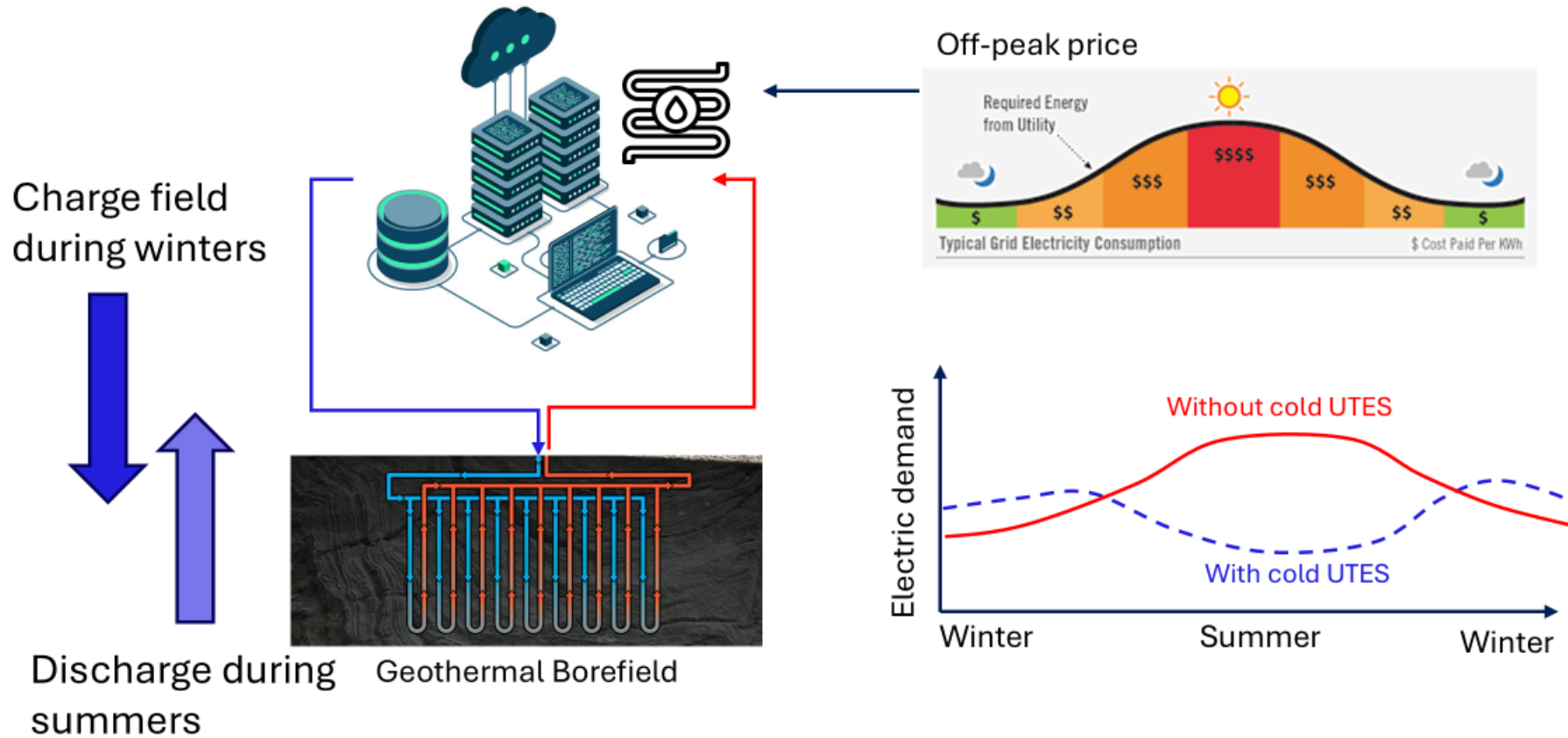


Source: US Department of Energy

- ✓ Location Flexibility
- ✓ EGS Scalability
- ✓ Breakthrough Projects:  

- ✓ Clean Power Advantage

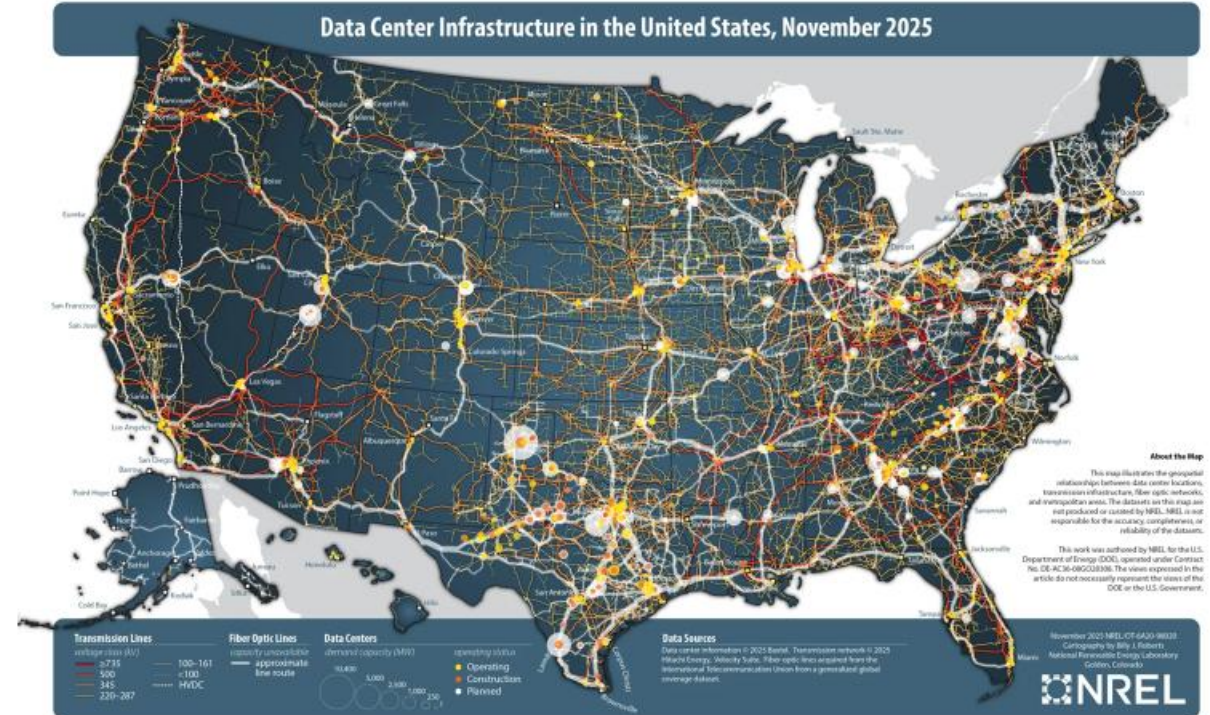
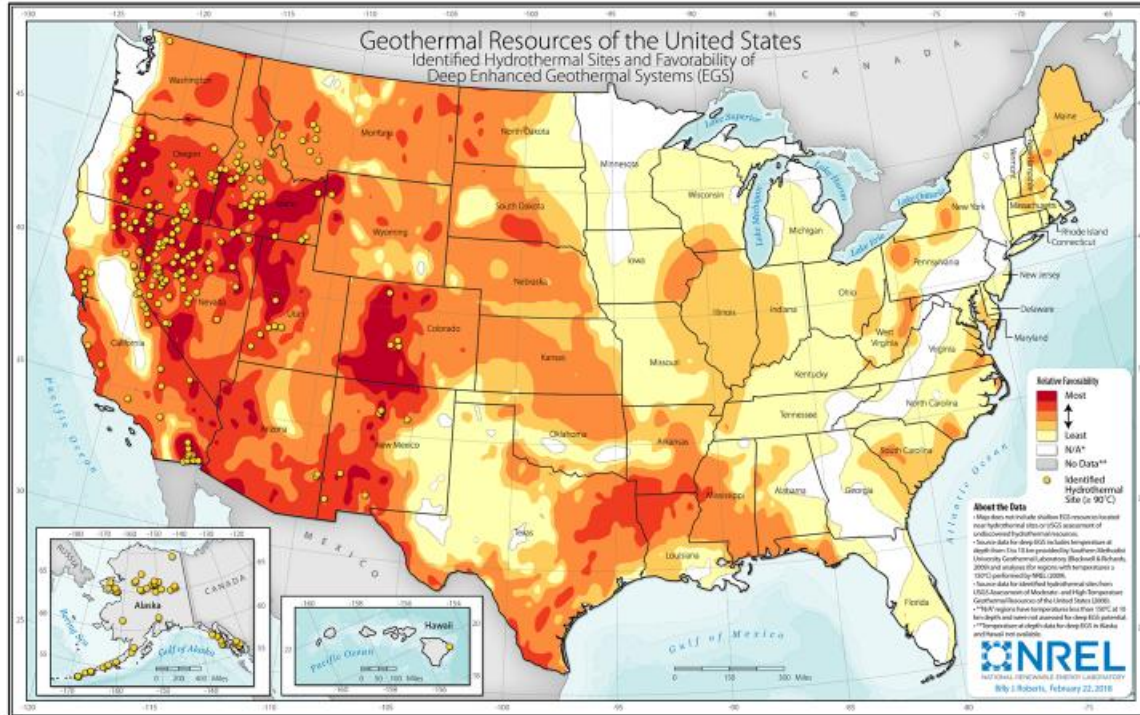
# Cold UTES for Load Shifting



Adapted from National Laboratory of the Rockies

- ✓ Optimization based on time of use prices
- ✓ Seasonal Charge/discharge
- ✓ Reduce strain on the grid

# Collocation opportunities for data centers



Source: National Laboratory of the Rockies

- ✓ Strong geographic overlap exists
- ✓ Reliable power and efficient cooling
- ✓ Geothermal cascade applications enable additional value streams

# Be in touch!

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Challenging today.  
Reinventing tomorrow.



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**Turn Your Wastewater Into Opportunity**



# Data Center-ATL-District Energy

## Project:

- Northern Climate
- 300 MW
- ~95 MW – Cooling Load
- Water-Cooled Server Racks

## Mission/Purpose:

- Workforce Development
- Community “Friendly”
- Efficiency / Sustainability
- Revenue Generation



# Data Center-ATL-District Energy

## Workforce Development

- Construction Trades
- ~75 Fulltime Employees

## Community “Friendly”

- Community Center
  - Pool / Pickle Ball
  - Learning/Activities Center
  - Interactive Energy Center / Conf. Rooms
  - Lake: Beach / Walking Trails
  - Garden / Greenhouse
- 
- Efficiency / Sustainability
  - Revenue Generation



# Wastewater Energy Transfer (WET) Market Applications

**PIRANHA**  
SERIES



**SHARC**  
SERIES



## Residential

## Commercial

## Industrial

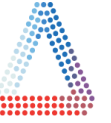
- Multi-Family Housing
- PIRANHA (35–350 Units)
- SHARC (350+ Units)
- Student Housing
- Senior Living
- Community Housing
- Corrections/Prisons

- Hospitals
- Micro-Breweries
- Hospitality
- Commercial Laundry
- University/College
- Corrections/Prisons
- **District Energy**
- **ATL's/TEN's**

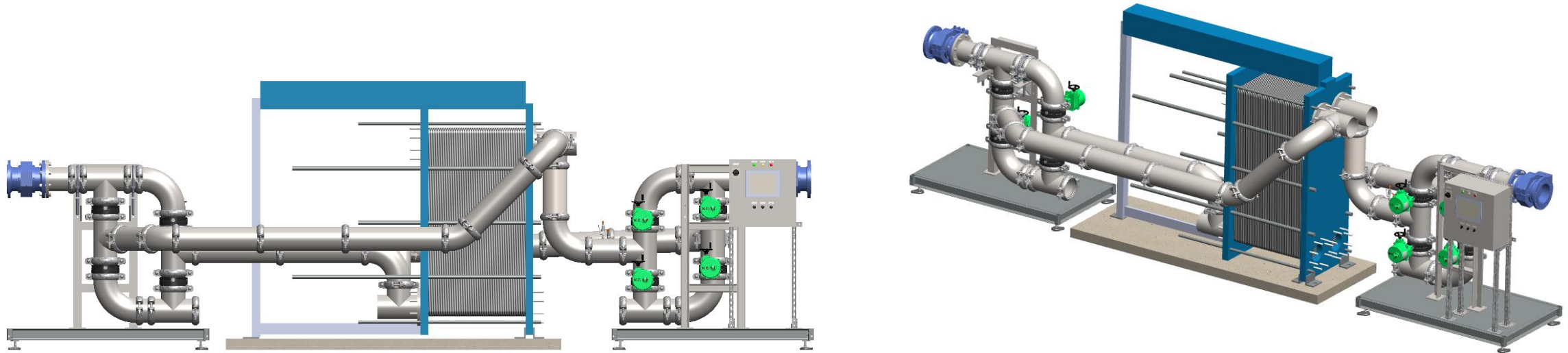
- Commercial Food Production
- Pulp and Paper
- Textiles
- Agriculture
- Aquaculture
- **District Energy**

- High capacity
- High volume filtration
- Uses custom heat exchanger
- **Small footprint**
- **No odor**
- **Passive Thermal Transfer**

- Wastewater-source heat pump
- Active energy recovery
- No filtering needed
- **Small footprint**
- **No odor**



## Thermal Energy Harvester - Backflush Only (BFO) SYSTEM



### The Why:

- No or Minimal Solids/Particulates
- No Macerator Needed
- High/Medium Temp Effluent Availability
- Don't Pay to Waste Available Energy
- Harvest and Transfer Thermal Energy

### Scale:

- Single Building
- Multiple Buildings
- Campus
- Municipalities
- ATL/TEN/District

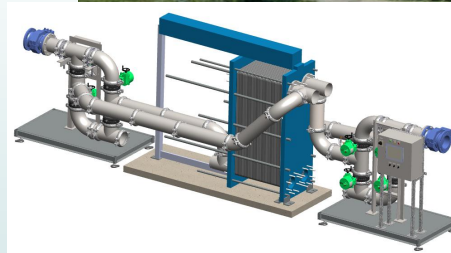
### Applications:

- Data Centers
- High/Medium Temp Geo Plants
- Industrial Process Heating/Cooling
- Wastewater Treatment Plant-Effluent Cooling
- Laundry: Commercial / Hospitality

# Data Center-ATL-District Energy

## Efficiency / Sustainability / Energy Flow

- **Reduction of RTU's:**
  - Peak Load
  - N+1 / Redundancy
- **Onsite Power Generation:**
  - Micro Turbine Plant
  - Water Cooled: Efficiency/Sound Reduction
- **Thermal Energy Harvest and Uses:**
  - ORCA Thermal Energy Transfer
  - Snow Melt
  - Pool Heating
  - Community Center
  - Lake with Fountains
  - Neighbors Hot Water Demand
  - Housing Development



**New Revenue Generation:**

**Owner/Partner – Thermal Energy Utility**

**Turn Your Wastewater into Opportunity.**



**Thank you!**

Michael Albertson

CEO/President-SHARC Energy

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[www.SHARCEnergy.com](http://www.SHARCEnergy.com)



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