



Cutting Carbon and Costs

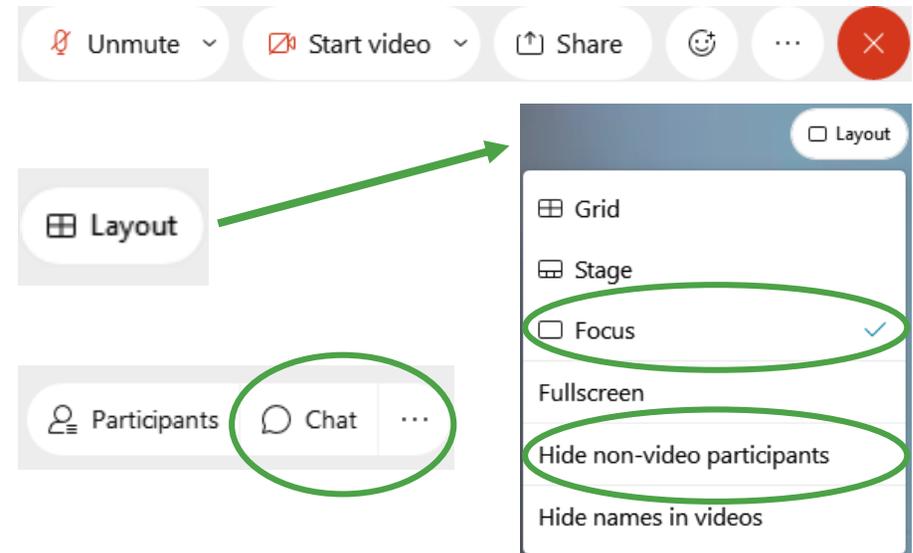
Do Heat Pumps Make Sense for Your Project?

WEBINAR | January 12, 2022

WELCOME

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- Presentation slides and contact information will be shared with all attendees following the event.



TODAY'S AGENDA

Welcome and Setting the Stage

Air Source Heat Pumps

Geothermal Heat Pumps

Open Q&A

Sadie McKeown, CPC

Leia Sims, KOW Building Consultants

Zachary Fink, ZBF Geothermal, LLC

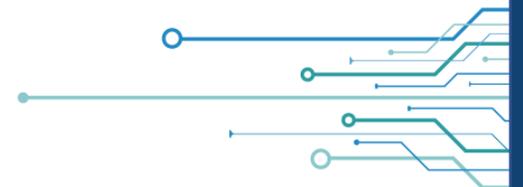
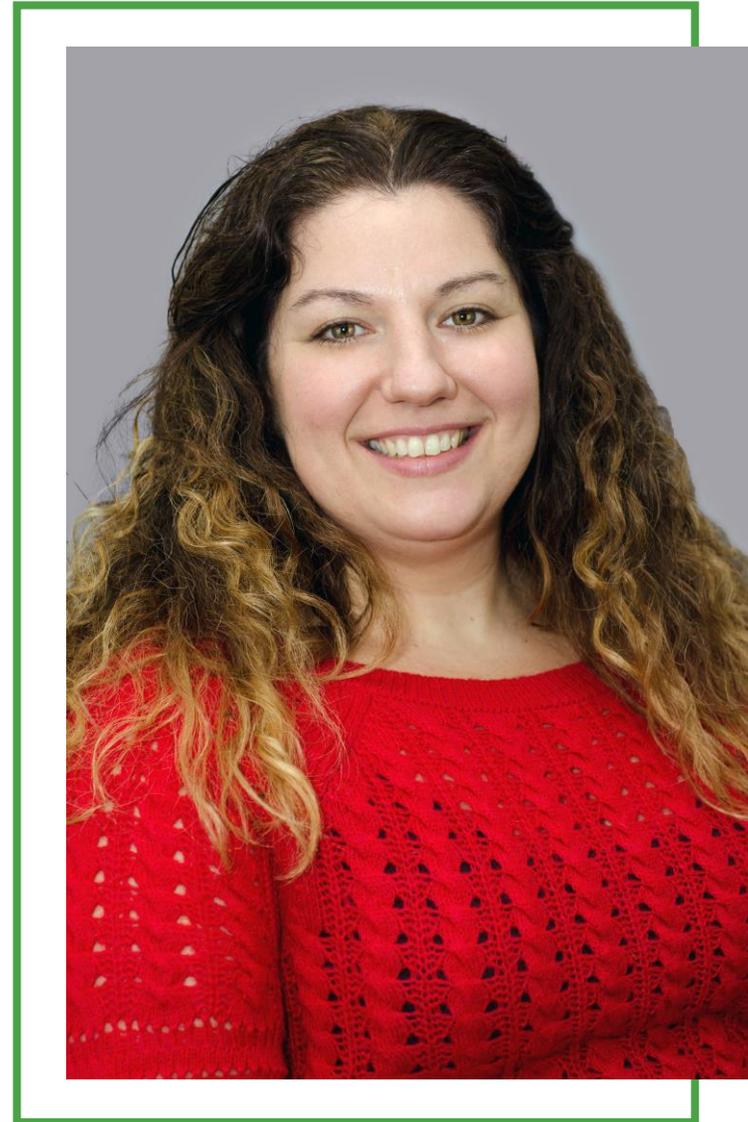
AIR SOURCE HEAT PUMPS

LEIA SIMS

DIRECTOR OF SUSTAINABILITY PROGRAMS

KOW Building Consultants

Leia Sims is focused on building science from educating owners, operators and tradespeople to diagnosing buildings of all sizes and assisting with implementing cost-effective solutions to reduce energy use. In her current role, Leia's team of sustainability consultants are focused in the multifamily affordable housing sector and provide full sustainability consulting services from energy audits to project implementation.



Air Source Heat Pumps

Leia Sims, KOW Building Consultants

DO HEAT PUMPS MAKE SENSE FOR YOUR PROJECT?

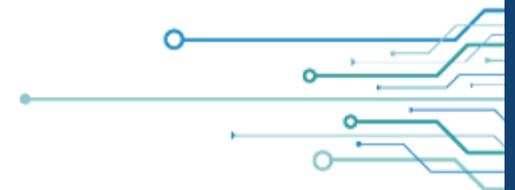
- System components
- Benefits of heat pumps
- Types of air-source heat pumps
- Challenges of installation
- Equipment and installer selection
- Maintenance
- Economics

Leia Sims

Director of Sustainability Services

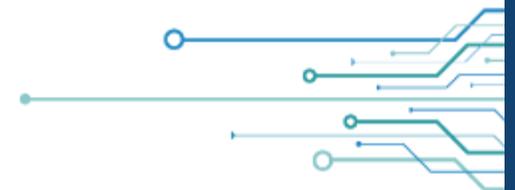
leias@kowbc.com

732-996-0179



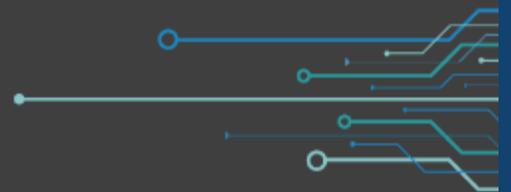
ABOUT KOW BUILDING CONSULTANTS

- Providing building consulting and inspection services since 1978
- Departments
 - Site Observation Reports
 - Property Condition Reports
 - Phase I & II Environmental Assessments
 - Plan and Cost Reviews
 - Sustainability Services
- KOW Sustainability Services
 - IPNA
 - Enterprise Green Communities
 - Technical Assistance
 - Local Law compliance
 - LL87
 - LL97
 - LL92/94
 - Energy Audits/Assessments
 - Help projects find incentives
 - Make recommendations that make sense

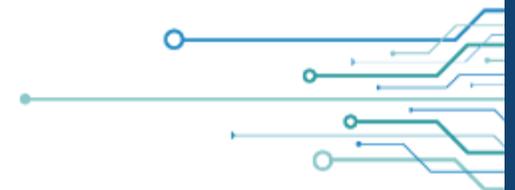




WHAT IS A HEAT PUMP?

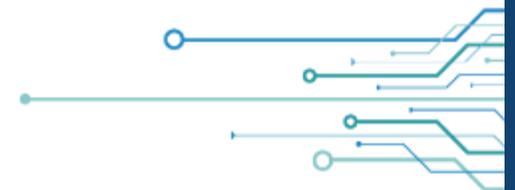


- Split system
 - Indoor unit
 - Outdoor unit
- Compressor
- Refrigerant
- Metering device (controls the refrigerant flow)
- Reversing valve (switching from heating to cooling)
 - This is what differentiates a heat pump from an air conditioner

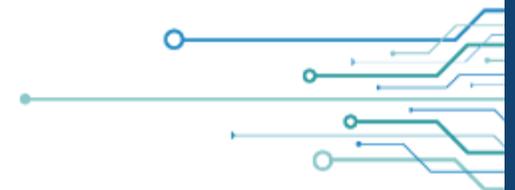


Benefits of Heat Pumps

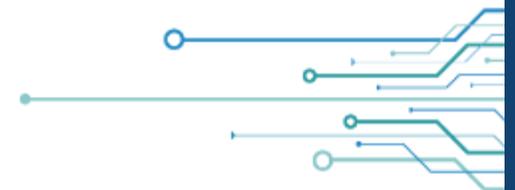
- Uses 30-50% less energy than conventional heating systems
- Lower energy consumption
- Reduce the impact of fluctuations in utility costs
- Eliminate distribution losses
- Electric consumption can be offset with solar



- Fewer components
 - Minimal maintenance requirements
- Tenants have control of their own temperatures
- Basic controls



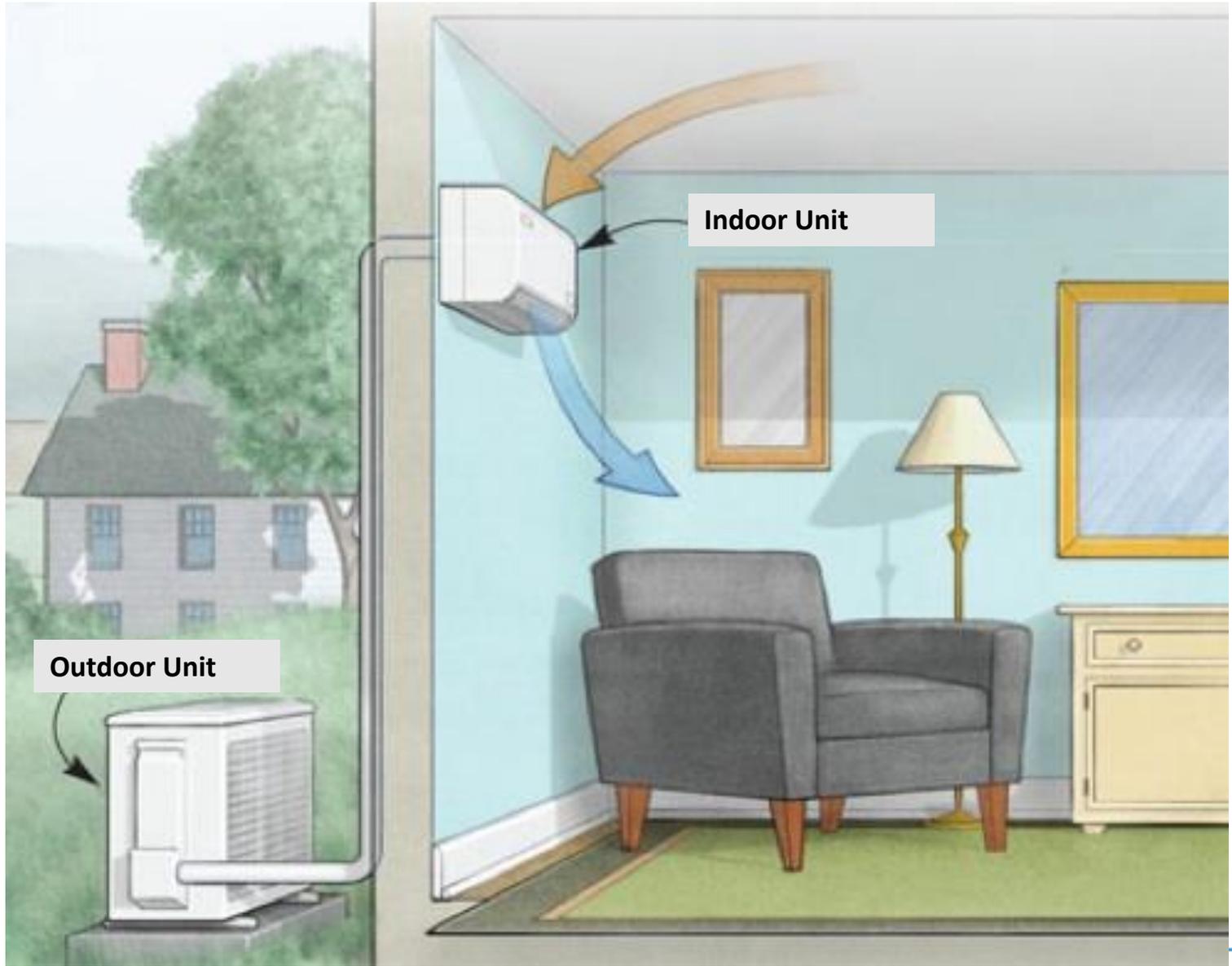
- Helps achieve compartmentalization
 - Improve overall building efficiency
 - Reduce transfer of smells
 - Reduce transfer of airborne pollutants
- Provided heating and cooling in one system
- Tenants control their own temperature
- Safer
- Very quiet
- Installation can be easy
 - Sizing and balancing distribution systems are a thing of the past
- Proven technology



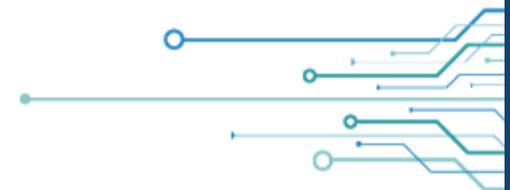
AIR-SOURCE HEAT PUMP SYSTEM COMPARISON

	Mini/Multi-Split	VRF / VRV Variable Refrigerant Flow / Volume	PTHP Package Terminal Heat Pump
Temperature control at each indoor unit	Yes	Yes	Yes
Ideal Building	Multifamily with 5 stories or less, Garden-style apartments	>20,000sf, ideal for high-rise and commercial settings. Good for buildings you want to heat and cool at the same time	Buildings with existing sleeve A/C or PTAC
Efficiency	Most-efficient	Very efficient	Very efficient
# of indoor units / outdoor unit	Up to 8	Up to 50	1
System complexity	Low to moderate	Sophisticated	Low

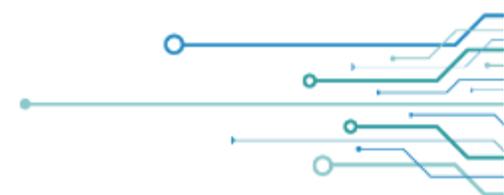
COMMON HEAT PUMP SETUP

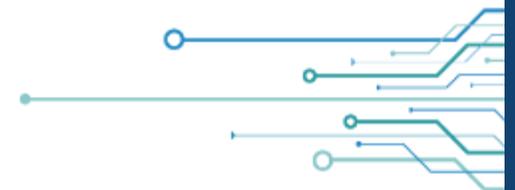


OUTDOOR UNIT PLACEMENT OPTIONS

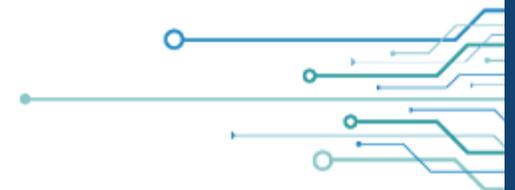




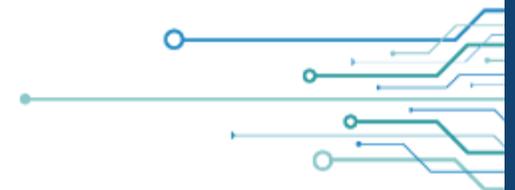




- Location of outdoor equipment
- Running refrigerant lines
 - Interior vs. exterior
 - Accessibility
 - Distance to outdoor equipment
- What to do with condensate
- Incorporating air sealing and insulation
- Proper sizing
- Reduced efficiency as temperatures drop
- Who pays utilities?
 - Owner pays heat
 - Bill tenants for A/C based on metered consumption
 - Provide A/C and include in rent – lease rider



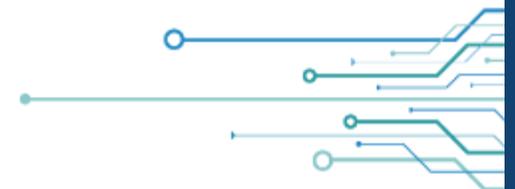
- Hire a reputable installer using reputable equipment
- Be sure a manual J sizing calculation (load calc) is done
- Use a manufacturer approved installer who offers an annual maintenance plan
 - They stand behind their work
- Use equipment with parts and labor warranties
- Incorporate an education plan for tenants
- NYS Clean Heat Program
 - <https://cleanheat.ny.gov/find-a-contractor/>
- Reputable heat pump brands
 - LG
 - Fujitsu
 - Mitsubishi
 - Daikin
 - Amana



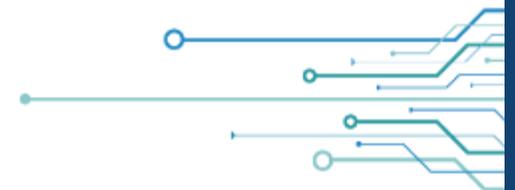
- **Clean filters**
 - Can be done by the super
 - Follow manufacturers spec's
 - Have an annual inspection and maintenance plan



- Perform a feasibility study
 - NYSERDA currently offers 50-75% incentive
 - Determine the best solution for your building
- Utility incentives for the installation \$2,000-\$4,000 per apartment
- Other savings result from heat pump installation
 - Fewer repairs due to water leaks from burst pipes
 - Reduce pointing/façade deterioration as a result of dripping A/C
- Increase property value
 - Electrification is the direction the grid is going
- LL97
- Consider incremental cost of install



- Buildings with a higher Return on Investment and shorter payback
 - Heating system currently running on oil or electric
 - One-pipe steam
 - If your distribution system is In need of repairs or upgrades
 - Buildings with high maintenance costs or emergency repairs
 - Distribution issues resulting in no-heat calls and open windows in winter
 - Buildings with excess solar production or ample land, parking lot or roof space to install large solar systems to offset the electric consumption



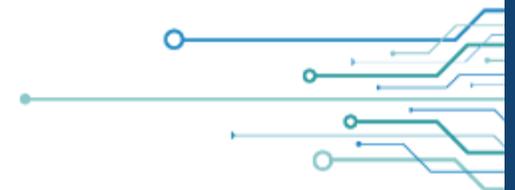
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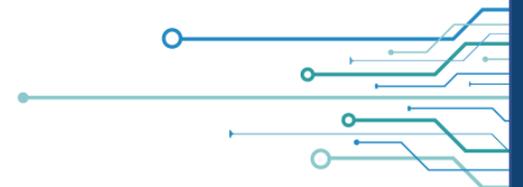
GEOTHERMAL HEAT PUMPS

ZACHARY FINK

PRESIDENT

ZBF Geothermal, LLC

Zachary Fink is President of ZBF Geothermal, a geothermal contractor on Long Island and NYC. Mr. Fink has been involved in projects ranging from 600 sf houses to 35-story buildings, installing geothermal. At ZBF Geothermal, Mr. Fink is geothermal consultant on these projects, participating in a design, modeling, and rebating capacity. Over the past 12 years, ZBF Geothermal has been involved in the installation of over 8,000 tons of geothermal heat pumps.



Geothermal



Presented by:

Zachary Fink

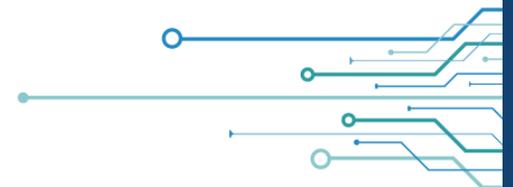
President

ZBF Geothermal, LLC

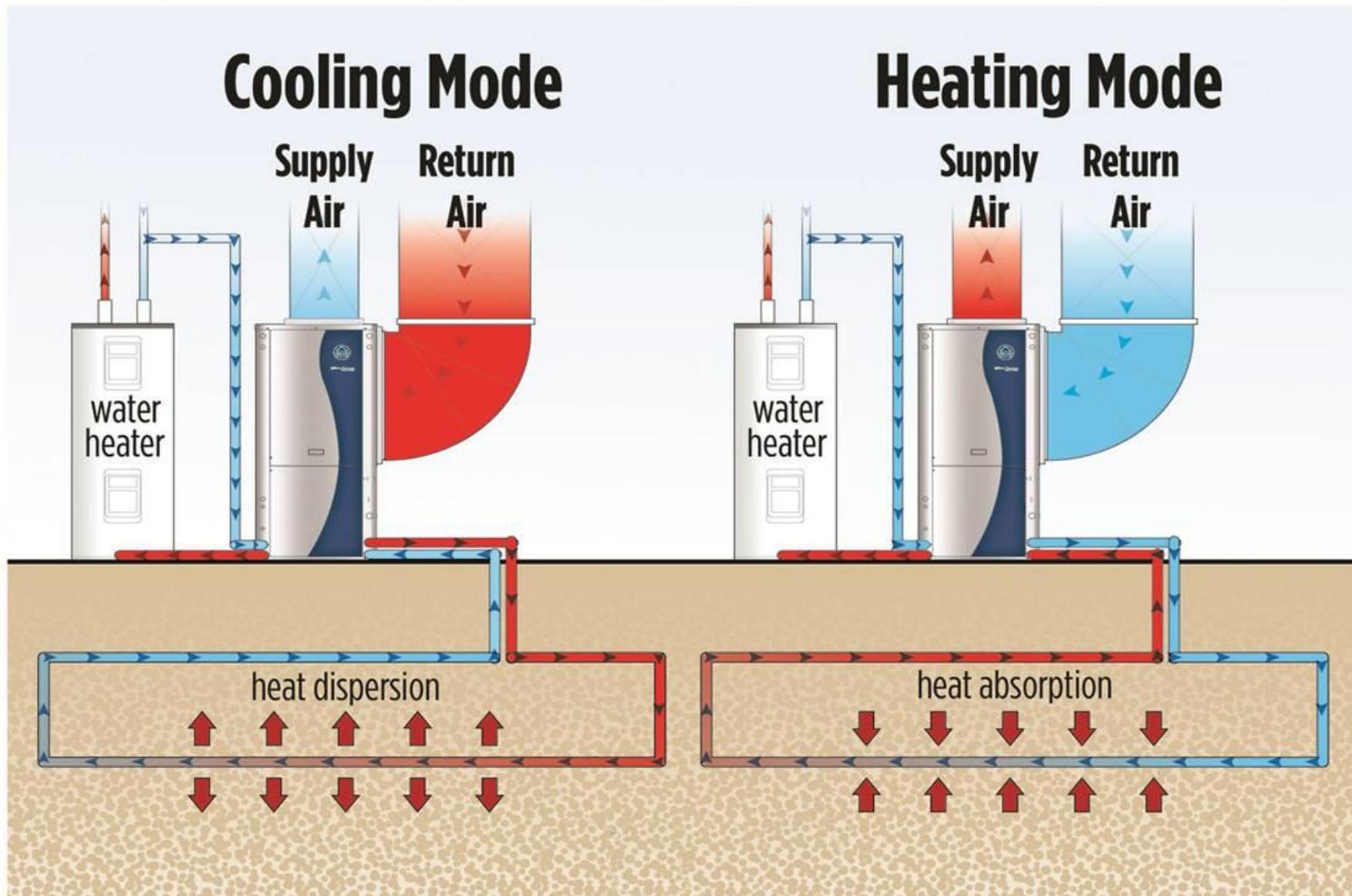
- **Today's Discussion Items**
- Why Geothermal?
- How it works
- Examples
- Incentives and Economics

Why Geothermal?

- Most efficient way to heat and cool a building
- Can provide 100% of heating, cooling, and domestic hot water loads regardless of the size of the building
- No outdoor equipment lowers maintenance costs
- Operational costs are ~20% less than Natural Gas and 50% less than traditional PTAC AC costs
- Loop field has a 50-year warranty and can be located under buildings, football fields, parking lots, and green spaces
- Buildings can be networked together to create district geothermal systems
- Incentives from NYS Joint Utilities, Federal Tax Credits, and possibilities for NYSERDA incentives
- Lower power requirements compared to other electrification options



How it Works



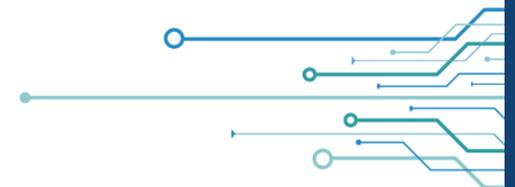


1 – Air-Cooled Heat Pump (Outside)

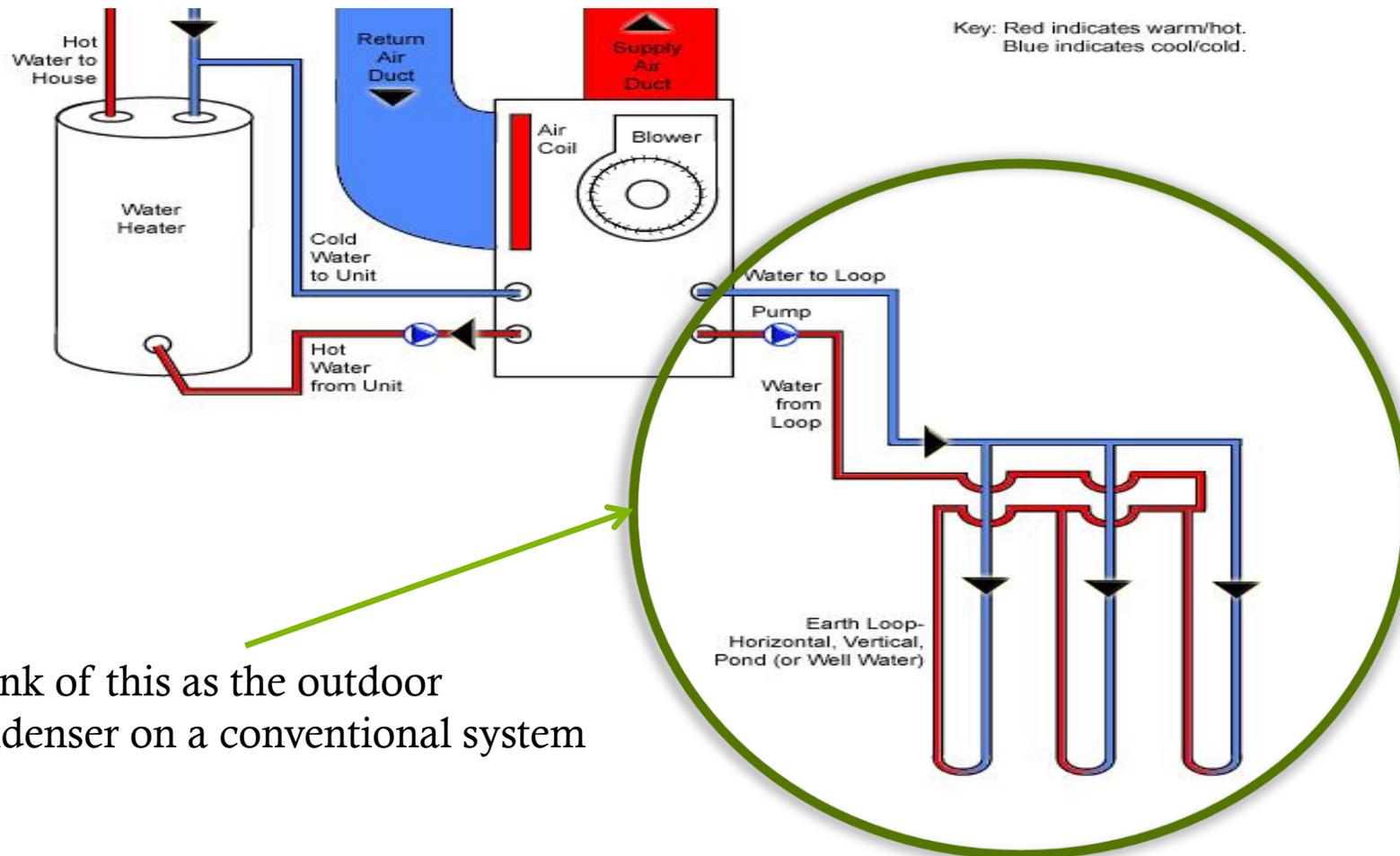
2 – Indoor Coil

3 – Air Cleaner

4 – Thermostat

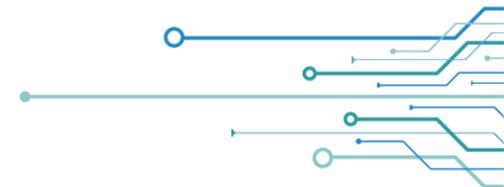


HOW DOES GEOTHERMAL WORK

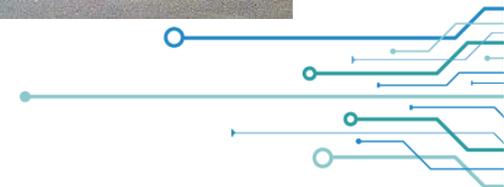


Think of this as the outdoor condenser on a conventional system

Examples



BEACH GREEN DUNES II – FAR ROCKAWAY

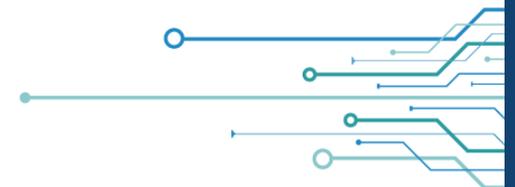
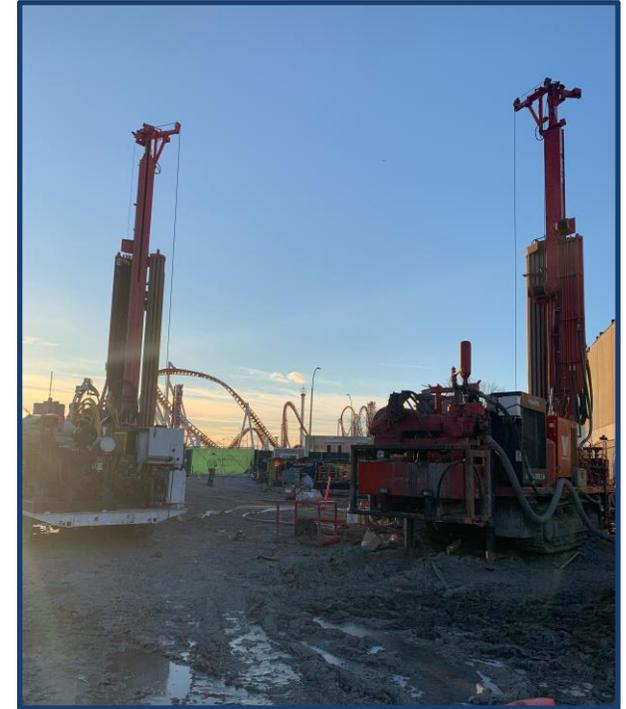


- 127 apartment building located in Far Rockway, NY
- Passive house certified
- Geothermal system is located under the parking lot
- Supported with a PSEGLI rebate of \$110,000
- Estimated tenant cooling bill of \$10/month in the summer
- Solar PV System to complement the geothermal system



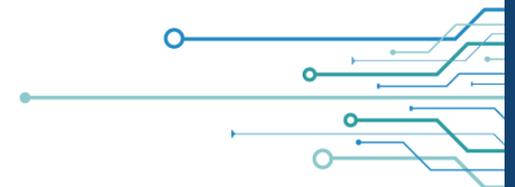


- Largest geothermal system under construction in NYC
- Largest multifamily geothermal system in NYS
- 454 apartments, 425,000 square feet of space
- 30% Affordable housing
- 2 Towers – 16 and 26 stories
- 28 miles of pipe in the ground
- Supported by a NYSERDA award under PON 4614 – district geothermal system
- Supported by a Con Edison Clean Heat Incentive



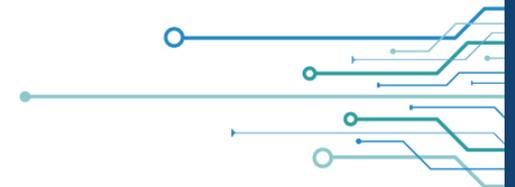
Incentives

- NYS Clean Heat Incentives are based on saving per MMTBU. In Con Edison service area this is \$200 to \$400 MMTBU which tends to equal \$3,000 to \$5,000 per ton of equipment installed
 - Con Edison incentives typically cover the cost premium to install a geothermal system
- Federal Tax Credit – Currently 10%
- MARCS Deprecation
- R&D Tax Credits
- NYSERDA Programs
 - PON 4614 for District Geothermal System
 - New Construction Program
 - Design Assistance Programs
 - Low Carbon Pathways for Multifamily Buildings



Energy Cost Equivalence Calculator

ENERGY SOURCE	COST OF ENERGY		\$ PER
			MBtu
Fuel Oil	\$3.50	\$/Gallon	\$2,950.58
Propane	\$3.30	\$/Gallon	\$3,855.79
Wood	\$250.00	\$/Cord	\$2,964.29
Natural Gas	\$12.00	\$/1,000 CU FT	\$1,224.49
Electric Resistance	\$0.21	\$/kWh	\$6,153.00
Air Source Heat Pump	\$0.21	\$/kWh	\$3,076.50
Geothermal Heat Pump	\$0.21	\$/kWh	\$1,465.00
Electric Resistance	\$0.15	\$/kWh	\$4,395.00
Air Source Heat Pump	\$0.15	\$/kWh	\$2,197.50
Geothermal Heat Pump	\$0.15	\$/kWh	\$1,046.43



Zachary Fink
President
ZBF Geothermal, LLC
Zach@ZBFGeothermal.com
C - (631) 921-7212

Questions?

Questions?

THANK YOU FOR TUNING IN

Contact Today's Speakers

Danielle Donnelly, CPC

Ddonnelly@communityp.com

Leia Sims, KOW Building Consultants

leias@kowbc.com

Zachary Fink, ZBF Geothermal

zach@zbfgeothermal.com

Connect with CPC



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Learn More

www.communityp.com/sustainability



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- **NYC ACCELERATOR: Free, expert guidance to future-fit New York City:** <https://www1.nyc.gov/site/nycaccelerator/index.page>
- **Building Energy Exchange: Heat Pump Planner Tool for Homeowners:** <https://be-exchange.org/beexreport/heat-pump-planner/>

