

**EMPIRE  
TECHNOLOGY  
PRIZE**

**\$1M  
GRAND  
PRIZE**

**WHAT'S NEXT IN  
CLEAN HEATING FOR  
TALL BUILDINGS**

ADMINISTERED BY

**THE CLEAN FIGHT**  
NEW YORK



SUPPORTED BY



**NYSDERDA**  
Supported







# MAKING SPACE HEATING DECARBONIZATION EASIER FOR NEW YORK'S TALL BUILDINGS

## TWO FOCUS AREAS

- 1** Centralized heat pumps that generate steam (219°F) or high temperature hot water (180°F)
- 2** Novel distribution solutions that make it easier to adopt centralized low temperature heat pumps ( $\leq 120^\circ\text{F}$ )

## \$10M PRIZE

- ✓ \$7M Finalist Award
- ✓ \$2M Demo Fund
- ✓ \$1M Winner Award

## NINE DEMO PARTNERS

**CBRE** Investment Management



 COLUMBIA UNIVERSITY  
Facilities and Operations



TISHMAN SPEYER

**EMPIRE STATE**  
REALTY TRUST

**Rudin**

//Fairstead

**VORNADO**  
REALTY TRUST

**LM** Development Partners

# SELECTED FINALISTS

## DISTRIBUTION SOLUTION



**HYDRONIC SHELL**  
TECHNOLOGIES

## HIGH TEMPERATURE HEAT PUMPS



**GIL-BAR**



# EMPIRE TECHNOLOGY PRIZE HIGH TEMPERATURE HEAT PUMP SOLUTIONS

COMPANY	SOURCE	OUTPUT	REFRIGERANT	MIN. TEMP SOURCE (COP ≥ 1.5)	CAPACITY RANGE (PER MODULE)
	AIR OR WATER	STEAM	CASCADE: R1234ze-E / R1233zd-E	-4°F	2200-3400 MBH
 *	AIR OR WATER	STEAM	CO2	6°F	1000, 3350 MBH
 **	AIR OR WATER	STEAM	HELIUM	-22°F	850-3400 MBH
	AIR OR WATER	HIGH TEMP HOT WATER	HELIUM	-22°F	850-3400 MBH
	AIR OR WATER	STEAM	CO2	-40°F	240-1440 MBH
	WATER	STEAM	CASCADE: R1234ze / Water	49°F	6000 MBH
	WATER	HIGH TEMP HOT WATER	R1234ZE	49°F	7000 MBH
	WATER	STEAM	CASCADE: R515B / R1233zd	15°F	102-1535 MBH
	WATER	HIGH TEMP HOT WATER	R515B	15°F	102-1535 MBH

\* Prototype under development  
 \*\* 850 MBH unit available in H1 2026

*Note, values have been provided by manufacturers and have not been independently validated*

# PANEL: WHAT'S NEXT IN CLEAN HEATING FOR TALL BUILDINGS?



**MICHAEL REED**  
Director,  
Building Transformation



**JULIA CYR**  
Sustainability Business  
Development



**LUCAS TAUB**  
Project  
Development Engineer

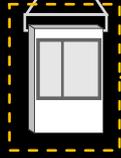
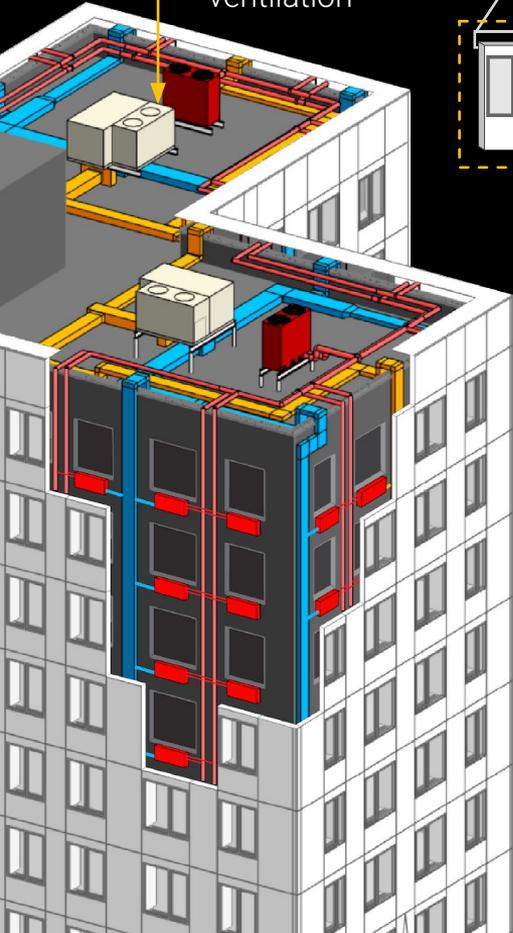


**DAVID GOLDSTEIN**  
Founder, CEO

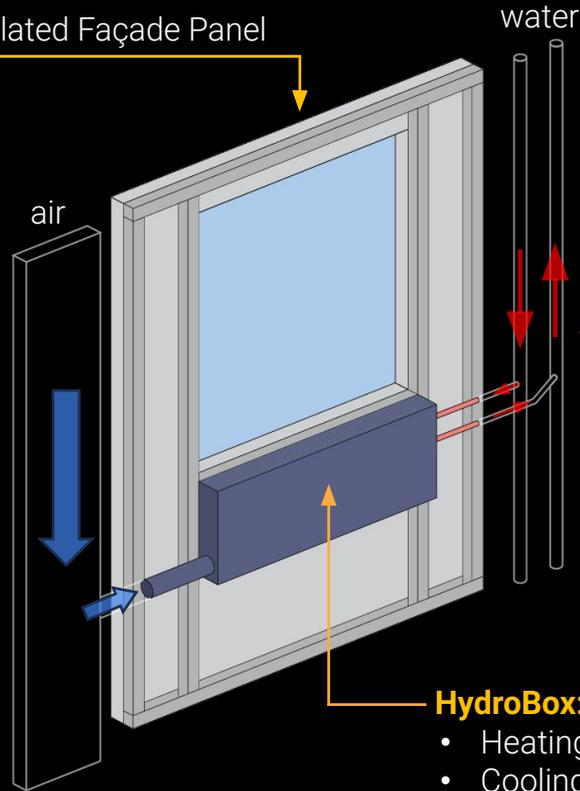


**HYDRONIC SHELL**  
TECHNOLOGIES

central heating,  
cooling, and  
ventilation

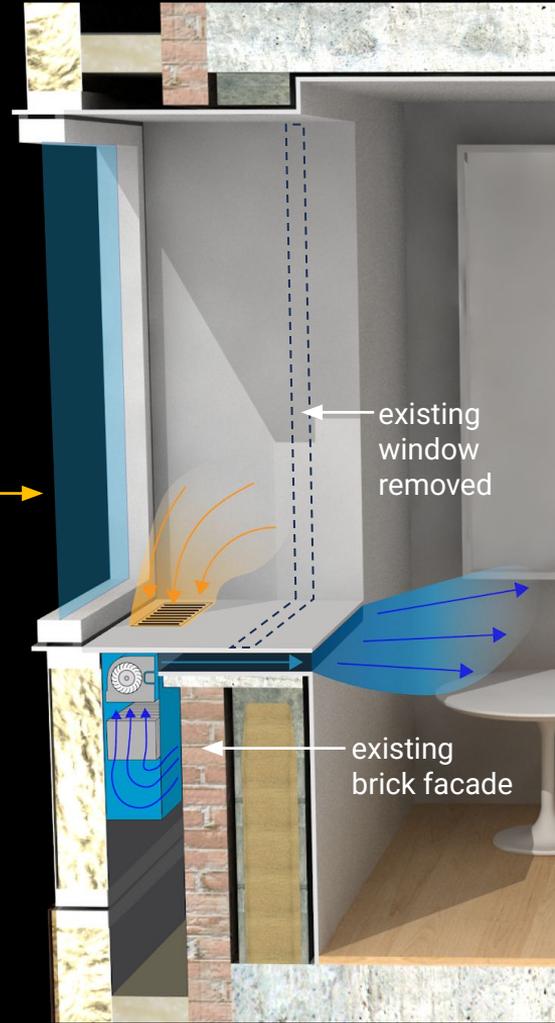


Insulated Façade Panel



**HydroBox:**

- Heating
- Cooling
- Ventilation



US Patents: 11,415,328 and 11,767,990

# Flow Environmental Systems

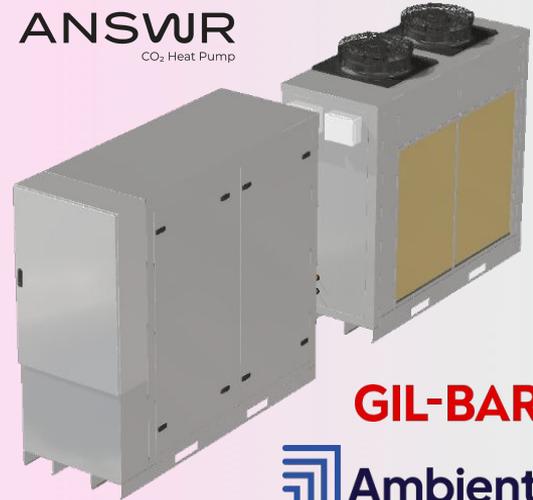
## **Air-to-Water or Water-to-Water or True Simultaneous**

- High Temp Hot Water (HTHW) up to 180F SWT (supports  $\Delta T$  from 10°F to 140°F)
- Medium Temp Hot Water (HHW or Potable DHW)
- Chilled Water (CW)

## **Benefits**

- Efficient
- Electrify Heating while Maintaining or Reducing Power Load
- Huge Operational Range with Minimized Derates
- Modular
- Simplified Installation
- Large Separation Distances on Air Source
- Space Saving
- Environmental (CO2 R744, GWP 1, A1, No PFAS, Future Proof)

**ANSWR**  
CO<sub>2</sub> Heat Pump



**GIL-BAR**

 **Ambient**

# Miller Proctor Nickolas

## Oilon Heat Pump Arrangements:

### Two Stage (Cascade) +

### Single Stage

Low Temperature Water Source (49F to 42F)

Medium Temperature Water Source (120F to 110F)

R515b (GWP 299)

R1233zd (GWP 1)

R1233zd (GWP 1)



Heat Capacity:	31 kW
Cool Capacity:	23 kW
Avg COPh:	3.3
Electrical:	9.4
Max Temp:	212 °F
<i>*all values are nominal</i>	

Heat Capacity:	25 kW
Cool Capacity:	16 kW
Avg COPh:	2.8
Electrical:	8.6
Max Temp:	250 °F
<i>*all values are nominal</i>	

Heat Capacity:	25 kW
Cool Capacity:	16 kW
Avg COPh:	2.8
Electrical:	8.6
Max Temp:	250 °F
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# EMPIRE TECHNOLOGY PRIZE



**LEARN MORE**

## \$1M GRAND PRIZE

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**WELLS  
FARGO**