



The Business Case
for Clean Cooling



New York City

June 2-3, 2026

 [ATMO.org](https://atmo.org)



REEF Presents

An HVAC Panel

**From Portfolio Data to Project Design:
How End Users Are Advancing the Transition to Natural Refrigerants**



Moderator:
Aleisha Khan

Executive Director
REEF



Submit questions throughout the fireside chats.

Indicate specific respondent.

Upvote your favorite questions for faster responses.





Umesh Goswami

Principal Environmental Sustainability
Manager
Roche



About Roche

Throughout our 125-year history, Roche has grown into one of the world's largest biotech companies, as well as a leading provider of in-vitro diagnostics and a global supplier of transformative innovative solutions across major disease areas. Our commitment to our people, partners, stakeholders and, most importantly, our patients remains as strong as it was on the first day of our journey.

Roche's position on climate change

We recognise climate change as one of the largest global risks and are committed to addressing it as a matter of urgency. We are committed to achieving net zero carbon emissions by 2045 and have set near- and long-term targets validated by SBTi.

Transition to natural refrigerants

Roche's halogenated hydrocarbon directive was established in 1994 to phase out ozone-depleting substances in Roche-owned and leased facilities in accordance with the objectives of the Montreal Protocol. In 2002, the program was expanded to cover climate-damaging (e.g., HFC's) as well. Roche aims to eliminate all HH's from all Roche-owned and leased facilities by 2030.





Curtis S Harrington

Director of Engineering
UC Davis
Western Cooling Efficiency Center



REFRIGERANT TRANSITION

CEC EPIC – DEVELOP AND TEST ULTRA-LOW GWP REFRIGERANT HEAT PUMPS

- Partnering with Trane and TRC

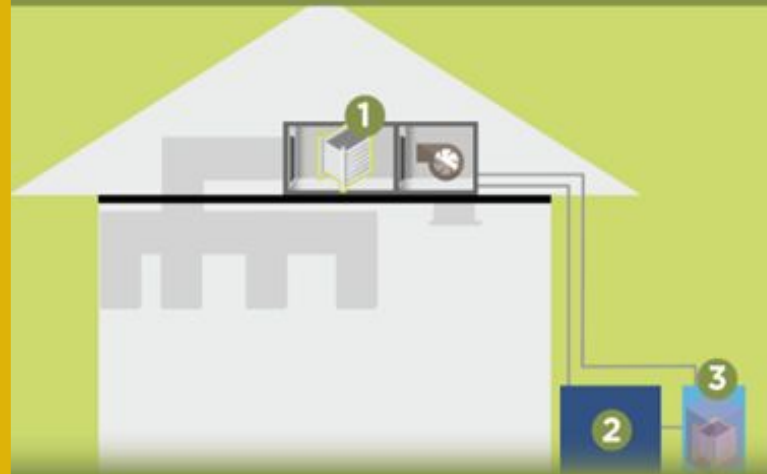
DEVELOPING TWO SOLUTIONS

- DX and ATW
- Integrating thermal storage

DEVELOPING INJECTION-MOLDED POLYMER HX (MPHX)

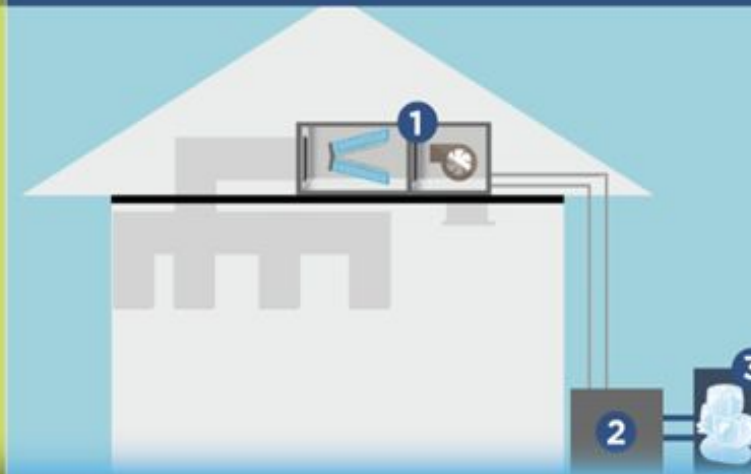
EVALUATING IMPACT ON EMISSIONS AND POWER DEMAND

LOW GWP REFRIGERANT OPTION 1: AIR-TO-WATER



- 1 High-efficiency hydronic air handler with variable speed fan and polymer heat exchanger (MPHX)
- 2 Variable speed heat pump using ultra-low GWP refrigerant R-290 (GWP <10, A3)
- 3 Secondary water loop with PCM-enhanced thermal storage system (MELTED) for load shifting

LOW GWP REFRIGERANT OPTION 2: AIR-TO-AIR



- 1 High-efficiency air handler with variable-speed fan, and refrigerant leak detection
- 2 Variable-speed heat pump with compressor optimized for high-glide refrigerants using ultra-low GWP refrigerant R-474B (GWP <10, A2L)
- 3 Ice thermal storage module integrated with heat pump system for load shifting



Jonathan Woolley, Ph.D.

President
Emanant Systems



Co-Founder, CTO
Aris Hydraulics



R290 air-to-water heat pump pilots

Research and demonstration projects in progress for multifunction R290 AWHPs in multifamily

1

DOE: LBNL + VEIC + The Veterans' Place

NORTHFIELD, VERMONT

Single room occupancy transitional housing for veterans. 3x R290 AWHPs, ductless fan coil units, dual volume TES modules provide heating and cooling for 11 bedrooms, and DHW for 5 shared baths and commercial kitchen.



2

NYSERDA: RMI + WINN CO

ALBANY, NEW YORK

Demonstration project in the contracting and planning stage. R290 AWHPs for heating, cooling and DHW. RMI as prime with WinnCo. Site selection in progress.





Michael May

President & CTO
èffecterra



High Efficiency CO2 Chiller Heat Pump Proof of Concept Pilot Specifications

Features

- Provides cooling and/or heating (simultaneous)
- Advanced compression technology implementation
- Advanced operability & control implementation
- High pressure design (130/90 Bar) to prevent charge loss during power outages
- High lift ejectors and liquid ejectors

Unit Specifications (at-a-glance)

- Cooling: 106 Tons (operable to 120°F ambient)
- Heating: 125 Tons (operable to -25°F ambient)
- Minimum Capacity: 20%

- Compressor: BOCK 6 Cylinder Reciprocating
- Controls: Danfoss ALSmart PLC
- Evaporators: Hydronic loops + fan coils
- Power: 460V - 3Ph - 60Hz, FLA: 315A
- Dimensions: 2.5m x 8.0m x 1.3m, ≤7,500 kg
- COP: Cooling 5–6 at 101°F; Heating 3.3–4.5 at 10–30°F

Ideal Pilot Sites

Locations that require space cooling, heating, and domestic hot water. Ideal applications would be non-mission critical needs in offices, hotels, hospitals, schools, gyms, restaurants and multi-mixed use real estate.

Timeline

We expect unit to be manufactured by Q1 2027 and installation to be ready in Q3 2027

What Effecterra Provides

- CO2 Chiller Heat Pump Unit
- Installation and commissioning support
- Continuous operational and remote monitoring support
- Full sensor package and data acquisition
- Operational manuals and knowledge transfer

Pilot Terms

- Collaborative verification and validation period of 12 months in operation
- Post-pilot: unit available for operational release after pilot period



Cory Palmer

Vice President of Engineering
DMG North





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#GoNatRefs



What Are We Seeing in Use Today?

Grounding in Reality

Current Installations, Gaps, and Signals

Q&A



From Pilots to Real Projects

The Bridge from Interest to Action



Early Adoption, Demonstrations, and Commitments

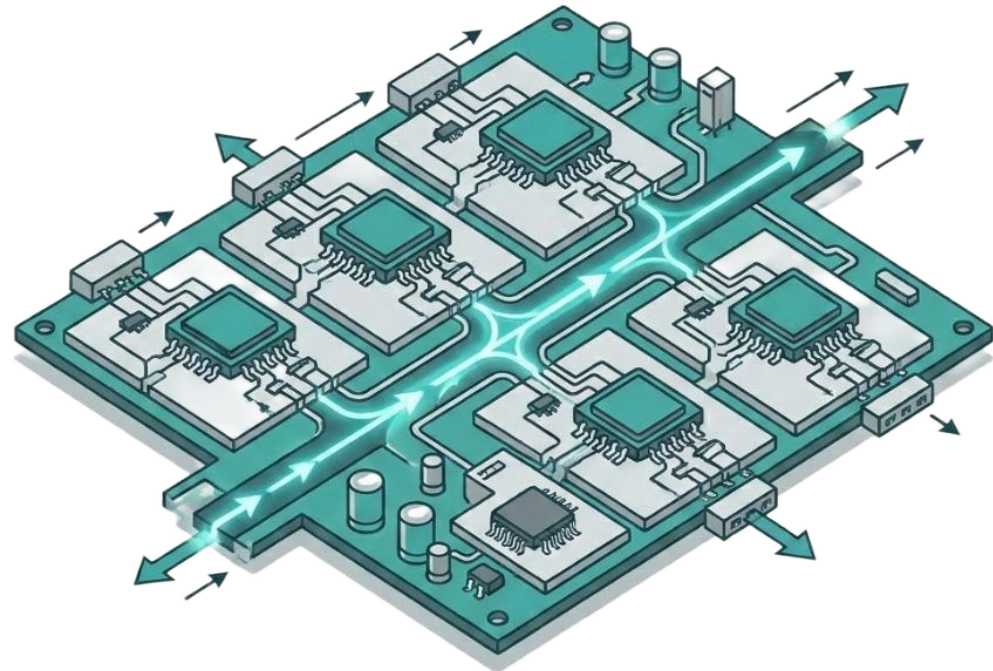
Q&A



What's Already Working at Scale?

Proof and Performance

Deployed Systems and Real Outcomes



Q&A



Scaling Across the U.S. Market

From Projects to Transformation

Workforce, Policy, and Market Readiness



Q&A



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Audience Q&A

