

# CO<sub>2</sub> Chiller Field Study – Quick Guide & Feedback Insert

## Supporting the CalNEXT CO<sub>2</sub> Chiller Demonstration

### Why You're Receiving This

This guide summarizes the most important takeaways from the CO<sub>2</sub> chiller field study and highlights both the strengths of CO<sub>2</sub> systems and the legitimate concerns noted during the project. It also gives you a way to ask questions, share feedback, or request clarification on any topic.

### Key Positive Findings

#### 1. Strong Cooling Performance

CO<sub>2</sub> chillers consistently held milk at lower temperatures than synthetic systems.

Benefit to dairies: better product protection, tighter temperature compliance.

Benefit to PRO: demonstrates superior thermal performance of PROGreen systems.

#### 2. Significant Heat Recovery Value

Heat reclaim from CO<sub>2</sub> delivered major savings:

- ~40,000 gallons/year propane reduction (Site-1)
- ~2.6 million ft<sup>3</sup>/year natural gas reduction potential (Site-2)

Benefit: huge customer fuel savings + large GHG reductions.

#### 3. Environmental & Regulatory Advantage

CO<sub>2</sub> (R-744) has:

- GWP = 1
- No future phase-downs or bans

- No flammability risk
- Lowest lifecycle climate impact of any refrigerant in dairy applications

Benefit: long-term refrigerant security for customers, especially with tightening California rules.

#### **4. Comparable or Better Energy Performance**

CO<sub>2</sub> matched or beat synthetic systems in efficiency at both sites when normalized. Heat recovery pushes the total benefit far ahead of synthetic options.

#### **5. Lower Total Cost of Ownership (when heat recovery is used)**

Over a 20-year life, CO<sub>2</sub> systems were ~16% cheaper to own and operate vs synthetic chillers.

#### **Common Questions & Legitimate Concerns**

Below are the concerns identified in the field study, each followed by a prompt so readers can share feedback or request clarification.

#### **Concern 1 — High Ambient Temperature Shutdowns**

CO<sub>2</sub> systems experienced occasional high-temp alarms prior to retrofits.

How we addressed it:

Adiabatic and water-assist gas cooler retrofits eliminated the outages.

Your feedback:

Do you have concerns about high-temperature operations in your region?

Yes  No Comments: \_\_\_\_\_

## **Concern 2 — Higher Upfront Cost**

CO<sub>2</sub> systems cost more upfront than synthetic chillers.

How we address it:

Fuel savings + refrigerant savings + incentives lead to fast payback (3–5 yrs).

Your feedback:

Is upfront cost a barrier at your facility? What would help?

## **Concern 3 — Need for Trained Technicians**

CO<sub>2</sub> systems operate at higher pressures and require familiarity with transcritical controls.

How PRO addresses it:

- Factory + onsite training
- Remote diagnostics
- Active dealer support
- CO<sub>2</sub> education programs (Refrigeration Mentor, etc.)

Your feedback:

Would additional training or resources help your team?

## **Concern 4 — Performance in Extreme Heat**

Efficiency drops in very hot conditions for basic transcritical systems.

How we address it:

- Gas cooler upgrades

- Ambient-based floating head control
- Optional hybrid/backup configurations

Your feedback:

Do you want more detail on PRO's hot-climate performance strategies?

### **Concern 5 — System Complexity vs. Synthetic Units**

CO<sub>2</sub> systems have more sensors, valves, and controls.

How we address it:

- Improved control logic
- Redundant protections
- Cleaner remote visibility
- Standardized commissioning templates

Your feedback:

What concerns you most about system complexity?

### **We Want Your Questions**

If you'd like help understanding any part of the study, or want to discuss feasibility at your site, please reach out: [info@prorefrigeration.com](mailto:info@prorefrigeration.com)