Food Retailer Survey Report

Understanding the food retail industry's current and future refrigerant use.

NORTH AMERICAN
Sustainable
Refrigeration
Council

Executive Summary

The food retail industry is experiencing a seismic shift away from hydrofluorocarbons (HFCs) toward low-global-warming-potential (GWP) alternatives, such as CO2 (R744).

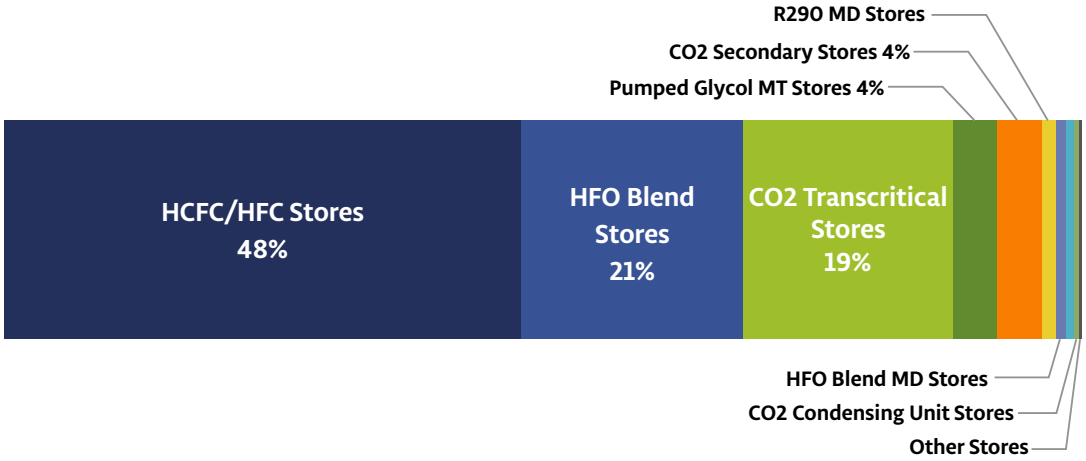
The North American Sustainable Refrigeration Council (NASRC) surveyed 18 food retailers to capture current refrigerant use, future system plans, and the key drivers and barriers that shape investment decisions over the next five years. Survey respondents represent over 29,000 U.S. locations across grocery, supermarket, convenience, and pharmacy formats.

Key Findings

- Legacy HFC/HCFC systems still dominate fleets in existing stores among large chains
- CO2 transcritical systems are poised to be the dominant technology in new sites
- CO2 condensing units are viewed as add-ons
- System replacements substantially exceed new store construction
- The Southeast is poised for significant growth in CO2 transcritical systems
- Regulatory requirements remain the top transition driver
- The lack of skilled technicians remains the top barrier to transitioning to CO2

Projected Store Mix in 2029

Using the survey's replacement and new-build responses, NASRC developed a high-level projection of store counts by **primary system type in 2029**.



In this scenario:

- HFC/HCFC DX stores decline to about 48% of total stores, down from roughly 80% of the base
- HFO blend stores increase to around 21%
- CO2 transcritical stores rise to about 19%
- Pumped medium-temperature glycol and CO2 secondary stores each grow to approximately 4% of the fleet, with smaller shares for systems such as R290 micro-distributed, HFO micro-distributed, CO2 condensing unit-led sites, and other niche architectures.

These projections underline two parallel trends: rapid growth in CO2 and other natural refrigerant-based solutions, and continued reliance on mid-GWP HFO blends as interim options, especially where secondary systems allow significant charge reductions.

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Introduction

In late 2025, the North American Sustainable Refrigeration Council (NASRC) surveyed leading U.S. food retailers to understand **how large chains are planning and executing the transition from high-global warming potential (GWP) hydrofluorocarbon (HFC) refrigerants**.

The survey was designed to:

- Understand current and future refrigerant use
- Identify market trends, opportunities, and barriers influencing refrigerant decisions
- Provide comprehensive market projections and actionable insights to prepare the market for forecasted refrigerant demands.

Background

Once considered a suitable substitute for ozone-depleting refrigerants, HFC refrigerants are super-polluting greenhouse gases with thousands of times more heat-trapping power than carbon dioxide. By contrast, natural refrigerants, including ammonia, carbon dioxide (CO2), and propane, have GWP values of 0 or near 0 and are considered a future-proof solution. Still, a unique set of market barriers—such as upfront cost premiums and workforce readiness—has prevented widespread adoption in U.S. supermarkets.

The federal government and several states have enacted legislation to regulate the use and production of HFCs, driving the transition to low-GWP alternatives. For detailed information on these regulations, visit nasrc.org/hfc-policy-tracker.

Since 2023, NASRC has published an annual retailer survey to track how market projections and strategies have evolved in response to federal HFC phasedown policies, emerging state regulations, and rapidly changing technologies.

Participant Profile

The study comprised **18 food retailers, representing over 29,000 U.S. locations across grocery, supermarket, convenience, and pharmacy formats**. Approximately 73% of participating companies were grocery and supermarket operators, and 27% convenience and pharmacy formats.

All respondents operated 100 or more stores, with representation across tiers, from regional chains (100–200 stores) to a single retailer with more than 10,000 locations.

Participants by Tier and Type

Methodology

The 2025 survey expands on the original study, focusing on chain food retailers and asking respondents to report both their existing fleet profile and their planned new construction and system replacement activity through 2029.

Terminology

Category	Refrigerants
HFCs	R404a, R507a, R407a, R407f, R422a, R422c, R422d, R427a
HCFCs	R22, R502
HFO Blends >300 GWP	R448A, R449A, R513A
HFO Blends <300 GWP	R454c, R454a, R455a, R471a
HFOs <10 GWP	R1234yf, R1234ze

Refrigerants were categorized as HFCs, HCFCs, HFO blends with >300 GWP, HFO blends with <300 GWP, and HFOs with <10 GWP. **This grouping aligned with regulatory thresholds**, particularly the 150/300 GWP breakpoints embedded in EPA's Technology Transition Rule (TTR) proposals.

System Type	Definition
CO2 Transcritical	Direct expansion (DX) refrigeration system capable of operating above CO2 critical point
CO2 Secondary	System circulating CO2 as pumped secondary fluid, cooled by primary system through heat exchanger
Pumped MT Glycol	System circulating glycol as secondary fluid for Medium Temp loads
HFO Blend MDS	Micro-distributed system of self-contained cases using HFO blends, cooled by water-loop
R290 MDS	Micro-distributed system of self-contained cases using propane (R290), cooled by water-loop
HFC/HFO Blend	Traditional direct expansion refrigeration system using HFCs or HFO blends

Findings

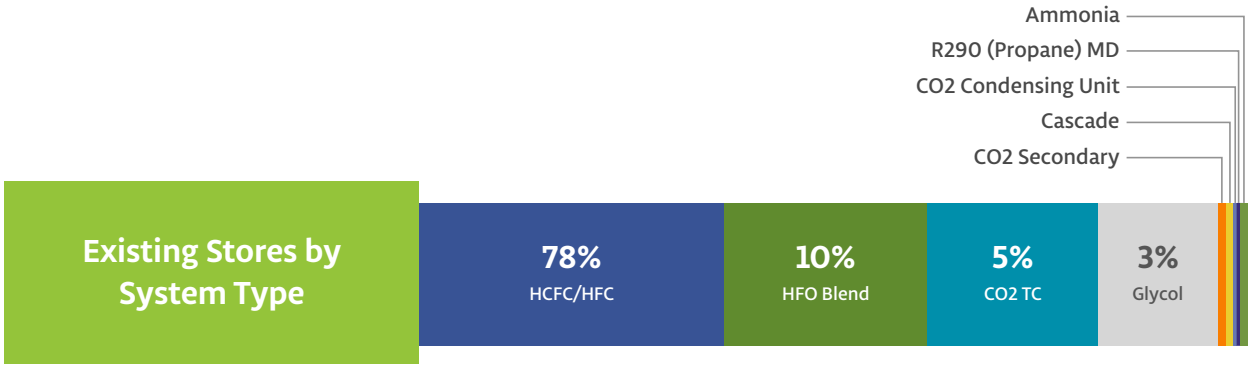
Key findings from the collected data are summarized below.

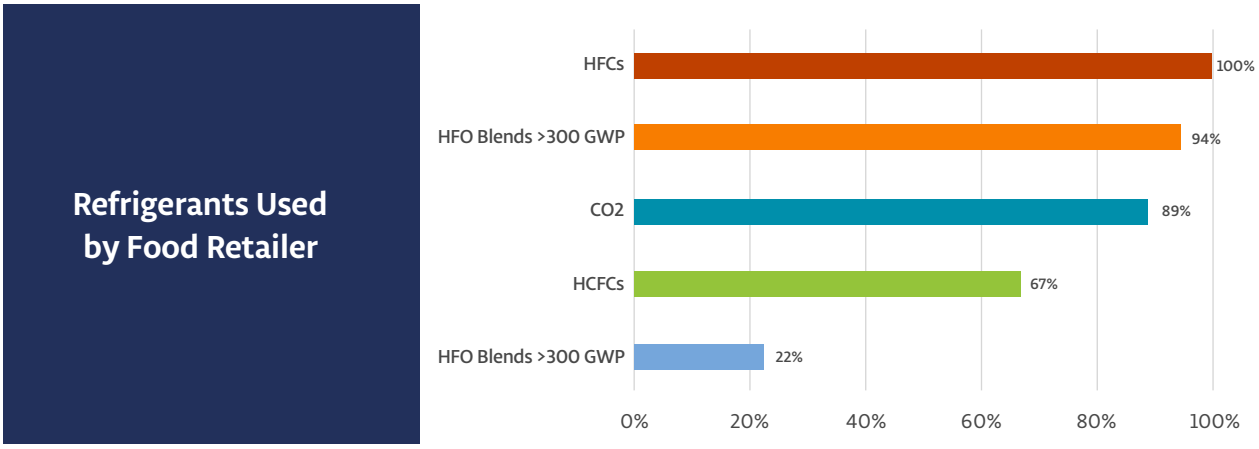
1. Legacy HFC/HCFC systems still dominate fleets in existing stores among large chains.

Retailers reported refrigerants in use across their portfolios (not store-weighted).

- 100% use HFCs
- 94% reported using HFO blends above 300 GWP
- 89% reported at least some use of CO2
- 67% still use HCFCs such as R22

The persistent use of R22 and other HCFCs was found to be higher than regulators often assume, with important implications for both policy design and funding eligibility.

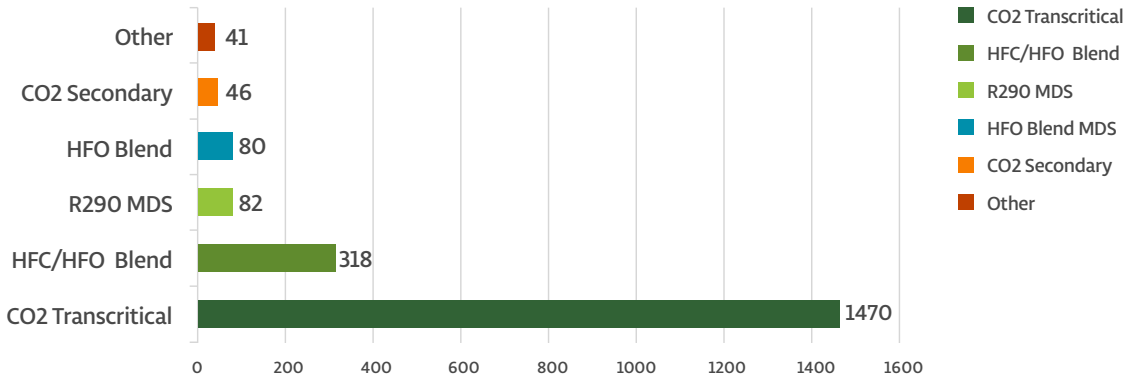




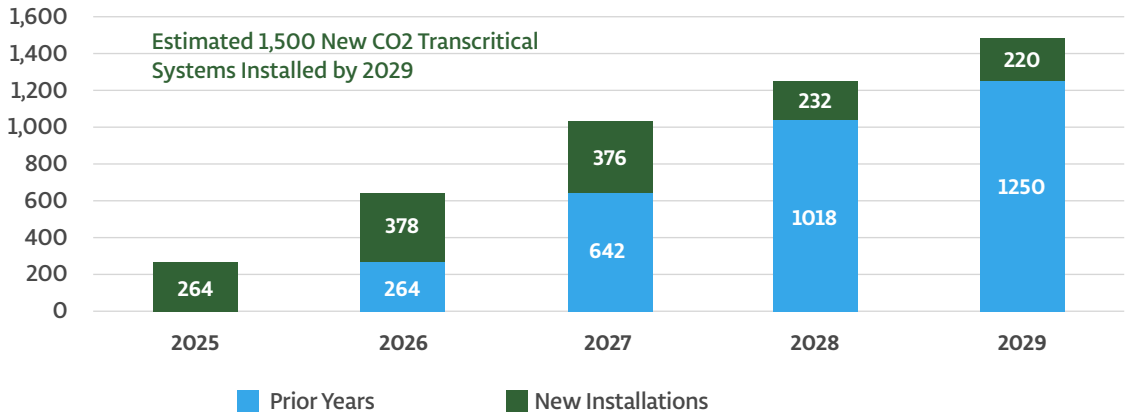
2. CO2 transcritical systems are poised to be the dominant technology in new sites.

Participants collectively reported plans for over 2,000 new stores between 2025 and 2029, and **CO2 transcritical systems will be the dominant architecture for those sites.**

New Stores Planned by System Type



Projected New CO2 Transcritical Systems



Updated Finding

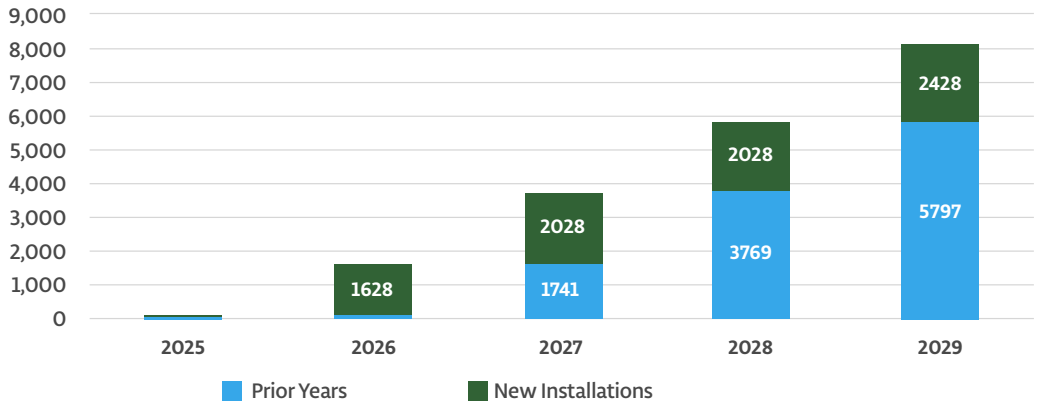
The 2024 survey found that retailers projected a step-change in CO2 adoption coinciding with TTR compliance dates.

The current survey shows a flattened continuous growth as retailers move forward regardless of rule timing. This suggests that large chains have internalized CO2 as part of their long-term strategy and are no longer pacing adoption strictly to proposed federal deadlines.

3. CO2 condensing units are viewed as add-ons.

CO2 remote condensing units emerged as a distinct category. **Respondents overwhelmingly described them as add-ons to existing stores to support new refrigerated load, not as primary system architectures** for full-line supermarkets.

Projected New CO2 Condensing Units

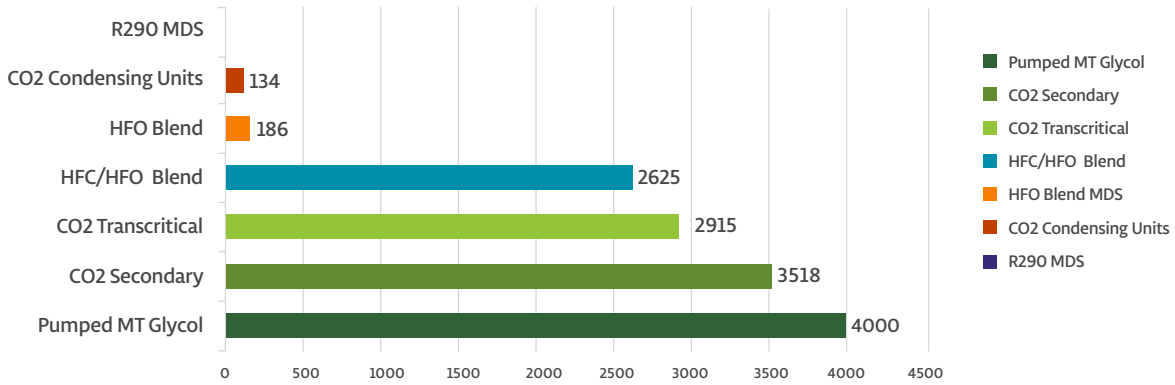


Projections show **strong year-over-year growth** in CO2 condensing unit installations, with **cumulative new installations exceeding 8,200 units by 2029**. Several retailers and OEMs view this segment as a strategic bridge technology, particularly if incentive programs can help scale volume and drive down costs.

4. System replacements substantially exceed new store construction.

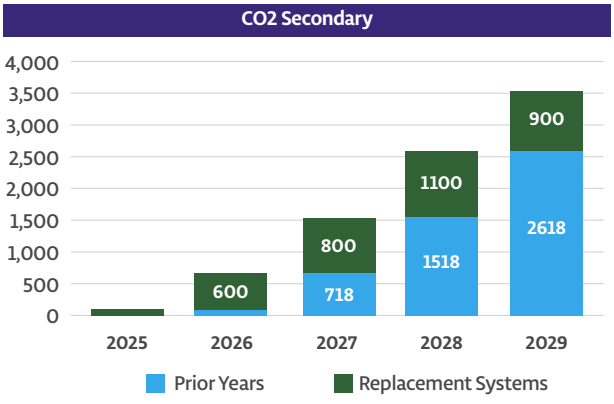
Retailers reported plans to replace approximately 13,400 systems by 2029 across a mix of architectures. While CO2 transcritical replacement systems represent a significant share of that activity, the single largest category of planned replacements is conversion to pumped medium-temperature glycol and CO2 secondary systems.

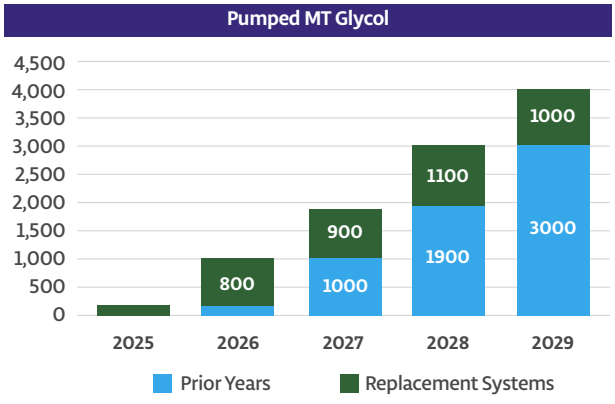
Projected Replacement by System Type



Gas retrofits—shifting from high-GWP HFCs to mid-GWP—also appear prominently in the replacement projections. These "HFC/HFO blend" entries in the survey typically reflect refrigerant change-outs on existing equipment, not full-system replacements. However, they account for a significant share of near-term emissions reductions for large chains.

Replacement System Projection

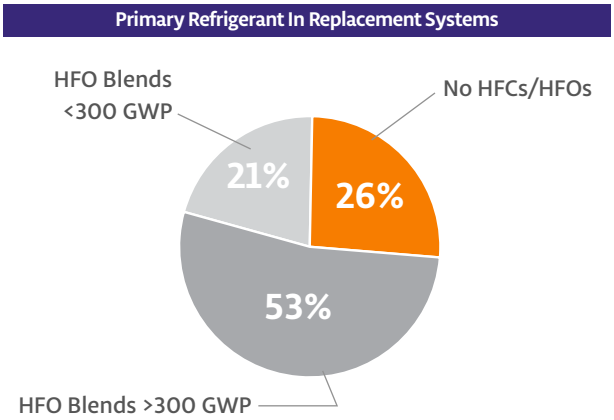


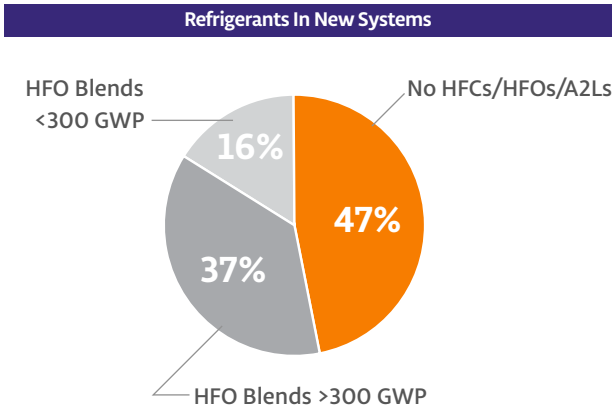


In secondary and pumped-glycol projects, retailers typically preserve the existing rack, often retain the primary refrigerant, and convert the low side of the system to a pumped secondary fluid. This phased strategy allows chains to reduce charge, cut leak-related emissions, and reconfigure loads in stages, rather than undertaking full rack and case replacements in a single, capital-intensive project.

For many respondents, secondary systems are seen as a way to "stretch the dollar" across large fleets while still delivering meaningful emissions reductions and future flexibility.

Projected Refrigerants Used in Replacement and New Systems



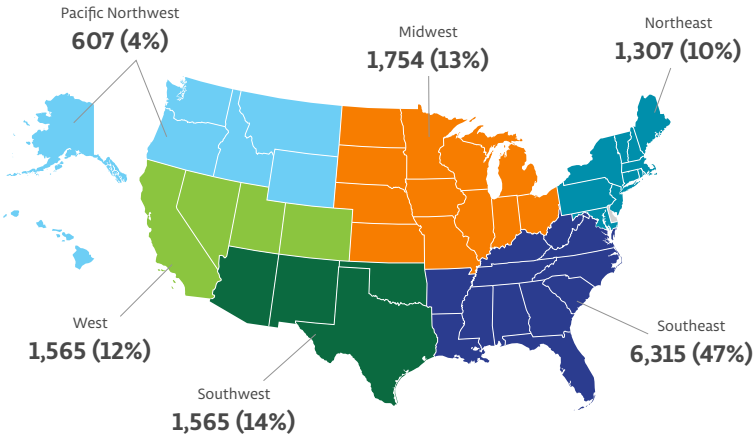


In discussion, retailers and NASRC repeatedly emphasized that A2L adoption in supermarket applications remains limited in near-term planning for many chains.

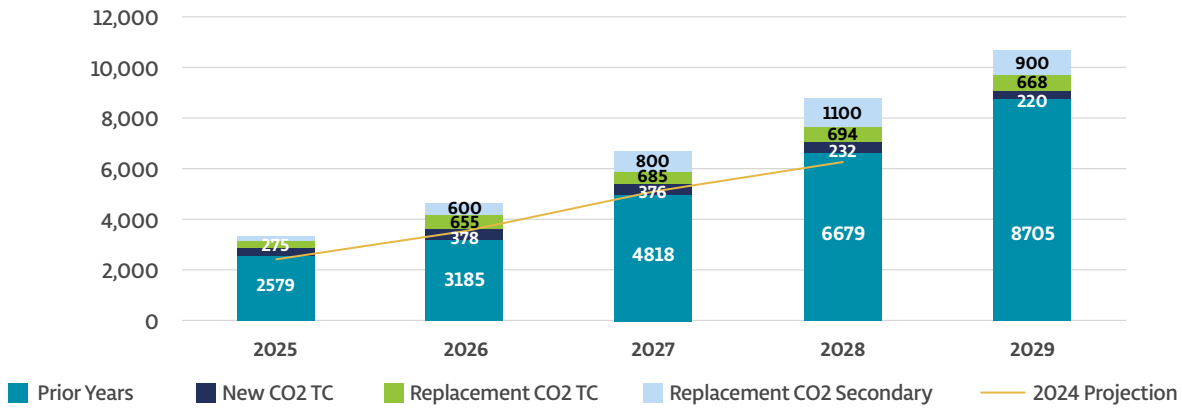
5. The Southeast is poised for significant growth in CO2 transcritical systems.

Participants reported that regional growth is more driven by where retailers are investing in new and replacement stores, and less by state-level regulation. At the same time, retailers and OEMs are actively refining system designs to address reliability and efficiency concerns in warm and humid climates.

Projected CO2 Transcritical Systems by Region



Total Projected CO2 Systems



Survey Update

New survey findings show retailers are on track to exceed expectations reported in the 2024 survey.

Total CO2 systems (including transcritical and secondary, new and replacement) are projected to surpass 10,000 by 2029, significantly above the original trajectory. Participants noted that this acceleration has occurred despite regulatory uncertainty, suggesting that corporate climate commitments, refrigerant risk management, and internal planning are now primary drivers of CO2 adoption among large chains.

6. Regulatory requirements remain the top driver.

Retailers rated the influence of various factors on their motivation to consider CO2 systems. Across respondents, three drivers consistently rose to the top:

Regulatory requirements

Existing and anticipated HFC-phase-down rules under the AIM Act and state programs.

Refrigerant cost and availability

The AIM Act phasedown curve, particularly the sharp reduction in available baseline in 2029, is shaping long-term thinking about refrigerant risk and total cost of ownership.

Future regulation risk

"Future-proofing" against additional restrictions and avoiding stranded investments in refrigerants that may face availability, cost, or compliance challenges later.

In open-ended responses, retailers characterized CO2 as a long-term solution aligned with refrigerant phasedown goals and highlighted its very low GWP as a core environmental benefit.

Participant Feedback

- "CO2 systems represent our long-term solution aligned with refrigerant phase-down goals, offering a sustainable path forward."
- "The most significant benefit is environmental sustainability. CO2 (R744) systems offer a low global warming potential (GWP) alternative to traditional HFC-based systems."

7. The lack of skilled technicians remains a barrier to transitioning to CO2.

When asked about barriers to or slowing the transition to CO2, retailers again showed a clear hierarchy.

Trained technicians

Lack of technicians with CO2 expertise.

Upfront capital cost

Respondents distinguished between new-build scenarios—where CO2 system cost premiums are often in the range of roughly 10–20% compared to 448/449 DX for large chains—and replacement scenarios, where the cost difference between a gas retrofit and a complete CO2 rebuild can be orders of magnitude higher.

Reliability concerns

Retailers cited uptime risks tied to controls complexity, design optimization for local climates, and the consequences of release events, noting that many of these issues are tightly coupled to training and design practices rather than inherent to CO2 itself.

Additional concerns surfaced, including supply-chain capacity for CO2 racks and components, long lead times, and uncertainty around efficiency impacts in different climates. While these did not always register as top-ranked barriers in the survey scoring, they are clearly influencing the pace of adoption.

Implications for Policy and Incentive Design

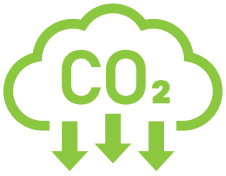
Three themes from the survey and follow-up conversations are directly relevant to policymakers and program administrators.

The continued prevalence of R22 and other HCFCs in commercial refrigeration challenges assumptions that these refrigerants are no longer a policy priority.

Retailers noted that regulatory and funding frameworks that ignore the realities of HCFC phaseout may inadvertently disincentivize transitions that could deliver substantial near-term emissions reductions.

Large chains are already planning—and in many cases, executing—significant CO2 deployment and secondary system conversions through 2029, regardless of current TTR enforcement timing.

For these operators, the key policy questions are less about whether to transition than about how rules will affect smaller retailers, the costs and feasibility of various compliance pathways, and how this should impact incentive program design to maximize the efficiency and operational performance of CO2 systems.



Replacement strategies emphasize emissions reductions achieved through a combination of charge reduction, lower-GWP refrigerants, and leak-rate reductions.

Retailers highlighted that gas retrofits and secondary systems can deliver large emissions reductions at significantly lower capital cost than full system replacements, raising questions about how regulations and incentives can best recognize performance outcomes rather than only equipment types.

Conclusion

The 2025 food retailer survey depicts a market already moving decisively toward lower-GWP refrigeration solutions, led by large chains planning beyond current regulatory uncertainties. CO2 transcritical systems are emerging as the dominant choice for new supermarkets, while pumped secondary and glycol systems, gas retrofits, and targeted use of CO2 condensing units provide flexible, phased pathways for existing fleets.

The results also underscore that the transition will be constrained if technician training, upfront capital cost, and reliability concerns are not addressed at scale—particularly in regions like the Southeast, where both projected CO2 growth and workforce needs are high.

These survey insights are informing NASRC's incentive program design, expansion of training initiatives, and development of educational resources. As the AIM Act phasedown intensifies and state policies continue to evolve, NASRC will repeat and refine this survey to track progress, identify gaps, and support an orderly, equitable transition to natural refrigerants across the entire food retail ecosystem.

This survey and report were made possible thanks to the generous support of the following companies:

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About the North American Sustainable Refrigeration Council (NASRC)

NASRC is a 501(c)(3) environmental nonprofit working to eliminate refrigeration's environmental impacts by facilitating the transition to natural refrigerants. NASRC collaborates with stakeholders across the refrigeration industry, including 55,000+ food retail locations, to drive a sustainable workforce, facilitate funding opportunities and catalyze continuous improvement. For more information, visit nasrc.org.