



California Air Resources Board
1001 I Street
Sacramento, CA 95814

October 30, 2023

Re: Senate Bill 1206 Assessment Report for Transitioning Hydrofluorocarbons (HFCs) to Ultra-Low Global Warming Potential (GWP) and/or No-GWP Alternatives

The North American Sustainable Refrigeration Council (NASRC) appreciates the opportunity to submit responses to the California Air Resources Board (CARB) Request for Information (RFI) for the Senate Bill (SB) 1206 Assessment Report.

NASRC is a California-based 501(c)(3) environmental nonprofit working to advance climate-friendly natural refrigerants and reduce greenhouse gas emissions caused by traditional hydrofluorocarbon (HFC) refrigerants. We collaborate with stakeholders from across the commercial refrigeration industry to address the barriers preventing the transition to natural refrigerants in the United States. Our member network includes major equipment manufacturers, service contractors, engineering & design firms, consultants, utilities, and food retailers representing over 55,000 locations nationally and roughly 70% of California's estimated 4,000 supermarket locations.

Once considered a suitable replacement for ozone-depleting substances, HFCs are super-polluting greenhouse gases and one of the most potent drivers of climate change. Pound for pound, HFCs trap thousands of times more heat in the atmosphere than CO₂. Classified as short-lived climate pollutants (SLCPs), HFCs have a disproportionate impact on warming in the near term, making their mitigation significantly more urgent than other GHGs.

In California, CARB's analysis identified the food retail sector as one of the state's largest sources of HFC emissions and one of the most cost-effective emission reduction potentials to meet the HFC emission reduction targets established under Senate Bill 1383. The average grocery store uses large quantities of HFC refrigerant and experiences high leak rates of approximately 25% of the refrigerant charge annually (about 875 lbs.). We estimate the climate impact from grocery refrigeration leaks in the U.S. alone to be around 55 million metric tons of CO₂ equivalent emissions (MTCO_{2e}) annually or more than half a billion MTCO_{2e} over 10 years.

What's more, there are technically viable, ultra-low global warming potential (GWP) solutions available on the market today. HFC-free natural refrigerants, such as CO₂, Ammonia, and Hydrocarbons, have zero or near-zero global warming potential (GWP), no ozone-depleting potential, and are considered technically viable, climate-friendly alternatives to HFCs. However, a unique set of market barriers—such as upfront cost premiums, technology limitations, and service workforce readiness—have prevented widespread adoption in U.S. grocery stores.

More than anything, the refrigeration industry needs solutions to transition away from HFCs and towards future-proof options that end the ongoing cycle of refrigerant transitions and system replacements that the industry has faced since the rise of chlorofluorocarbons refrigerants (CFCs). To enable California to transition the state's economy away from HFCs and to ultra-low GWP or no-GWP alternatives no later than 2035, we have provided considerations in response to the RFI below. Please note that our responses focus specifically on the food retail sector.

Section 1: Commercial and Industrial Stationary Refrigeration

- 1. What potential technological solutions are available for existing facilities and how can their adoption be accelerated?** Natural refrigerants, including CO₂ (R-744), Ammonia (R-717), and Hydrocarbons (R-290, R-600a) have zero or near-zero global warming potential (GWP), no ozone-depleting potential, and are considered technically viable, climate-friendly alternatives to HFCs. What's more, they are not at risk of being categorized as per-and polyfluoroalkyl substances (PFAS), making them the most future-proof solution for the industry. The technology is ready to deploy and nearly every major equipment manufacturer that produces HFC-based equipment in the U.S. also provide equipment available for CO₂, propane, and/or ammonia. Some examples of equipment manufacturers are available in our directory [here](#).

However for existing facilities, there are currently no “drop-in” refrigerant solutions that are <10 GWP, so the transition requires a full replacement of HFC-based refrigeration equipment with HFC-free equipment. This represents an enormous cost burden and logistical challenge. While the cost can be prohibitive for all food retailers, many small and independent food retailers simply do not have the capital needed to make the transition. Funding support is needed to accelerate this transition, especially for small and independent food retailers. See question 2 for incentive suggestions.

Another important solution for existing facilities will be “modular” technology solutions, such as self-contained cases and condensing units, that can be phased in and replace existing equipment over time. We recommend that CARB explore opportunities to accelerate the adoption of modular solutions through both incentive programs and support for pilot installations of new modular technologies to help advance the market.

Finally, it will be critical to support solutions that help grow, train, and retain California's refrigeration technician workforce to help accelerate the adoption of these technologies (see section 7).

- 2. What incentives are needed to transition existing refrigeration facilities and what GWP limit should be set for technologies supported through incentives?** Incentives to replace equipment that uses high-GWP HFC refrigerants with ultra-low GWP refrigeration equipment can both accelerate the transition to climate-friendly refrigerants and prevent store closures and food deserts in disadvantaged communities. With each system replacement costing millions of dollars, the total capital cost to transition all California food retail locations to HFC-free systems will require a multi-billion-dollar investment.

This cost burden is particularly challenging for small and independent food retailers and food retailers operating in disadvantaged communities. These businesses often lack the financial resources to transition their stores, risking store closures and the emergence of food deserts. Funding support is crucial for small and independent grocers disproportionately impacted by the cost to transition away from HFC refrigerants.

California has taken extraordinary steps to alleviate this burden with the establishment of the F-gas Reduction Incentive Program (FRIP). We strongly encourage the state to continue investing in this transition and prioritize small and independent businesses and those operating in disadvantaged communities. We also suggest that the state provide a high per-project funding threshold to ensure sufficient funds are available to enable the capital investment to transition and influence project planning.

Additionally, we encourage the state to incentivize only the very lowest GWP alternatives that are also not at risk of being classified as PFAs or facing other regulatory restrictions. Incentivizing other alternatives would be a disservice to the industry and has the potential to perpetuate the ongoing burden of refrigerant transitions in the future. With the federal HFC phasedown already impacting the supply and prices of high-GWP refrigerants, it will be even more important to provide support for small businesses to transition to future-proof and climate-friendly refrigerants.

Within FRIP, we also suggest exploring options to provide incentives for “pre-purchasing” of equipment that can be used in future installations. This is often a strategy of larger retailers that makes the equipment more affordable and ready to deploy at an accelerated rate.

Finally, we recommend that the state explore additional models of incentives that could be “stacked” with FRIP to maximize impact, such as:

- Incentives for food retailers to sell or destroy their recovered HFC gas through a state buy-back program or other model;
- Incentives that optimize installation timelines for contractors and enable more projects to be completed;
- Incentives that optimize system performance through proper commissioning and leak maintenance over the first year;
- Incentives that accelerate innovation amongst equipment manufacturers to create energy efficient, no or ultra-low GWP, modular equipment for existing facilities; and
- Upstream or midstream incentives that allow manufacturers and/or contractors to offer equipment and/or services at lower costs for a limited time.

4. What barriers exist in bringing technologies such as ejectors, CO2 condensing units and others, to the California market, particularly for smaller refrigeration systems such as those found in convenience stores?

The main barrier to bringing new and modular technologies to the market is cost. By our estimates, the cost of a CO2 condensing unit is five times higher than the cost of a comparable HFC condensing unit. We expect that this is in large part due to a lack of economies of scale. CARB can support these technologies by directly accelerating installations to help reach economies of scale and drive costs down. Incentive opportunities like those listed in question 2 can be the accelerator for those installations.

Section 7: Workforce Training

32. What workforce training will be required for technicians to transition to ultra-low GWP and/or no-GWP alternatives? Earlier this year, we released a [report](#) summarizing the findings of an assessment we conducted to compile data-driven solutions to build a sustainable technician workforce. Increasing access to training on to ultra-low GWP and no-GWP refrigerants was one of the leading solutions identified. Since then, we have developed and piloted two models for successful training.

- **Natural Refrigerant Training Summit:** This year, we hosted the [first-ever Natural Refrigerant Training Summit](#), which provided more than 200 refrigeration technicians with 17 different natural refrigerant training sessions at no cost. Southern California Edison hosted the event in Irwindale, California, and the model proved to be incredibly successful. Based on an event follow-up survey, 100% of responding technicians reported an improvement in their CO2 knowledge level.

We recommend the state look into options to scale this type of training offering and provide support for contractors to invest in training throughout the state through funding support and a statewide program.

- **On-Site Training:** We have hosted several free technician training events at grocery stores around California. While the audience is smaller than the training summits, these on-site events offer technicians the opportunity to get in front of real-world equipment and have a more hands-on experience. We recommend that the state look into opportunities to leverage existing equipment to train more of the workforce to install and service these systems.

33. How can the necessary training become more available and accessible for technicians? We recommend that the state work in partnership with the industry, existing training entities, and HVACR trade school and community college programs to develop and launch a state-wide training program for technicians. Each stakeholder group has active leaders that are working to scale training opportunities, so there is an opportunity to leverage that expertise and provide resources and funding to develop a state-wide program.

To truly build a ready and trained technician workforce, other activities to address the shrinking technician workforce will be critical. Some examples of activities consider are listed below:

- a. **HVACR Student Networking:** Coordinate opportunities for California HVACR students to learn about and build relationships with the refrigeration industry. This can establish a stronger pipeline of students entering the industry to help rebuild the refrigeration workforce. For example, we recently hosted a networking event with nearly 100 California HVACR students and faculty and over 350 stakeholders from the refrigeration industry. The event successfully connected students to industry stakeholders, built relationships with school faculty, and raised awareness about a career in refrigeration.
- b. **HVACR Faculty Training:** Refrigeration and climate-friendly refrigerants are typically underrepresented in HVACR school curriculum. To equip HVACR faculty to introduce new curriculum to their programs, we encourage the state to support HVACR school faculty training on refrigeration and climate-friendly refrigeration technologies.
- c. **Managerial Training:** Retention is the most cost-effective strategy to reduce the growing refrigeration technician workforce gap. We recommend exploring opportunities to support managerial training for seasoned technicians to ensure success as they advance through their careers and take on leadership roles within their companies.

Section 10: Overarching Questions

38. What factors around PFAS (per- and polyfluoroalkyl substances) should be considered as California transitions to ultra-low- and/or no-GWP alternatives? The potential for refrigerants to be classified as PFAS is a risk to the food retailers who have been stuck in an ongoing cycle of refrigerant transitions for decades. These transitions are costly, logistically challenging, and have the potential to lead to store closures. Clarity and certainty are the most important things for the industry to enable a smooth transition away from HFCs. To prevent perpetuating the cycle of refrigerant transitions, we would encourage CARB to focus on the very lowest GWP alternatives that are also not at risk of future regulatory restrictions or bans.

41. Do you have any suggestions for legislative, or regulatory changes that are needed to transition away from HFCs and to ultra-low GWP and/or no-GWP alternatives? Effective legislation has the potential to provide the clarity and certainty that the industry currently needs. We appreciate CARB's history of examining industry challenges and seeking solutions that benefit the market and the industry, and encourage CARB to take a similar approach in this next phase.

We appreciate your consideration and are happy to act as a resource to further develop these ideas or others moving forward. Thank you for the opportunity to submit comments.

Sincerely,



Danielle Wright
Executive Director
North American Sustainable Refrigeration Council