

GreenChill

KEEPING COOL FOR FIFTEEN YEARS

2007-2022



15
YEARS





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For 15 years, GreenChill Partners have led the way for supermarkets, modernizing the technology in refrigeration systems and reducing emissions that can harm our ozone layer. These industry leaders are demonstrating an unwavering commitment to best practices that protect our planet and the people. EPA's GreenChill Program proves that when we work together, we can deliver environmental protections and economic benefits, from job creation to cost savings, for all.

Michael S. Regan, Administrator
U.S. Environmental Protection Agency



The GreenChill Program at 15 Years

In 2007, EPA launched the GreenChill Partnership, a program for food retailers committed to leading the transition out of ozone-depleting refrigerants, reducing refrigerant emissions, and adopting improved refrigeration management practices and technologies. The goals of the GreenChill Partnership are to provide food retailers (supermarkets, grocery stores, co-ops, supercenters, and wholesale clubs) and other industry stakeholders with information and assistance to:

- Transition to environmentally friendlier refrigerants;
- Lower refrigerant charge sizes;
- Eliminate refrigerant leaks;
- Implement best environmental practices; and
- Adopt green refrigeration technologies.

EPA also believed from the Partnership's inception, that the Agency could accomplish these goals while also saving food retailers money. Indeed, 15 years later, GreenChill Partners have shown they can save money and reduce the environmental impact of refrigeration in supermarkets and food retail stores across the United States.

Since 2007, the Program's Corporate Partners and individually GreenChill Certified Stores have avoided 100 million metric tons of carbon dioxide equivalent (MMT CO_2e), 583 metric tons of ozone depletion potential (ODP), and saved \$582 million in refrigerant replacement costs. GreenChill Partners cover one-third of food retail locations in the United States. Many more food retail companies and individual stores are eligible to participate in GreenChill and contribute to the Program's success. In just one year, if every supermarket reduced its emissions rate to the GreenChill Partnership average, the supermarket industry could save more than \$541 million in refrigerant replacement costs, reduce emissions by 30 MMT CO_2e , and avoid 69 MT ODP. As GreenChill celebrates this anniversary, the Program continues to work collaboratively with the food retail industry to reduce refrigerant emissions that harm the ozone layer and contribute to climate change. GreenChill continues to evolve as the supermarket industry makes advances in corporate sustainability and climate protection.



The GreenChill program has been an extremely valuable public/private partnership for Hy-Vee, and the entire grocery industry. This program has been instrumental in helping retailers like Hy-Vee benchmark their progress in reducing greenhouse gas emissions and achieving our sustainability goals.

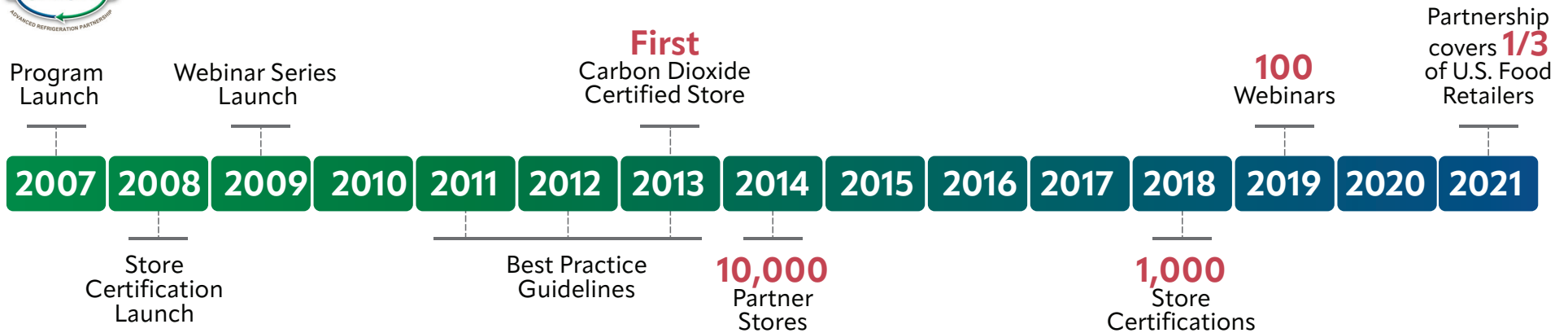
Jon Scanlan, Assistant Vice President,
Refrigeration & Energy Management, Hy-Vee

Today, GreenChill stakeholders are on the forefront of creating and piloting recently developed systems and refrigerants that operate with lower global warming potentials (GWPs) and can lessen contributions to climate change. In 2020, Congress passed the American Innovation and Manufacturing (AIM) Act, which gave EPA new authorities to phase down hydrofluorocarbons (HFCs),

a class of potent greenhouse gases that are commonly used as refrigerants. As the AIM Act is implemented, GreenChill stakeholders will serve as leaders in reducing the use of high-GWP HFC refrigerants. This 15th anniversary report highlights the many meaningful and measurable accomplishments of GreenChill and its Partners and looks ahead to the future of the Program.



GreenChill's Cool Accomplishments



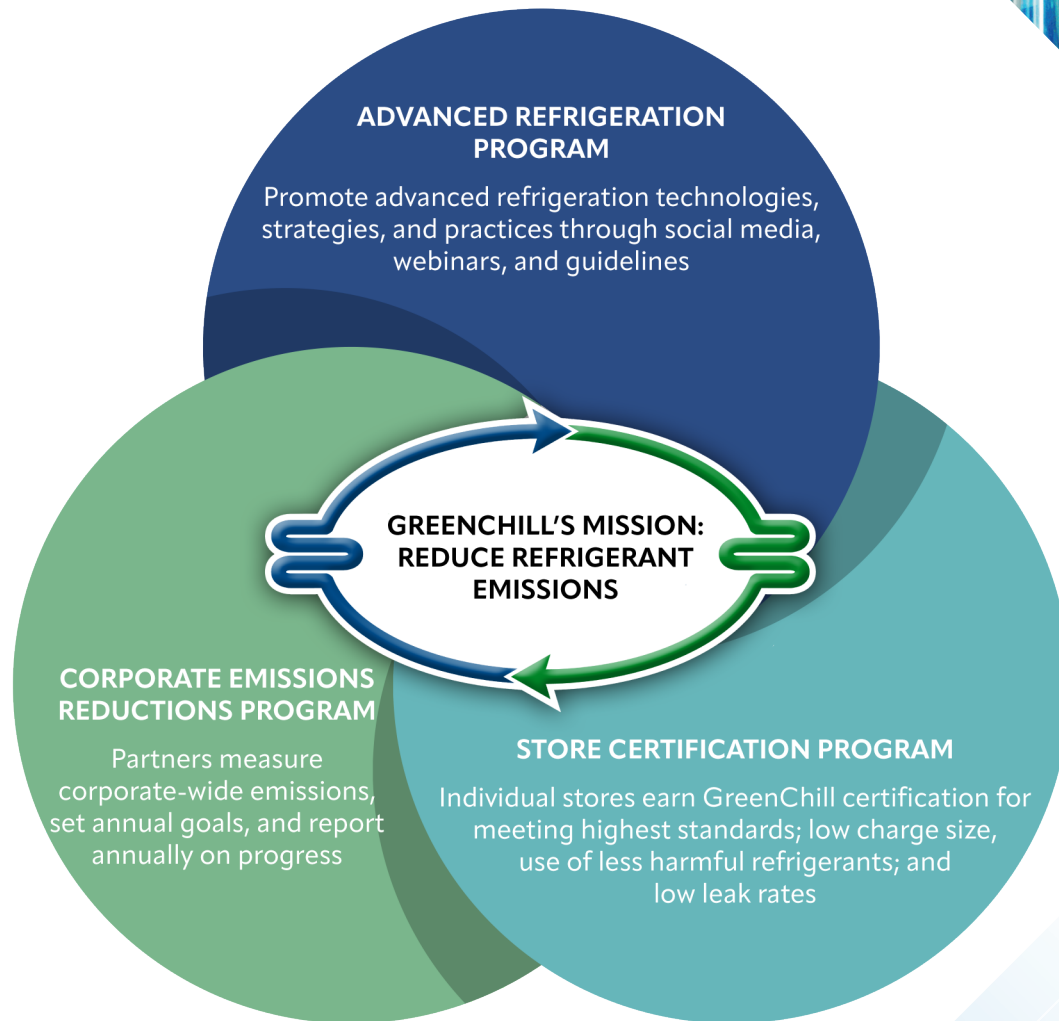
GreenChill's Cool Programs

Three core programs work in different ways to achieve GreenChill's mission.

Corporate Emissions Reduction Program (the Partnership). Partners with food retailers and refrigeration system manufacturers to reduce refrigerant emissions, and chemical producers to promote the adoption of environmentally friendlier refrigerants.

Store Certification Program. Recognizes individual stores for using environmentally friendlier commercial refrigeration systems.

Advanced Refrigeration Program. Promotes advanced refrigeration technologies, strategies, and practices through technical webinars, industry-specific web content, information, and guidelines.



Corporate Emissions Reduction Program Success

[GreenChill's Corporate Emissions Reduction Program](#) success is the result of Partner actions. Partners include food retailers (i.e., supermarkets, grocery stores, co-ops, supercenters, and wholesale clubs), refrigeration system manufacturers, and chemical producers. They set annual emissions reduction goals, measure refrigerant stocks and emissions, and report their data to EPA. GreenChill's trends show major shifts in the adoption of alternative refrigerants since 2007 that benefit the ozone layer and reduce contributions to climate change.

GreenChill Partnership Continues to Grow

GreenChill launched with just 10 Partners and today has 43 corporate partners. GreenChill's Food Retail Partners operate more than 13,500 stores in all 50 states, accounting for roughly one-third of all U.S. food retailers.

Recognizing GreenChill Partner Achievements

EPA spotlights Partner achievements by honoring top performing companies at an annual recognition event. GreenChill recognizes Partners for outstanding achievements to reduce refrigerant emissions and decrease their impact on the ozone layer and climate change. Since 2007, GreenChill has recognized 213 individual achievements. For example, Weis Markets achieved the Most Improved Emissions Rate recognition most recently in 2021. Cook County Whole Foods Co-op received the Best Emissions Rate recognition in 2020. [Explore current and past winners.](#)



Giant Eagle achieved the Best Partner Emissions Rate in 2011



GreenChill's 10 original Partners in 2007

GreenChill Partner Trends Show Gains for the Environment

Partner data trends since 2007, depict benefits for the environment. GreenChill Partners are successfully transitioning out of ozone-depleting substances, and more recently, are adopting lower-GWP alternative refrigerants that lessen the industry's contributions to climate change.

In addition to these environmental benefits, Partners' efforts to adopt newer system technologies, use newer refrigerants, apply best practices, and maintain leak tight systems result in decreasing refrigerant emissions, and also lower refrigerant replacement costs. Moreover, by ensuring that common sources of leaks, such as corroded parts, leaky valves, and broken motors, are regularly inspected and repaired, and continued maintenance also help Partners improve the performance and energy efficiency of their refrigeration systems. Partners have avoided an estimated \$399 million in refrigerant replacement costs since 2013.

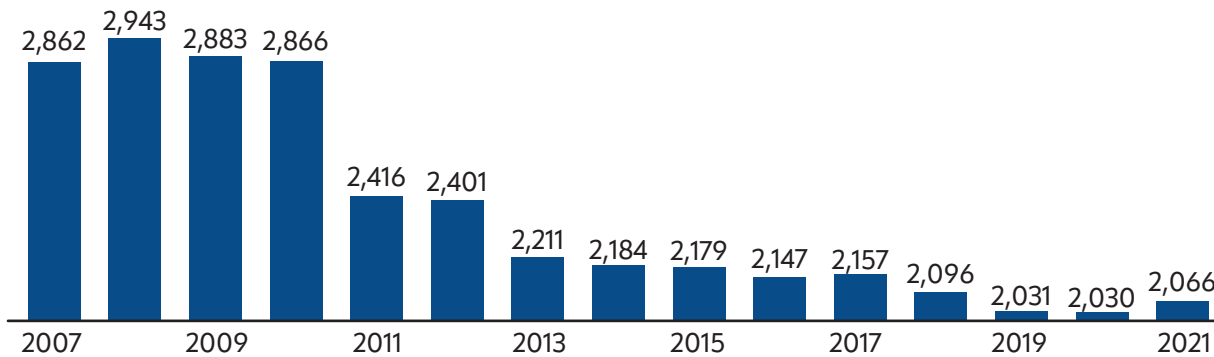
Partners Maintain a Low Refrigerant Emissions Rate

At the launch of the GreenChill Partnership in 2007, EPA developed an industry average leak rate of 25% based on research and expert input. Partners' average refrigerant emissions rate was 12.9 percent in 2021, which is about half of the estimated industry average of 25 percent.

Partners are Using Less Refrigerant

Since 2007, the amount of refrigerant contained in Partner stores' systems has been declining, likely due to the adoption of newer system technologies. Additionally, stores are increasingly shifting to self-contained equipment, and traditional food retailers are piloting smaller footprint stores in urban areas. Both self-contained equipment and smaller footprint stores result in smaller refrigerant charge sizes per store.

Average Pounds of Refrigerant Installed per GreenChill Partner Store Over Time



The GreenChill partnership has expanded our knowledge of our system and is helping our co-op realize sustainability goals. Their webinars have introduced us to new products and methods that we would not have otherwise known about. Knowing how our leak rates compare to the industry is a valuable tool and we have an expanded awareness of the positive impact that we can have with reduced leak rates.

Brett Frazer, Facilities Manager,
City Market, Onion River Co-op

Partners are Transitioning to Alternative Refrigerants

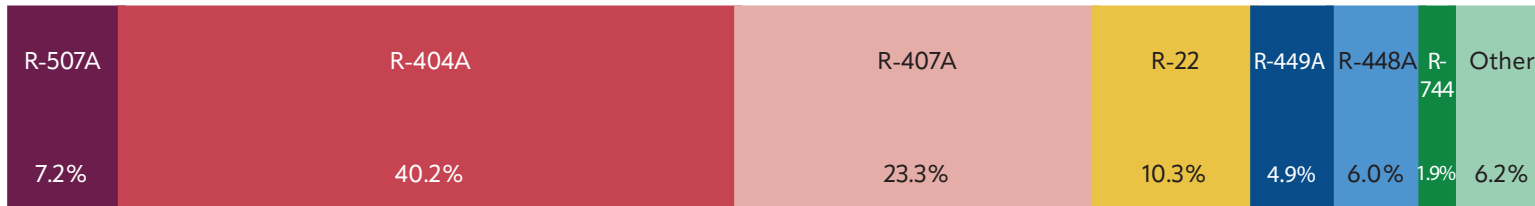
Over time, the number of GreenChill Partners and the refrigerants they use have evolved. In 2010, production and import of the common refrigerant R-22 was banned except for use in equipment manufactured before 2010. As a result, GreenChill Partners have transitioned away from R-22 to a wider variety of alternative non-ozone depleting refrigerants.

Refrigerants in Partner Stores (2007 and 2021)

2007



2021

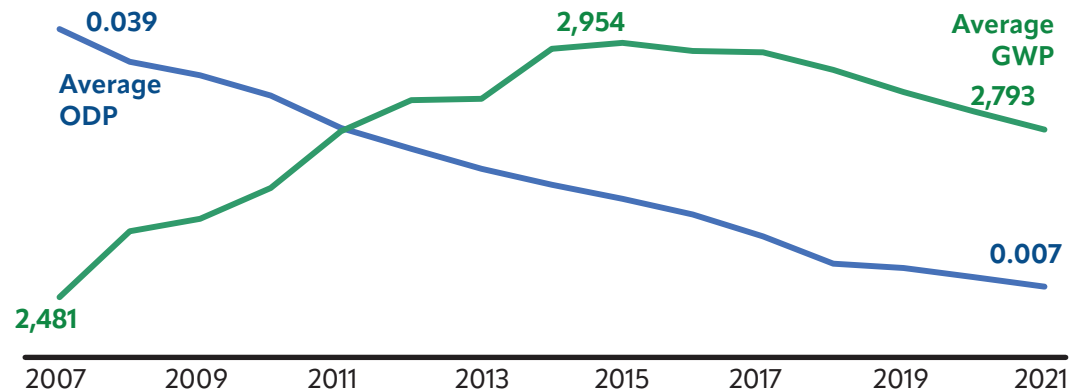


Higher GWP

Lower GWP

After the 2010 phase-out of R-22 in new systems, the average GWP of refrigerants increased, peaking in 2015 when the refrigerant profile of the Partnership included over 44 percent of R-404A (which has a GWP of 3,922). Since that time, the average GWP of installed refrigerants has fallen to 2,793. This reduction is driven by a declining use of R-404A in Partner systems and growth in the market share of lower GWP alternatives. This indicates that Partners are effectively transitioning away from higher-GWP refrigerants such as R-507A and R-407A to more climate-friendly refrigerants, such as R-290 and R-744.

Average ODP and GWP per Pound of Refrigerant Installed in GreenChill Partner Stores Over Time



Store Certification Program Achievements

[GreenChill's Store Certification Program](#) sets the standard for demonstrating the responsible refrigerant management of individual food retail stores. Through this program, GreenChill awards either Platinum, Gold, or Silver-Level Certification to food retail stores that significantly reduce the environmental impact of their refrigeration systems. The Program provides an opportunity to recognize the individual stores that go above and beyond to meet ambitious environmental standards, including the use of advanced refrigeration systems, non-ozone-depleting refrigerants, lower-GWP refrigerants, and maintaining leak tight systems.

GreenChill Store Certification Criteria		
Certification Level	Charge to Load Ratio*	HFC Emissions Rate
Silver	<1.75	<15%
Gold	<1.25	<15%
Platinum (HFC Pathway)**	<0.5	<5%

*(lbs. HFC/1,000 BTU/hr)

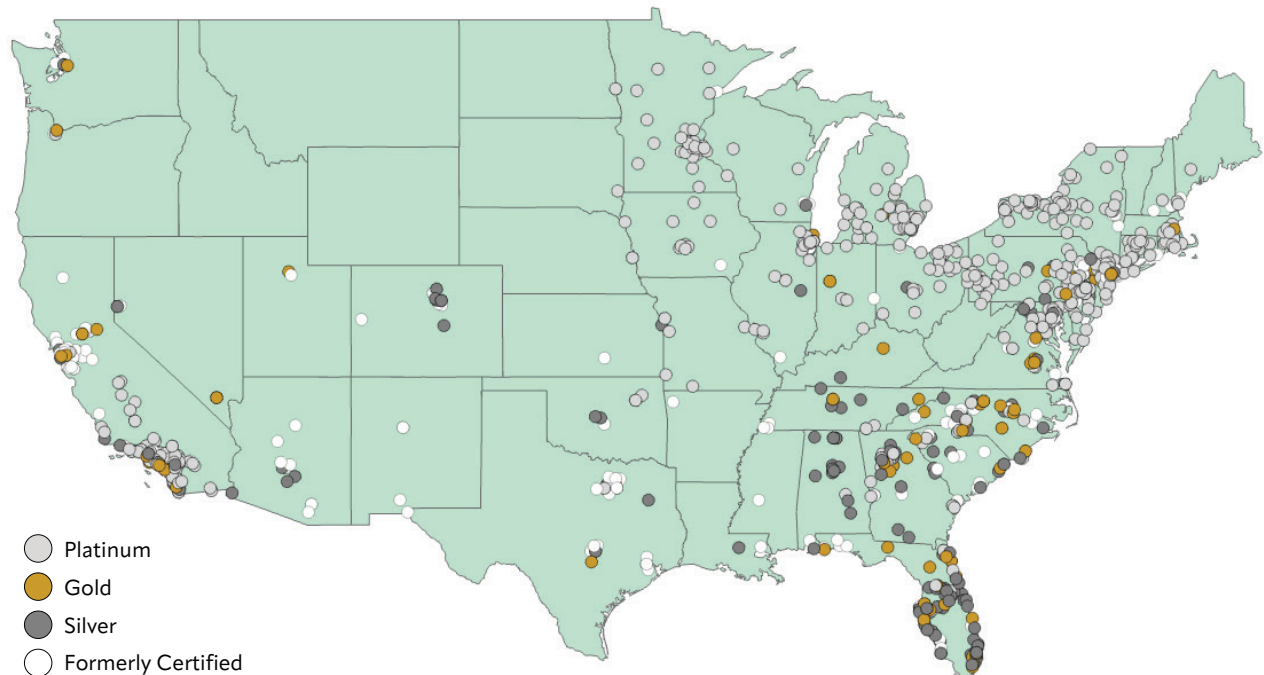
**Stores may achieve Platinum-Level Certification via the HFC pathway if refrigerants have GWPs lower than 150. Newly constructed stores using HFCs or hydrofluoroolefins (HFOs) must be leak tested according to [GreenChill Guidelines](#).

Food Retail Stores Aim High and Meet GreenChill Standards

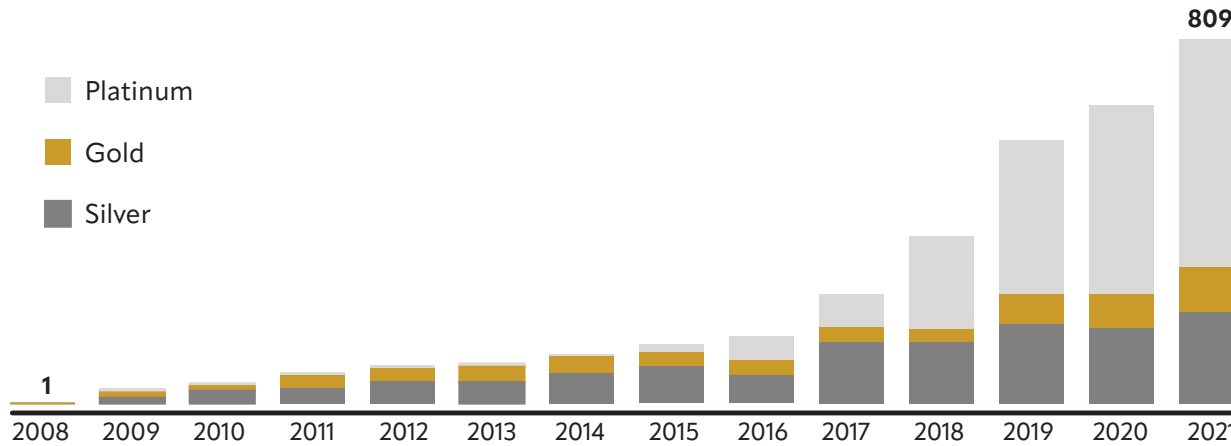
GreenChill issued its first Store Certification in 2008. Since then, over 1,100 individual food retail stores across the United States have committed to GreenChill Store Certification standards and successfully certified their stores. The number of GreenChill Certified Stores has grown by an average of 67% each year.

GreenChill Certified Stores are consistently striving for greater environmental achievements, as demonstrated by the growth in the number of Platinum-Level stores – the highest certification level profiled in the exhibits. Stores' increasing focus on designing systems that meet and surpass GreenChill standards means that over half of GreenChill Store Certifications are at the Platinum-Level as of September 2022.

GreenChill Certified Stores (2022)



Number of GreenChill Certified Stores Over Time



Food Retailers are Achieving Significant Environmental Benefits

Since 2008, GreenChill Certified Stores have avoided emissions equivalent to over 1.4 MMTCO₂ through preventative maintenance and leak reduction practices – equivalent to the total emissions avoided from 250,000 homes' electricity use for one year. By meeting GreenChill standards, Certified Stores have avoided more than \$7,600,000 in refrigerant replacement costs as compared to typical food retail stores.

Food Retail Stores are Maintaining Certified Systems with Success

GreenChill engages with Store Certification Program participants to ensure that stores re-certify when eligible to continue earning recognition and demonstrating their environmental achievements. The number of re-certifying stores continues to rise – in 2021, 83% of GreenChill Certified Stores were re-certifications. In fact, over 75% of all stores have certified for two or more years and nearly 40% of all stores have certified for four or more years.



Our proudest moment with GreenChill was the first time ALDI won a Certification award. The comradery and support felt by colleagues in the industry was moving. This recognition, and the impact we know we are making on the environment, keeps us motivated to do more.

Amber Hardy, Director of Facilities, Systems and Sustainability, ALDI

GreenChill Store Certification Criteria Food Retail Stores are Using Lower-GWP Refrigerants

GreenChill Certified Stores are industry leaders in environmentally friendly refrigeration technologies across the sector, including the use of low-GWP refrigerants and installation of advanced refrigeration systems (i.e., those that reduce refrigerant charges and refrigerant emissions).

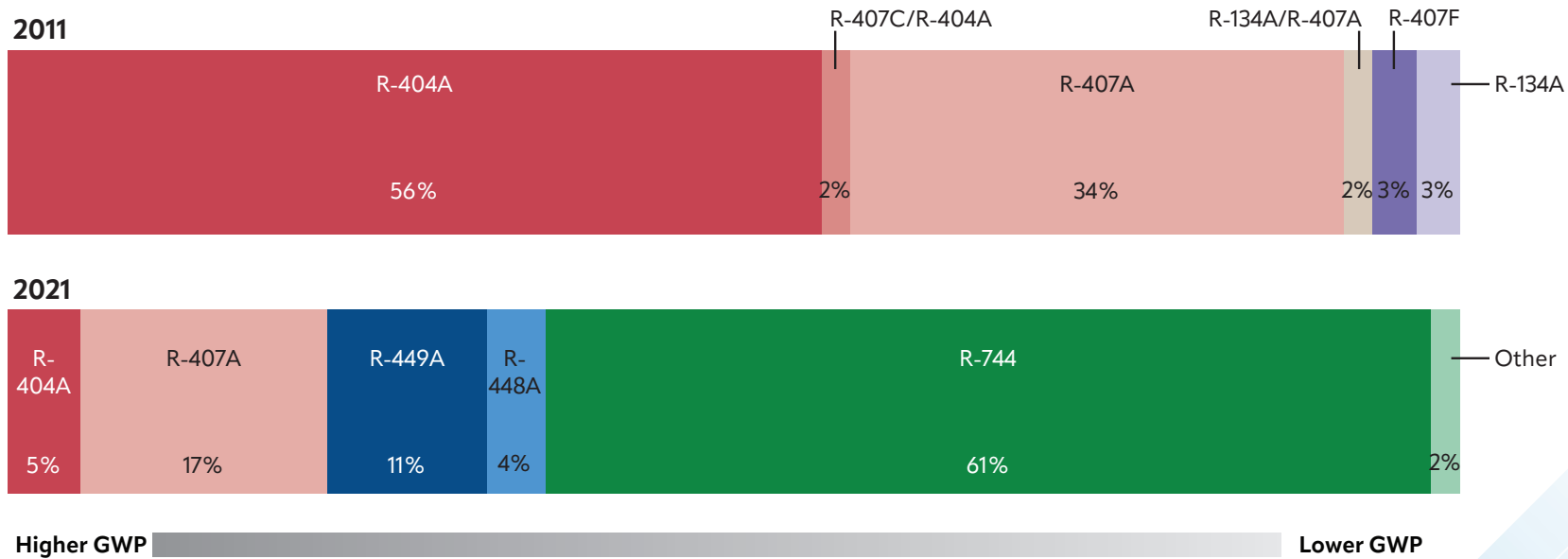
Celebrating 10+ Years of GreenChill Certification

These GreenChill Certified Stores have cumulatively avoided emissions of 91,000 MTCO₂e.

- Food Lion – Columbia, SC
- Hannaford – Turner, ME
- Publix Super Markets – Fort Myers, FL
- Publix Super Markets – Winter Haven, FL
- Publix Super Markets – Suwanee, GA
- Sprouts Farmers Market – Whittier, CA
- Stater Bros. Market – Chino, CA
- Stater Bros. Market – Moreno Valley, CA
- Target – San Clemente, CA
- Weis Markets – Hanover, PA



Refrigerants in Certified Stores: 2011 and 2021



Two refrigerants listed together (e.g., R-134A/R-407A) indicate two primary refrigerants in use.

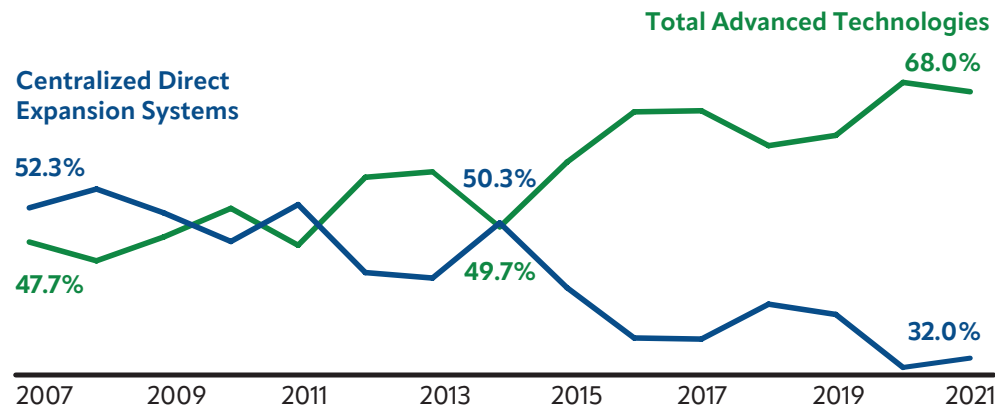
Advanced Refrigeration Program

[GreenChill's Advanced Refrigeration Program](#) provides the food retail industry with the latest information on emerging refrigeration system technologies and trends. Advanced emerging refrigeration system technologies are important because they push the industry forward. They generally operate more efficiently and with lower refrigerant charge sizes, are less prone to leaking, and use lower-GWP refrigerants. GreenChill Program offerings include informational webinars, tools, calculators, and guidelines that help industry stakeholders assess the costs and benefits of adopting new refrigeration technologies.

Partners are Adopting Advanced Technologies

When GreenChill began in 2007, the most common systems newly installed in food retail stores were conventional centralized direct expansion systems. In subsequent years, new system sales have shifted to advanced technologies that typically leak less and/or use refrigerants with better environmental profiles. These advanced technologies include distributed, micro-distributed, secondary loop, cascade, and transcritical carbon dioxide systems.

Percentages of Refrigeration System Types Installed Over Time*



*As reported by GreenChill Refrigeration Systems Manufacturing Partners

GreenChill at the Forefront of Sharing Technology Innovations

[GreenChill webinars](#) provide information to stakeholders about reducing refrigerant emissions from the food retail sector, including sharing information on leak detection practices, improved maintenance options, the newest system technologies, and real-world experiences piloting alternative refrigerants. Since 2007, GreenChill has hosted over 100 webinars that have brought stakeholders together to exchange industry best practices.

Collaborate with GreenChill

GreenChill stakeholders go beyond the core Partner categories. GreenChill's mission can only be achieved in collaboration with service technicians, technology providers, component manufacturers, and many others in the food retail and environmental protection sectors. Often, these stakeholders contribute to GreenChill through participating in and presenting at webinars, sharing their input and expertise on technical documents, among other activities.



Request a Partnership Packet



Sign the Partnership Agreement



Meet eligibility requirements



Become a GreenChill Partner!

The GreenChill Partnership Process

Partnership Opportunities

Eligible food retailers, refrigeration system manufacturers, and chemical producers can apply to join the GreenChill Partnership Program.

- [An Overview for Prospective Food Retail Partners](#)
- [An Overview for Prospective Refrigeration System Manufacturing Partners](#)

Store Certification Opportunities

Individual food retail stores can apply to certify their store.

- [An Overview for Prospective Stores](#)
- [GreenChill Store Certification Program Guidance](#)
- [GreenChill Store Certification Fact Sheet](#)

Networking and Information Sharing Opportunities

All stakeholders can engage by visiting GreenChill's website, accessing resources, and signing up for the GreenChill list to learn about webinars and opportunities.

- [Sign up for the GreenChill email list](#)

Benefits of GreenChill Partnership

Protect the Environment, Save Money

Refrigerant leaks not only contribute to climate change, but can be a significant cost to a company's bottom line. Refrigerant leaked from commercial refrigeration systems eventually needs to be replaced and leaky systems also require maintenance and repairs that come at a high cost. Eliminating and reducing refrigerant emissions saves time and money for businesses and protects the environment.

Receive Analytical Support

GreenChill provides customized data reports that outline individual Partner trends in relation to overall Program statistics. Partners can compare how their metrics, such as emissions rates or ODP impact per store, compare to the Partnership as a whole. Many Partners identify this as the most valuable aspect of participating in GreenChill.

Access Best Practices

GreenChill is a forum to share best practices that reduce refrigerant replacement costs, discuss new ideas that streamline refrigeration system maintenance, and talk about the adoption of new refrigerants. GreenChill offers resources on the Program website, through Partner communications, and during webinars.

Earn Recognition

Each year, GreenChill holds a ceremony to recognize Partners and individual food retail stores for their achievements.

Prepare for the Future

GreenChill activities help Partners develop long-term refrigeration management plans and anticipate industry changes, including shifting technologies and refrigerants. GreenChill Partners lead the industry in environmentally friendly refrigeration practices.



Stater Bros. Markets achieved Store Re-Certification Excellence in 2015

The Future of GreenChill

The phasedown of HFCs under the AIM Act represents both the next challenge and the next opportunity for food retailers. EPA will continue to engage with Partners to leverage and expand on the GreenChill tools and strategies that were successful in ensuring a smooth transition from ozone-depleting refrigerants. Over the past 15 years, GreenChill Partners have adopted advanced refrigeration technologies and have taken action to reduce refrigerant emissions making ozone recovery possible and reducing stores' impact on climate change. By using lower-GWP refrigerants in equipment with better, more energy efficient designs, and implementing best practices, Partners continue to demonstrate their commitment to protecting our world. EPA looks forward to working with stakeholders to chart the future of the Partnership.



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PCC Community Markets operates on a triple bottom line, always balancing our economic, social, and environmental impact. As the nation's largest community-owned food market, we are deeply appreciative to EPA for the 2021 GreenChill Program recognition for Most Improved Emissions Rate. The installation of carbon dioxide refrigerant systems in our new stores while reducing leaks in existing stores is part of how we're optimizing our commitment to sustainability.

Mark Comstock, Vice President of Store Development, PCC Markets

Current GreenChill Partners

GreenChill is immensely thankful for Partner contributions that make the Program a success, especially founding Partners Food Lion, Giant Eagle, Hannaford, Harris Teeter, Publix Super Markets, Whole Foods Market, Hillphoenix, Kysor/Warren, and Chemours.

Food Retailers



System Manufacturers



Chemical Producers





Summary of GreenChill Recognition Recipients (2007-2021)



Summary of GreenChill Recognition Recipients (2007-2021)

Company name	Best Emissions Rate	Most Improved Emissions Rate	Exceptional Goal Achievement	Superior Goal Achievement	Distinguished Partner	Best of the Best/Store Leadership	Store Certification Excellence	Store Re-Certification Excellence
Albertsons*						★1		
ALDI						★1	★4	★54
Ashland Food Co-op	★1		★1	★1				
BJ's Wholesale Club				★1				
Brookshire Grocery Company		★1	★1	★2				
Buehler's Fresh Foods		★3		★3				
City Market, Onion River Co-op	★1	★1	★1	★2				
Coborn's Inc.			★1	★3				
Cook County Whole Foods Co-Op	★3			★1				
Dorothy Lane Market		★1		★1				
Food Lion				★6	★2			★2
Fresh & Easy Neighborhood Market					★1		★2	
Giant Eagle	★6		★4	★3				
The GIANT Company				★1				
Grocery Outlet, Inc.				★1		★1		
Hannaford				★2		★1		★2
Hanover Co-Op Food Stores		★3		★1				

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Harris Teeter	★3	★2		★2				
Hillphoenix					★2		★11	
Honeywell					★1			
Husmann					★1			
Hy-Vee			★4	★7	★1			
King Kullen			★4	★4				
Kysor/Warren					★1			
The Kroger Co.				★1				
Lidl*						★1		
McQuade's Marketplace	★1	★2		★1				
Meijer	★2		★2	★6		★1		★4
PCC Community Markets		★1						
Piggly Wiggly*						★1		
Port Townsend Food Co-op	★3			★1				
Price Chopper	★1	★2		★5	★1	★1		
Publix Super Markets				★1			★1	★2
Raley's				★3	★1			★1

Summary of GreenChill Recognition Recipients (2007-2021)

Company name	Best Emissions Rate	Most Improved Emissions Rate	Exceptional Goal Achievement	Superior Goal Achievement	Distinguished Partner	Best of the Best/Store Leadership	Store Certification Excellence	Store Re-Certification Excellence
ShopRite*								1
Sprouts Farmers Market	2		1	2		2	6	47
Star Market*						1		
Stater Bros. Market	3			1				8
SUPERVALU				3	2			
Sweetbay				1				
Target				3	1	2		1
Wegmans*								1
Weis Markets		4	3	7	1			7
Whole Foods Market		2		2	1	2		3

* Non-Partner Store Certification recognition

www.epa.gov/greenchill
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September 2022

