

Getting to know GreenChill: Best Practices for Reducing Refrigerant Emissions

Ky Asral, NJDEP



Bella Maranion, EPA



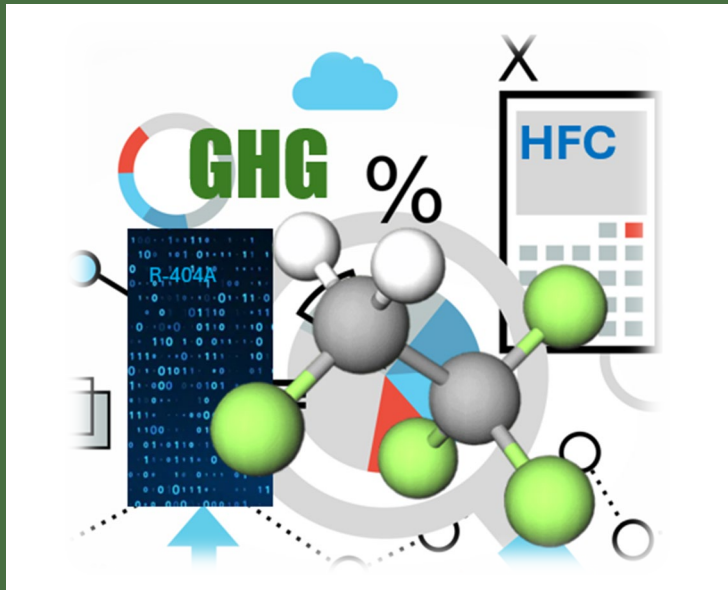
Annie Kee, EPA



Scott Scheesley, Weis Markets



NEW JERSEY
DEPARTMENT OF
ENVIRONMENTAL
PROTECTION



NJ SUSTAINABLE
BUSINESS REGISTRY

BUSINESS DIRECTORY
**RECOGNIZING
AND PROMOTING**
NJ SUSTAINABLE
BUSINESSES





EPA's GreenChill Program: Overview and Best Practices for Reducing Refrigerant Emissions

NJDEP Webinar
September 18, 2024

Outline



- GreenChill Program Overview – EPA
 - Best Practices for Reducing Refrigerant Emissions
- Refrigerant Management: Practical Experiences – Weis Markets
- Q&A Session

Bella Maranion



Bella Maranion
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Bella is a Senior Advisor in the Stratospheric Protection Division at EPA where she has worked for over 30 years in developing national regulations and policies and managing domestic and international projects related to ozone layer and climate protection. She has served on various technical committees for various national and international standards organizations. Her work also includes working with specialized sectors of use such as aviation, marine, and the military; promoting partnerships and public sector initiatives to reduce ozone-depleting substances (ODS) and greenhouse gas (GHG) emissions; and supporting sound management and responsible disposal and destruction. She helped launch EPA's GreenChill Partnership in 2007.

Annie Kee



Annie Kee
Environmental Protection Specialist
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Annie is an Environmental Protection Specialist in the Stratospheric Protection Division in EPA's Office of Air and Radiation, where she works on partnership programs and rulemakings under the American Innovation and Manufacturing (AIM) Act. Prior to working with Stratospheric Protection Division, she worked on EPA's SmartWay program, which helps companies advance supply chain sustainability by improving freight transportation efficiency.



GreenChill Overview



Program Overview

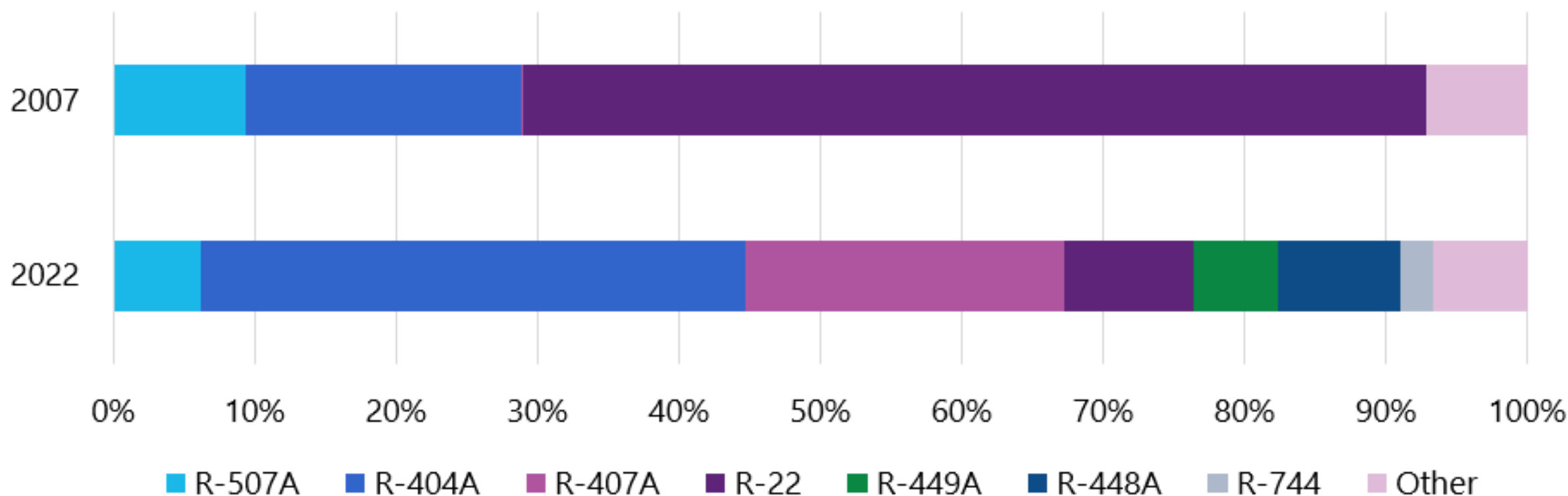


GreenChill is an EPA partnership with food retailers to reduce refrigerant emissions and decrease stores' impact on the environment

GreenChill's mission is to incentivize and support the supermarket industry to:

- Transition to zero ozone depletion potential/ lower-global warming potential refrigerants
- Lower refrigerant charge sizes and eliminate leaks
- Adopt refrigeration technologies and best environmental practices to minimize emissions

Partnership Installed Refrigerants

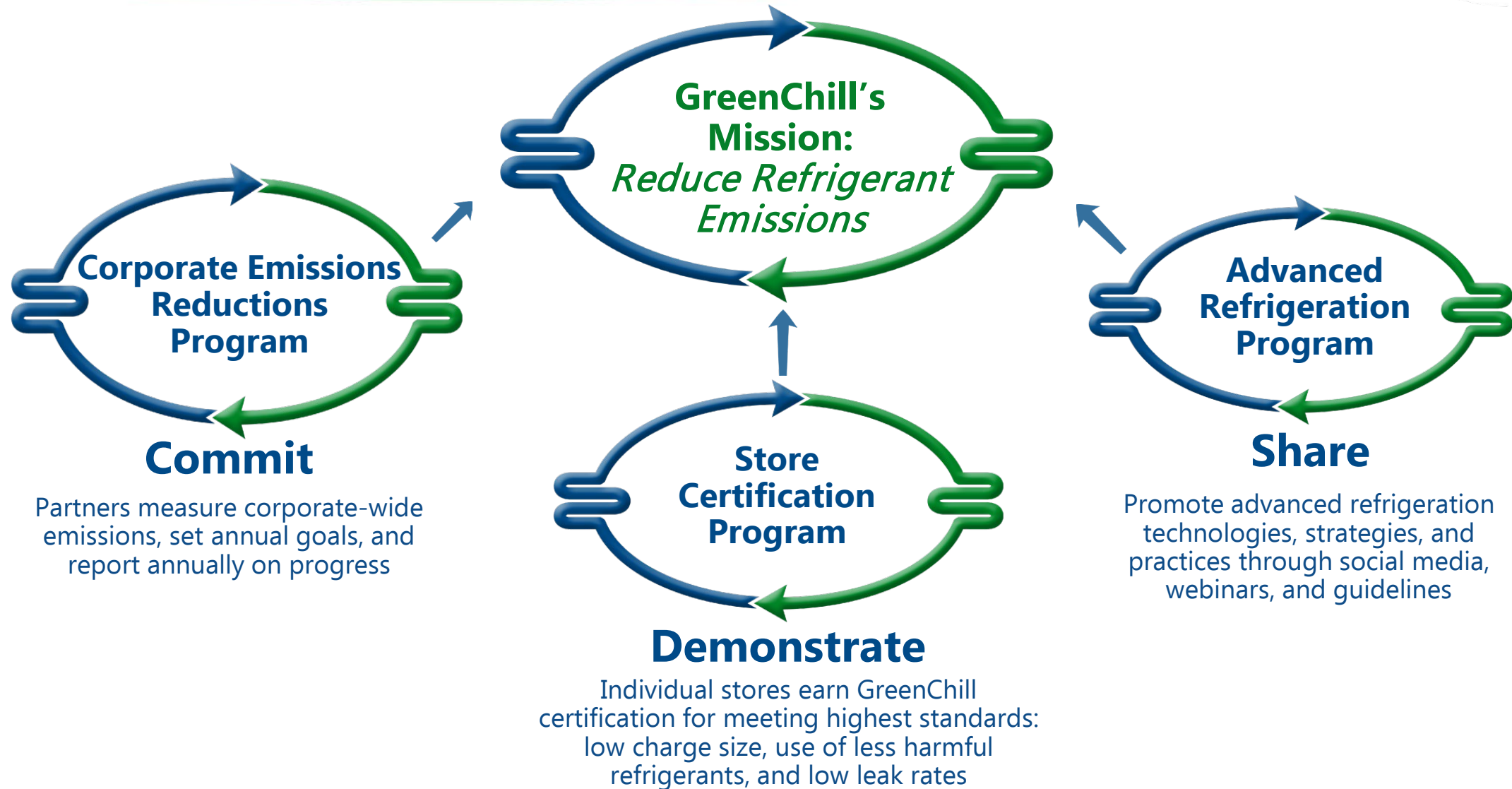


Global warming potential high to low, except "Other" category

Key Takeaways

- A much broader array of refrigerants are installed today as compared to 2007
- R-22 represents less than 10% of installed refrigerant in 2022

GreenChill's Mission



Corporate Emissions Reduction Program



Food Retailers

- Partners submit:
 - Corporate-wide data on refrigerant installed and emissions
 - Refrigerant Management Plan with goal
- Partners receive:
 - Individual benchmark report
 - Recognition for annual achievements

Systems Manufacturers

- Partners submit:
 - Data on commercial systems sold
- Partners receive:
 - Aggregate data for all systems sold by Partners

Chemical Producers/Reclaimers

- Promote the adoption of retrofit chemicals and secondary fluids

GreenChill Partners	
Food Retail-Corporate	35
Systems Manufacturers	5
Chemical Producers/Reclaimers	7

GreenChill Partners Lead the Way



Advanced Refrigeration Program



- Promotes the use of advanced refrigeration technologies, strategies, and practices
 - GreenChill participants play an important role in tackling climate change by using lower-global warming potential refrigerants and equipment with better, more energy efficient designs
- Provides resources on topics, including:
 - Leak tightness and repair
 - Retrofits
 - Refrigerant management
 - Store maintenance
 - Best practices



For more details, visit the [Advanced Refrigeration Program webpage](#)

Store Certification Program



- Certified stores demonstrate leadership in food retail refrigerant management
- These stores:
 - Use only non-ozone depleting refrigerants that are Significant New Alternatives Policy program approved
 - Have lower refrigerant charge sizes and leak rates compared to the average food retail store*
- Any food retail store in the United States can apply; not necessary to be a GreenChill Partner

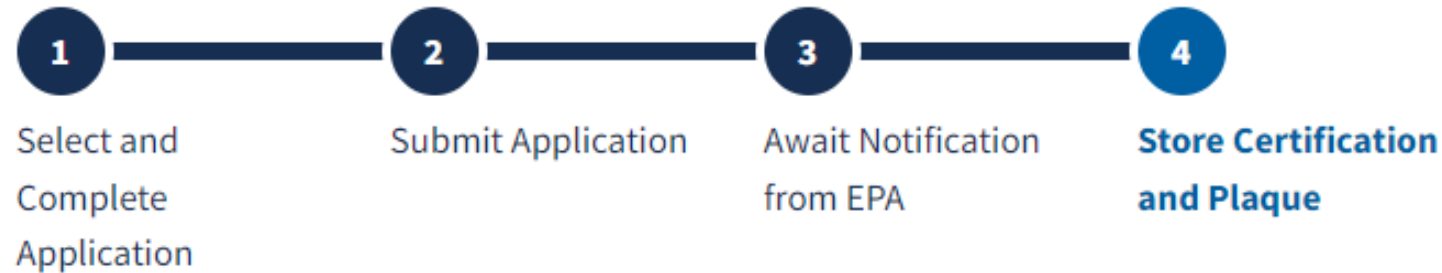


Platinum, Gold, and Silver certification levels

How to Certify a Store

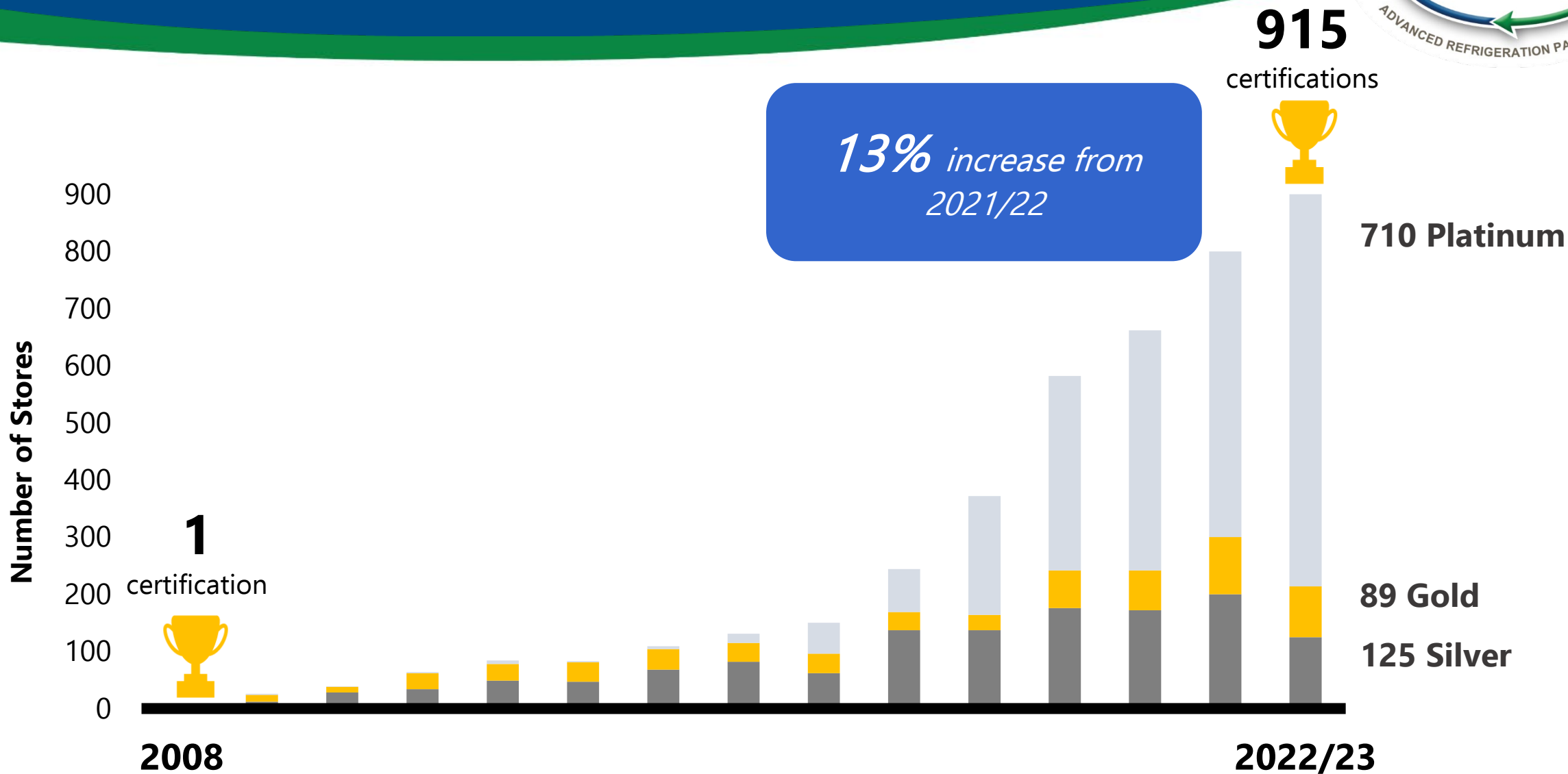


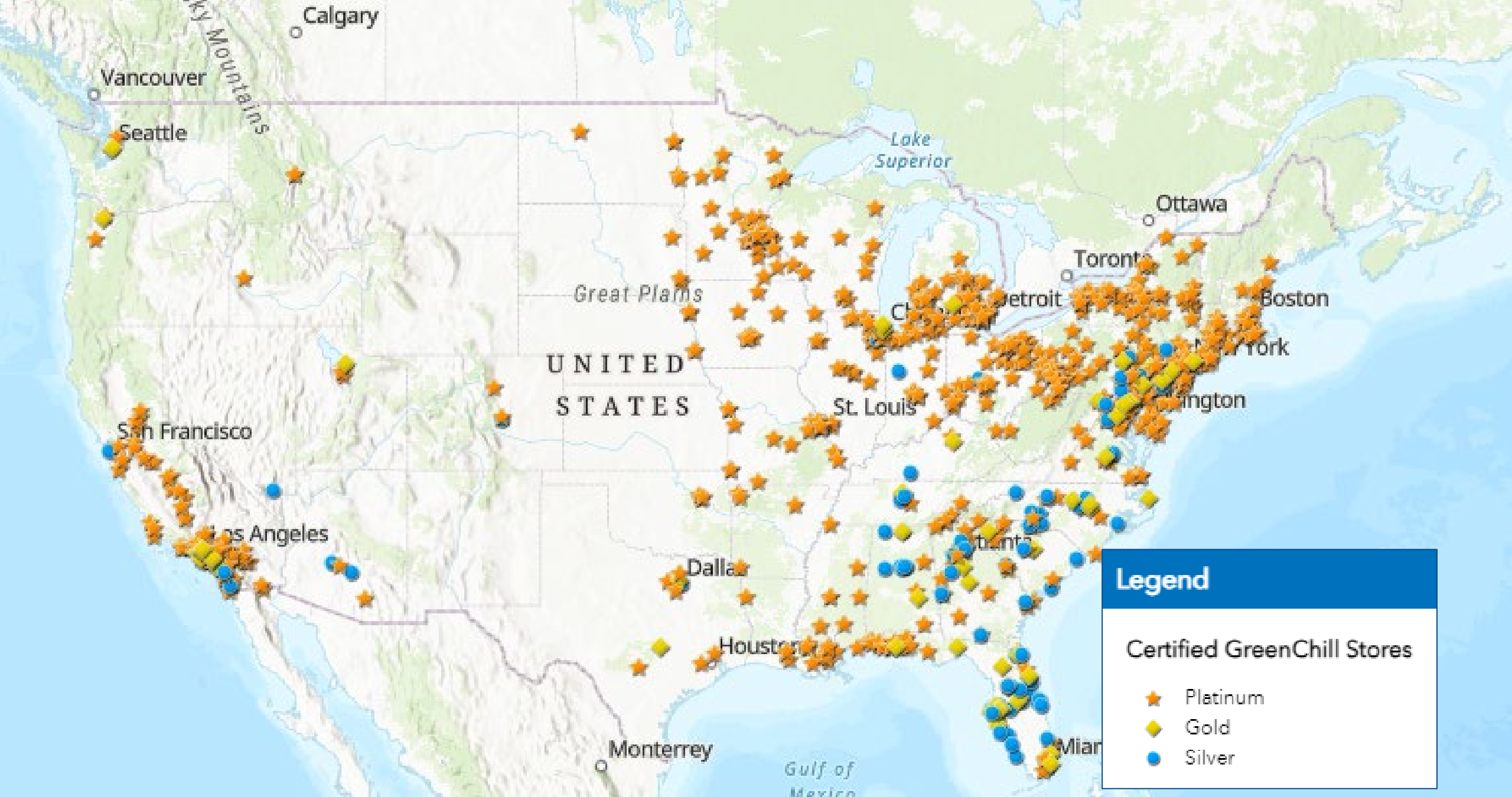
- Process is quick and easy; there is no fee to certify a store
 - Store completes a short application about the type of refrigerants used in the store, refrigerant emissions, and refrigerant charge
- Any food retail store can apply (design phase, newly constructed, fully operational, or being remodeled)



For more details, visit the [Store Certification webpage](#)

Store Certification Program





Find the [Store Certification Map](#)

GreenChill Certified Stores in New Jersey

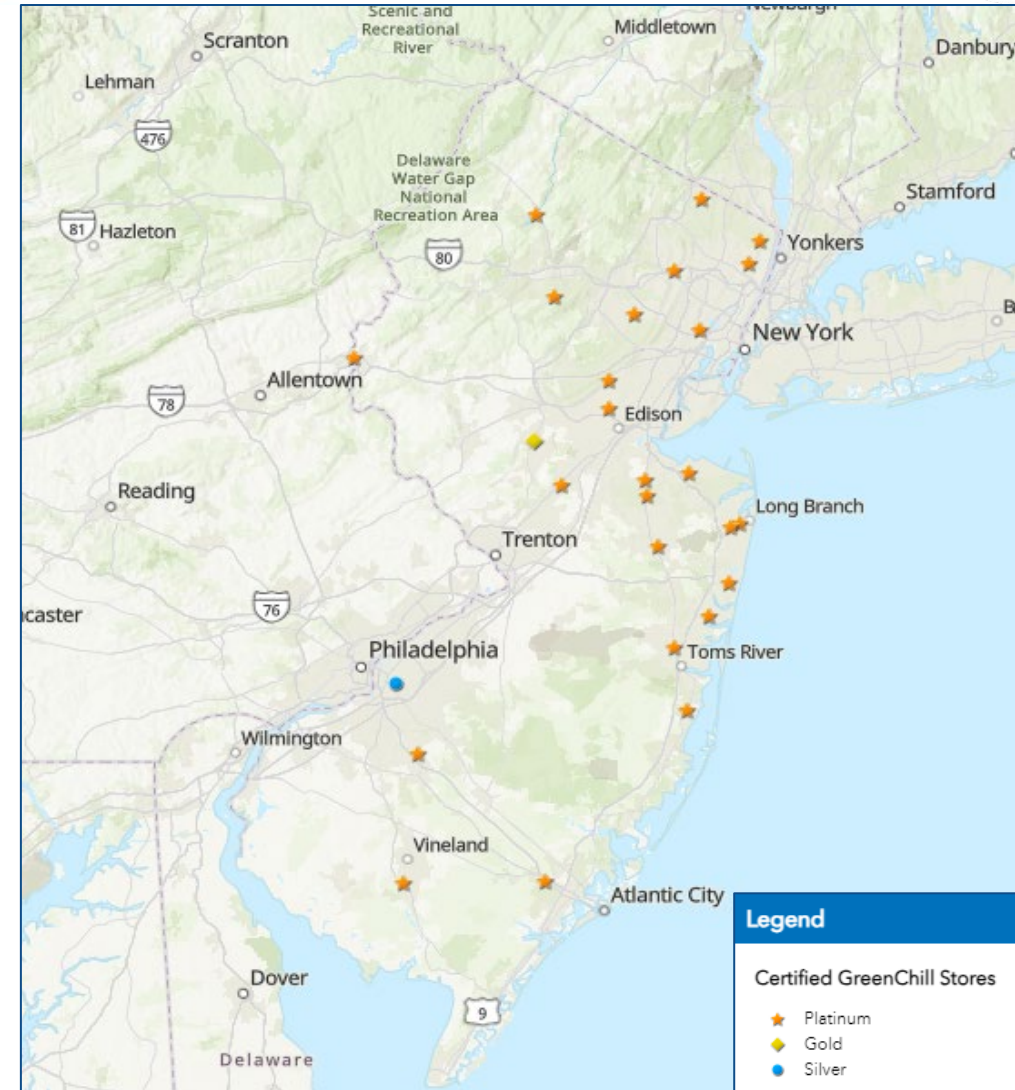


GreenChill Certified Stores in NJ:

- ALDI (20)
- ShopRite (1)
- Sprouts Farmers Market (1)
- Target (2)
- Weis Markets (2)
- Whole Foods Market (1)

Store Certification Levels in NJ:

- Silver: 1
- Gold: 1
- Platinum: 25





Best Practices for Reducing Refrigerant Emissions



Supermarket Refrigeration



- A typical supermarket using traditional refrigeration system has about 3,500 lbs of refrigerant
- The Food Industry Association (FMI) data estimates national average leak rate is about 25%
- GreenChill Partners' reported average leak rate is about half of industry average



Relevant Regulations



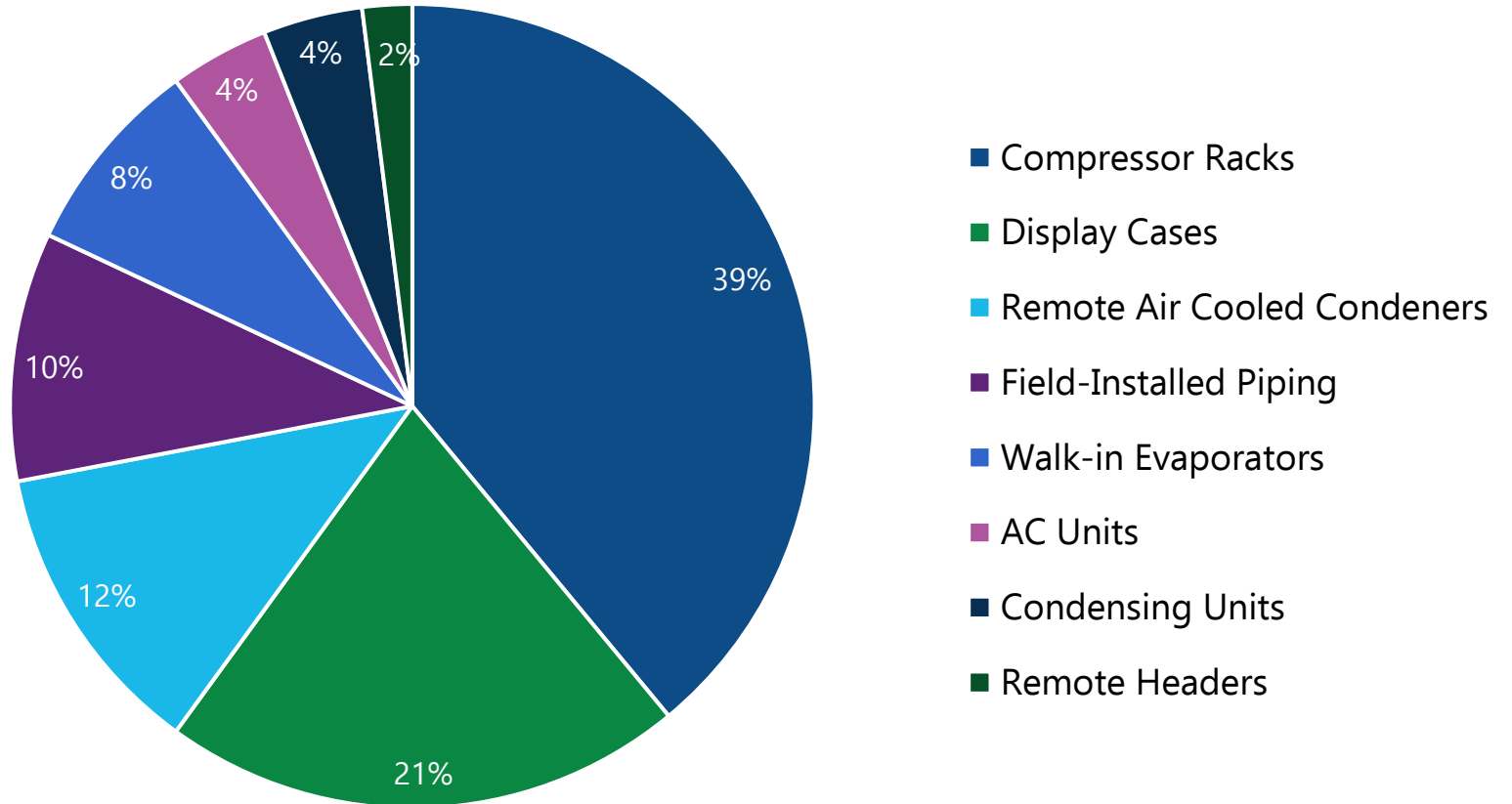
- Clean Air Act regulations
 - Require commercial refrigeration systems containing >50 lbs of refrigerant that leak more than 20% to be repaired
- American Innovation and Manufacturing (AIM) Act 2023 Technology Transition Final Rule
 - Requires supermarket systems to use refrigerants with global warming potential (GWP) < 150 starting 2027
- AIM Act proposed Emissions Reduction and Reclamation rule
 - Has proposed leak repair requirements for refrigerant-containing appliances containing >15 lbs or more of HFCs or substitutes for an HFC with a GWP greater than 53



Where Leaks Occur



- Leaks can occur in various locations throughout a supermarket
- Refrigerant leak estimates from one regional supermarket chain



Leak Sources for a Regional Supermarket Chain

Reducing Refrigerant Leaks



- According to the North American Sustainable Refrigeration Council (NASRC), retailers identified leak issues in 4 categories:
 - Cases and fixtures
 - Machine rooms and racks
 - Condensers, and
 - Connecting piping
- Successful repair of leaks and avoiding leaks ensure that appliances are operating efficiently and can help to avoid unnecessary food waste
 - In 2021, 344,000 tons of food were lost in the United States due to equipment issues in the retail and food service subsectors

Why Prioritize Leak Tightness During Equipment Installation?



Reasons why food retail stores should prioritize leak tightness during commercial refrigeration equipment installation include:

- Leaks are expensive
- Leaks harm the ozone layer and/or contribute to climate change
- Prioritizing leak tightness at installation sends a clear message to technicians and employees
- Waiting until leaks become a problem before addressing them only makes the problem bigger

Best Practices for Leak-Tight Installations



- GreenChill's Best Practices Guideline describes a process for testing a refrigeration system for leaks immediately after installation
- Steps include:
 - Pre-check and preparation procedures
 - Pressure testing procedures and standards
 - Stair-step evacuation procedures and standards
 - Charging the system with refrigerant
 - Final check procedures

For more details, explore [GreenChill Best Practices Guideline: Ensuring Leak-Tight Installations of Commercial Refrigeration Equipment](#)

Leak Prevention



- Best practices for leak prevention during design and operation of refrigeration system
 - Tracking leaks
 - Preventive maintenance practices
 - Leak repairs
 - Reducing leak potential
- Challenges
 - Difficulty in finding qualified technicians to reduce leaks in stores

GreenChill Certified Stores are Reducing Refrigerant Emissions



GreenChill Store Certifications and Avoided Emissions from 2008-2022



Note: Equivalencies estimated using EPA's Greenhouse Gas Equivalencies Calculator

GreenChill Food Retailers are Saving Money



- Certified Stores on average save more than \$2,200 each year in refrigerant replacement costs as compared to typical food retail stores.
- From 2008-2022, GreenChill Certified Stores saved more than \$8,300,000 in combined operating costs.



Benefits of GreenChill Partnership



- Protect the environment, save money
- Receive analytical support
- Access best practices
- Earn recognition
- Webinars
- Prepare for the future



Resources and Webinars



- GreenChill [Resources](#) and [Guidance Documents and Fact Sheets](#)
- [GreenChill Webinars](#), including:
 - [Managing Your Refrigerant Portfolio and Regulatory Compliance Through Data \(DC Engineering\)](#)
 - Importance of quality data and a centralized data hub to manage refrigerant and make decisions based on analysis
 - Best practices around training and readiness for compliance inquiries
 - [Refrigerant Leak Detection Technologies \(Matelex\)](#)
 - Overview of pros and cons for direct and indirect Automatic Leak Detection (ALD)
 - Example savings from reducing leaks, managing energy use
 - [Refrigerant Management Solutions \(DC Engineering\)](#)
 - Best practices to develop a holistic refrigerant management strategy to transition to new technologies and refrigerants, reduce leaks
 - [Exploring the True Cost of Refrigerant Leaks and Proactive Solutions \(NASRC\)](#)
 - Details environmental and economic impact of leaks and specific technical solutions

Conferences



September 23 – 25, 2024 | Baltimore, Maryland

Attend the GreenChill Recognition Event and Breakout Session on Sep. 25th!

[Food Marketing Institute 2024 Energy and Store Development Conference](#)

Learn from the best in the food retail industry about energy efficiency and conservation, as well as store design and merchandising

February 8 – 12, 2025 | Orlando, Florida

[ASHRAE Winter Conference](#)

Technical program with tracks covering heating, ventilation, and AC systems and equipment, refrigerants, energy efficiency, operations, and maintenance

Become a GreenChill Partner!



**Join your
Industry Peers!**

*GreenChill is
actively recruiting
new Food Retail
Partners*



Request a
partnership packet



Sign the partnership
agreement



Meet eligibility
requirements



Become a GreenChill
partner!

The GreenChill Partnership Process

For more details, visit [the Partnership webpage](#)

Thank You!



www.epa.gov/greenchill

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 [@EPAair](https://twitter.com/EPAair)



Refrigerant Management: Practical Experiences

Weis Markets

Scott Scheesley



Scott Scheesley
Facility Maintenance HVAC/Refrigeration Manager
Weis Markets, Inc.
Email: scott.scheesley@weismarkets.com



Scott Scheesley is the corporate refrigeration manager for Weis Markets, Inc., a regional grocer. He is responsible for all liquid ammonia and traditional refrigerant systems, including the maintenance and regulatory requirements, many are EPA, PSM and OSHA-required programs. He manages 30 technicians, a parts department, several support vendors, contractors and suppliers. He leads the company's founding partnership with the EPA in the GreenChill program, starting in 2008. Scott has an extensive background in production, manufacturing, controls and military maintenance operations and holds a B.S. degree in Chemistry.

Weis Markets – In a Snapshot



- Regional Grocery Retailer
 - Central/Eastern Pennsylvania – 118
 - Western New Jersey – 6
 - Southern New York – 8
 - Delaware – 5
 - Maryland – 52
 - Northern Virginia – 9
 - Eastern West Virginia – 3
- 23,000 Associates

Weis Markets – In a Snapshot



- Special Facts
 - Founded in 1912
 - Privately-Owned / Publicly-Traded
 - Internal Manufacturing Facilities
 - Milk/Assorted Drinks
 - Ice Cream
 - Meat Plant
 - Internal Distribution
 - Milton Distribution Facility
 - Truck Fleet

Weis Markets – In a Snapshot



weis
markets

**For over
100 years,
Weis Markets
and its associates
have worked hard
to offer their customers
the best combination of
value, quality, and service.**

Weis Markets – Today



weis
markets

Weis Markets – Today



weis
markets

Weis Markets - Scott Scheesley



- Responsibilities
 - All store Refrigeration/HVAC maintenance
 - 27 In-house technicians / 4 Vendors
 - 5 Supervisors
 - Corporate Ammonia refrigeration maintenance
 - 4 In-house technicians
 - 1 Supervisor
 - Support Personnel
 - Parts / Admin

Weis Markets - Scott Scheesley



- Responsibilities
 - Compliance Programs
 - EPA Reporting
 - Process Safety Management (PSM)
 - Several OSHA Requirements
 - Pennsylvania College of Technology Advisory Board
 - GreenChill Program Lead

Founding GreenChill Partner



- Weis helped establish the GreenChill Program
 - Identified the value in the program
 - Spearhead a national recognition program
 - Enhance internal operations:
 - Decrease maintenance downtime
 - Reduce shrink
 - Save capital to reinvest elsewhere
 - Receive PR / Recognition
 - Reduce environmental impact

Weis – A GreenChill Partner



- 2008 Weis Baseline Year
 - Leak rate – 18.3%
 - 77,966 lbs
 - R-22: 21,800lbs
 - R-404A: 58,600lbs
 - Other: Balance
 - \$433,626 cost

Weis – A GreenChill Partner



- 2008 Weis Markets joined GreenChill
- 2012 Established Technician Incentive Plan
 - All techs paid cash bonus on combined results
- 2013 Leak Checks changed – *Quarterly to Monthly*
- 2014 Purchased 12 additional “Bag” Leak Detectors
- 2015 Purchased 6 additional “Bag” Leak Detectors

Weis – A GreenChill Partner



- 2015 Changed Incentive Plan
 - Reward individuals with low leak rates
 - Encourage techs with high leak rates to improve
- 2018 Included Supervisor in Incentive Plan
 - Supervisor rewarded by their team's results
- 2018-20 Upgraded 27 detectors to “non-bag” type
- 2022-24 Upgraded 27 detectors to more accurate units.

Weis GreenChill Incentive Plan



■ Technician Incentive Plan

- Below 10% leak rate \$500
- Below GreenChill goal \$600
- Below stretch goal \$700
- 4th Lowest leak rate \$500
- 3rd Lowest leak rate \$750
- 2nd Lowest leak rate \$1,000
- Lowest leak rate \$1,250
- Most improved \$500

Weis GreenChill Incentive Plan



■ Technician Incentive Plan

■ Below 10% leak rate	\$500	500
■ Below GreenChill goal	\$600	600
■ Below stretch goal	\$700	700
■ 4 th Lowest leak rate	\$500	
■ 3 rd Lowest leak rate	\$750	750
■ 2 nd Lowest leak rate	\$1,000	
■ Lowest leak rate	\$1,250	Payout = \$2,550
■ Most improved	\$500	

Weis GreenChill Incentive Plan



- ▣ Supervisor Incentive Plan
 - Below 10% leak rate \$1,500
 - Below GreenChill goal \$1,500
 - Below Stretch goal \$2,000
 - **Payout is also cumulative**

Weis GreenChill Incentive Plan



Technician Incentive Plan	<u>Before</u>	<u>2024</u>
▪ Below 10% leak rate	\$500	\$1,000
▪ Below GreenChill goal	\$600	\$1,250
▪ Below stretch goal	\$700	\$1,500
▪ 4 th Lowest leak rate	\$500	\$1,000
▪ 3 rd Lowest leak rate	\$750	\$1,500
▪ 2 nd Lowest leak rate	\$1,000	\$2,000
▪ Lowest leak rate	\$1,250	\$2,500
▪ Most improved	\$500	\$750

Weis GreenChill Incentive Plan



Supervisor Incentive Plan	<u>Before</u>	<u>2024</u>
▪ Below 10% leak rate	\$1,500	\$3,000
▪ Below GreenChill goal	\$1,500	\$3,000
▪ Below Stretch goal	\$2,000	\$4,000

Weis GreenChill Partnership Cost



Cost to Weis

- Expected cumulative payout to Associates
 - \$130,250
- Cost to conduct leak checks – *Yearly estimate*
 - \$48,600
- Cost to maintain equipment – *Filters/Maintenance/Equipment*
 - \$45,000

TOTAL = \$223,850

Weis GreenChill Partnership Cost



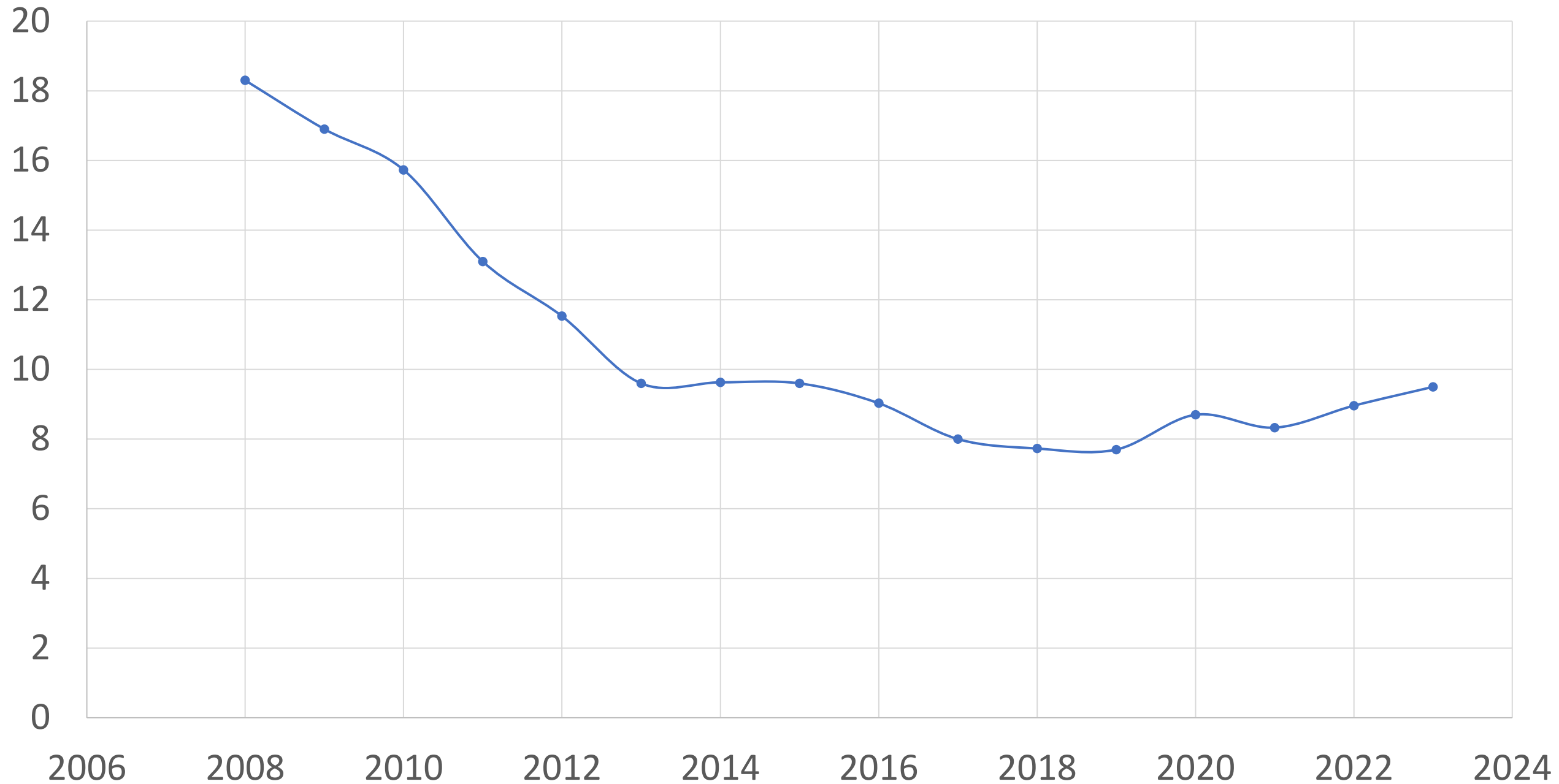
Cost to Weis

- **For all this investment, there had better be results!**

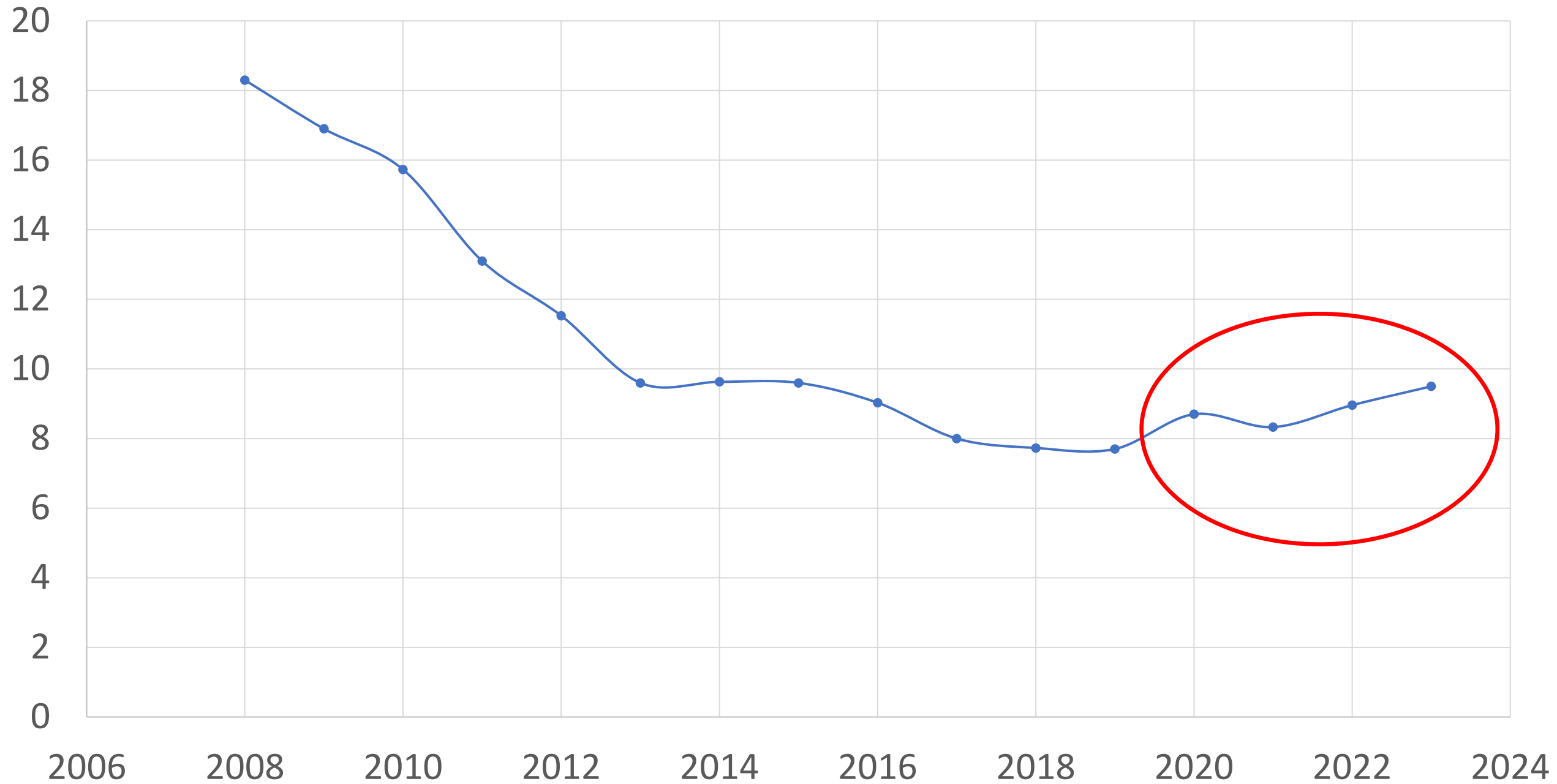
TOTAL = \$223,850/yr

So, what were the results?

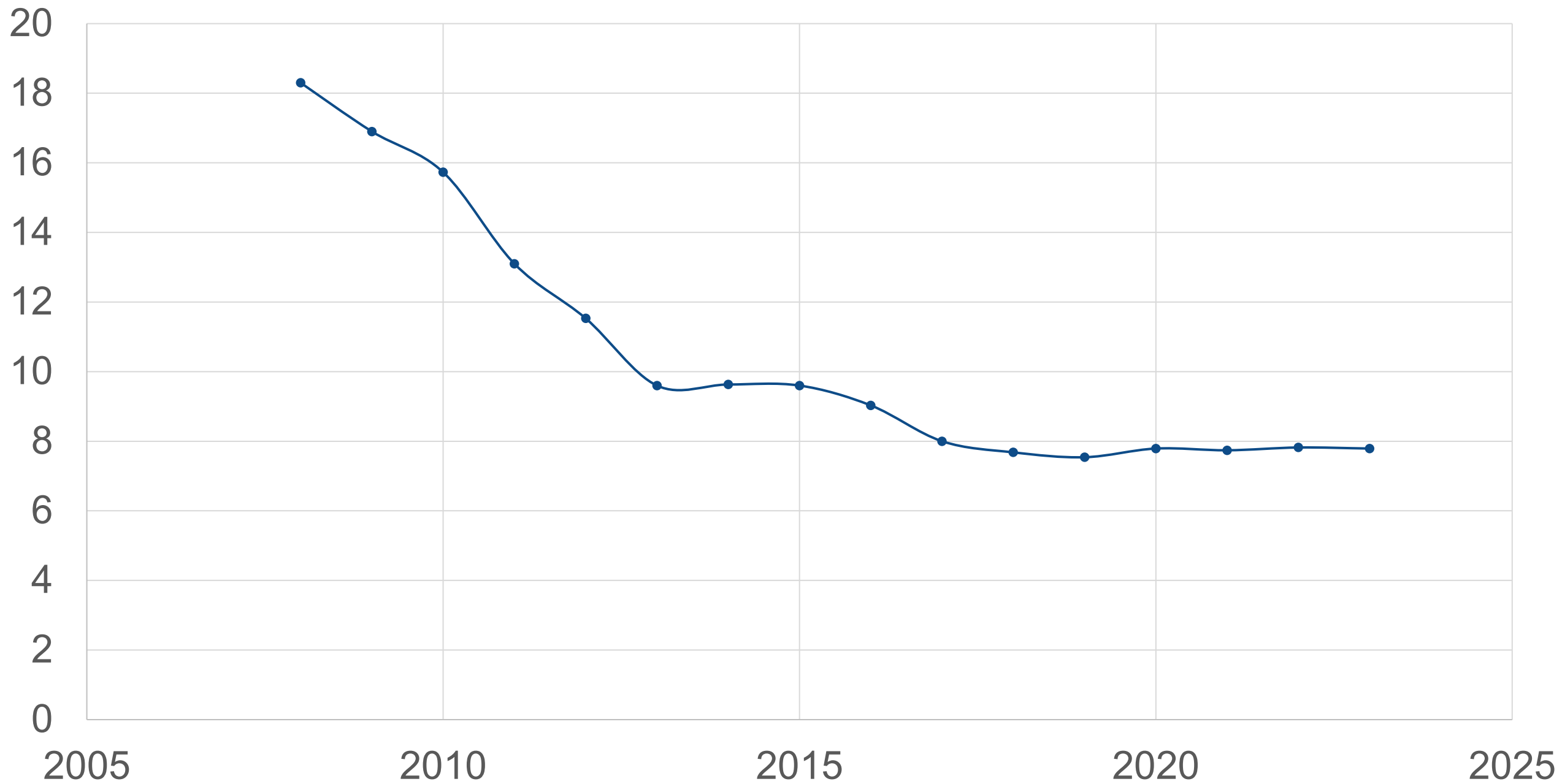
Average Leak Rate *(3yr Average, All Refrigerants)*



Average Leak Rate (3yr Average, *All Refrigerants*)



Average Leak Rate (3yr average, *HFC/HCFC Only*)



Weis GreenChill Partnership Savings



Year	Emissions Rate	Refrigerant Used	Refrigerant Cost	Savings from Baseline
2008	18.30%	77,966	\$443,626	0
2009	14.10%	64,795	\$404,320	\$120,436
2010	14.80%	66,832	\$342,179	\$80,921
2011	10.40%	47,205	\$286,534	\$217,656
2012	9.40%	42,197	\$233,771	\$221,336
2013	9.00%	40,055	\$198,454	\$205,069
2014	10.50%	46,400	\$227,567	\$169,050
2015	9.30%	41,014	\$138,101	\$133,646
2016	7.30%	40,031	\$195,921	\$295,223
2017	7.40%	41,080	\$190,764	\$280,990
2018	8.40%	45,402	\$202,668	\$238,859
2019	7.20%	37,707	\$163,848	\$252,599
2020	8.50%	44,237	\$212,344	\$244,820

\$2,460,605

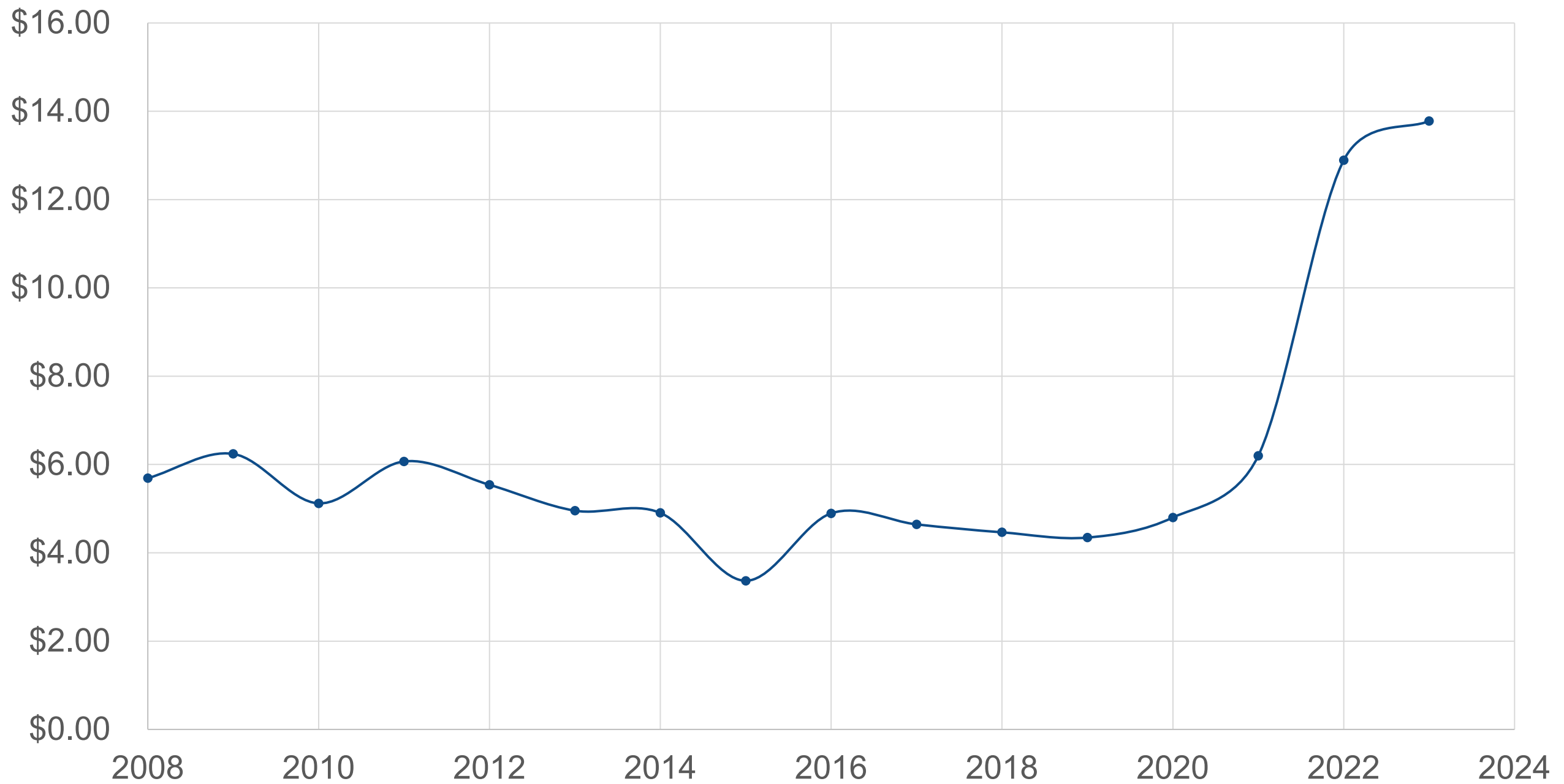
Weis GreenChill Partnership Savings



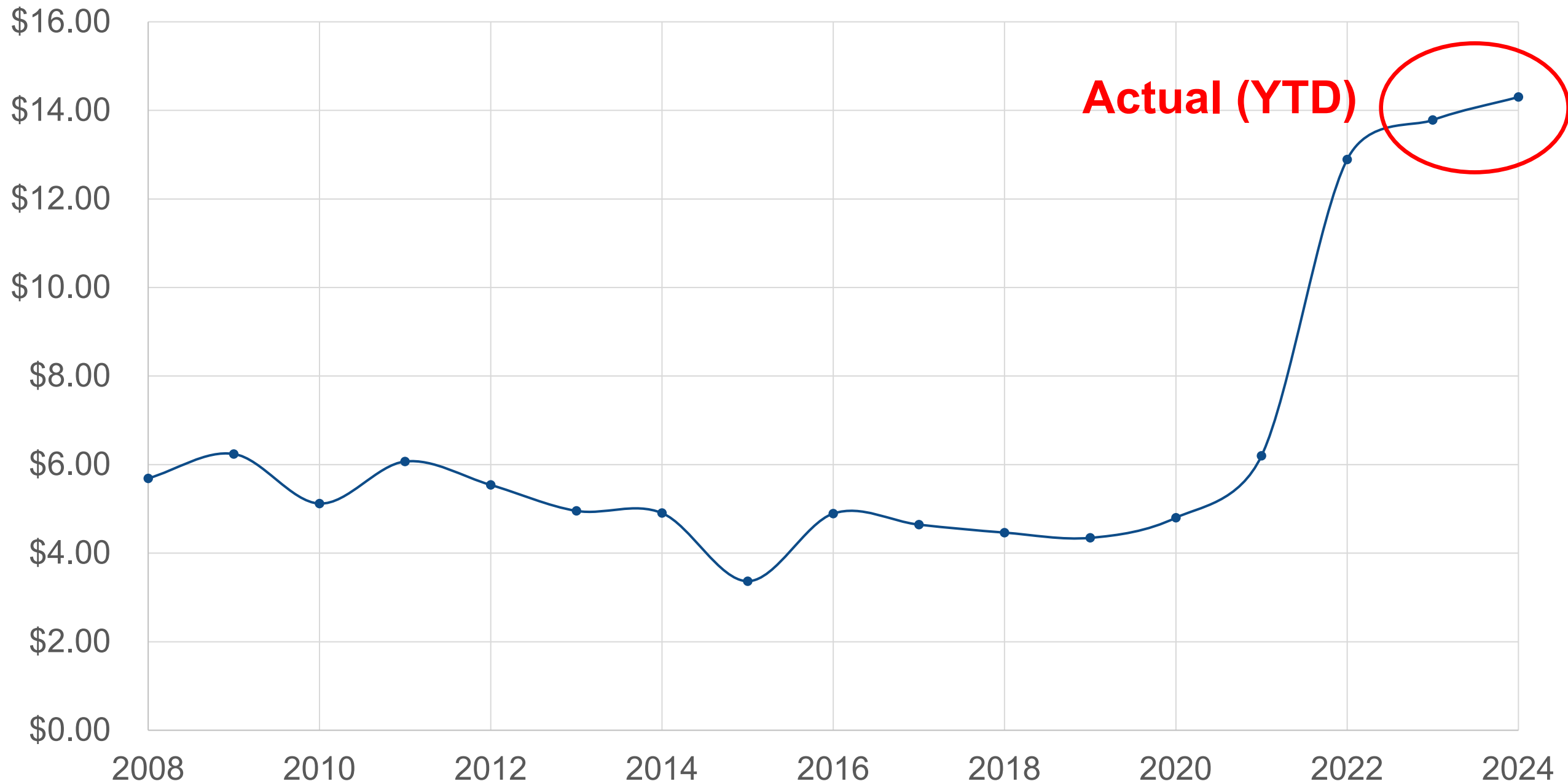
Year	Emissions Rate	Refrigerant Used	Refrigerant Cost	Savings from Baseline
'08 thru 2020	10.4%	634,921	\$3.24M	\$2,343,887
2021	9.3%	48,493	\$300,579	\$290,883
2022	9.1%	47,899	\$617,445	\$624,230
2023	9.2%	48,683	\$670,904	\$663,612

\$3,922,612

Refrigerant Costs \$/lb



Refrigerant Costs \$/lb



Weis GreenChill Partnership



- Where do we go from here?
 - Continue to invest, to save
- How can we invest?
 - Six new CO2 stores under construction
 - Add technology where it makes sense
 - Have a strategy for people

Weis GreenChill Partnership



- People Strategy *(You must build a team)*
 1. Keep the people you have!
 - While disposing of NVA players
 - Think of people value as money in the bank
 2. Only hire the 'right kind' of talent
 3. Provide the 'right kind' of leadership
 - Equip, mentor, train, compensate, engage
encourage, discipline, elevate

Weis GreenChill Partnership



- Technology
 - 24/7 – Leak detection in stores
 - 24/7 – Remote monitoring
 - Better parts and use of "AI" for predictive maintenance



Thank you!