



U.S. EPA

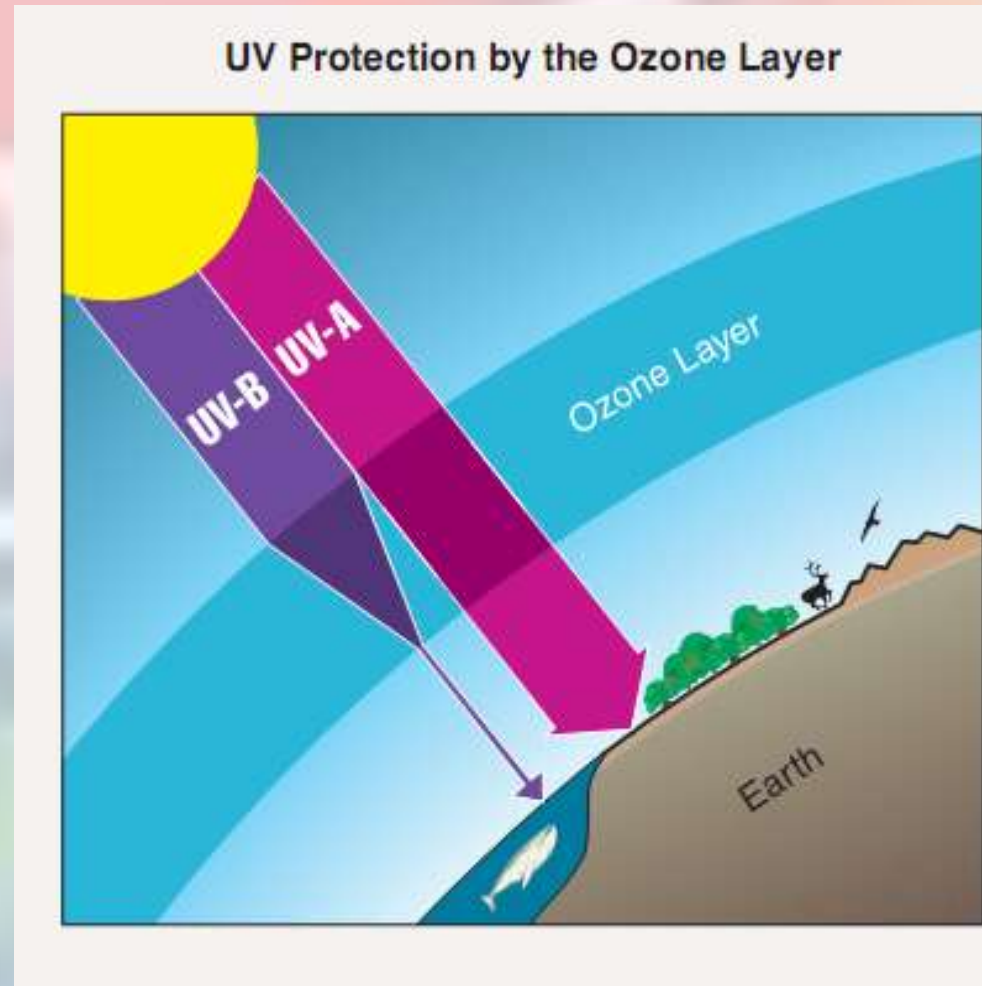
Stratospheric Protection Division

Update Presentation



Environment & Health: Protection by the Ozone Layer

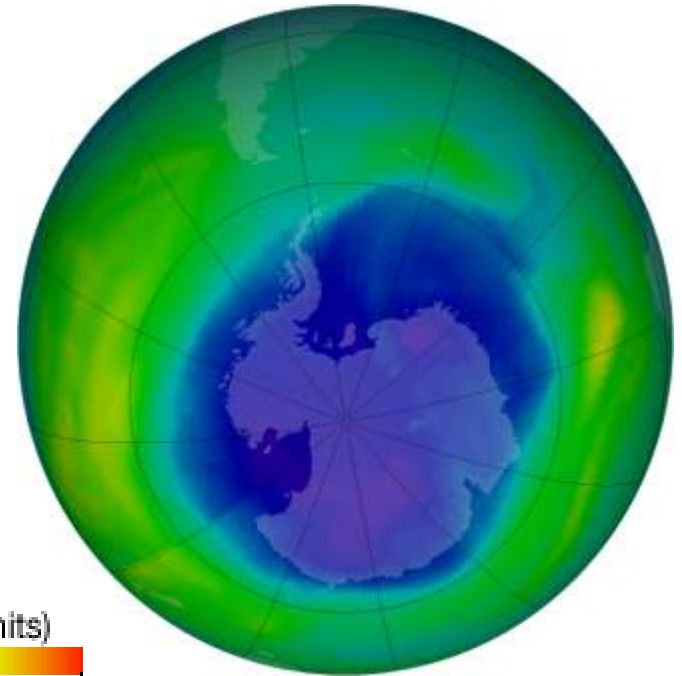
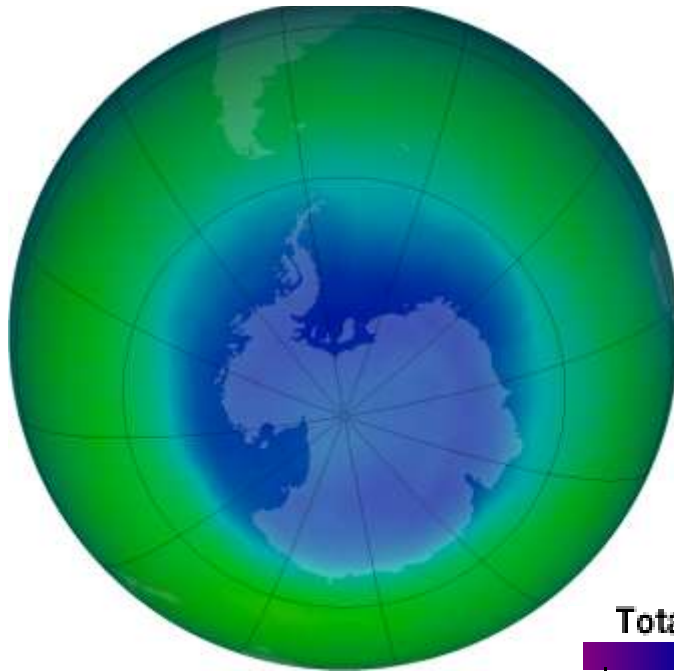
- Ozone layer shields Earth from ultraviolet radiation:
 - Skin cancer
 - Cataracts
 - Weakened immune systems
 - Damage to plant life, single-cell organisms, aquatic ecosystems
- Economic impacts



Ozone Layer on Track to Recover

Ozone hole over Antarctica in **September 1987**

Ozone hole over Antarctica in **September 2010**



Figures: NASA

- *Ozone layer is Earth's "sunscreen" – protects people, plants and animals from too much ultraviolet radiation*
- *Because ozone depleting chemicals persist for long periods in the ozone layer, damage cannot be reversed rapidly - but should recover by about 2065*

Health Effects

- **Skin cancer is the most common U.S. cancer**
 - more common than breast, prostate, colon & lung cancer *combined*
- **Treatment costs for non-melanoma skin cancer were \$1.5 billion in 2004**
- **Lifetime risk of developing melanoma is increasing**
 - 1960: 1 in 800 chance
 - 1986: 1 in 150 chance
 - 2009: 1 in 50 chance
- **Melanoma is 6th most common fatal cancer**
 - Accounts for 4% of all cancer deaths
 - Most common cancer among 20-30 year olds

SPD Mission

4 elements, domestic and international aspects, protect ozone layer and Earth's climate system:

- 1. Reduce and end production of substances that harm the ozone layer**
- 2. Reduce emissions of substances that harm the ozone layer that are already in use**
- 3. Ensure safer alternatives in sectors that use chemicals that harm the ozone layer**
- 4. Reduce lifetime risk of skin cancer and other health effects while ozone layer recovers**

R-22 Phaseout & Supply

- Goal = gradually transition away from R-22 by phasing out production in gradual steps
- 2010: decreased amount of R-22 allowed to be produced or imported for domestic use
- 2012-2014: R-22 phaseout continues with annual decreases in production/import
 - EPA considering 55-90 million lb limit for 2012
 - Current 2012 limit is 55 million lbs until the final amount is set (later this year)
 - Goal is for final limit to increase recycling of R-22
- 2015: Production of all HCFCs cannot exceed 10% of baseline
- 2020: Phaseout of all production and import of R-22

R-22 Use in Supermarkets

- Virgin R-22 is only allowed for maintenance and repair (i.e. servicing) of existing systems
- Changes to an existing R-22 system that **expand the system (increase the cooling capacity)** are not considered regular servicing/maintenance
 - Virgin R-22 may not be used
 - Whole system must now use recovered or reclaimed R-22
- EPA encourages stores to keep detailed records of refrigerant used when expanding a system
- Fact sheet available at www.epa.gov/greenchill

Proposed Amendments to §608 Regulations

- Lowers leak repair “trigger rate” from 35% to 20%
- Requires verification & documentation of all repairs
- Requires retrofit or retirement of appliances that cannot be sufficiently repaired
- Allows for flexibility in repair or retrofit timelines
- Requires replacement of appliance components with history of failures
- Mandates recordkeeping of full charge & fate of recovered refrigerant
- GreenChill Webinar-EPA's Proposed Amendments to the §608 Leak Repair Regulations
 - <http://epa.gov/ozone/partnerships/greenchill/events.html>-under Webinar Archives

SNAP – New Refrigerants

- Regulation that allows use of certain hydrocarbons for certain end uses
 - Allows use of R-600a (Isobutane), R-441A (HCR-188C1) in new household refrigerators & freezers
 - Allows use of R-290 (Propane) in new retail food self-contained units
 - Does *not* apply to rack systems, vending machines, retrofits
 - Use conditions: equipment must meet UL 250/471 standards, charge limit of 57 grams of R-600a and 150 grams of R-290, red-colored ports, labeling
 - Effective date: February 21, 2012
- <http://www.gpo.gov/fdsys/pkg/FR-2011-12-20/pdf/2011-32175.pdf>

SNAP – Trends in New Refrigerants

- More flammable refrigerants:
 - Propane (R-290)
 - R-441A
 - HFO-1234yf
 - HFO-1234ze
 - HFC-32
- More refrigerants with low global warming potential:
 - CO₂ (1)
 - Fluoroketone (1)
 - R-290 (3)
 - R-441A (<5)
 - HFO-1234yf (4)
 - HBA-2 (4.7-7)
 - HFO-1234ze (6)

SNAP – Not Under Review!

- HFO-1234yf for commercial rack systems
- HFO-1234yf blends for retail food refrigeration
- HFO-1234ze for retail food refrigeration
- Hydrocarbons for commercial rack systems
- R-600a/Isobutane for retail food self-contained units
- Hydrocarbons for commercial air conditioning

The RAD Program

- RAD = responsible appliance disposal
- Voluntary program that builds on the safe disposal regs for small appliances
- Partners ensure disposal of small refrigerated appliances using best available environmental practices
- RAD has 47 partners, including :
 - 40 utilities
 - 1 appliance manufacturer
 - 2 state affiliates
 - 4 appliance retailers
- Partners prevented emissions in 2010 of 1.41 MMTCO₂e or annual greenhouse gas emissions of over 276,000 cars

What Happens to Old Refrigerated Household Appliances?

Old fridges and freezers collected by municipalities and appliance retailers may be either...

– Disposed Of

- Refrigerant may or may not be recovered and reclaimed/destroyed, as required by law
- Foam is landfilled
- Fate of used oil, PCBs, mercury uncertain
- Metal components scrapped

OR

– Resold

- Old units continue to strain energy demand
- Ultimate disposal uncertain



Display Cases & Insulating Foam

- Display cases manufactured before 2007 probably used R-22 as the foam blowing agent for insulating foam
 - At end of life, insulating foam gets shredded or degrades in landfill
 - Harms ozone layer and contributes to climate change just like R-22 refrigerant being vented
- By properly disposing of display cases & insulating foam, a typical supermarket can prevent:
 - 200 lbs. of R-22 blowing agent: 165 MTCO₂eq (carbon dioxide emissions from 18,000 gallons of gas)

Display Cases & Insulating Foam

- Possible rebates from power company for upgrades to more energy efficient display cases
 - Must prove energy efficiency improvements
 - Must properly destroy insulating foam
- Pilot project with Utilities
 - Have the recycler
 - Have the utility
 - Just need the supermarket!



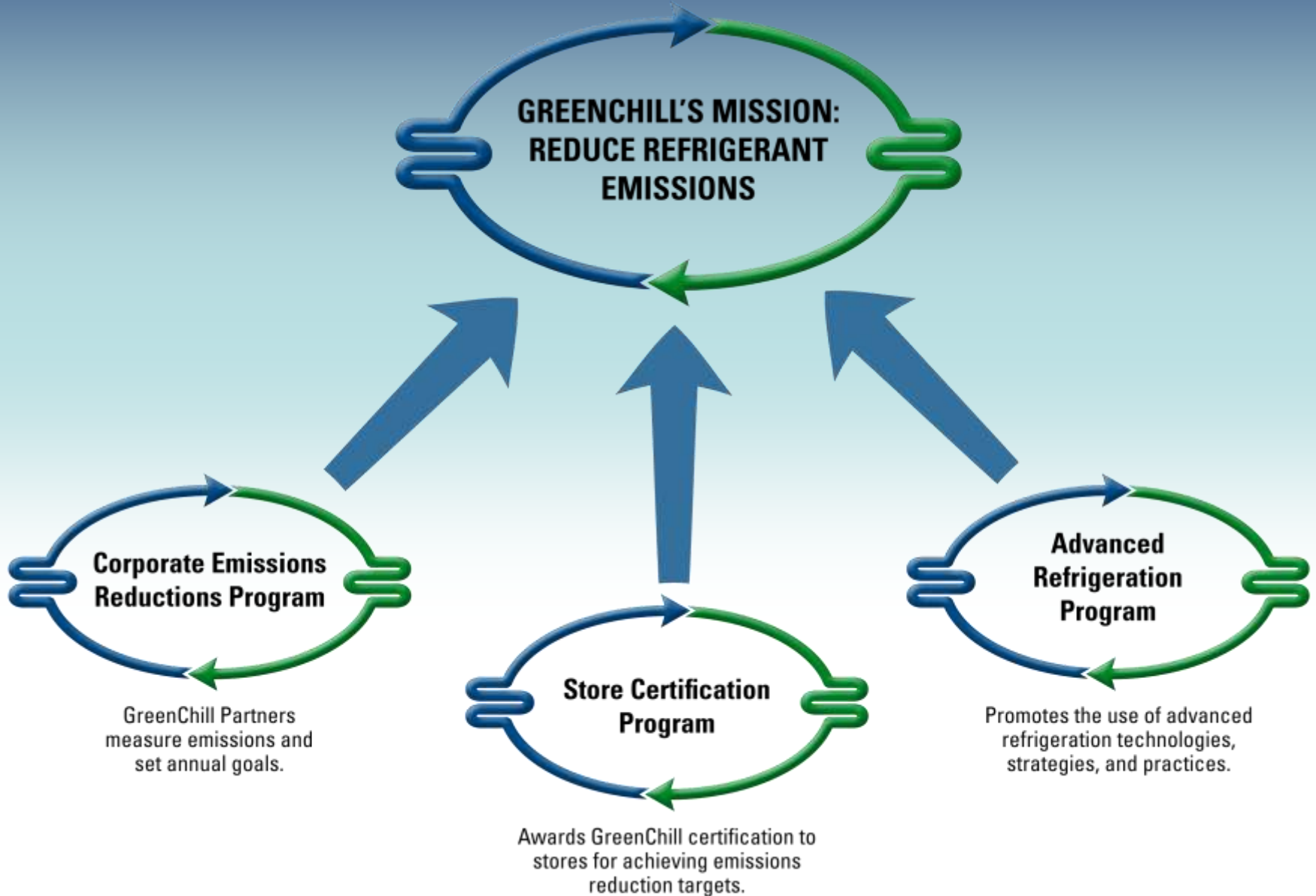


THE GREENCHILL PARTNERSHIP



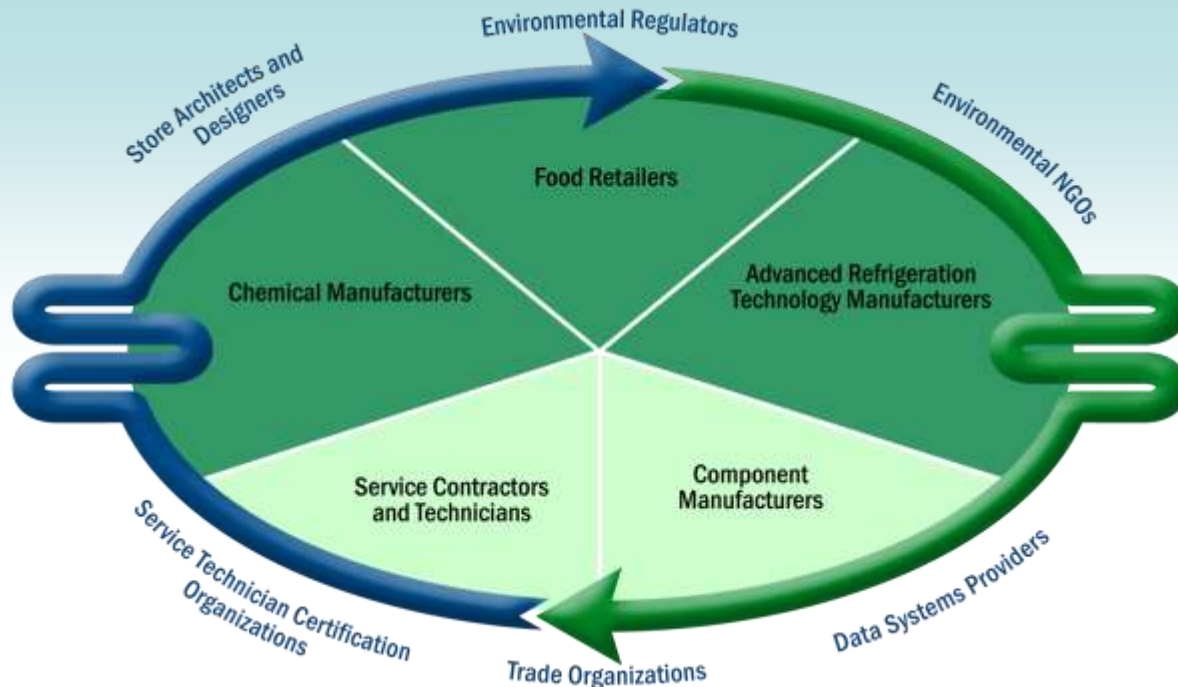
- ▶ **GREENCHILL** is an EPA partnership with food retailers to reduce refrigerant emissions and decrease their impact on the ozone layer and climate change.
- ▶ **Mission:** to motivate and help the supermarket industry to
 - ▶ transition to refrigerants with better environmental profiles;
 - ▶ lower refrigerant charge sizes and eliminate leaks; and
 - ▶ adopt green refrigeration technologies and environmental best practices.

GreenChill Programs



GreenChill Stakeholders

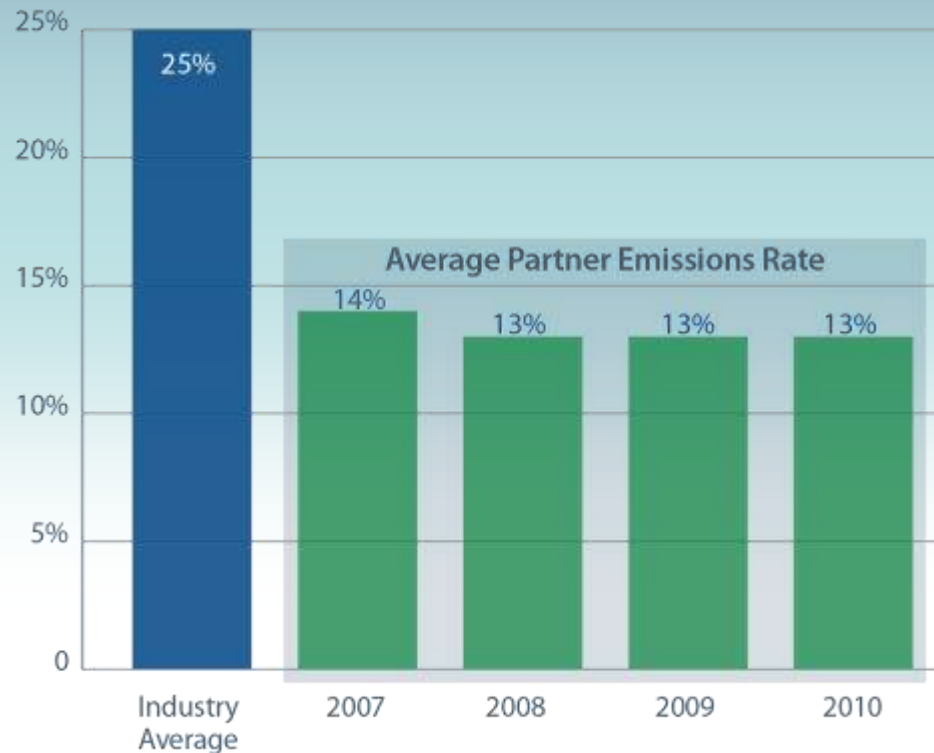
- ▶ 6 founding partners – launch Nov. 27, 2007
- ▶ Currently 54 partners with 7900+ stores
- ▶ 20% of all stores in the industry



Changing Industry Assumptions

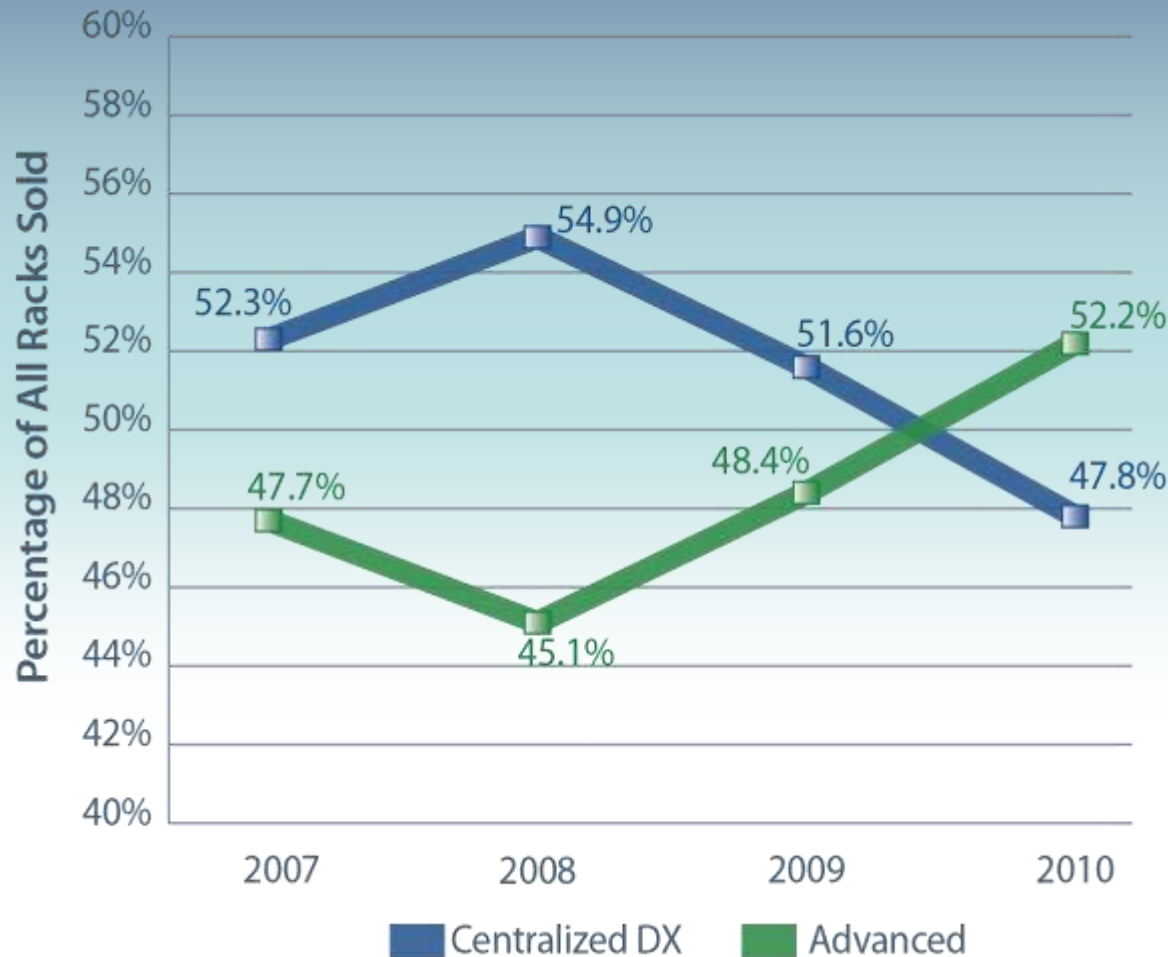
It IS possible to ...

- ▶ achieve a corporate-wide leak rate below 10%
- ▶ further improve once you get below 10%
- ▶ maintain that low leak rate – it's not just luck
- ▶ prevent leaks rather than repair them
- ▶ achieve zero leaks



GreenChill food retail partner average leak rate vs. industry average

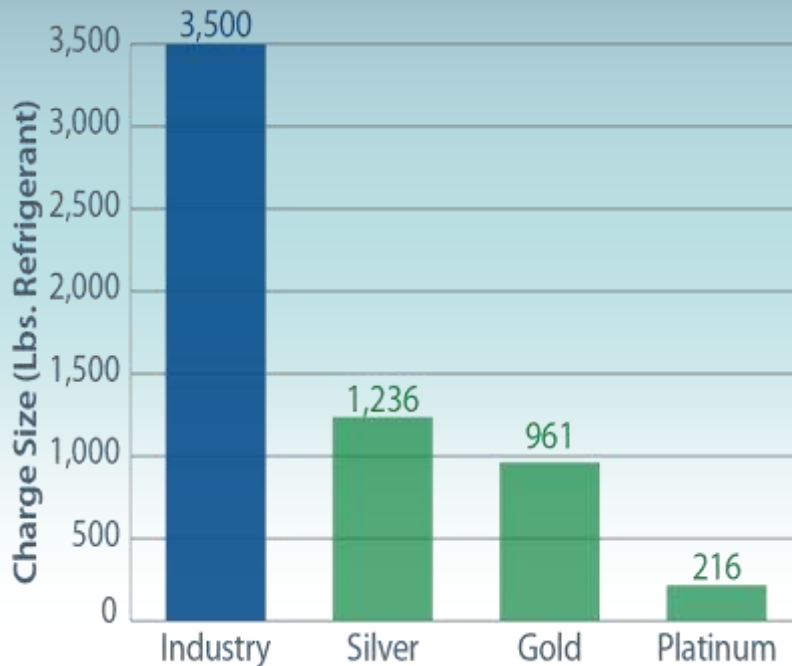
Advanced Technology



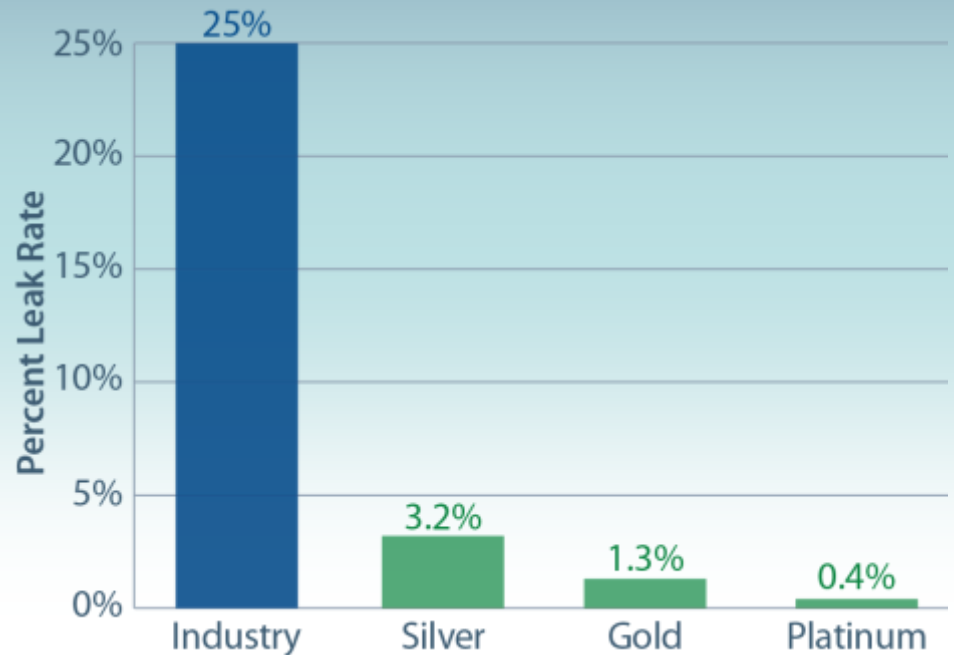
- ▶ **Equipment that prevents leaks**
- ▶ **Equipment that reduces charge sizes and amount leaked**
- ▶ **Data to back up claims**
- ▶ **Better leak detection equipment**

- ▶ **Some partners changed bid process – spec says “must achieve GreenChill platinum store certification”**

Store Design to Prevent, Rather Than Repair



Average commercial refrigeration system charge size for GreenChill store certification levels vs. typical store



Average leak rate for each GreenChill store certification level vs. typical store

Refrigerant GWP

CFCs (Phased out)



HCFCs (Being phased out; Partners reducing use)

- Mainly R-22
- Ozone depleting
- High GWP: 1820



High-GWP HFCs (Partners reducing use)

- Mainly R-404A and R-507A (GWPs = 3920, 3990)
- No ODP
- Significantly Higher GWPs



Lower-GWP HFCs (Increasing in use)

- Mainly 407 series: R-407A, R-407C, R-407F (GWPs = 2110, 1770, 1825)
- No ODP
- Lower GWPs than other HFC blends



Low and Zero GWP Refrigerants (Pilots and Emerging)

- CO₂, Ammonia, HFOs, Hydrocarbons
- No ODPs
- Low GWPs

Resources for Supermarkets

- ▶ **Environmental Best Practices Guidelines:**
 - ▶ Installation Leak Tightness
 - ▶ R-22 Retrofit
 - ▶ Leak Prevention and Repair

- ▶ **Webinars, Roundtables, Calculators**
 - ▶ Installation Leak Tightness Guidelines
 - ▶ R-22 Retrofit Guidelines
 - ▶ Leak Prevention and Repair Guidelines

- ▶ **LinkedIn Group to ask questions and get answers to problems**

THE GREENCHILL PARTNERSHIP
 U.S. ENVIRONMENTAL PROTECTION AGENCY
 ADVANCED REFRIGERATION PARTNERSHIP

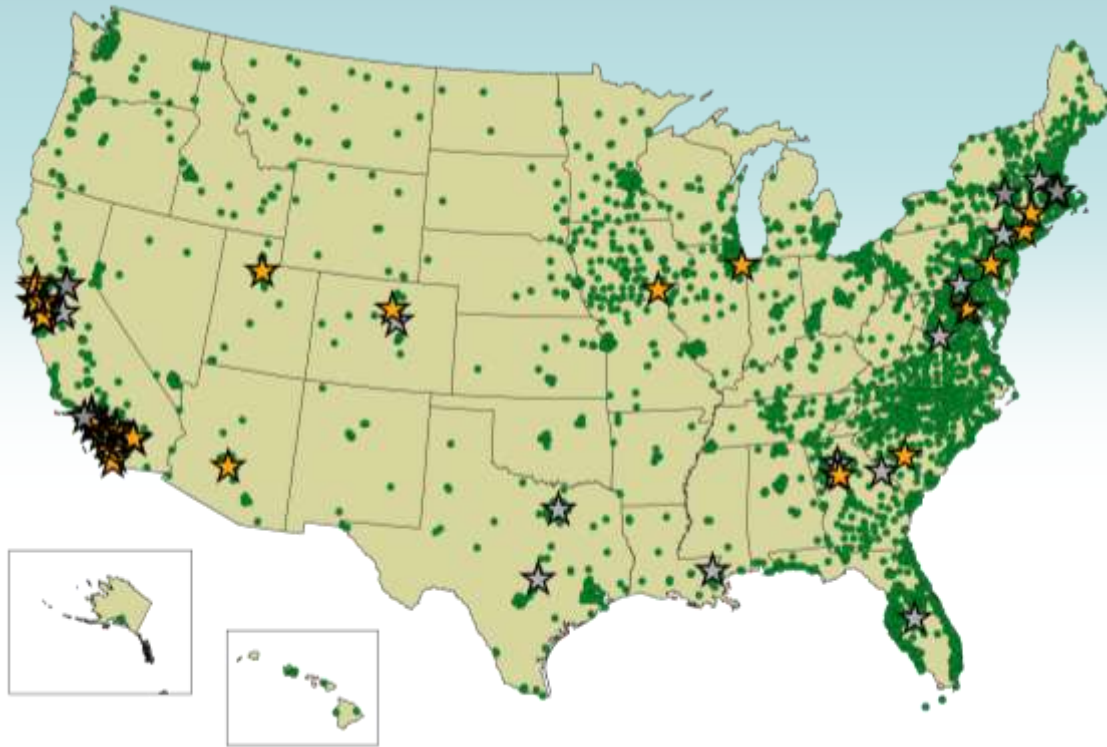
Financial Impact Calculator - The Cost of Refrigerant Leaks*

| 1) Cost to Replace Leaked Refrigerant | | 2) Sales/Profit | |
|--|--------------|--|----------------------------------|
| 1. Refrigerant type: | R-404A | 1. Item to be sold (milk, frozen peas, hotdogs, etc.): | milk |
| 2. Amount of refrigerant leaked (in pounds): | 100 | 2. Units (gallons, pounds, packs, ounces, etc.): | gallons |
| 3. Price per pound that you pay for refrigerant: | \$6.83 | 3. Sales price per unit: | \$3.50 |
| | | 4. Profit margin per unit sold (in percent): | 1.00 |
| Cost to replace leaked refrigerant: | \$683 | You have to sell | 19,514 gallons of milk |
| | | to pay the replacement cost of | 100 pounds of refrigerant |

Need to sell 19,514 gallons of milk to pay replacement cost for 100 pounds of leaked refrigerant

Industry Potential

- ▶ If every U.S. supermarket met GreenChill benchmarks, the supermarket industry would ...
 - ▶ Reduce emissions by 22 MMTCO₂eq & 238 ODP tons
 - ▶ Save \$100,000,000 in reduced refrigerant replacement costs
- ... annually



★ Platinum-Level Certification

★ Gold-Level Certification

★ Silver-Level Certification

● GreenChill Partner Store

SunWise Goal: Prevent skin cancer by building sun safety habits in kids

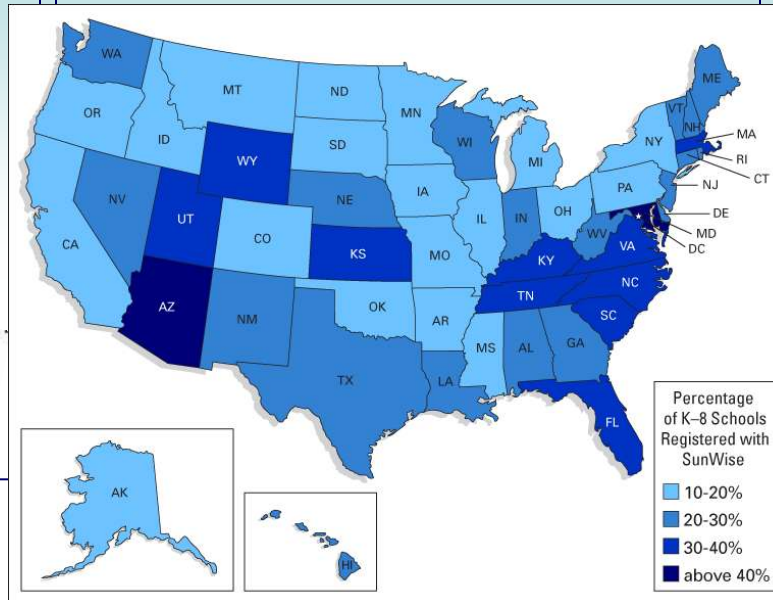
Proven Effective

SunWise students show an 11% decrease in sunburns.

Every \$1 invested in SunWise earns \$2 to \$4 in public health savings.



In All 50 States



Free Resources



SunWise®

a program that radiates good ideas

A Partnership Program of the U.S. Environmental Protection Agency

www.epa.gov/sunwise

- UV Index
 - Mobile apps now available on all major platforms
 - Upgrading to hourly forecast
- SunWise with SHADE Poster Contest
 - More than 112,000 posters received over ten years
- Don't Fry Day 2012 – May 25th
 - Sun safety campaign sponsored by EPA and partners

