# Proposed Refrigerant Management Program

## Regulation for Reducing Leaks of Potent Greenhouse Gases from Commercial Refrigeration Systems

**December 9-10, 2009**

California Environmental Protection Agency
AIR RESOURCES BOARD

# Overview

- Summary
- High-global warming potential (GWP) sector
- Stakeholder process
- Proposed regulation
- Environmental and economic impacts
- Rule implementation
- Conclusions and recommendation

# Summary

- **One of the largest GHG emission reduction strategies from Scoping Plan**
- **Focuses on leak inspection & repair**
- **Repairing leaks saves businesses money**
- **Comprehensive implementation and outreach plan**

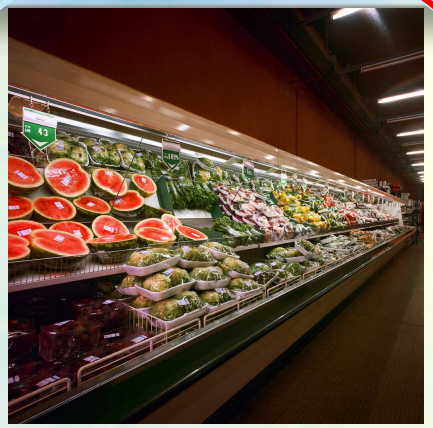
# High-Global Warming Potential (GWP) Sector

# What Are High-Global Warming Potential (GWP) Gases?

- Typically thousands of times more potent than carbon dioxide ($CO_2$)
- Hydrofluorocarbons (HFCs) and ozone-depleting substances (ODS)
- Other substances not used for refrigeration (halons, $SF_6$, others)

# High-GWP Sector

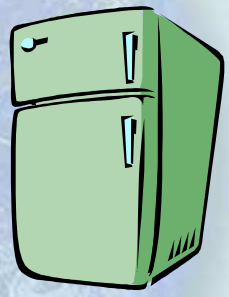
Consumer Products



Commercial Refrigeration

Motor Vehicle AC

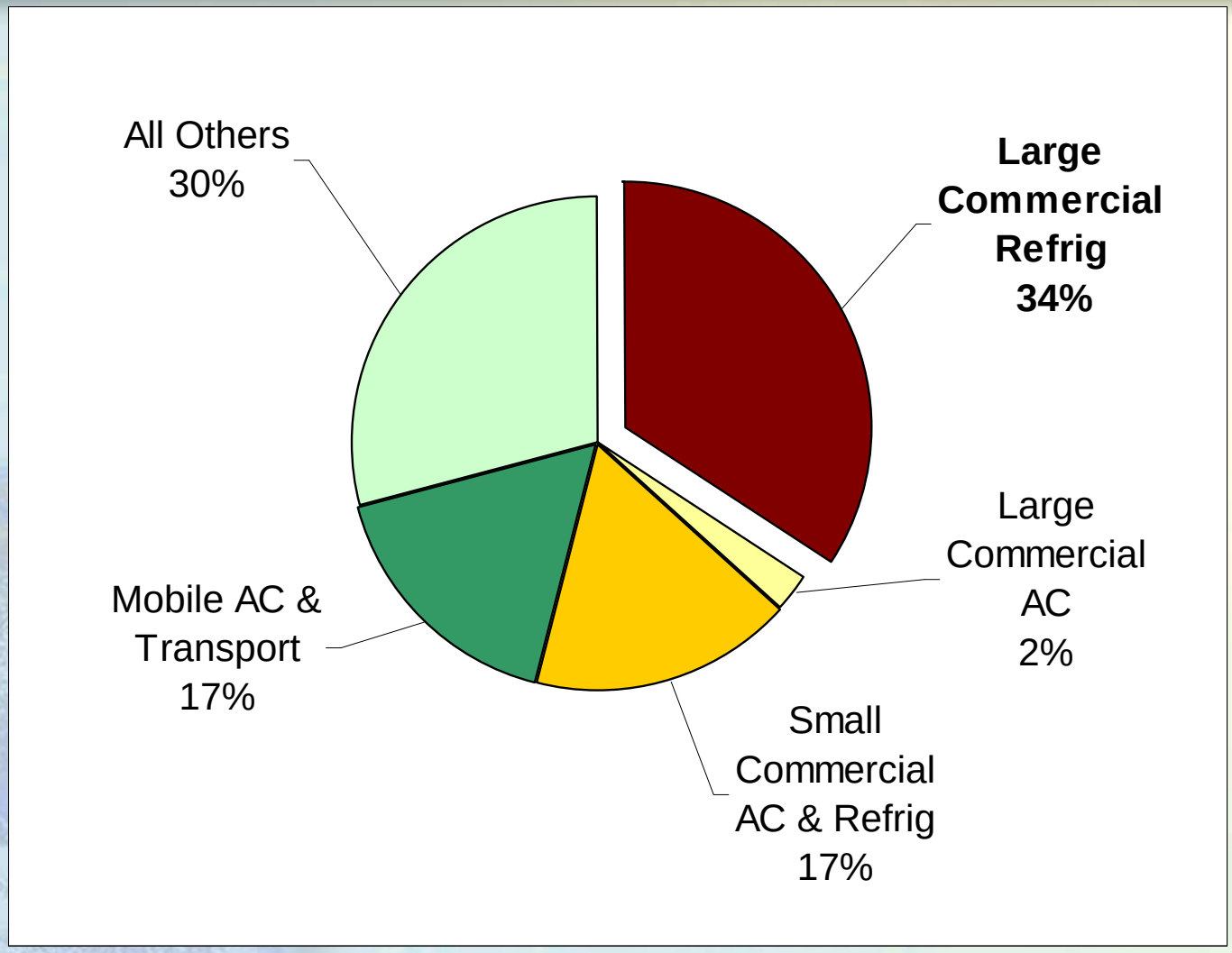
Residential, Commercial AC and Appliances



Insulating Foam

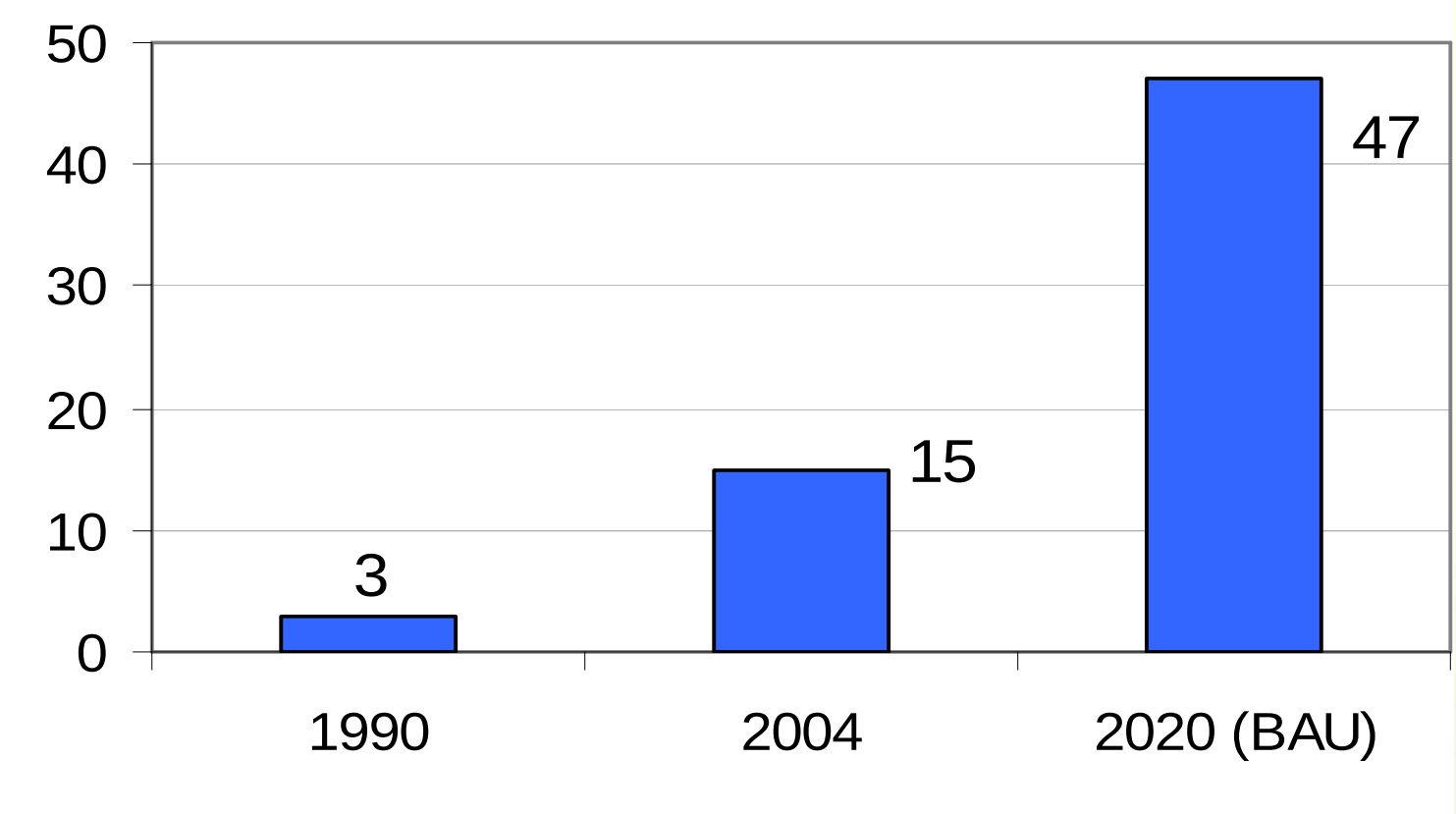

Fire Suppressant

# High-GWP GHG Sector Emission Sources (BAU 2020) 47 MMTCO$_2$E



# High-GWP: Fastest Growing Sector of GHG Emissions

**High-GWP* Sector Growth 1990 – 2020 ($MMTCO_2E$)**




* Hydrofluorocarbons (HFC); Perfluorocarbons (PFC); Sulfur hexafluoride ($SF_6$)

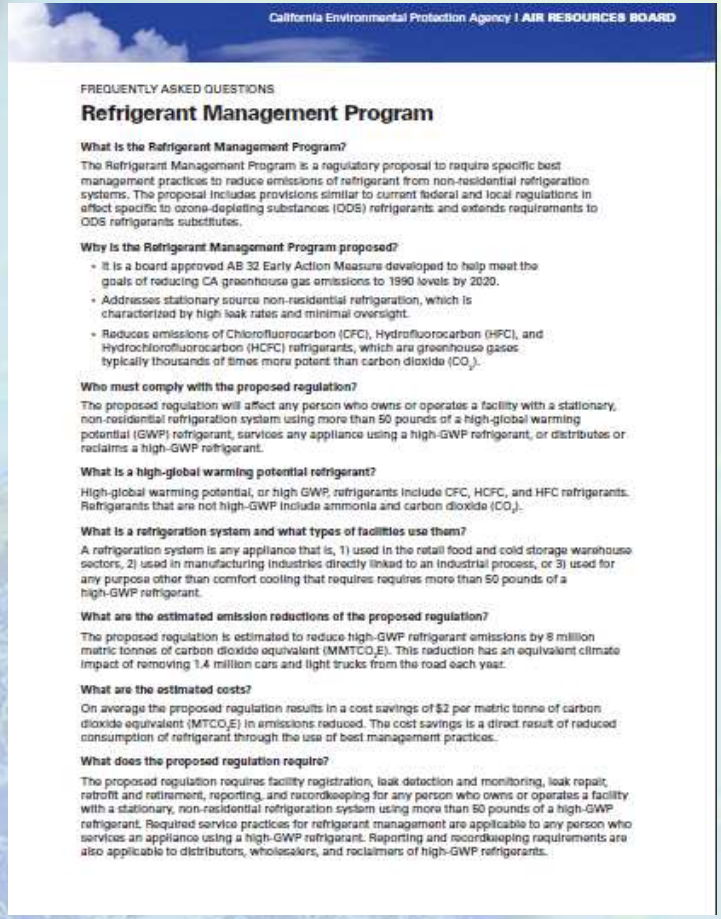
# Stakeholder Process

# Stakeholder Process

- Worked closely with facility owners and operators, refrigerant manufacturers and distributors, US EPA, CAPCOA, NGOs, trade associations, technicians, and contractors
- Five technical workgroup meetings
- Seven public workshops (So. Cal, Central, N. Cal)
- Technician and service contractor surveys
- Site visits
- Independent stakeholder meetings

# Extensive Outreach

## FAQ Sheet



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FREQUENTLY ASKED QUESTIONS

**Refrigerant Management Program**

**What is the Refrigerant Management Program?**

The Refrigerant Management Program is a regulatory proposal to require specific best management practices to reduce emissions of refrigerant from non-residential refrigeration systems. The proposal includes provisions similar to current federal and local regulations in effect specific to ozone-depleting substances (ODS) refrigerants and extends requirements to ODS refrigerants substitutes.

**Why is the Refrigerant Management Program proposed?**

- It is a board approved AB 32 Early Action Measure developed to help meet the goals of reducing CA greenhouse gas emissions to 1990 levels by 2020.
- Addresses stationary source non-residential refrigeration, which is characterized by high leak rates and minimal oversight.
- Reduces emissions of Chlorofluorocarbon (CFC), Hydrofluorocarbon (HFC), and Hydrochlorofluorocarbon (HCFC) refrigerants, which are greenhouse gases typically thousands of times more potent than carbon dioxide ($CO_2$).

**Who must comply with the proposed regulation?**

The proposed regulation will affect any person who owns or operates a facility with a stationary, non-residential refrigeration system using more than 50 pounds of a high-global warming potential (GWP) refrigerant, services any appliance using a high-GWP refrigerant, or distributes or reclaims a high-GWP refrigerant.

**What is a high-global warming potential refrigerant?**

High-global warming potential, or high GWP, refrigerants include CFC, HCFC, and HFC refrigerants. Refrigerants that are not high-GWP include ammonia and carbon dioxide ($CO_2$).

**What is a refrigeration system and what types of facilities use them?**

A refrigeration system is any appliance that is, 1) used in the retail food and cold storage warehouse sectors, 2) used in manufacturing industries directly linked to an industrial process, or 3) used for any purpose other than comfort cooling that requires requires more than 50 pounds of a high-GWP refrigerant.

**What are the estimated emission reductions of the proposed regulation?**

The proposed regulation is estimated to reduce high-GWP refrigerant emissions by 8 million metric tonnes of carbon dioxide equivalent ($MMTCO_2E$). This reduction has an equivalent climate impact of removing 1.4 million cars and light trucks from the road each year.

**What are the estimated costs?**

On average the proposed regulation results in a cost savings of $2 per metric tonne of carbon dioxide equivalent ($MTCO_2E$) in emissions reduced. The cost savings is a direct result of reduced consumption of refrigerant through the use of best management practices.

**What does the proposed regulation require?**

The proposed regulation requires facility registration, leak detection and monitoring, leak repair, retrofit and retirement, reporting, and recordkeeping for any person who owns or operates a facility with a stationary, non-residential refrigeration system using more than 50 pounds of a high-GWP refrigerant. Required service practices for refrigerant management are applicable to any person who services an appliance using a high-GWP refrigerant. Reporting and recordkeeping requirements are also applicable to distributors, wholesalers, and reclaimers of high-GWP refrigerants.

- Top-down outreach strategies
  - Trade associations (67)
  - Small business associations (120,000+ members)
  - Agricultural industry associations (21)
  - Government agencies (cities, counties, air districts) (85)
- Bottom-up outreach strategies
  - Refrigeration and AC contractor/technician surveys
  - Business surveys
  - Facility outreach pilot study direct business contacts (200)

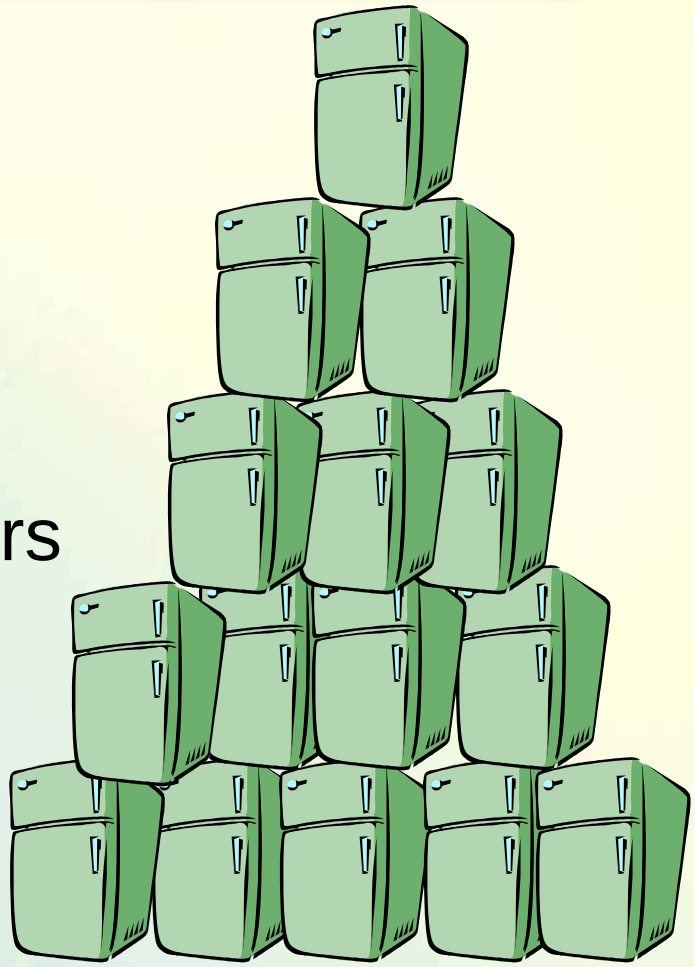
# Key Themes of Stakeholder Input

- Focus on obtaining the greatest emission reductions at the least costs
- Emphasize common-sense “Best Management Practices (BMPs)”
- Level the playing field (BMPs apply to all)
- Complement existing federal and local refrigerant management rules

# Proposed Regulation

# Regulation Focuses on Large Commercial Refrigeration Systems

- Systems that require more than 50 lbs of refrigerant
- 50 lbs is equivalent to:
  - 100 household refrigerators
  - 23 stand alone produce coolers



# Businesses Affected

*Rule generally applies to:

- Supermarkets and grocery stores
- Food and beverage processors
- Cold storage warehouses
- Industrial process cooling

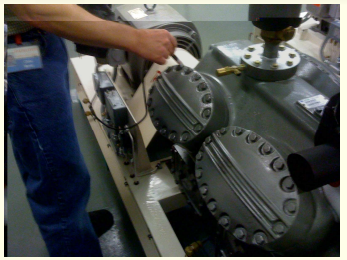
Businesses generally not affected:

- Bars and restaurants
- Gas stations
- Liquor stores
- Bakeries
- Office buildings

* These businesses are also affected by federal rules and/or SCAQMD Rule 1415 requirements, including leak inspection, repair, and fees, specific to ozone depleting refrigerants.

# Key Provisions of Proposed Regulation

Refrigerant leak inspection & repair



Required service practices

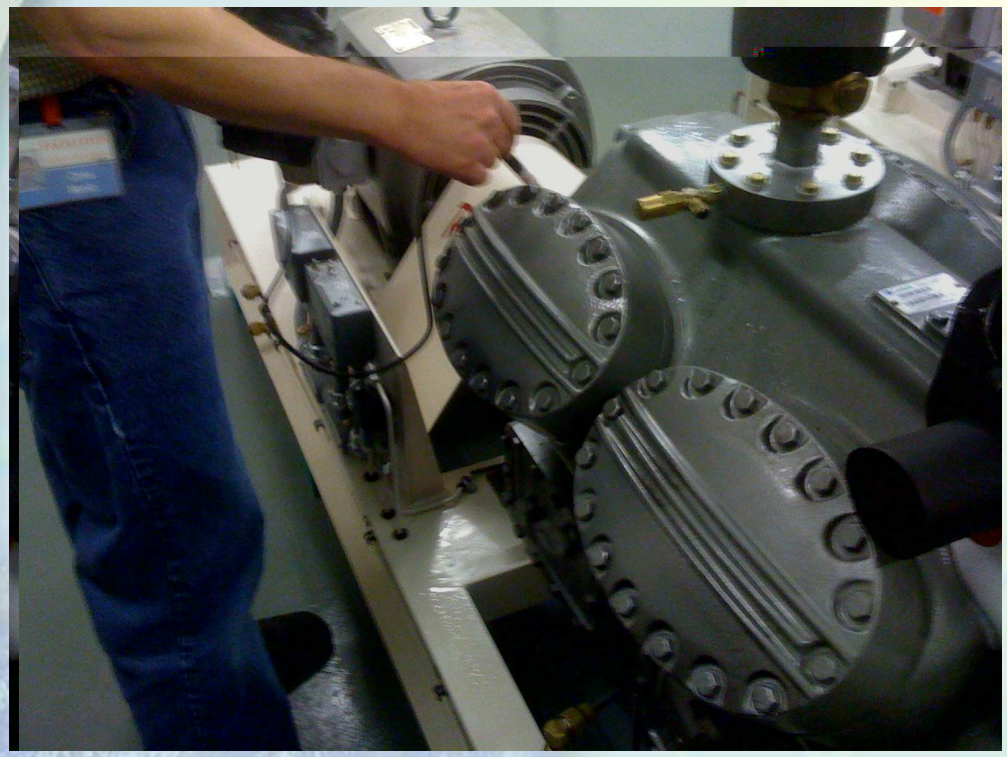
Refrigerant sale, use, and disposal


Facility registration, reporting, & fees

# Leak Detection & Monitoring

| Refrigerant Charge Size Category | Requirement |
|---|---|
| Facilities with large system(s) (≥ 2,000 lbs) | Automatic leak detection system |
| Facilities with medium system(s) (200 -<2,000 lbs) | Quarterly inspection |
| Facilities with small system(s) (>50 -<200 lbs) | Annual inspection |

# Refrigerant Leak Detection Methods

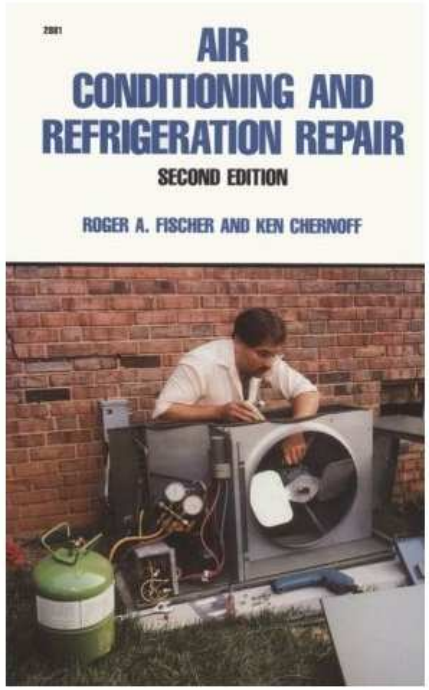


Portable Leak Detector (Sniffer)


Additional refrigerant needed (system leaked refrigerant)

# Leak Repair
# Retrofit & Retirement Plans

- Refrigerant leak repairs
  - U.S. EPA certified technician
  - Up to 14 days to repair leaks
  - Verification tests
  - Extensions under certain conditions
- Retrofit or retirement plan for systems that can't be repaired



# Required Service Practices

- Complements existing federal rules
  - Leak repair by a U.S. EPA certified technician
  - No venting
  - Proper recovery of refrigerant
- No topping off without leak repair
- Evacuate spent cylinders

# Refrigerant Sale, Use, and Disposal

- Extend existing requirements to all high-GWP refrigerants:
  - Refrigerant sales to U.S. EPA certified technicians
  - Refrigerants sold must be approved by U.S. EPA or Executive Officer
- Recordkeeping and reporting requirements for distributors, wholesalers, and reclaimers

# Average Refrigerant Leaks from Facilities are Substantial

| **Refrigerant Charge Size** | **Emissions - $MTCO_2E$/year (per facility)** | **Equivalent Vehicle Miles** |
|---|---|---|
| Facilities with Large Systems (≥ 2,000 lbs) | 2,500 | 5.3 Million |
| Facilities with Medium System(s) (200-<2,000 lbs) | 670 | 1.5 Million |
| Facilities with Small System(s) (50-<200 lbs) | 80 | 180,000 |

# Facility Registration, Reporting, and Fee Requirements

| Refrigerant Charge Size | Number of Facilities | Registration and Annual Reporting Deadline* | Annual Fee |
|---|---|---|---|
| Facilities with Large Systems (≥ 2,000 lbs) | 2,000 | March 1, 2012 | $370 |
| Facilities with Medium System(s) (200-<2,000 lbs) | 8,500 | March 1, 2014 | $170 |
| Facilities with Small System(s) (50-<200 lbs) | 15,500 | March 1, 2016 One-time registration/ No reporting | $0 |

*** For large and medium systems, annual reports are due March 1 of each year.**

# Fees Support Program Implementation

- Fee used for outreach, training, enforcement, and administration
- Facility fees primarily based on:
  - average inspection frequency
  - average number of systems/facility
  - average time per inspection
- Fee well under typical air permit
- High-GWP gases not subject to AB 32 administrative fee

# Key Provisions Timeline

- Rule outreach begins immediately after approval
- Leak detection and monitoring and leak repair become effective on January 1, 2011
- Facilities follow required service practices (no venting, recover refrigerant)
- Gradual phase-in of facility registration, annual reporting, and fees from 2012 – 2016

# Environmental and Economic Impacts

# 5th Largest GHG Reduction Measure

| AB 32 Reduction Measure | Reductions in 2020 ($MMTCO_2E$) |
|---|---|
| Vehicle GHG Standards (Pavley I and II) | 31.7 |
| Energy Efficiency | 26.3 |
| Renewable Energy Standard | 21.3 |
| Low Carbon Fuel Standard | 15 |
| Refrigerant Management Program | 8.1* |

* Includes 0.9 $MMTCO_2E$ of ozone depleting substance reductions

# Emission Reductions are Significant

18 million barrels of oil


1.4 million vehicles removed from road

**8.1 MMTCO$_2$E is equivalent to:**

Energy used by 1.5 million homes/year

# Economic Impacts

- Leak detection/repair requirements add cost to business
- Costs offset by savings from reducing leaks (less refrigerant purchased)
- Average savings: Cost-effectiveness =

  -$2 per $MTCO_2E$ reduced (negative cost)
- Several businesses already use best management practices

# Proposed Modifications (15-Day Changes)

- Exempt military tactical equipment
- Make clarifying edits

# Rule Implementation

- Continue to work with stakeholders
- Implementation advisory workgroup
- Ongoing direct outreach to business
- Training program (e.g., business, districts)
- Develop outreach materials
- Develop online reporting database

# Conclusions & Recommendation

- Significant emission reductions
- Developed through extensive outreach
- Relies on the use of proven best management practices to reduce leaks
- Cost-effective
- Meets all legal requirements of AB 32
- ***Staff recommends Board adoption with proposed modifications***