High-GWP Refrigerant Management Program for Stationary Sources

Refrigerant Management Program
Public Workshop
Sacramento – August 24, 2009 (Webcasted)

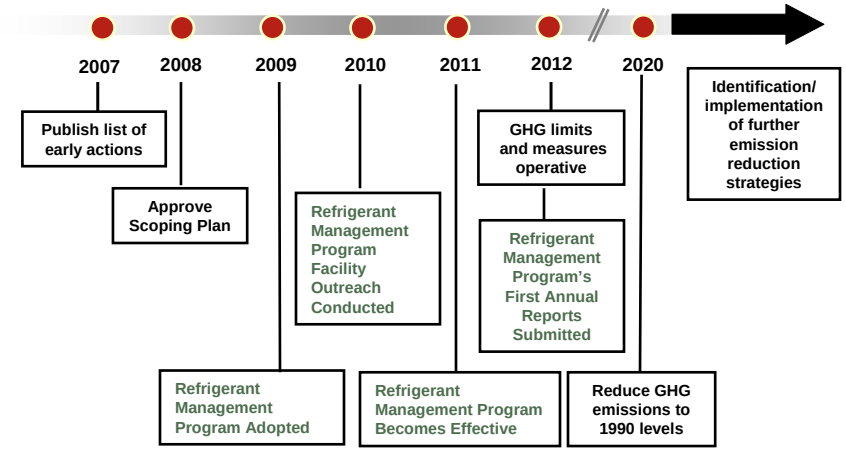
1

Agenda

- Introduction to the California Global Warming Solutions Act (AB32)
- Overview of High-GWP Sector
- Review of Proposed Refrigerant Management Program
- Estimated Number of Facilities - Updated
- Business-As-Usual Emissions & Potential Reductions - Updated
- Staff Recommendation
- Review of Proposed Refrigerant Management Program
- Cost Analysis & Effectiveness - Updated
- Case Studies
- Timeline & Next Steps

2

California Global Warming Solutions Act of 2006 (AB 32)



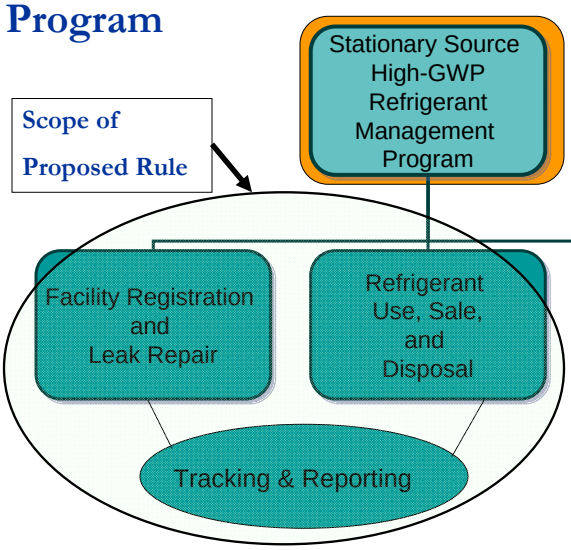
3

Stationary Source High-GWP GHG Sector Overview

- **What Are High-Global Warming Potential (GWP) Gases**
  - Gases that may cause many times more global warming than equivalent weight of carbon dioxide (CO_2)
  - Kyoto Protocol Gases (HFCs)
  - Montreal Protocol Gases (ODSs)
  - Other Gases

4

Review of Proposed Refrigerant Management Program



New systems specifications will be coordinated with the California Energy Commission's anticipated 2011 Update of Building Standards Code (Title 24).

5

Goal: Minimize emissions of high GWP refrigerants from stationary refrigeration and air conditioning equipment through:

- Leak Detection and Monitoring
- Leak Repair
- Refrigeration and Air-Conditioning System Retrofit and Retirement
- Required Service Practices
- Reporting by facilities and refrigerant distributors and reclaimers
- *Builds on Federal Rule 608 and SCAQMD Rule 1415*
  - 43% Facilities of Currently Subject to Leak Inspection, Leak Repair, Registration and Fee, Reporting, and Recordkeeping Requirements (South Coast AQMD)
  - Majority of Facilities are subject to Federal Leak Repair and Recordkeeping Requirements
  - All facilities are subject to Federal Required Service Practices

6

Proposed Rule Applicability by Subject

	Facilities	Refrigeration Systems	Certified Technicians	Distributors and Wholesalers	Certified Reclaimers
Facility Registration and Leak Repair					
Registration for Operation	X				
Leak Detection and Monitoring		X			
Leak Repair		X			
Retrofit & Retirement Plans		X			
Required Service Practices	X	X	X		
Reporting	X	X			
Recordkeeping	X	X			
Refrigerant Use, Sale, and Disposal					
Prohibitions			X	X	X
Reporting				X	X
Recordkeeping				X	X

Required Service Practices are applicable to all refrigeration and air-conditioning appliances without regard to the amount of refrigerant used.

7

Estimated Number of Facilities - Updated

Facilities With Specific System Types	***Current Best Estimate***
➢ *Large Refrigeration Systems*	*2,000*
➢ *Medium Refrigeration Systems*	*8,500*
➢ *Small Refrigeration Systems*	*15,500*
All Refrigeration Systems	***26,000***
➢ *Large Air-conditioning Systems*	*2,700*
➢ *Medium Air-conditioning Systems*	*6,300*
➢ *Small Air-conditioning Systems*	*14,000*
All Air-conditioning Systems	***23,000***
All R/AC Systems	***49,000***

8

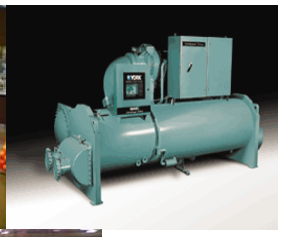
Leak Repair: focus on large refrigeration equipment, e.g.,

Commercial building chillers & rooftop units

Supermarket systems

Industrial process refrigeration






9

Facility Types Impacted

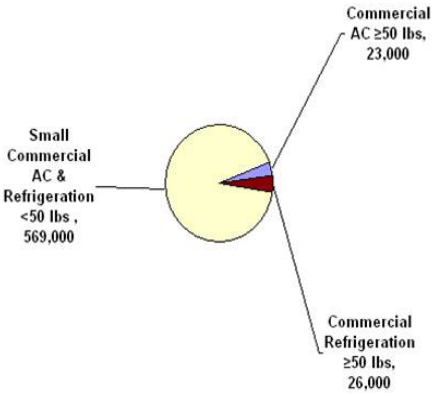
- **Common Businesses Generally Impacted**
  - Cold Storage Warehouses
  - Grocery Stores/Supermarkets
  - Food Preparation/Processing/Service
  - Process Cooling
  - Pharmacies
  - Large Convenience Stores
- **Common Businesses Generally Not Impacted**
  - Bars & Restaurants
  - Liquor Stores
  - Butcheries
  - Hotels & Motels
  - Office Buildings
  - Gas Stations
  - Small Convenience Stores
  - The rule is not applicable to any business using an ammonia-based refrigeration system.

The proposed rule may apply to businesses listed under Businesses Generally Not Impacted based on specific refrigeration equipment in operation at a facility.

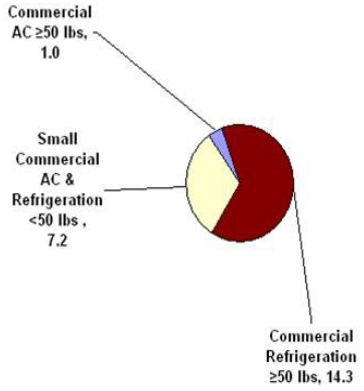
10

Number of Facilities and Emissions from Stationary Refrigeration & Air Conditioning Equipment (2020)

NUMBER OF COMMERCIAL FACILITIES



BAU EMISSIONS ($MMTCO_2E$)



Refrigerant Management Program (RMP) will affect 4% of facilities which account for 64% of all estimated 2020 HFC emissions.

11

Business-As-Usual HFC Emissions & Potential Reductions From Refrigeration Systems - Updated

Refrigeration System Charge Size	Estimated Facilities	Estimated 2020 BAU Emissions ($MMTCO_2E$)	Estimated 2020 Emission Reductions ($MMTCO_2E$)
Facilities with Large Refrigeration Systems *(Refrigerant Full Charge 2,000 lbs or Greater)*	~ 2,000	5.5	3.3
Facilities with Medium Refrigeration Systems *(Refrigerant Full Charge 200 lbs or Greater and Less than 2,000)*	~ 8,500	7.5	3.0
Facilities with Small Refrigeration Systems *(Refrigerant Full Charge 50 lbs or Greater and Less than 200)*	~ 15,500	1.3	0.9
Total Facilities with Refrigeration Systems *(Refrigerant Full Charge 50 lbs or Greater)*	~ 26,000	14.3	7.2

Totals may not add due to rounding.

12

Comparative Business-As-Usual HFC Emissions & Potential Reductions From Air-Conditioning Systems - Updated

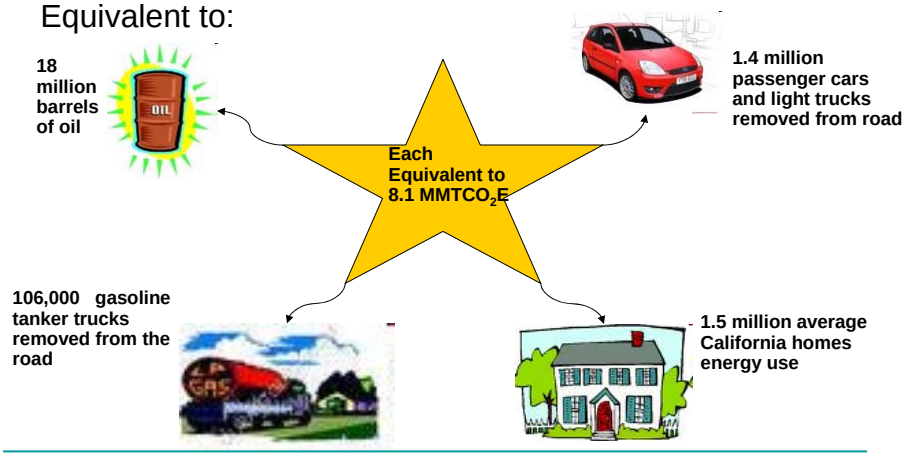
Air-Conditioning System Charge Size	Estimated Facilities	Estimated 2020 BAU Emissions ($MMTCO_2E$)	Estimated 2020 Emission Reductions ($MMTCO_2E$)
Facilities with Large Air-Conditioning Systems	~ 2,700	0.2	0.0
Facilities with Medium Air-Conditioning Systems	~ 6,300	0.2	0.1
Facilities with Small Air-Conditioning Systems	~ 14,000	0.7	0.4
Total Facilities with Air-Conditioning Systems *(Refrigerant Full Charge 50 lbs or Greater)*	~ 23,000	1.0	0.4

Totals may not add due to rounding.

13

Another Look at Estimated Potential Emission Reductions

- The 8.1 $MMTCO_2E$ Potential Emission Reduction is Equivalent to:



The 8.1 MMTCO2E Potential Emission Reduction includes Kyoto and Non-Kyoto Gases.

14

Refrigerant Management Program Efforts to Date

Outreach Activities	Timeframe
High-GWP Sector Public Workshop	February 2008
Monthly CAPCOA Meetings and Meetings with SCAQMD	Ongoing
Individual Stakeholder Meetings	February 2008 to Current
Technical Workgroup Meetings	April, May, July 2008 January, July 2009
Draft Proposed Rule Versions Released for Comments	July, September 2008 January, August 2009
Site Visits to Facilities	March 2008 to Current
Public Workshops (3 cities)	September 2008 February 2009
Refined "Facility Estimates & Cost Analysis" Based on Comments	*March – July 2009*
Refined "Proposed Rule" Based on Comments	*March – July 2009*
Outreach Efforts	*March – Ongoing 2009*

15

Summary of Staff Recommended Proposed Changes

- **Proposed Rule Changes:**
  - Eliminate Facility Registration for Operation, Leak Detection and Monitoring, and Leak Repair Requirements Applicability to Air-conditioning Systems
  - Eliminate Implementation Fee for Small Refrigeration Systems
  - Clarify Business License Requirements
  - Clarify that required service practices are applicable to any person installing, maintaining, or servicing any appliance that could reasonably be expected to release a high-GWP refrigerant into the atmosphere
  - Require Refrigerant Cylinder Evacuation to 15 Inches of Mercury
  - Clarify Required Use of SNAP Approved Refrigerants – Only If Used as ODS Substitute
  - Revise Retrofit and Retirement Plan Requirements
    - If Failure To Repair Leak in 45 Days
    - If Refrigerant Leak Not Isolated to Single Component
  - Revise Refrigerant Distributor or Wholesaler and Certified Reclaimer reporting to Specify Annual Aggregate Data

16

Implementation Schedule by Subject

	Facilities with Large Refrigeration Systems	Facilities with Medium Refrigeration Systems	Facilities with Small Refrigeration Systems	Refrigerant Distributors, Wholesalers & Reclaimers
Facility Registration and Leak Repair				
Leak Detection and Monitoring	**2011**			
Leak Repair	**2011**			
Retrofit & Retirement Plans	**2011**			
Required Service Practices	**2011**			
Annual Registration for Operation	**2012**	**2014**	**2016**	
Annual Implementation Fees*	**$370**	**$170**	**$0**	
Reporting	**2012**	**2014**	**N/A**	
Recordkeeping	**2011**	**2011**	**2011**	
Refrigerant Use, Sale, and Disposal				
Prohibitions				**2011**
Reporting				**2012**
Recordkeeping				**2011**

* Paid with annual Registration for Operation.

Required Service Practices are applicable to all refrigeration and air-conditioning appliances without regard to the amount of refrigerant used.

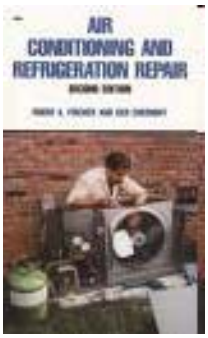
17

Leak Detection and Monitoring

Refrigerant Charge Size Category	Requirement
Facilities with Large System(s)	Automatic Leak Detection System
Facilities with Medium System(s)	Quarterly Inspection
Facilities with Small System(s)	Annual Inspection

18

Leak Repair and Retrofit and Retirement Plans



- Refrigerant Leak Repairs Required by a U.S. EPA Certified Technician within 14 days of leak detection
  - Up to 60 days allowed if certain conditions apply
- Verification tests
  - Immediate initial verification test required on leak repair
  - Follow-up verification tests required for entire Refrigeration System
- Retrofit or Retirement Plan required for Refrigeration System if not repairable

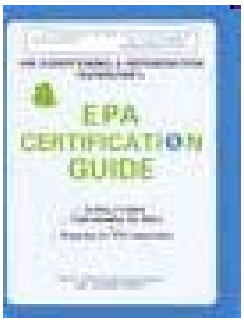
19

Required Service Practices

- Practices in Code of Federal Regulations
  - No discharge of refrigerant from refrigerant circuit (no venting)
  - Refrigerant recovery using approved recovery/recycling equipment
  - Technician must hold a valid U.S. EPA certificate
  - Refrigerant recovery using approved equipment and procedures.
  - Service of refrigeration or air-conditioning systems consistent with US EPA certification.
- Practices Not Specific to Code of Federal Regulations
  - Use of approved refrigerants (U.S. EPA or Executive Officer)
  - Refrigerant cylinder evacuation
  - No topping off

20

Certified Technician



- What Are Requirements for Technician Certification?
  1. Holds a valid certificate issued by a training program certified by the U.S. EPA in one of the following categories:
     - Type I - Technician certificate for small appliances; or
     - Type II - Technician certificate for high or very high pressure refrigeration systems; or
     - Type III - Technician certificate for low pressure refrigeration systems; or
     - A Universal Technician certificate.
  2. Holds a current and active California contractors license:
     - Is a licensed California contractor, or
     - Is an employee of a person holding a current and active California contractors license, or
     - Is an employee of the Facility Owner or Operator

21

Facility Registration for Operation & Implementation Fees

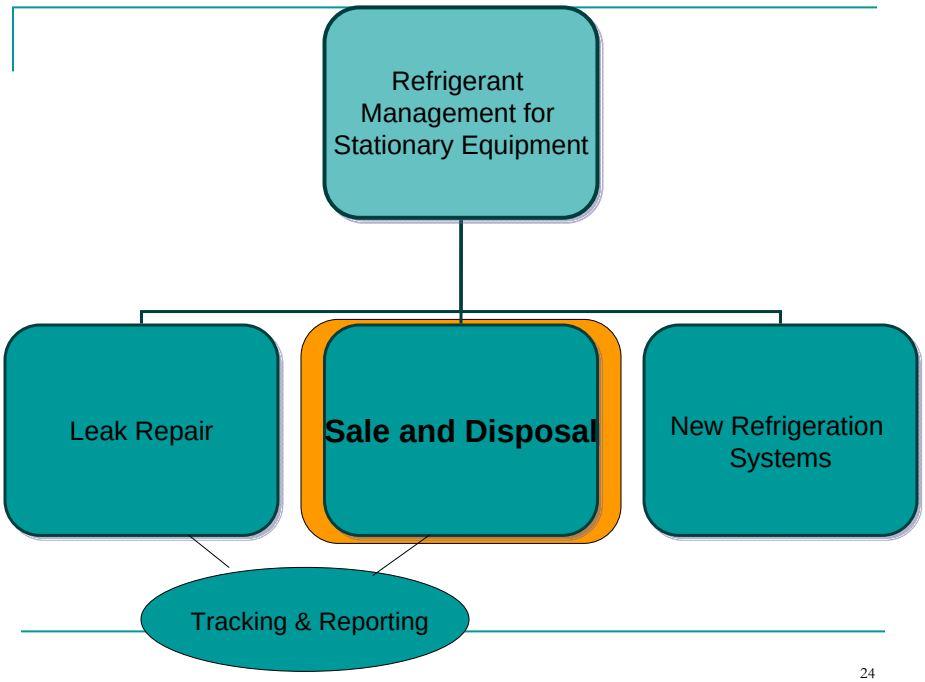
Refrigerant Charge Size Category	Facility Registration Due Date	Facility Implementation Fee
Facilities with Large System(s)	March 1, 2012	$370
Facilities with Medium System(s)	March 1, 2014	$170
Facilities with Small System(s)	March 1, 2016	$0

22

Facility Reporting & Recordkeeping

- Annual Report
  - Refrigeration Service and Leak Repair Report
  - Facility Refrigerant Purchased and Used Report
- Recordkeeping - records retained for 5 years
  - Records to support required annual reports
  - Documentation of all leak detection systems
  - Records of all service and refrigerant leak repairs

23



24

Refrigerant Wholesalers & Distributors, and Reclaimers

- **Prohibitions**
  - No sale or distribution in a container greater than 2 pounds to a person unless:
    - The buyer is or employs a person who is certified by US EPA
    - Refrigerant is sold only for resale or reclamation
    - Refrigerant is contained in an appliance
  - No sale of refrigerant to a new owner unless it has been reclaimed
  - No sale of refrigerant as an ODS substitute unless it is approved by US EPA under SNAP Program
  - No cylinder disposal unless facility evacuates under vacuum
  - No refill or modification to allow refill of non-refillable cylinder

25

Refrigerant Distributors or Wholesalers & Reclaimers

- **Reporting & Recordkeeping**
  - Distributors & Wholesalers Reporting - Report total refrigerant received and distributed for resale or use by category:
    - Certified Technician or Employer
    - Appliance Manufacturer
    - Refrigerant Distributor, Broker, or Other
  - Reclaimer Reporting - Report total annual refrigerant received, reclaimed, and destroyed
  - Recordkeeping – records maintained for 5 years

26

Other Draft Rule Sections

- § 95385. Confidentiality
- § 95386. Enforcement
- § 95387. Equivalent Local Rules
- § 95388. Conditional Exemptions

27

Cost Analysis & Effectiveness - Updated Cost Estimates Assumptions

Annual cost	Facilities with Large Refrigeration Systems	Facilities with Medium Refrigeration Systems	Facilities with Small Refrigeration Systems
Facility Specific Annual Costs			
Implementation fee	$370	$170	$0
Reporting and recordkeeping	$475	$410	$115
System Specific Annual Costs			
Leak detection equipment	$917 capital cost $720 operating cost	$0	$0
Leak inspection cost	$150 annual audit	$300 (quarterly inspections)	$75 (annual inspection)
Leak repair cost*	$2,450 + refrigerant recharge	$1,550 + refrigerant recharge	$900 + refrigerant recharge

* A percentage of total leak repair costs are attributed to the rule based on the assumption that repairs are required at some point to maintain refrigeration business needs.

28

Cost Analysis & Effectiveness - Updated

Statewide Annual Cost of Proposed Rule (2020 Updated)

	Annual Cost (HFC and ODS) ($ millions)	Annual Cost (HFC Only) ($ millions)
Annual Costs		
Implementation Fee	$2.4	$2.0
Reporting and recordkeeping	$7.0	$6.4
Leak inspection	$21.0	$19.7
Automatic leak detection and monitoring		
Capital costs & Annual maintenance	$7.4	$5.7
Repair (labor, parts, and refrigerant recharge)	$11.3	$10.2
Refrigerant savings	$68.1	$56.8
Net cost	- $19.1	- $12.8
Potential Emission Reductions ($MMTCO_2E$)	8	7
Average Cost-effectiveness ($ / $MTCO_2E$)	- $2	- $2

29

Example Case Study Facility with Small Refrigeration System

Facility Description:

- Pharmacy
- One Small Refrigeration System (72 pounds)

Photo is not actual facility – example only.

Facility Cost	
Annual Fees	$0
Automatic Leak Detection & Monitoring Capitol and Operating Cost	$0
System Leak Inspection Cost / Automatic Leak Detection Audit	$75
Leak Repair	$0
Reporting and Recordkeeping	$19
Annual Gross Cost	$94
Refrigerant Savings	- $0
Net Annual Costs	$94
Estimated Emission Reduction ($MTCO_2E$)	0
Cost Effectiveness ($ / $MTCO_2E$)	N/A

30

Example Case Study Facility with Medium Refrigeration System

Photo is not actual facility – example only.

Facility Description:
- Commercial Bakery
- Two Medium and One Small Systems (280, 210, and 150 pounds)

Facility Cost	
Annual Fees	$170
Automatic Leak Detection & Monitoring Capitol and Operating Cost	$0
System Leak Inspection Cost / Automatic Leak Detection Audit	$675
Leak Repair	$195
Reporting and Recordkeeping	$219
Annual Gross Cost	$1,259
Refrigerant Savings	- $1,501
Net Annual Costs	-$242
Estimated Emission Reduction ($MTCO_2E$)	80
Cost Effectiveness ($ / $MTCO_2E$)	-$3

31

Example Case Study Facility with Large Refrigeration System


Photo is not actual facility – example only.

Facility Description:
- Food Distribution
- Four Large and One Medium Refrigeration Systems (1,500 to 3,200 pounds)

Facility Cost	
Annual Fees	$370
Automatic Leak Detection & Monitoring Capitol and Operating Cost	$6,549
System Leak Inspection Cost / Automatic Leak Detection Audit	$900
Leak Repair	$1,814
Reporting and Recordkeeping	$1,081
Annual Gross Cost	$10,714
Refrigerant Savings	- $19,469
Net Annual Costs	- $8,755
Estimated Emission Reduction ($MTCO_2E$)	1,205
Cost Effectiveness ($ / $MTCO_2E$)	-$ 7

32

Continued Outreach Efforts

Outreach Activities	Timeframe
Develop Outreach Materials and Conduct Direct Outreach to Businesses	July – Ongoing 2009
Develop Best Practices Case Studies	September – Ongoing 2009

If you have any candidates for a facility that would make a good case study for use of best management practices, or

If you know of any organizations that we should make sure to outreach to please let us know!

33

Refrigerant Management Program Rulemaking Process Timeline & Next Steps

Primary Task	Timeframe
5th Technical Workgroup Meeting	July 7, 2009
Release Updated Draft Rule, Emissions Inventory, and Cost Analysis Documents	August 2009
Hold Statewide Public Workshop	August, 24 2009 Sacramento - Webcast
Public Comments Due on Appendices and Draft Rule	September 4, 2009
Public Release for 45-day comment Period	October 2009
Board Meeting	December 2009
Ongoing Outreach	Throughout 2009 and After

34

Contact Info

Refrigerant Management Program Internet Resources:

- Website: http://www.arb.ca.gov/cc/reftrack/reftrack.htm
- List serve: http://www.arb.ca.gov/listserv/listserv.php

ARB Staff Contacts

Chuck Seidler	cseidler@arb.ca.gov	916-327-8493
Pamela Gupta	pgupta@arb.ca.gov	916-327-0604

35