

High GWP Refrigerant Management for Stationary Equipment

Brief for Technical Working Group
31 July 2008

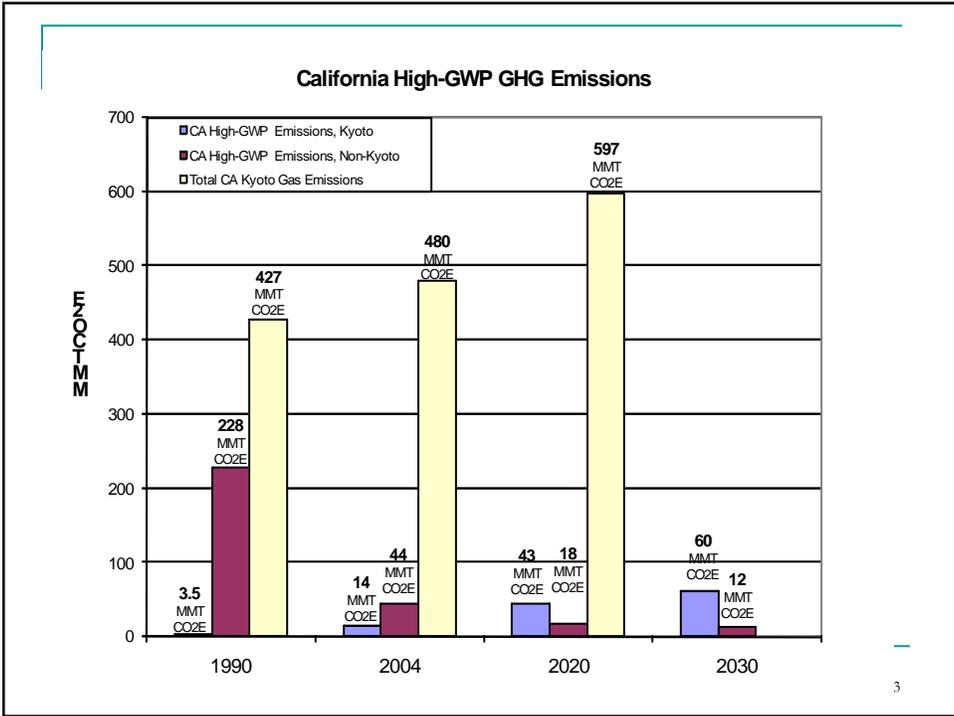
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Agenda

Primary Objective: Discuss draft staff proposal and obtain stakeholder comments.

- Preliminary emissions estimates
- Affected equipment and facilities
- Proposed refrigerant management program
- Technical and policy issues
- Timeline

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BAU Projections for California

ODS + HFCs (MMT CO ₂ eq)	2007	2020
High GWP emissions	57	61
Stationary refrigeration/AC emissions	30	35

Based on US EPA Vintaging Model

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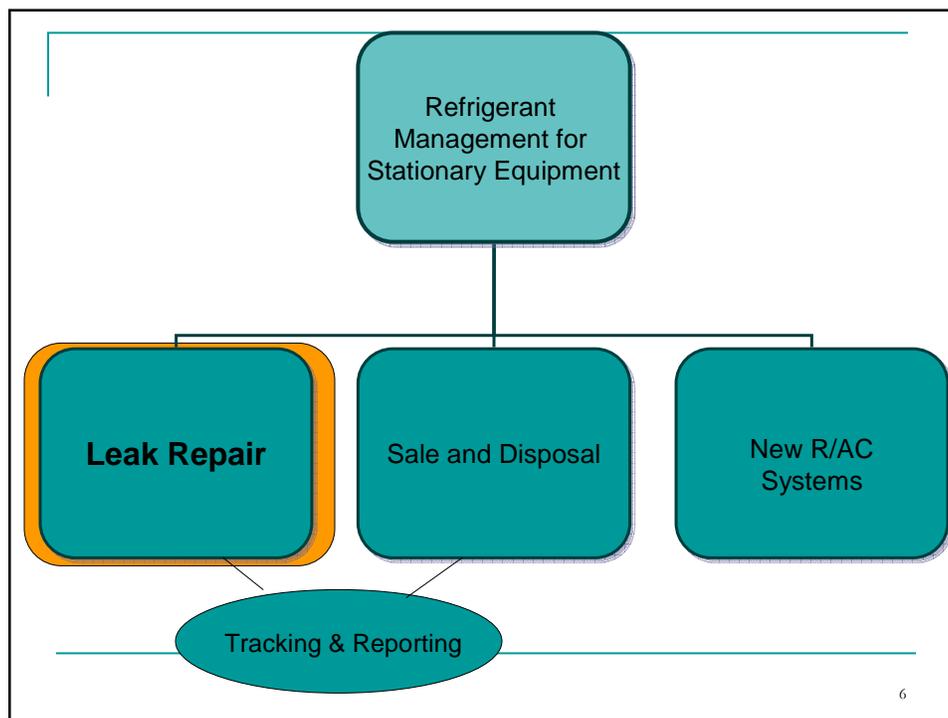
Goal: Minimize emissions of high GWP refrigerants* from stationary refrigeration and air conditioning equipment through:

- Leak test and repair
- Best practices for installation and servicing
- Sale restrictions
- Safe disposal
- Specifications for new equipment
- Reporting by facilities, technicians, reclaimers, distributors

Builds on Federal 608 program and SCAQMD Rule 1415

**CFCs, HCFCs, HFCs, PFCs*

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

Commercial building chillers & rooftop units

Supermarket systems

Industrial process refrigeration



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Facilities Potentially Impacted

(Approx # CA)

- ❑ Grocery stores/supermarkets (n = 3,400)
- ❑ Warehouses used for cold storage
- ❑ Food preparation/processing/service
- ❑ Office, commercial, and industrial buildings (n~ 20,000)
- ❑ Hospitals and other medical facilities
- ❑ Military bases
- ❑ Institutions (schools, universities, laboratories, etc) (n=10,000)
- ❑ Hotels, recreational facilities, etc (n = 10,000)
- ❑ Process cooling

*Facilities would be required to register or apply for permit from agency
Categories w/o numbers have not yet been inventoried but are
expected to be smaller compared to others.*

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Annual Reporting

- Leak test + leak rates
- Check operations
- Check components and connections
- Start dates based on system charge size:

>600 lbs 2010

200-600 lbs 2012

50-200 lbs 2014

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Continuous Monitoring/Automatic Leak Detection

- Proposed for facilities with systems >600 lbs
- Calibrated mechanical, electrical, or electronic device, either
 - Direct system that uses electronic sensors adjacent to the refrigeration or air-conditioning system; or
 - Indirect system that interprets measurements that indicate a leak (e.g., liquid level in a receiver vessel combined with temperatures and pressures)

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Leak Repair

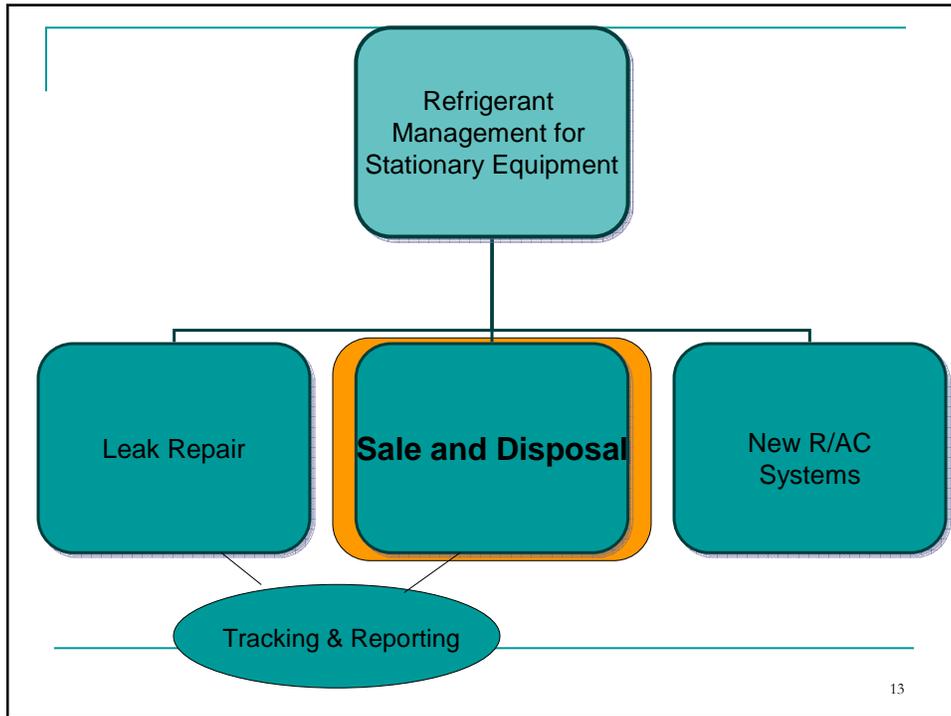
- Within 7 days of detection
 - Longer if parts need to be ordered
 - If District approves system retirement or retrofit schedule
- Verification tests
 - Immediate initial verification test for any system >50 lbs
 - Follow-up verification tests for system >600 lbs:
 - Within 7 days?
 - Part of a quarterly test?
- Maintain log of date, cause, repairs, refrigerant added, technician

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Leak Repair Service Practices

- No opening system w/o refrigerant recovery
- Only SNAP-approved refrigerants
- No top off without repair attempt
- Recovery using procedures and certified equipment in accordance with EPA regulations

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Sale & Disposal

End-of-Life Emissions

- HCFC-22 refrigerant reclaimed in the U.S. is ~<3%
- “Empty” cylinders are not empty
- Lack of economic incentive to recover and return gas

Sale & Disposal

Potential Solutions

- Cylinders
 - Require deposit on refrigerant cylinders
 - Deposit would be returned when technician returns empty or a filled cylinder with recovered refrigerant
 - Ban use of “1-way” cylinders
 - Same done in EU,UK, Australia
 - Ban disposal of cylinders

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Sale & Disposal

- Required Services Practices
- Sale and Distribution of High-GWP Refrigerant & Equipment
- Prohibitions
- Reporting & Recordkeeping

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Sale & Disposal

■ Required Services Practices

- Refrigerant recovery using approved recovery/recycling equipment.
- Refrigerant recycling to same equipment or to other equipment owned by same person.
- Refrigerant recovery using approved equipment and procedures.
- Service of refrigeration or air-conditioning systems consistent with US EPA certification.

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Sale & Disposal

■ Sale and Distribution of High-GWP Refrigerant

- Refrigerant distributor proposed requirements:
 - 2012 through 2014 - at least 20% reclaimed
 - 2015 through 2019, at least 30% reclaimed
 - 2020 and after, at least 50% reclaimed
 - The percent refrigerant reclaimed is equal to the total refrigerant collected and reclaimed for resale in a calendar year divided by the total refrigerant sold in the same calendar year.

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Sale & Disposal

■ Prohibitions

- No sale or distribution in a container greater than 2 pounds to a person unless:
 - The buyer is certified by US EPA
 - Refrigerant is sold only for:
 - Resale to certified technicians
 - Resale to refrigeration or air-conditioning appliance manufacturers
 - Reclamation
 - Refrigerant is contained in a refrigeration or air-conditioning system or commercial refrigeration appliance.

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Sale & Disposal

■ Prohibitions - continued

- No sales to a new owner unless reclaimed.
- No sales unless US EPA approved refrigerant under SNAP program.
- No sales of recovery or recycling equipment not meeting AHRI Standard 740 requirements.
- No intentional disruption of refrigerant circuit unless an attempt to recover refrigerant.
- No disposal of a cylinder unless disposal or recycling facility evacuates the cylinder.

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Sale & Disposal

■ Reporting & Recordkeeping

- Certified Technician
 - Total refrigerant purchased.
 - Total refrigerant charged into a refrigeration or air-conditioning system.
 - Total refrigerant charged into equipment other than a refrigeration or air-conditioning system.
 - A record of refrigerant transactions.
 - A record of refrigerant shipped to a reclaimer.
- Recordkeeping – 5 years

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Sale & Disposal: Reporting

■ Reporting & Recordkeeping - continued

- Distributors & Wholesalers
 - Total refrigerant shipped to service technicians/contractors.
 - Total refrigerant shipped to service reclaimer.
- Recordkeeping – 5 years

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Sale & Disposal: Reporting

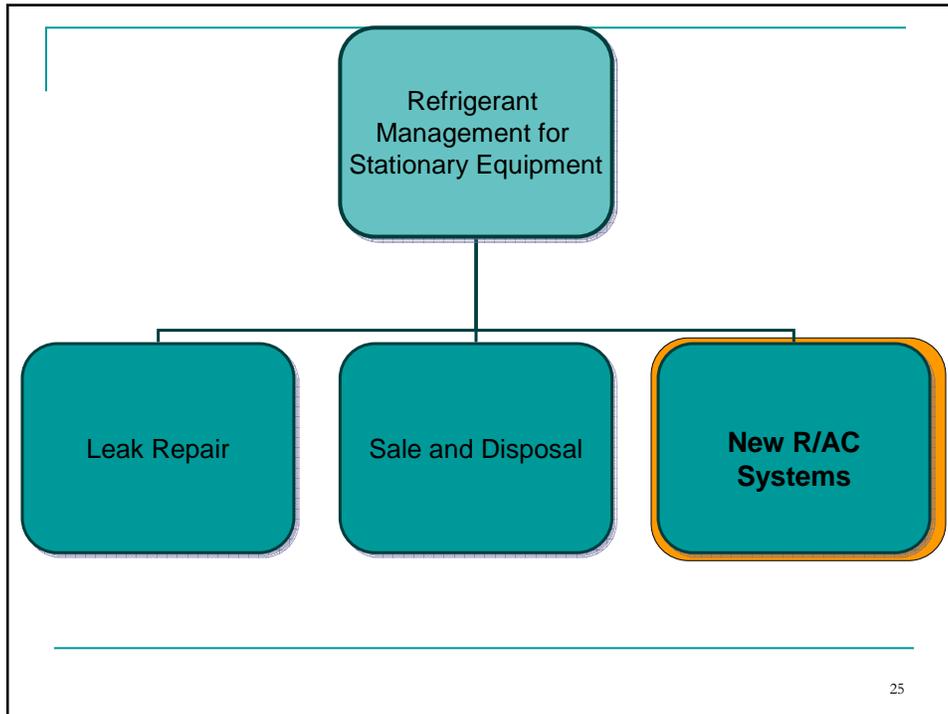
- Reporting & Recordkeeping - continued
 - Reclaimers
 - Total refrigerant collected for reclamation.
 - Total refrigerant collected for destruction.
 - Total refrigerant reclaimed.
 - Total refrigerant destroyed.
 - A record of refrigerant received by a certified technician/contractor.
 - Recordkeeping – 5 years

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Facility Reporting & Recordkeeping

- Annual Report
 - Total energy use
 - Leaks
 - Equipment inventory and total charge
 - Additional refrigerant charge
- Recordkeeping
 - Maintain records for 5 years
 - Refrigerant purchases
 - Refrigerant sent to reclaim, destruction

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SCAQMD Top 10 Leaks (2004-05)

- 5,770 records at 1,402 facilities
- All top 10 leakers are commercial food refrigeration systems
- For 11% of systems, leak rate exceeds 35%
- For 2.7% of systems, leak rate exceeds 100%

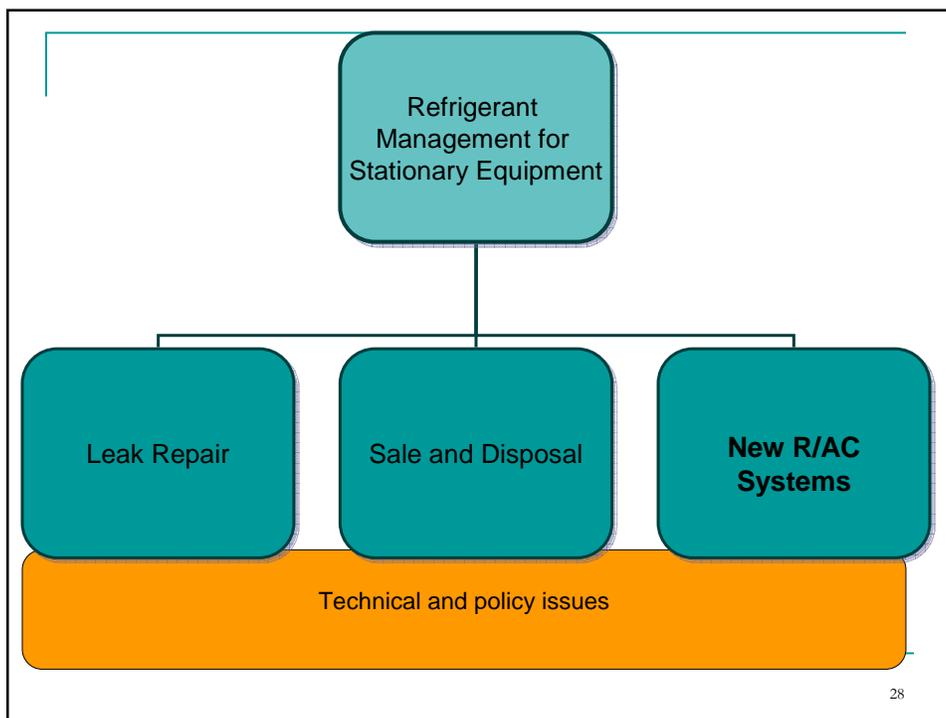
Rank of leak	Leak (pounds)	Emissions (MTCO2E)
1	10,500	8,000
2	10,000	7,500
3	9,000	7,000
4	8,500	6,500
5	8,200	6,000
6	7,200	5,500
7	7,000	5,000
8	6,500	4,500
9	6,200	4,000
10	6,000	3,500

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New Commercial Food Refrigeration Systems

- Manufacturers and technicians must comply with the specifications in ASHRAE Standard 147.
- On or after January 1, 2015, a stationary refrigeration system in a facility over 25,000 square feet must demonstrate that the facility planned to be constructed meets one of the following conditions:
 - The facility will use Best Available Refrigeration Technology
 - The facility will have a “total carbon footprint” that is 25% less than the baseline facility carbon footprint

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Technical & Policy Issues

- **AQMD adoption and implementation**
 - Statewide Rule –
ARB registration and fee collection with district enforcement
ARB enforcement in non-adopting districts
 - Statewide Rule –
Districts adopt rule – registration, fee collection, and enforcement
ARB registration, fee collection, and enforcement in non-adopting districts
- **Mitigation Fee**
 - Consideration of high-GWP mitigation fee to encourage market change

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Fast Track (Comprehensive) Rule Development

- Technical workgroup meetings Spring / Summer 2008
- Staff analyses
- Release of draft proposed rule

- Release technical chapters of staff report Sept./October 2008
- Statewide Public Meeting(s)
- Receive public comments
- Stakeholder meetings

- Board Hearing and Rule Adoption Early 2009

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Closing Remarks

- Are there additional stakeholders or associations that you believe should be involved in these discussions?
- ARB requests that written comments on the proposed regulation and concept paper be provided by Aug 18th.
- If stakeholders would like to meet with ARB staff separately to discuss regulatory text or concepts, please contact staff.

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Contact Info

<http://www.arb.ca.gov/cc/reftrack/reftrack.htm>

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