NASRC Low-GWP & Energy Efficiency Expo

CARB Update:
Refrigerant Regulations & Incentive Program

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Today’s Presentation

- Background
- Proposed HFC Regulations
- Next Steps and Anticipated Timelines for Proposed Regulations
- SB 1013 Incentive Program
Background
HFCs are the fastest growing greenhouse gases

- Currently 4% of California GHG emissions (Increasing to 10% by 2030 under BAU)

- SB 1383 reduction goal: 40% below 2013 levels by 2030 (one-half of today’s HFC emissions)

Source: CARB F-Gas Inventory, 2018
Majority of Emissions from Refrigeration and AC Sector

Sources of HFC Emissions in California

Year 2018
- 28% Mobile AC + Refrigeration
- 34% Stationary AC
- 27% Stationary Refrigeration
- 11% Other

Year 2030 (Projected)
- 46% Stationary AC
- 28% Stationary Refrigeration
- 15% Mobile AC + Refrigeration
- 11% Other

Source: CARB F-Gas Inventory, 2018
Progress in meeting our goal

BAU Emissions
30 MMTCO₂e

Reductions: RMP, Small Can Program
Reductions: SB 1013
Reductions: Global HFC Phasedown

Emissions Goal
10 MMTCO₂e

Additional Reductions Needed

Year 2030

Additional reduction measures required to meet the goal

Source: CARB F-Gas Inventory, 2018
Proposed HFC Regulations
Proposed Equipment GWP Limits

• **Stationary Refrigeration**: New equipment containing more than 50 lbs. of refrigerant, GWP < 150, starting January 1, 2022

• **Stationary AC**: New Equipment, GWP < 750, starting January 1, 2023
Affected Sectors for Stationary Refrigeration

- Commercial Refrigeration
- Industrial Process Refrigeration
- Cold Storage

Currently subject to RMP
## Refrigeration Technologies GWP < 150 ("low-GWP")

<table>
<thead>
<tr>
<th>End-Use Sector</th>
<th>Low-GWP Options Currently Available</th>
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</table>
| **Supermarkets and grocery stores**    | • Transcritical CO₂  
• Ammonia/CO₂ cascade  
• Propane/CO₂ cascade  
• Micro-distributed Propane systems  
• HFO/CO₂ or HFOs-based systems          |
| **Cold storage warehouses and Industrial refrigeration** | Majority already use ammonia others: Transcritical CO₂, NH₃/CO₂, Low-charge ammonia, HFO-based systems |

80+ supermarkets in California using low-GWP refrigerants in 2019
Proposed Equipment GWP Limits

**Stationary Refrigeration**: New equipment containing more than 50 lbs. of refrigerant, GWP < 150, starting January 1, 2022

All new equipment would be subject to this, irrespective of whether installed in new facilities / remodels / existing facilities

We sought stakeholder input
Stakeholder Input to CARB about GWP < 150

• GWP < 150 feasible in new construction and remodels
• **Currently**, expensive and logistically challenging in existing facilities

*Original Image Source: Kysor Warren*
Challenge: Feasibility of GWP < 150 in Existing Facilities

• Only 1 – 2% new facilities + remodels annually
• Most of the new systems will go into existing facilities / legacy stores
• Existing stores have the highest potential for emissions and reductions

Source: CARB Refrigerant Management Program, 2018
Challenge: Feasibility of GWP < 150 in Existing Facilities

- If existing stores cannot meet GWP < 150, we lose emissions reductions
- We need alternative ways to get the reductions to meet the SB1383 target
- Supermarket companies and NASRC* suggested some alternatives

*North American Sustainable Refrigeration Council
How can Existing Facilities Reduce their Emissions?

HFC emissions (in CO₂ equivalents) =

\[ \text{System charge} \times \text{Refrigerant GWP} \times \text{Leak Rate} \]

Ways to guarantee emissions reductions:

- GWP reduction
- Charge reduction (verification can be complicated)

(Leak rate reductions can never be guaranteed)
End-User Input to CARB

CARB Proposed HFC Reduction Measure

New Systems <150 GWP (in new construction / remodels / existing facilities)

Existing Stores <150 GWP
Cost, Logistics

End-User Alternative Proposals

New Systems <150 GWP in New Construction / Remodels

Existing Stores Option 1: Prescribed Retrofits

Existing Stores Option 2: Blended/GHGP Reduction

CARB “Hybrid” Option

Existing Stores Option 3: Weighted GWP Reduction
Option 1 for Existing Stores

Prescribed Retrofits to GWP < 1,400

• Existing systems retrofit to GWP < 1,400 by 2030
• Certainty of emissions reductions, straightforward implementation
• Lacks flexibility – potentially every system (above 50 pounds) using high-GWP refrigerants would be affected
Greenhouse Gas Emission Potential (GHGp) Reduction

- \( \text{GHGp} = \sum (\text{Charge} \times \text{GWP}) \)
- Reduce GHGp by ~ 55% below 2018 baseline by 2030
- A per-company target, not per-system or per-store
- Flexible – don’t have to convert / retrofit every single store/system
- Credit for charge and GWP reduction

Potential Challenges

- Tracking and reporting each company’s baseline (sales, transfers etc.)
- Charge reduction – verification is difficult, needs additional recordkeeping / reporting
- No credit for “nominal” charge reduction; must accompany significant changes
Option 3 for Existing Stores

Weighted-Average GWP Reduction

• Weighted-Average GWP = \( \frac{\sum (\text{charge} \times \text{GWP})}{\sum \text{charge}} \)

• Target: Weighted GWP of each company < 1,400 by 2030

• Fixed target, no need for tracking company baselines
• Fixed target but still per-company, not per system
• Flexible – don’t have to convert / retrofit every store or system
• Gives credit for new low-GWP stores
• Rewards conversion to lower and low-GWP (complete or “modular”)
I. New equipment in newly constructed/fully remodeled facilities, GWP < 150
   • Effective January 1, 2022
   • One-time, free RMP registration required for GWP < 150 facilities
   • Question: Remove 50 lb. threshold for new construction / remodels?

II. For existing supermarkets and grocery stores - CARB is evaluating 2 compliance pathways – weighted-average GWP reduction and the GHGp programs:
   • Large companies (> 20 stores per company or national chain) will have a progress step in 2026
   • Small companies (1 – 20 stores per company) – same target by 2030, no progress step
   • For GHGp, additional recordkeeping and reporting for verification of charge reduction required

Both options prepare supermarkets for future HFC phase-down / sales ban
Flexibility to plan over 8 – 10 years
# Next Steps and Anticipated Timelines

## Stationary Refrigeration and AC Equipment

<table>
<thead>
<tr>
<th>Event</th>
<th>Dates</th>
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<tbody>
<tr>
<td>Public workshops and Stakeholder meetings</td>
<td>October 2017, October 2018</td>
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<tr>
<td>Technical Working Groups: March 2019, August 2019</td>
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<td><strong>Next Workshop</strong>: January 30, 2020</td>
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<tr>
<td>Economic Analysis</td>
<td>March 2020</td>
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<tr>
<td>Staff Report (ISOR); 45-Day public comment opens</td>
<td>April 2020</td>
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<td>Board Meeting</td>
<td>July 2020</td>
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<tr>
<td>Regulation Effective Date</td>
<td>Jan 2022 – Refrigeration; Jan 2023 - AC</td>
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SB1013 Fluorinated Gases Emission Reduction Incentive Program
Incentive Program

SB 1013 establishes an incentive program to promote adoption of “new refrigerant technologies” (i.e., low and lower-GWP)

- $1 million recently allocated in the FY 19-20 budget
- Designing the incentive program based on stakeholder input
Incentive Program Structure

- Based on California Climate Investments requirements
- Program materials webpage for posting guidance documents
- Program Guidelines
  - Competitive solicitation
  - Eligible technologies
  - Scoring criteria
  - Application process and solicitation materials
- Coordination with CPUC and utilities
# Incentive Program Timeline

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<thead>
<tr>
<th>Event</th>
<th>Date/Period</th>
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<tr>
<td>Public workshop</td>
<td>1st workshop: January 30, 2020</td>
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<tr>
<td>Expenditure Record Posting</td>
<td>January 2020</td>
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<tr>
<td>Draft Program Guidelines and Public Workshop/Webinar</td>
<td>March-April 2020</td>
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<td>Program Solicitation Open</td>
<td>Summer 2020 (8 weeks)</td>
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<td>Awards Announcement</td>
<td>Fall 2020</td>
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<td>Funds disbursement</td>
<td>Reimbursement system</td>
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Feedback and Questions – Contact Us

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For more information, please visit:
https://ww2.arb.ca.gov/our-work/programs/stationary-hydrofluorocarbon-reduction-measures

Thank you for listening!
Extra Slides
National and Global Action on HFCs
National Action

- Ongoing coordination and regulatory guidance to U.S. Climate Alliance (24 states)
- New York, Connecticut, Maryland, Delaware in the process of enacting HFC rules
- Washington and Vermont state recently passed legislation following CA’s SB1013
End-Use Sectors Covered by SB 1013

- Supermarket (retail food) refrigeration
- Remote condensing units
- Stand-alone (self-contained) units
- Food processing & dispensing units
- Refrigerated vending machines
- Residential refrigerator-freezers
- Foam
- Chillers
- Cold storage warehouses
- Aerosol propellants