

NASRC Low-GWP & Energy Efficiency Expo

CARB Update: Refrigerant Regulations & Incentive Program

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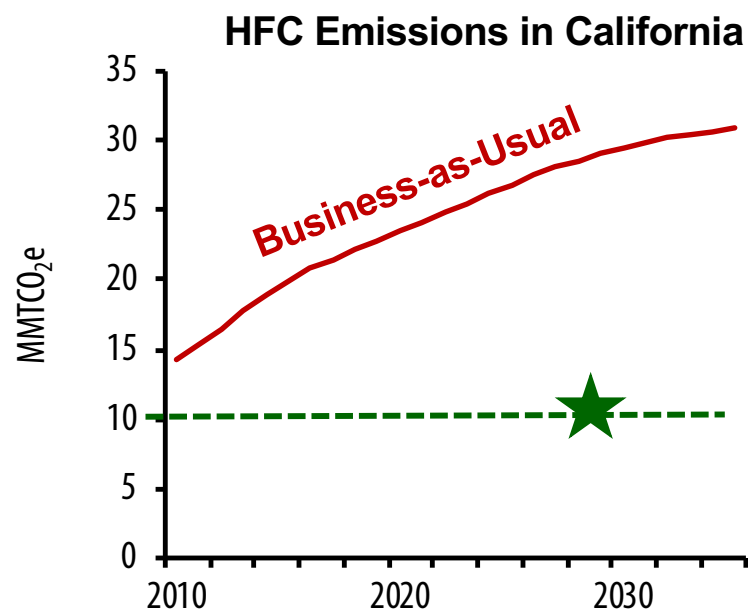
Today's Presentation



- Background
- Proposed HFC Regulations
- Next Steps and Anticipated Timelines for Proposed Regulations
- SB 1013 Incentive Program

Background

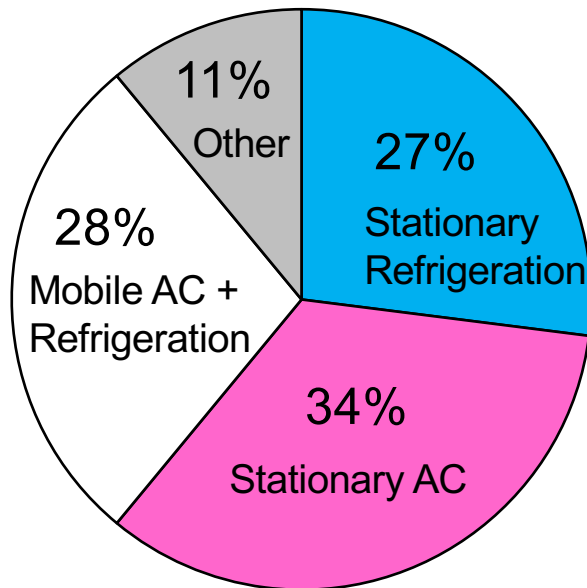
HFCs are the fastest growing greenhouse gases



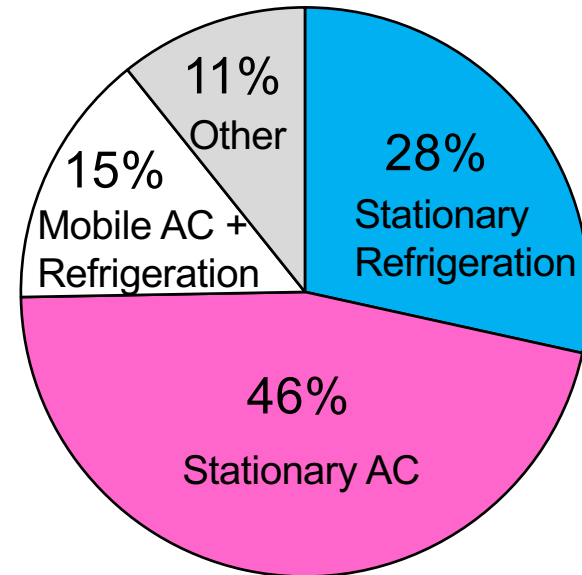
- **Currently 4% of California GHG emissions** (Increasing to 10% by 2030 under BAU)
- **SB 1383 reduction goal: 40% below 2013 levels by 2030** (one-half of today's HFC emissions)

Source: CARB F-Gas Inventory, 2018

Sources of HFC Emissions in California



Year 2018

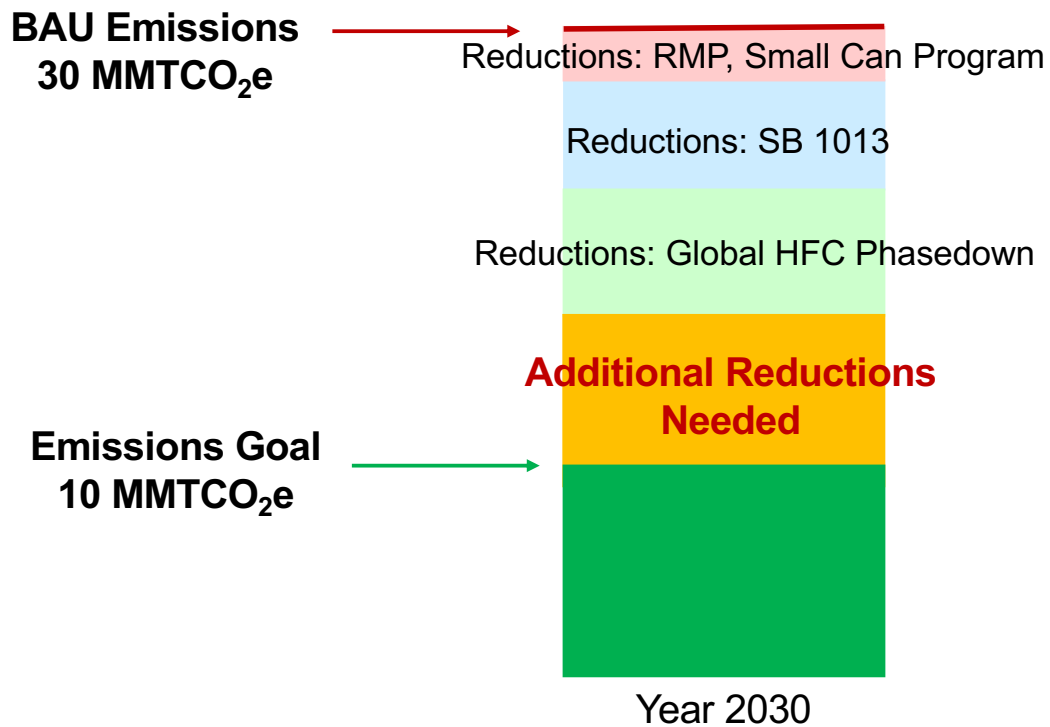


Year 2030 (Projected)

Majority of Emissions from Refrigeration and AC Sector

Source: CARB
F-Gas Inventory,
2018

Progress in meeting our goal



Source: CARB F-Gas Inventory, 2018

[Additional reduction measures required to meet the goal](#)

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

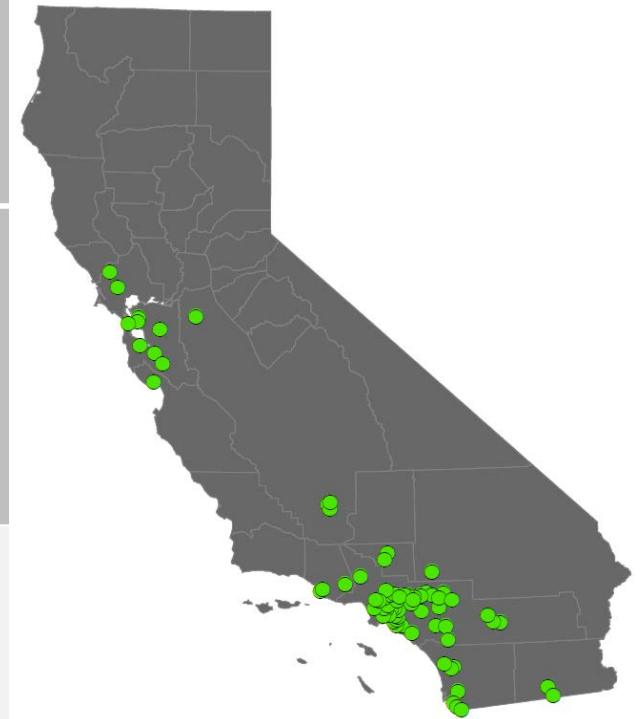


- Commercial Refrigeration
- Industrial Process Refrigeration
- Cold Storage

Currently subject to RMP

Refrigeration Technologies GWP < 150 (“low-GWP”)

End-Use Sector	Low-GWP Options Currently Available
<p>Supermarkets and grocery stores</p>	<ul style="list-style-type: none"> • Transcritical CO₂ • Ammonia/CO₂ cascade • Propane/CO₂ cascade • Micro-distributed Propane systems • HFO/CO₂ or HFOs-based systems
<p>Cold storage warehouses and Industrial refrigeration</p>	<p><i>Majority already use ammonia</i> others: Transcritical CO₂, NH₃/CO₂, Low-charge ammonia, HFO-based systems</p>



80+ supermarkets in California using low-GWP refrigerants in 2019

Proposed Equipment GWP Limits

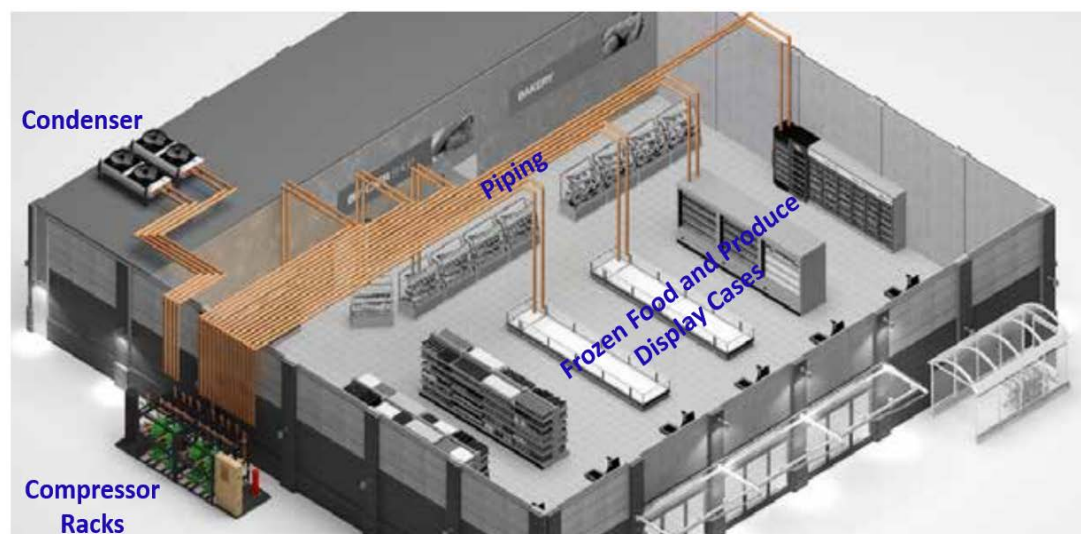
Stationary Refrigeration: New equipment containing more than 50 lbs. of refrigerant, GWP < 150, starting January 1, 2022

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

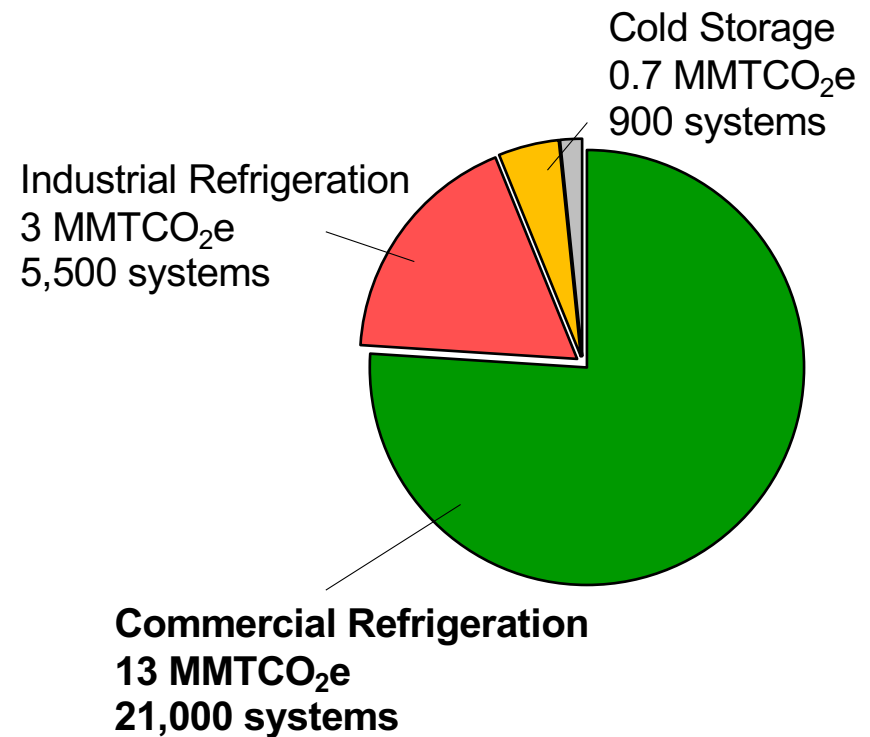
- GWP < 150 feasible in new construction and remodels
- Currently, expensive and logistically challenging in existing facilities



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) =

System charge × Refrigerant GWP × Leak Rate

Ways to guarantee emissions reductions:

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

(Leak rate reductions can never be guaranteed)

CARB Proposed HFC Reduction Measure

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



Hurdles

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

Option 2 for Existing Stores



Greenhouse Gas Emission Potential (GHGp) Reduction

- **GHGp = $\Sigma(\text{Charge} \times \text{GWP})$**
- 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** = $\frac{\Sigma(\text{charge} \times \text{GWP})}{\Sigma \text{charge}}$
- 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”)

Potential Changes to Proposal for Refrigeration Systems



- 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	
Public workshops and Stakeholder meetings	October 2017, October 2018
	Technical Working Groups: March 2019, August 2019
	Next Workshop: January 30, 2020
Economic Analysis	March 2020
Staff Report (ISOR); 45-Day public comment opens	April 2020
Board Meeting	July 2020
Regulation Effective Date	Jan 2022 – Refrigeration; Jan 2023 - AC

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



Image source: Depositphotos.com

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



Public workshop	1st workshop: January 30, 2020
Expenditure Record Posting	January 2020
Draft Program Guidelines and Public Workshop/Webinar	March-April 2020
Program Solicitation Open	Summer 2020 (8 weeks)
Awards Announcement	Fall 2020
Funds disbursement	Reimbursement system

Thank
you for
listening!



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>

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

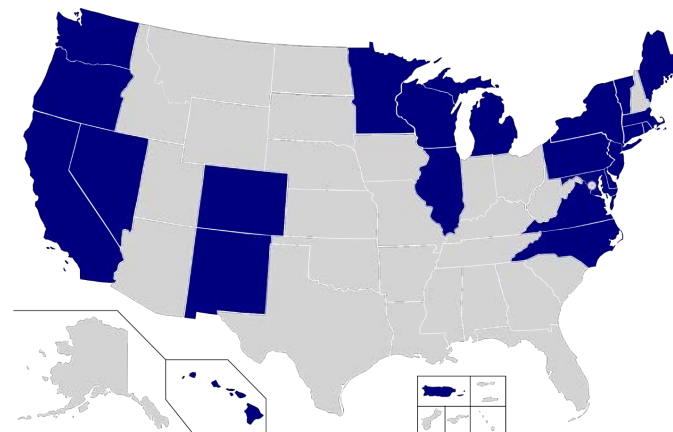


Image sources: usclimatealliance.org; map from wikipedia



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