Public Workshop:
Amendments to California’s HFC Regulation

July 22, 2020

California Air Resources Board
Research Division
F-gas Reduction Strategy Section
HFCReduction@arb.ca.gov
Submit your questions and comments via GoToWebinar

- Use question box
- “Raise” your hand for follow up
**Today’s Agenda**

9:00 am: Introduction, Discussion of Refrigeration Sections of Draft Regulatory Text

10:15 am: Discussion of Air Conditioning Sections of Draft Regulatory Text

11:30 am: Discussion of Other Changes in Draft Regulatory Text

12:30 pm: Concluding Remarks
Richie Kaur, Proposed HFC Regulations on Refrigeration
richie.kaur@arb.ca.gov

Kathryn Kynett, Proposed HFC Regulation on AC
kathryn.kynett@arb.ca.gov

Elizabeth Brega, Variance Language and Other Changes
elizabeth.brega@arb.ca.gov

Glenn Gallagher, HFC Regulations
glenn.gallagher@arb.ca.gov

Aanchal Kohli, Incentive Program, Codes and Standards
aanchal.kohli@arb.ca.gov

Pamela Gupta, Manager
pamela.gupta@arb.ca.gov

Michael FitzGibbon, Branch Chief
michael.fitzgibbon@arb.ca.gov

Elizabeth Scheehle, Division Chief
elizabeth.scheehle@arb.ca.gov

Shannon Dilley, Senior Attorney
shannon.dilley@arb.ca.gov
Introduction and Proposed Rules for Stationary Refrigeration

Richie Kaur
F-gas Reduction Strategy Section
Research Division
California Air Resources Board
richie.kaur@arb.ca.gov
Hydrofluorocarbons (HFCs) are the fastest growing greenhouse gases

HFC Emissions in California 2000-2030

HFC Emissions Goal in 2030

Source: CARB F-gas Inventory, 2018
Regulation Timeline

Public Workshops, Working Groups, Stakeholder Meetings

2016
- SB 1383 – CA must reduce HFC emissions 40% below 2013 levels by 2030
- World agrees to phasedown HFCs (Kigali Amendment)

2017
- CARB finalizes SLCP Strategy

2018
- CARB adopts “CA SNAP” Regulation & SB 1013 passes
- Public workshop to announce rulemaking to set GWP limits for new equipment (via Amendments to CA SNAP Reg)

2019
- Economic Analysis (SRIA) approved by DOF
- Public workshop to announce plan to adopt SNAP prohibitions and enact GWP limits on new equipment through rulemaking

2020
- Two public workshops to release and discuss draft regulatory text

2022, 2023
- Effective Dates
- 45-day notice package, comment period, Dec. 2020 Board Hearing

Mexichem Flour. vs U.S. EPA Ruling
Changes in the California HFC Regulation

Initial HFC Regulation Adopted, March 2018
- Refrigeration, Foams
- Aerosols, Additional Foams, Chillers, Cold Storage, Refrigerator

SB 1013 Signed, September 2018

“California SNAP Regulation”
- Combined via Administrative Process, January 2020

Amendments to California SNAP Regulation
- Amendments Include
  - Refrigeration systems > 50 lb
  - New air conditioners
  - Variance language, other updates
Today’s Presentation on Refrigeration

• Overview: Affected End-Uses and Proposed Rules
• Draft Regulatory Text Updates
• Next Steps and Anticipated Timelines
• Discussion
Overview
Affected End-Uses and Rules for Refrigeration

Proposed Rules:
• New facilities: systems > 50 lb, GWP < 150, starting 2022, irrespective of end-use
• Existing facilities: rules depend on the end-use
Expected Emissions Reductions from Proposed Refrigeration Rules

- Annual Emissions Reductions in 2030: 1.5 MMTCO$_2$e
- Cumulative Emissions Reductions by 2040: 22 MMTCO$_2$e
Draft Regulatory Text

• Existing CA SNAP / SB 1013 prohibitions are listed in Tables 1 and 2.

• New requirements are listed in Tables 3 and 4 (edited for clarity since January)
Refrigeration Rules by End-Use:

1. Retail Food Refrigeration
§ 95374. Table 4 in the draft regulatory text

<table>
<thead>
<tr>
<th>General End-Use</th>
<th>Specific End-Use</th>
<th>Prohibited Substances</th>
<th>Effective Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigeration Equipment, Stationary</td>
<td>Refrigeration equipment (new), containing more than 50 pounds refrigerant</td>
<td>Refrigerants with a GWP of 150 or greater</td>
<td>Prohibited as of January 1, 2022</td>
</tr>
<tr>
<td>(in New Facilities)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What is a “New Facility”?  

§ 95373. Part of Definitions

“New Facility” means any of the following:

(1) New construction;

(2) An existing facility not previously used for cold storage, or refrigeration used in retail food, commercial, industrial refrigeration; or

(3) …with a replacement of 75 percent or more of evaporators (by number) and, 100 percent of compressors racks, and 100 percent of condensers.

Exception: § 95375(c) and § 95375(d)

Approved Building Permits: The prohibitions do not apply to any facility with new refrigeration equipment that received an approved building permit before the effective date.
Proposed Rules for Existing Retail Food Facilities

• Supermarket stakeholder driven
• Guaranteed emissions reductions similar to CARB’s original proposal

1. Greenhouse Gas Potential Reduction

\[ \text{GHGp} = \Sigma(\text{Charge} \times \text{GWP}) \]

2. Weighted-Average GWP Reduction

\[ \text{WAGWP} = \frac{\Sigma(\text{Charge} \times \text{GWP})}{\Sigma \text{Charge}} \]

• Per-company targets, not per-system or per-store
• Flexible – don’t have to retrofit every single store or system
• Plan over 8 – 10 years; Prepares industry for future phase-down or sales ban
• CARB incentive program designed to help with the transition
§ 95374. Table 4 in the draft regulatory text

<table>
<thead>
<tr>
<th>Retail Food Facilities</th>
<th>Requirement</th>
<th>Effective Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigeration Equipment, Stationary (in Existing Facilities)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Companies owning or operating 20 or more retail food facilities and national supermarket chains operating in California</td>
<td>WAGWP &lt; 2,500 or GHGp reduction ≥ 25% below 2019 levels</td>
<td>January 1, 2026</td>
</tr>
<tr>
<td></td>
<td>WAGWP &lt; 1,400 or GHGp reduction ≥ 55% below 2019 levels</td>
<td>January 1, 2030</td>
</tr>
<tr>
<td>Companies owning or operating fewer than 20 retail food facilities</td>
<td>WAGWP &lt; 1,400 or GHGp reduction ≥ 55% below 2019 levels</td>
<td>January 1, 2030</td>
</tr>
</tbody>
</table>

**Change:** Baseline year for GHGp 2019 instead of 2018
Questions Received for Retail Food

Q. Are systems < 50 lb included in GHGp calculations?
A: Systems < 50 lb in 2019 – Not included.
   Systems > 50 lb in 2019 but replaced by systems < 50 lb later – Included.

Q. Will new stores get credit under WAGWP?
A: Yes. Rewards low-GWP transitions.

Q. Do retailers have to choose between GHGp and WAGWP pathways?

Q. Which rules will apply to supermarket chillers?
A: GWP < 150 for new facilities, WAGWP/GHGp for existing facilities. 
   Note: chiller GWP limits for IPR are different.

Q. Which rules will apply to new remote condensing units?
A: If charge > 50 lb, GWP < 150 for new facilities, WAGWP/GHGp for existing facilities (in Table 4).
   If charge < 50 lb, existing SNAP rules will apply (in Table 1).
Refrigeration Rules by End-Use:

2. Industrial Process Refrigeration (IPR) – chillers, non-chiller systems, ice rinks
## Requirements for IPR: Chillers

### § 95374. Table 3

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<tr>
<td>Chillers</td>
<td>Chillers (new) designed for minimum evaporator temperature &gt; +35 °F (2 °C)</td>
<td>Refrigerants with a GWP of 750 or greater</td>
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<td>Chillers</td>
<td>Chillers (new) designed for minimum evaporator temperature ≤ +35 and &gt; -10 °F (-26 °C)</td>
<td>Refrigerants with a GWP of 1,500 or greater</td>
<td>Prohibited as of January 1, 2024</td>
</tr>
<tr>
<td>Chillers</td>
<td>Chillers (new) designed for minimum evaporator temperature ≤ -10 °F (-26 °C) and &gt; -58 °F (-50 °C)</td>
<td>Refrigerants with a GWP of 2,200 or greater</td>
<td>Prohibited as of January 1, 2024</td>
</tr>
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</table>

**Change:** Temperature ranges for IPR chillers modified based on stakeholder input
## Requirements for IPR: Non-Chiller Systems

§ 95374. Table 3

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<td>Industrial Process Refrigeration excluding chillers</td>
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<td>Ice Rinks</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Ice Rinks</td>
<td>Refrigeration Equipment and Chillers (new) used in Ice Rinks</td>
<td>Refrigerants with a GWP of 750 or greater</td>
<td>Prohibited as of January 1, 2024</td>
</tr>
</tbody>
</table>
Q. Does the IPR definition match the U.S. EPA definitions?
A: Yes, but edited to align even more closely with EPA definitions under Rule 608 and SNAP rules.

§ 95373. Definitions

“Industrial Process Refrigeration” means to cool process streams at a specific location in manufacturing and other forms of industrial processes and applications, and are complex, customized systems that are directly linked to the industrial process. Where one appliance is used for both industrial process refrigeration and other applications, it will be considered an industrial process refrigeration system if 50 percent or more of its operating capacity is used for industrial process refrigeration. Industrial process refrigeration or cooling using a chiller is regulated as a chiller. Industrial process refrigeration not using a chiller is regulated as industrial process refrigeration equipment.
Refrigeration Rules by End-Use:

3. Cold Storage
§ 95374. Table 3

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**Clarification:** SB 1013 already had some prohibitions for cold storage. Those continue to apply for all other cases (see Table 2 of draft regulatory text)
Enforcement-related Requirements (Labeling, Recordkeeping, Reporting)
Summary of Requirements

§ 95375. Requirements Applicable to Table 3 and Table 4

For Equipment Manufacturers
- Labeling
- Recordkeeping

For Retail Food Facility Owner-Operators
- One-time, free registration in R3 for new GWP < 150 facilities
  - For current low-GWP stores, please register by January 1, 2022
- For GHGp/WAGWP compliance
  - Starting 2022, annually report/certify WAGWP and GHGp
  - Keep records for calculations
  - Update R3 with changes to systems
§95375. Requirements Applicable to Table 3 and 4

Labeling: Display a label on the equipment that clearly and visibly indicates:
- Type of refrigerant
- Where available, the refrigerant charge size
- Date of manufacture (year)
- Existing labels meeting the above requirements may be used
Any person who manufactures new motor-bearing refrigeration equipment shall maintain for five years and make available, upon request:

- Contact details of purchaser (name, address, telephone, email)
- Model and serial number of the equipment and / or components where applicable
- Date of manufacture of the equipment
- Date of sale of the equipment
- The refrigerant type(s) the equipment is designed to use
- The refrigerant and full charge capacity of the equipment, where available

Similar requirements as under the original 2018 “CA SNAP” regulation (Section § 95375)
 §95375. Requirements Applicable to Table 4

- **Registration Requirements.** On or before January 1, 2022, retail food facilities shall register in the R3 database, refrigeration systems containing more than 50 pounds of refrigerant that use a GWP less than 150.

  Similar to current RMP registration, but one time, no fee

- **Reporting Requirements.** Starting 2022, annually report company’s WAGWP and GHGp along with RMP annual reports
  - Via R3, by March 1 of the following calendar year
§95375. Requirements Applicable to Table 4

Recordkeeping

- Records showing your GHGp / WAGWP calculations for each year (spreadsheets etc.)
- When any changes are made to GWP of the refrigerant and / or charge of a system, keep records:
  - Full charge, before and after
  - Means by which full charge was determined, before and after
  - Type of refrigerant, before and after
  - Amount of refrigerant removed, amount stored / sent, where it was sent
  - Date of system retirement / removal
  - For retired systems - amount of refrigerant removed, where it was sent afterwards
  - Documentation such as, invoices, receipts, records of shipments, plans, or work details, that are generated from a third party, such as a service technician or refrigerant reclaimer.
Next Steps and Anticipated Timelines
Next Steps and Anticipated Timelines

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Feedback and Questions for Refrigeration – 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! CARB welcomes your feedback.

Discussion on refrigeration (until 10:15 AM)
Public Workshop
Proposed GWP Limit for New Stationary Air Conditioning Equipment

July 22, 2020

Kathryn Kynett
F-gas Reduction Strategy Section
Research Division
California Air Resources Board
kathryn.kynett@arb.ca.gov
Today’s Agenda

• 9:00am: Introduction, Discussion of Refrigeration Sections of Draft Regulatory Text

• 10:15 am: Discussion of Air Conditioning Sections of Draft Regulatory Text

• 11:30 pm: Discussion of Other Changes in the Draft Regulatory Text

• 12:30 pm: Concluding Remarks
Today’s Presentation

• Background

• Draft Regulatory Text

• Next Steps and Anticipated Timelines

• Discussion
Background
AC Proposal Timeline

Public Workshops and Regulatory Development Activities

2016

- SB 1383—CARB must reduce HFC emissions 40% below 2013 levels by 2030
- World agrees to phasedown HFCs (Kigali Amendment)

2017

- CARB includes 750 GWP limit for new AC equip. in SLCP Strategy

2018

- CARB adopts SNAP Regulation & SB 1013 passes
- Industry/NRDC Agreement (<750 GWP by 2023) & CARB moves forward with rulemaking

2019

- SFM Workgroup
- U.S. EPA proposes SNAP Rule 23 (approves alternatives for AC with <750 GWP)

2020

- Economic Analysis (SRIA) 45-Day Notice Package
- Dec. 2020 Board Hearing

2023

- Effective Date

At a public workshop, CARB announces timeline to move forward with a regulation enacting 750 GWP limit for new AC equip.
Refrigerant Alternatives <750 GWP

100-Yr GWP Value

- 2,500
- 2,000
- 1,500
- 1,000
- 500
- 0

R-22  R-410A  R-32  R-452B  R-454A  R-454B  R-454C  R-457A  R-466A

750 Limit

Being phased out under the Montreal Protocol/Kigali Amendment
Refrigerants under 750 GWP
Refrigerant Standards & Codes

Refrigerant Standards
- ASHRAE Standard 34: Safety Designation & Classification
- U.S. EPA SNAP**

Safety Standards
- UL 60335-2-40: Heating and Cooling Equipment

Codes Proposal
- Model Codes or State Fire Marshal*

State Building Code
- California Building Code

*State Fire Marshal has authority to make code changes proposals (convening workgroup)
**Refrigerants must also be listed as “acceptable” under the U.S. EPA SNAP Program (Proposed Rule 23)

[Adapted from Goetzler et al., 2016]
Regulatory Text
§ 95374. List of Prohibited Substances.
(c) The following table lists prohibited substances as of their relevant dates:
Table 3: End-use and Prohibited Substances.

<table>
<thead>
<tr>
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<th>Specific End-Use</th>
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</thead>
<tbody>
<tr>
<td>Air-conditioning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air-conditioning</td>
<td>Air-conditioning equipment (new),</td>
<td>Refrigerants with a GWP of 750</td>
<td>Prohibited as of January 1, 2023</td>
</tr>
<tr>
<td>equipment</td>
<td>residential and non-residential</td>
<td>or greater</td>
<td></td>
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</tbody>
</table>
§95375. Requirements Applicable to Table 3 of Section 95374(c).

(1) Prohibitions. No person shall sell, lease, rent, install, use, or enter into commerce in the State of California, any end-use equipment or product manufactured after the effective date, that does not comply with Table 3 of section 95374(c) of this subarticle.
§95373. Definitions

“Air-conditioning Equipment” or “Air-conditioning System” equipment that cools or dehumidifies spaces in residential or non-residential settings, for comfort cooling and other purposes, including but not limited to…"

- Room AC
- Central AC (ducted and non-ducted)
- Heat pumps
- Dehumidifiers
- Computer room and data center cooling
- Remote condensing units for AC
§ 95373. Definitions.

“New Air-conditioning Equipment” means any air-conditioning equipment or system that is first installed using new or used components, or a combination of new or used components, or a new exterior condenser, condensing unit or remote condensing unit in an existing system.
Definition of New AC Equipment

3. Condenser
Hot coils release collected heat into the outside air.

4. Compressor
A pump that moves refrigerant between the evaporator and the condenser to chill the indoor air.

5. Fan
A fan blows air over the condenser to dissipate the heat outside.

1. Evaporator
Cooling coils remove heat and humidity from the air using refrigerant.

2. Blower
A blower (or fan) circulates air over the evaporator, dispersing the chilled air.

6. Filter
Located in the air conditioning unit to remove particles from the air.

7. Thermostat
A control system to regulate the amount of cool air that is distributed.
§95375. Requirements Applicable to Table 3 of Section 95374(c).

(3) Labeling and Recordkeeping.

(i) Labeling.

• Type of Refrigerant
• Refrigerant charge size
• Date of manufacture (in standard format)

Existing labels may be used if they meet the requirements
§95375. Requirements Applicable to Table 3 of Section 95374(c).

(3) Labeling and Recordkeeping.

(i) Labeling

(ii) Recordkeeping for Manufacturers.

• Name, address, telephone and email of purchaser
• Model and serial number of equipment
• Date of manufacture
• Date of sale
• Refrigerant type and amount
Expected Emissions Reductions from Proposed AC Rule

- Annual Emissions Reductions in 2030: 2.3 MMTCO$_2$e
- Cumulative Emissions Reductions by 2040: 50 MMTCO$_2$e
Next Steps
## Next Steps and Anticipated Timelines

### Stationary AC Equipment

<table>
<thead>
<tr>
<th>Event</th>
<th>Timeline</th>
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<tr>
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For more information, please visit:
Stationary Hydrofluorocarbon Reduction Measures Website
Public Workshop
Proposed Updates to Other End Uses and Variance Provision

July 22, 2020

Elizabeth Brega
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• Proposed Regulatory Updates

• Proposed Variance Provision:
  • Overview of variance criteria
  • Application process
  • Application materials
Proposed Regulatory Updates
§ 95373, Definitions

Several definitions related to Senate Bill 1013 end uses have been added and updated.
Proposed Variance Provisions
§ 95377. Variance.

There are two types of variances:

(1) Impossibility

- Criteria to apply for an Impossibility variance: A lower risk substitute is not currently or potentially available, an exemption will not increase the overall risk to human health or the environment, the Applicant has a niche end-use or circumstance, and the Applicant used best efforts to anticipate and address the Impossibility and any potential noncompliance.

(2) Force Majeure

- Criteria to apply for a Force Majeure variance: Non-compliance is due to a Force Majeure event and the Applicant used best efforts to anticipate and address the Force Majeure and any potential noncompliance.
The Executive Officer may approve a variance for a force majeure event prior to the close of a public comment period if an immediate variance is needed to protect human health or the environment.

Following the public comment period the Executive Officer may revoke or modify the Executive Order.

If approved, the Executive Order is issued.
Application Process

• A variance is only approved for the applicant and cannot be retroactively applied

• A variance may be modified or revoked if:
  • Any terms and/or conditions specified in the executive order are not followed
  • The applicant no longer meets the variance criteria
## Key Application Materials

<table>
<thead>
<tr>
<th>Evidence, rationale, and supporting documentation relating to the Impossibility or Force Majeure</th>
<th>A compliance plan</th>
<th>A description of the damage or harm that would result from compliance with the regulatory requirements</th>
</tr>
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<tr>
<td>Quantification of GHG emissions (for Impossibility criteria only)</td>
<td>Information regarding any negative impacts to human health or the environment</td>
<td>A mitigation plan</td>
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Next Steps
Next Steps and Anticipated Timelines

### Proposed Amendments

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