



**WEBINAR
SERIES**

Carbon-Free Cooling

The Critical Role of HFC Refrigerants in Reaching California's GHG Targets

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North American Sustainable Refrigeration Council (NASRC)

OUR MISSION

501c3 nonprofit removing the barriers to adoption of natural refrigerants to create more sustainable future for supermarket refrigeration

WHO WE ARE

24,000 supermarket locations
+130 supermarket stakeholders
Equipment manufacturers,
contractors, Eng. & design firms,
consultants, utilities

WHAT WE DO

- Leverage collective stakeholder action to overcome hurdles to natural refrigerants
- Initiatives to achieve cost parity, drive data, and adequate training resources

NASRC End-User Members



NASRC Members



DC ENGINEERING
Careful listening. Dynamic solutions.

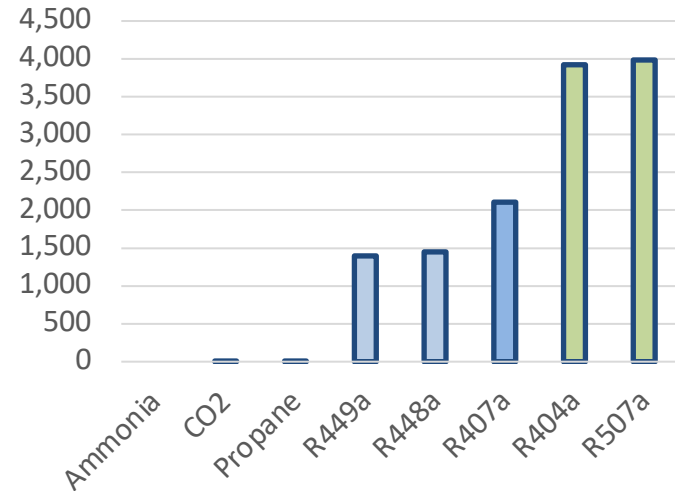


Refrigerants 101

Hydrofluorocarbons (HFCs) are potent Greenhouse Gases (GHGs) commonly used in air-conditioning & refrigeration

- **Thousands** times more heat-trapping power than CO₂
- **Short** Lived Climate Pollutants
- **Fastest growing** source of GHGs globally
- Mitigation can **avoid** 0.5 degree C of warming by 2100

Climate impact measured in Global Warming Potential (GWP)



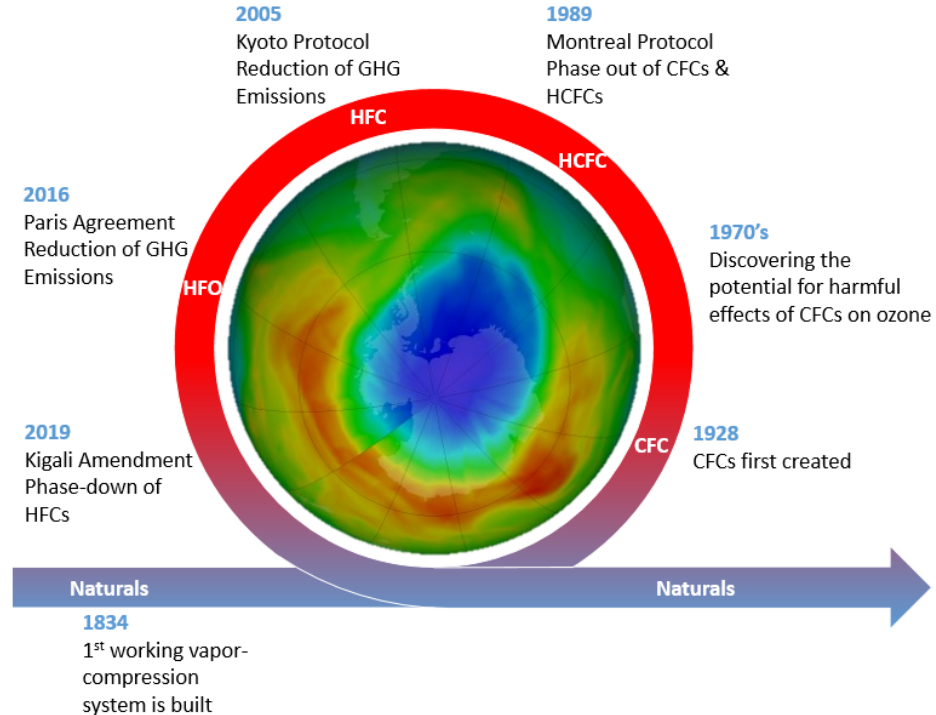
Natural Refrigerants

Ammonia
R717

Carbon
Dioxide
R744

Hydro
carbons
R290

- Naturally occurring - Cannot be patented
- Negligible climate impact - Zero or near-zero GWP
- Technically viable and "future-proof" solution



Refrigerant Regulations

International

- Kigali Amendment (2016) – Montreal Protocol (1987)
- 102 countries ratified
- 85% phasedown of HFCs by 2036

Federal

- Title VI Clean Air Act (1990)
- EPA SNAP Program
- Ban use of high GWP HFCs (2016) – **on hold?**

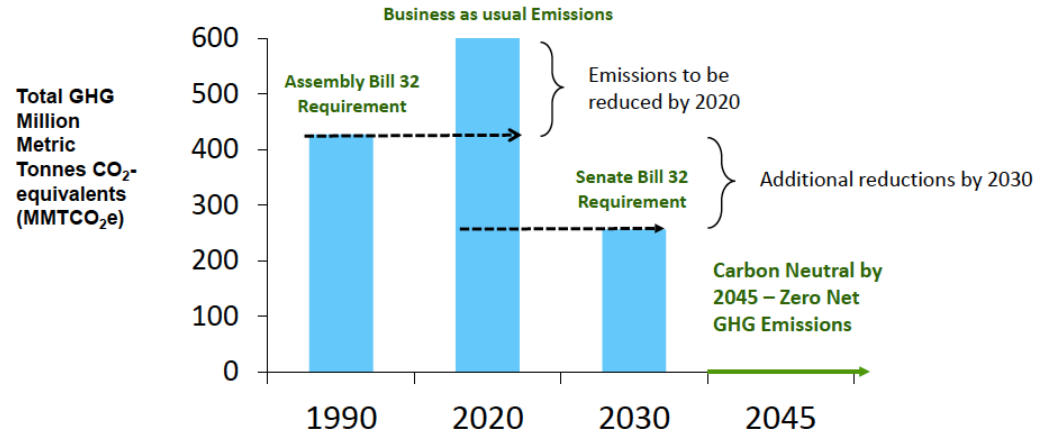
State

- US Climate Alliance (2017)
- Uphold Goals of Paris Climate Agreement
- 24 States – 55% of US population
- 16 States – HFC reduction commitments

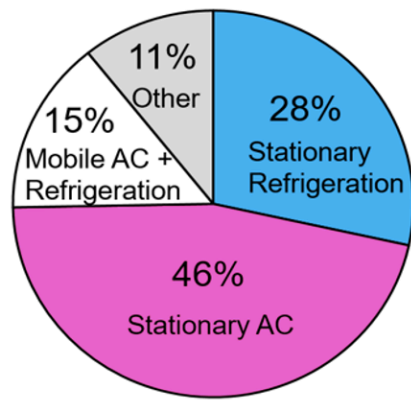
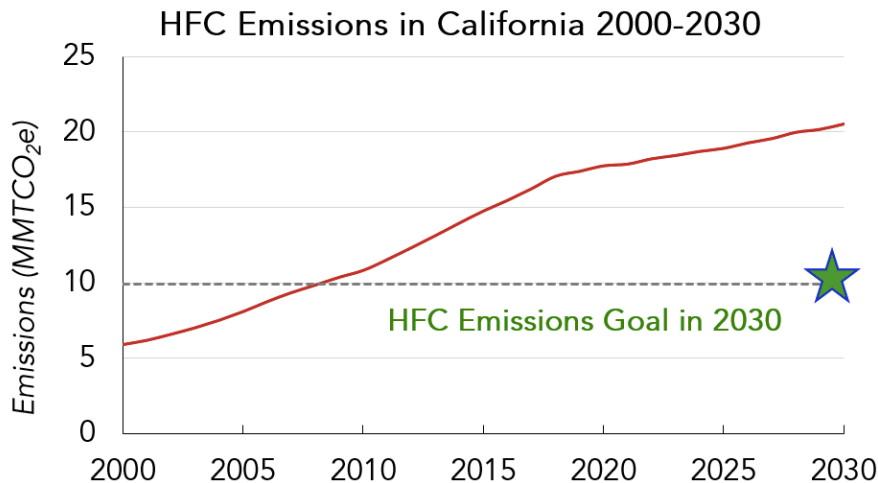
California's Climate Strategy

- AB32 – Reduce GHG to 1990 levels by 2020
- SB32 – Reducing GHG to 40% below 1990 by 2030
- SB 1383 – 40% reduction in HFCs from 2013 levels by 2030
- Executive Order – Carbon Neutral by 2045

Why HFC reductions? Part of Comprehensive GHG Emissions Reductions Goals in CA, from All Sources



Hydrofluorocarbons (HFCs) are the fastest growing greenhouse gas



Source: CARB F-gas Inventory, 2018

CARB HFC Rulemaking – Stationary Refrigeration

New Construction

GWP <150
Jan 1, 2022

- New Equipment in new facilities /major remodels
- Stationary refrigeration >50 lbs.

Existing Facilities

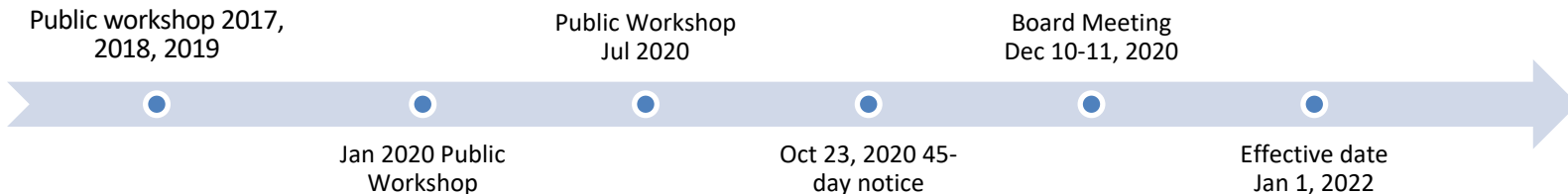
Two Compliance Pathways:

**Reduce GHG Potential
55% by 2030**

or

**Weighted GWP <1400
by 2030**

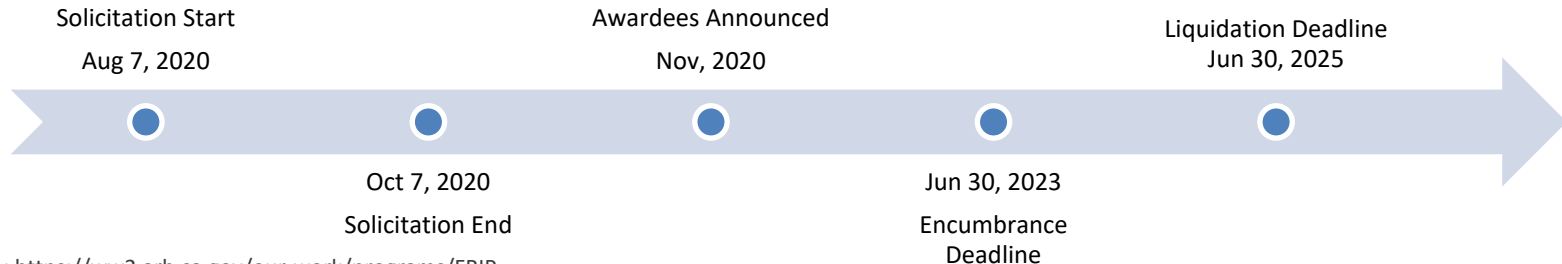
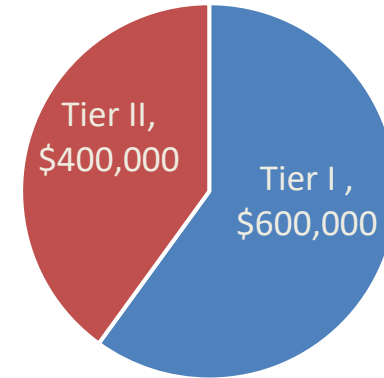
- Per-company target, not per-store
- Flexibility to plan over 8-10 yrs.
- Prepares sector for future HFC phase-down / sales ban



CARB F-Gas Reduction Incentive Program (FRIP)

- SB 1013 established an incentive program to “promote the adoption of new refrigerant technologies.”
- \$1 million allocated in the FY 2019-20 budget from the Greenhouse Gas Reduction Fund (GGRF)

FRIP Funding



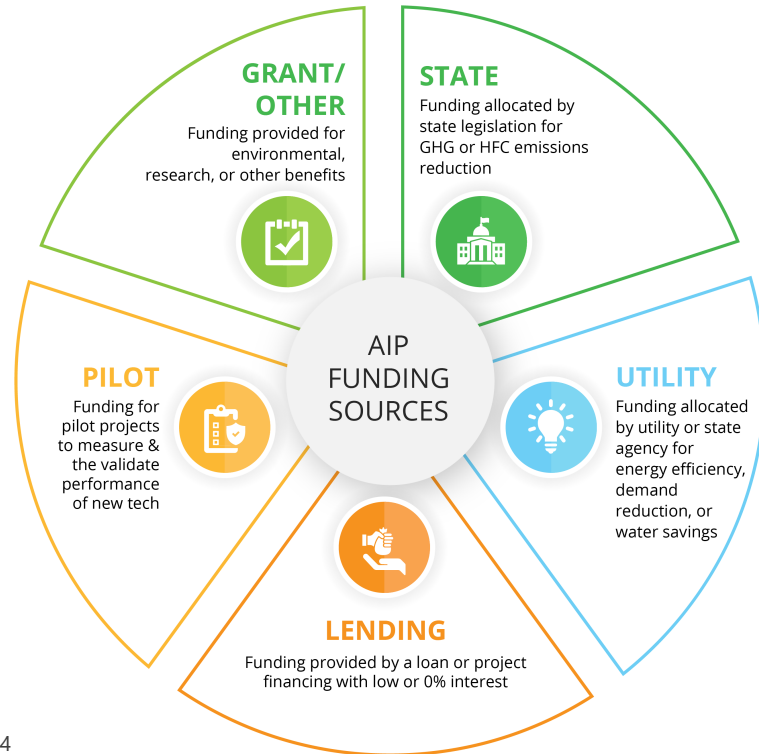
CARB FRIP Funding Tiers

FRIP Tier	Technology and refrigerant GWP limits	Maximum funding available per projects (\$)	Scoring Criteria
Tier I	Installation of or full/partial conversion to ultra-low-GWP refrigerant (< 10 GWP)	150,000 for existing facilities or 50,000 for new facilities or 100% project cost premium (whichever is lower)	<p>Optional (Extra Points)</p> <ul style="list-style-type: none"> • Energy Efficiency • Benefits to Priority Population • Independent owner/operator • Existing Facility
Tier II	<p>i. Retrofit only: Refrigerant retrofit from high-GWP (> 3900) to lower-GWP refrigerant (< 1500 GWP)</p> <p>ii. Retrofit + charge reduction: Refrigerant retrofit from high-GWP (> 3900) to lower-GWP refrigerant (< 1500 GWP) with at least 25%charge reduction</p>	<p>i. 25% of retrofit costs*. 50% of costs*for projects located in low-income/disadvantaged communities or independent stores.</p> <p>ii. 25% of retrofit costs* and \$25/pound of refrigerant permanently removed up to 1000 pounds.</p> <p>* Retrofits valued at \$45/pound</p>	

Source: <https://ww2.arb.ca.gov/our-work/programs/FRIP>

Aggregated Incentives Program (AIP)

- No-cost platform to streamline application process
- Maximize funding for ultra-low-GWP technologies
- Align additional benefits (energy efficiency, demand, water, etc.)



Source: <http://nasrc.org/aggregated-incentives-program>

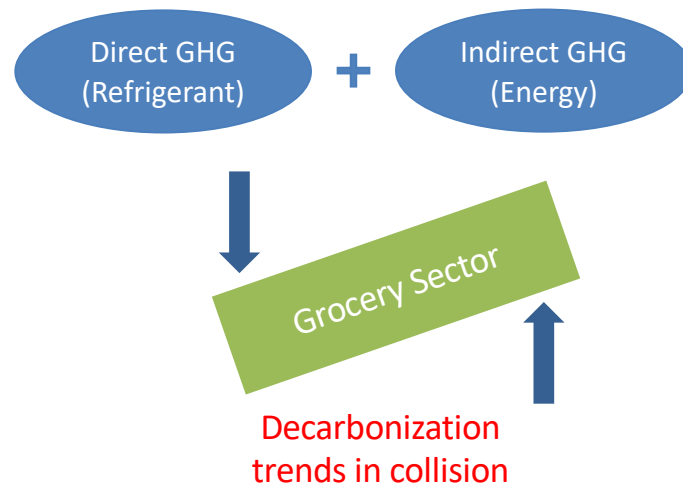
Policy Impact

Grocery Sector

- New Construction
 - Flat growth (1-2% annually)
 - Cost premium for <150 GWP (> 20%)
- Existing Stores
 - Highest potential for HFC emission reduction and most challenging
 - Strategies to reduce GWP
 - Retrofit gas (R-448a/R-449a)
 - Reduce refrigerant charge < 50 lbs.
 - Partial or complete remodel to natural refrigerant

Energy

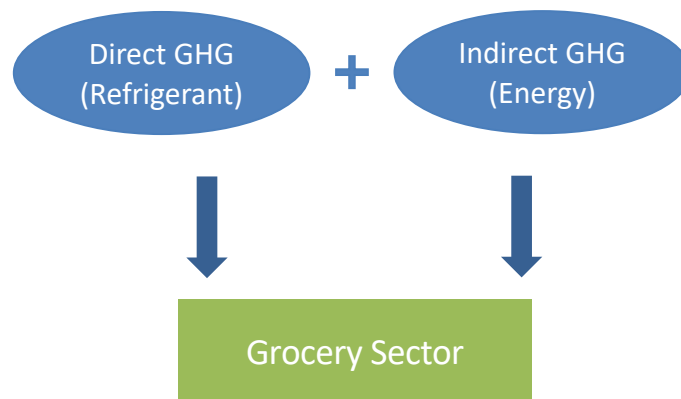
TEWI = Total Equivalent Warming Impact



What is Needed?

1. Energy policy to incorporate refrigerant GHG
 - Goals & Potential Study
 - Avoided Cost Calculator
 - Utility program design to include low-GWP technologies
2. Data and research studies to understand performance impacts
 - especially existing stores

Drive maximum GHG reduction



Decarbonization
trends aligned

NASRC Resources

- [Aggregated Incentives Program](#)
- [Natural Refrigerant Technology Library](#)
- [Resource Library](#)

Thank you!

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www.nasrc.org