California’s F-Gas Regulations

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California Air Resources Board
HFCs are the Fastest Growing GHGs

- Currently 4% of CA 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 CA

- Stationary Refrigeration: 27%
- Stationary AC: 34%
- Mobile AC + Transport Refrigeration: 28%
- Fire Suppressants, Solvents, Foams, Aerosol Propellants: 11%

Source: CARB F-gas Inventory 2018
Current HFC Regulations

Current Measures

- Refrigerant Management Program
- Motor Vehicle AC Measures
- SB 1013 / California Cooling Act
- Global HFC Phasedown (on hold)
- Additional reduction measures required to meet the goal

Emissions Goal
10 MMTCO₂e

Source: CARB F-gas Inventory 2018
Proposed Equipment GWP Limits
(Board Hearing, May 2020)

• **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
Proposed GWP < 150

- Commercial refrigeration
- Industrial process refrigeration
- Cold Storage
Refrigeration Technologies GWP < 150

- Transcritical CO₂
- Ammonia/CO₂ cascade
- Propane/CO₂ cascade
- Microdistributed Propane systems
- HFO/CO₂ or HFOs-based systems
Challenges: Feasibility < 150 GWP in Legacy Stores

- 1-2% new stores
- Existing stores have challenges – costs, technical feasibility etc. – while keeping store operational

*Commercial Refrigeration*
- 13 MMTCO$_2$e
- 21,000 systems

*Industrial Refrigeration*
- 3 MMTCO$_2$e
- 5,500 systems

*Cold Storage*
- 0.7 MMTCO$_2$e
- 900 systems

CARB 2018
## Cost Estimates for Commercial Refrigeration, Industrial Refrigeration and Cold Storage

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SB 1013: Incentive Funding Program

• $1 million incentive program to promote adoption of “new refrigerant technologies”

• Stakeholder input welcome for incentive program design

• Coordination with utilities for matched funding programs
Global and National Action on HFCs

- Global HFC Phasedown effective 2019
- EU F-gas Regulation effective 2016
- Canada, Australia, Japan have HFC reduction mandates
- Regulatory guidance to U.S. Climate Alliance
- SB 1013 followed by Washington and Vermont
- New York, Connecticut, Maryland, Delaware in the process of enacting HFC rules

We welcome public input on our proposed regulations and the incentive funding program.

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https://ww2.arb.ca.gov/
For more information on the proposed refrigeration regulation contact Richie Kaur at Richie.Kaur@arb.ca.gov

For more information on the proposed air-conditioning regulation contact Kathryn Kynett at Kathryn.Kynett@arb.ca.gov

For more information on all HFC regulations contact Glenn Gallagher at Glenn.Gallagher@arb.ca.gov or Pamela Gupta at Pamela.Gupta@arb.ca.gov

All rulemaking materials can be found at https://ww2.arb.ca.gov/our-work/programs/hfc-reduction-measures/meetings-workshops
Low charge ammonia installations around the world

- CANADA = 200+
- US = 220+
- EUROPE = 1440+
- CHINA = 150+
- JAPAN = 500+
- AUSTRALIA = 100+

shecco Atmosphere America 2018
CO₂ transcritical stores in the world

October 2018

ET Summit 2019

ETCC EMERGING TECHNOLOGIES COORDINATING COUNCIL

shecco webinar February 2019