

# ET Summit 2019

Presented by



# California's F-Gas Regulations

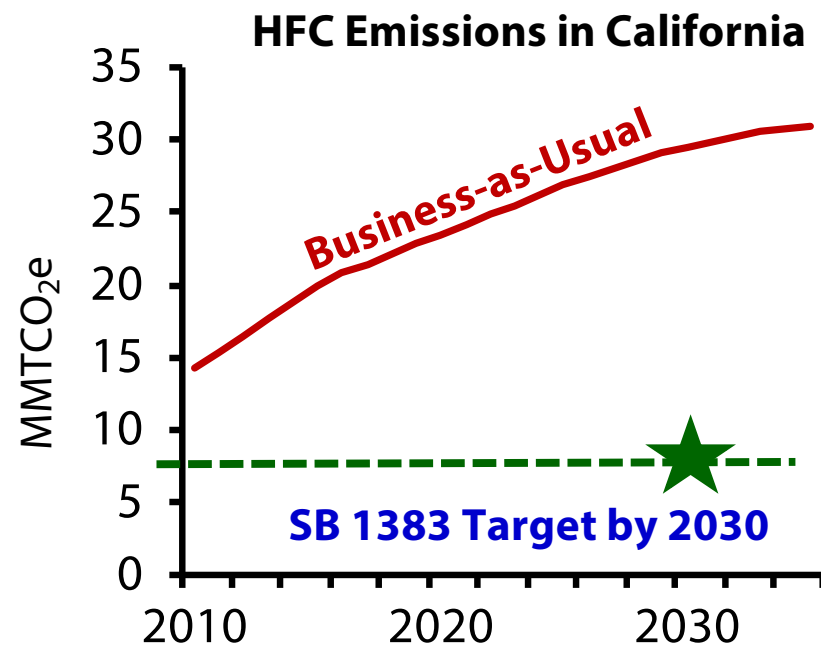
Aanchal Kohli, D. Env.

F-Gas Reduction Strategist

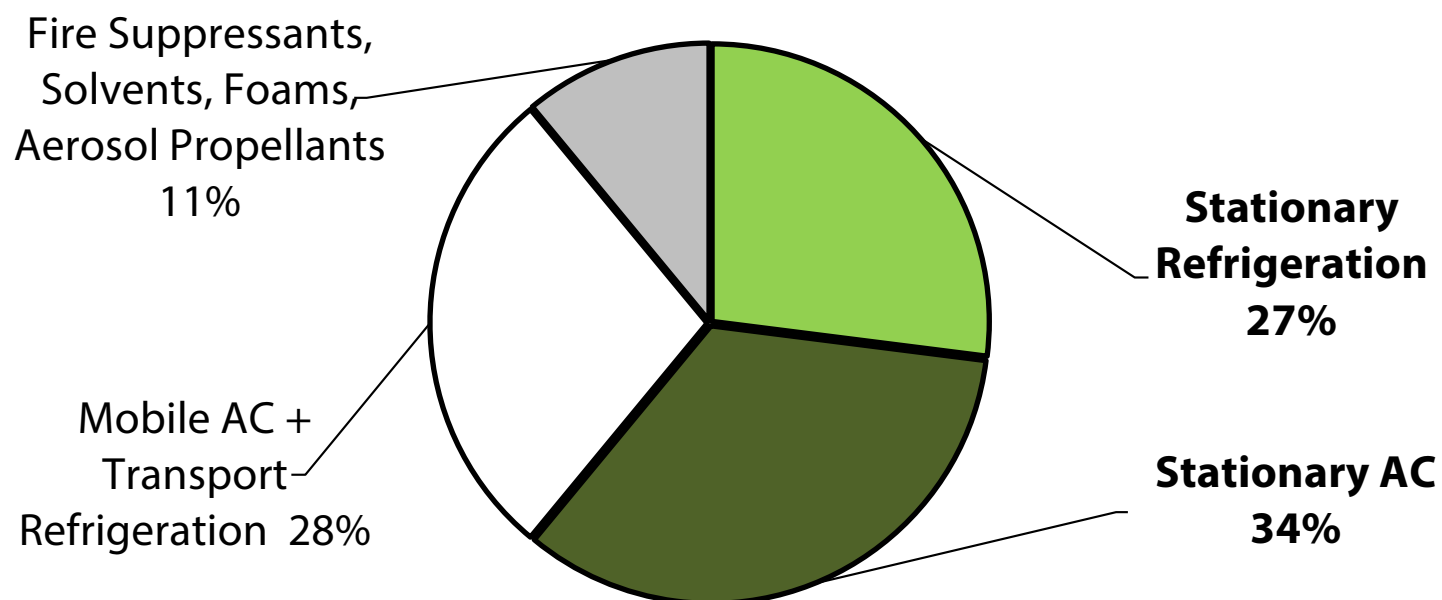
California Air Resources Board

## 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



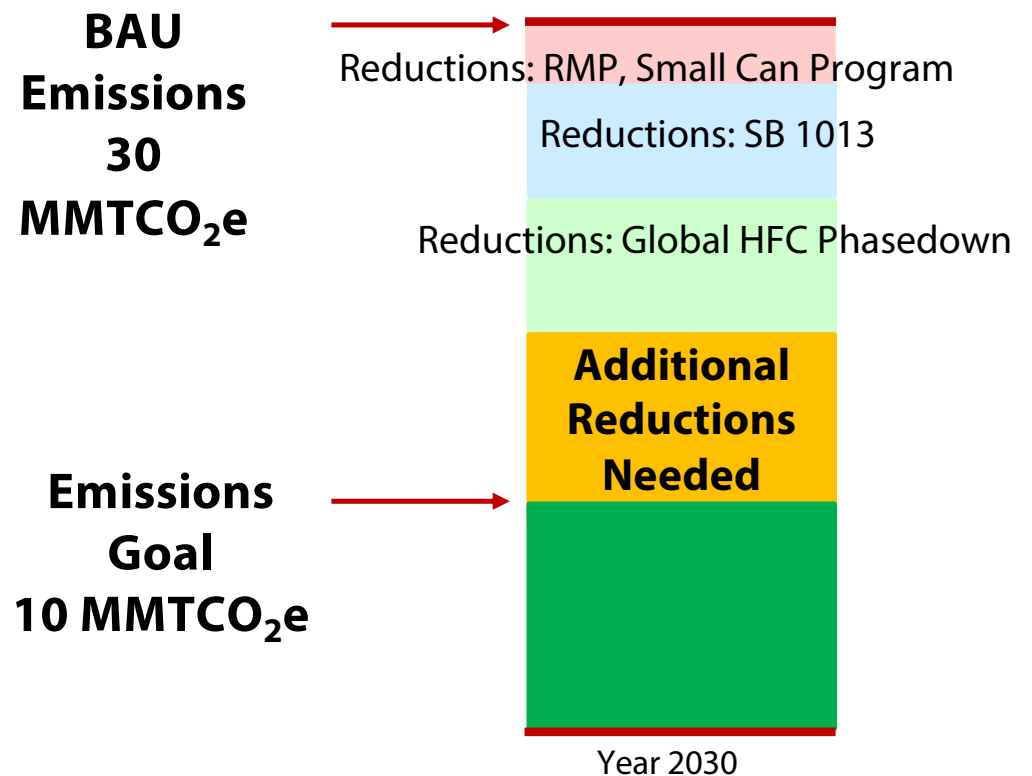
## Sources of HFC Emissions in CA

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



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

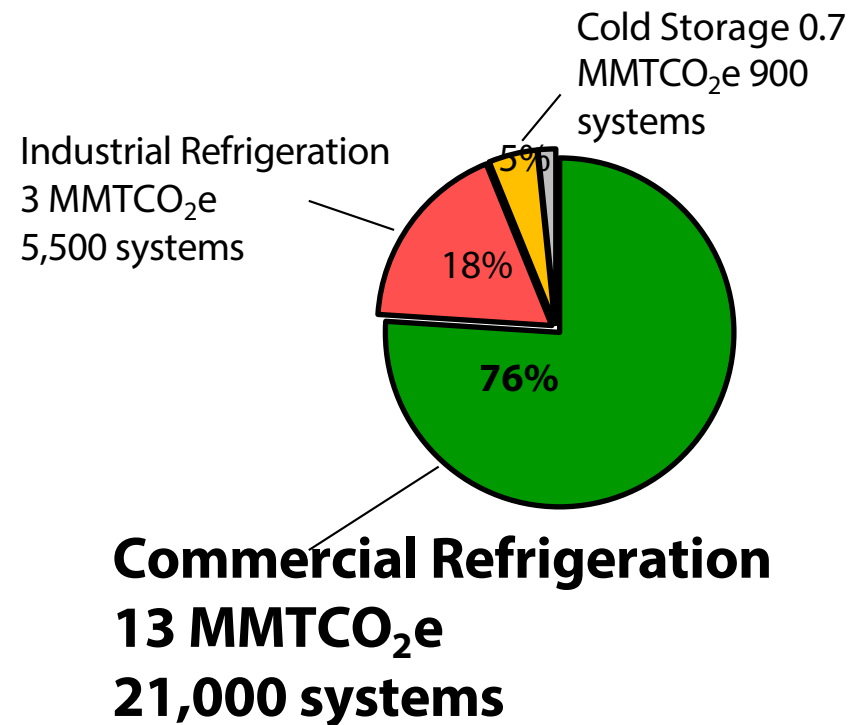


## Refrigeration Technologies GWP < 150

- Transcritical CO<sub>2</sub>
- Ammonia/CO<sub>2</sub> cascade
- Propane/CO<sub>2</sub> cascade
- Microdistributed Propane systems
- HFO/CO<sub>2</sub> 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



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

Commercial Refrigeration	Equipment Cost (\$)	Install Cost (\$)	Maintenance (\$/year)	Refrigerant (\$/year)	Recordkeeping (\$/year)
Baseline Costs	0.6 – 1 M	250 – 450 K	40 – 50 K	3 – 6 K	RMP costs
Cost premium	+20%	+10%	+0%	- 30 - 50%	-100%
Industrial Process and Cold Storage	Equipment Cost (\$)	Install Cost (\$)	Maintenance (\$/year)	Refrigerant (\$/year)	Recordkeeping (\$/year)
Baseline Costs	1.5 – 2 M	500 – 600 K	6 – 13 K	3 – 6 K	RMP costs
Cost premium	+20 %	+10 %	+0 %	- 30 – 50 %	-100 %

## 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



Image source: Depositphotos.com

## 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

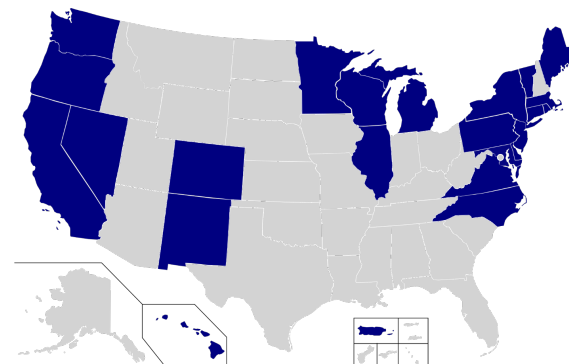


Image source: Wikipedia

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

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**Aanchal Kohli. D. Env.**

F-Gas Reduction Strategist  
California Air Resources Board  
Aanchal.Kohli@arb.ca.gov  
<https://ww2.arb.ca.gov/>

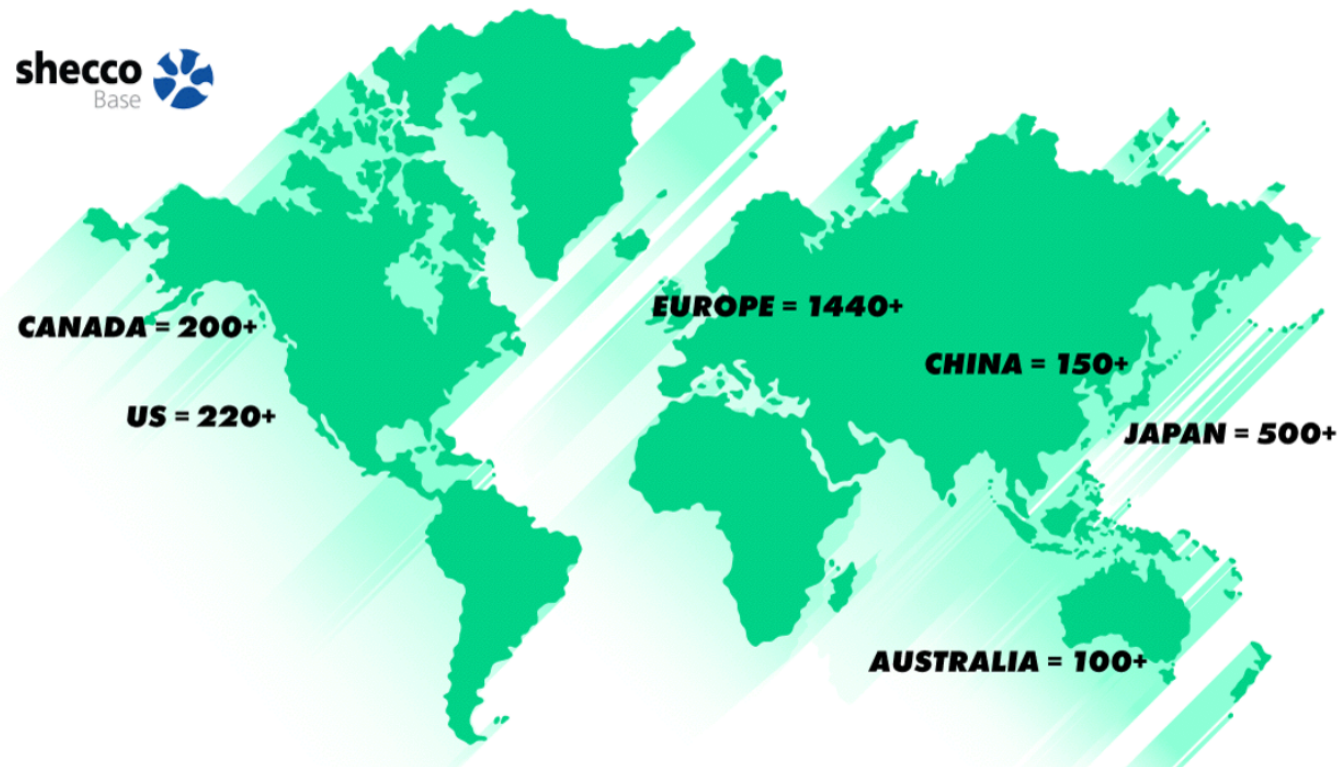
For more information on the proposed refrigeration regulation contact Richie Kaur at [Richie.Kaur@arb.ca.gov](mailto:Richie.Kaur@arb.ca.gov)

For more information on the proposed air-conditioning regulation contact Kathryn Kynett at [Kathryn.Kynett@arb.ca.gov](mailto:Kathryn.Kynett@arb.ca.gov)

For more information on all HFC regulations contact Glenn Gallagher at [Glenn.Gallagher@arb.ca.gov](mailto:Glenn.Gallagher@arb.ca.gov) or Pamela Gupta at [Pamela.Gupta@arb.ca.gov](mailto: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*



## CO<sub>2</sub> transcritical stores in the world

October 2018



shecco webinar February 2019