

The Regulatory Report: 2022 Changes and What You Need to Know in 2023

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VP Regulatory Affairs

February 7, 2023



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Introduction

The Climate Alliance States and the Biden Administration's fast-paced regulatory agenda are prioritizing issues critical to the heating, ventilation, air conditioning, refrigeration (HVAC-R), and water heating industry.

- Implementing the American Innovation and Manufacturing (AIM) Act
- Decarbonization
- Energy efficiency
- Chemicals in equipment components or "Articles"



Refrigerant Transition

Hydrofluorocarbon (HFC) Supply Phase-down

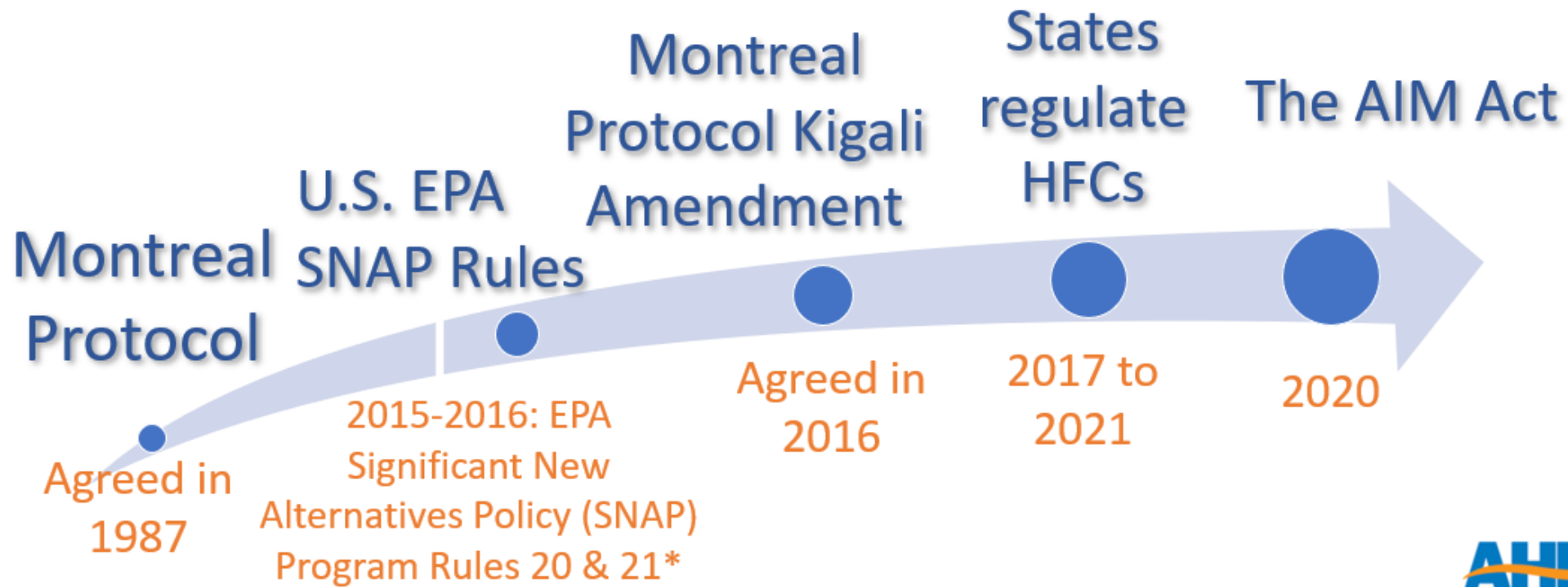
Technology Transitions (TT)

Refrigerant Management

Hydrofluorocarbon (HFC) Uses



Fluorocarbon Transitions



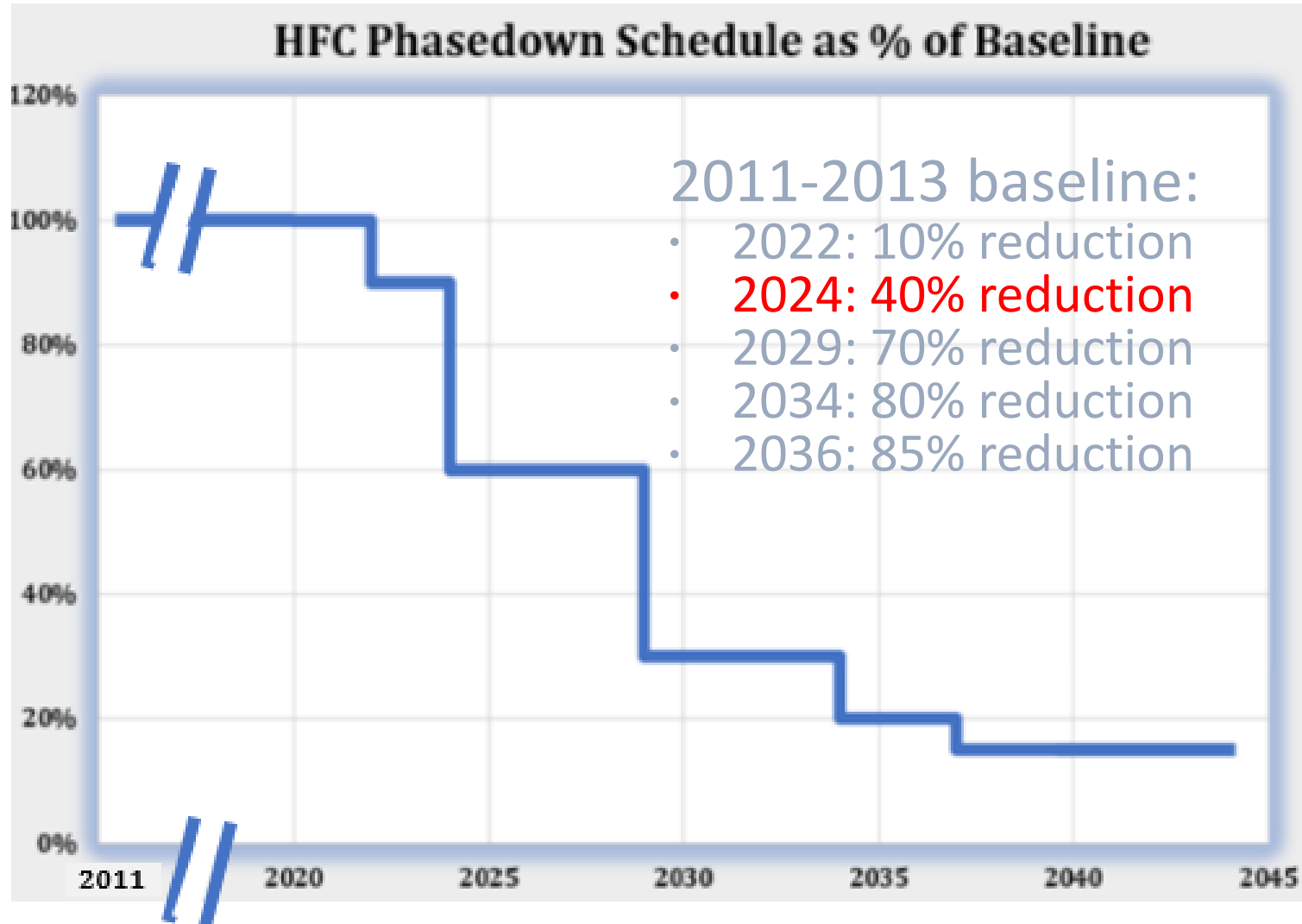
*SNAP rules 20 & 21 were remanded back to EPA by DC Circuit Court (2017/2018)

American Innovation and Manufacturing Act of 2020

- Framework rules
 - Refrigerant management including recovery and reclaim
 - Acceleration after 2024, if quota is not used
 - Allows for exports to countries that don't produce HFCs that are adhering to a similar phase-down.

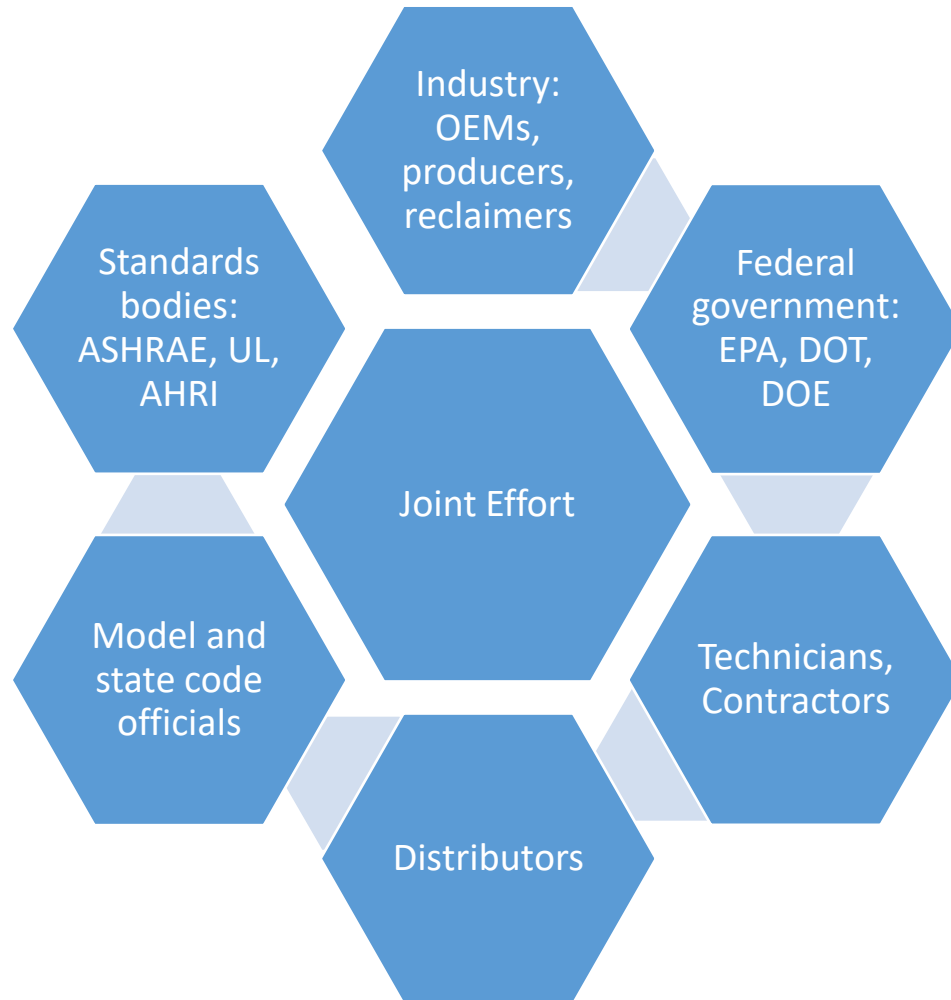
HFC Phasedown

American Innovation and Manufacturing Act of 2020

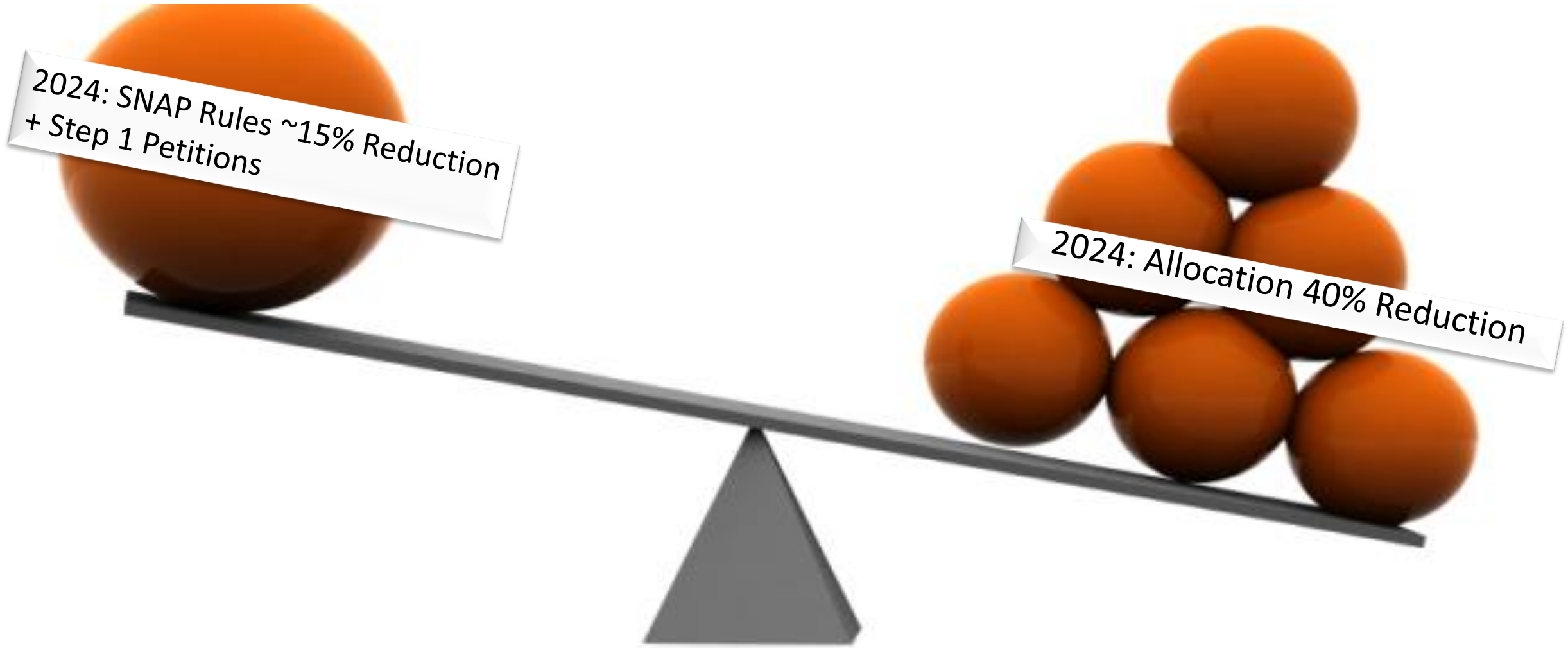


- Mandates phase-down of HFC supply
 - Environmental Protection Agency (EPA) regulation Oct 1, 2021
- Authorizes sector transitions
- Refrigerant management, including recovery and reclaim

How will we do it?



- AHRI Safe Refrigerant Transition Task Force continues to work with all stakeholders to address barriers to a safe and orderly transition
- Contact Mary Koban if you are interested in participating: mkoban@ahrinet.org

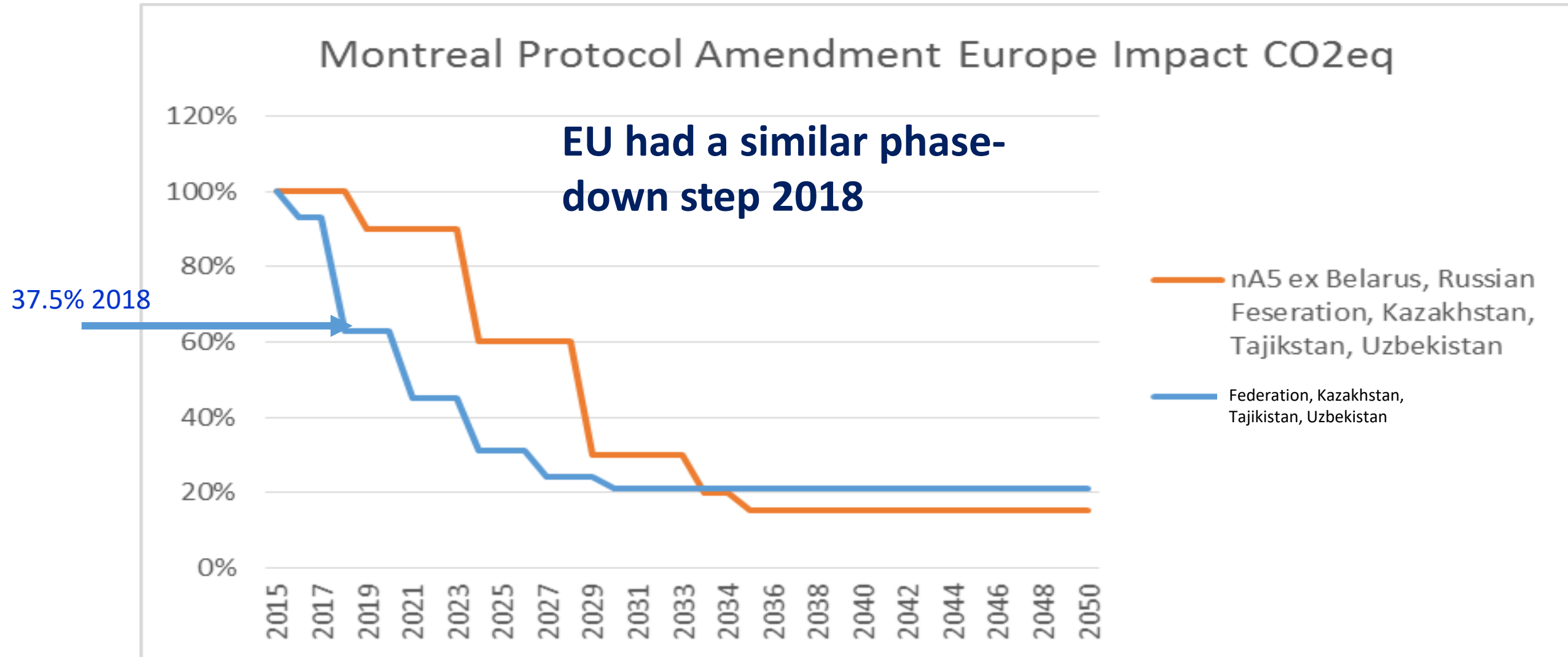


Balancing Supply and Demand

Where is the additional 25% going to come from?

European Union (F-gas) Regulations

End-users were not ready

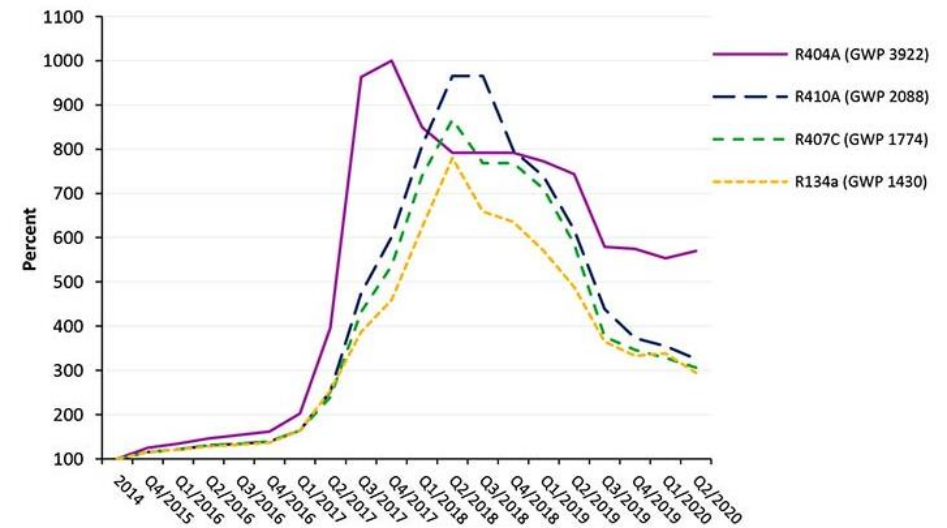


The Phase Down Could Be Chaotic

Phase down = Reduced Supply
Economics → Scarcity &
Increased Prices

Refrigerant demand and prices fall

29 SEP 2020



Average purchase prices reported by three large refrigerant distributors. Prices are indexed to the baseline year 2014

EUROPE: The effects of Covid-19 are held at least partly responsible for a fall in refrigerant demand and prices in the quarter to September.

The refrigerant price trends are recorded in the latest report from German consultancy Öko-Recherche.

- The Cooling Post 2020

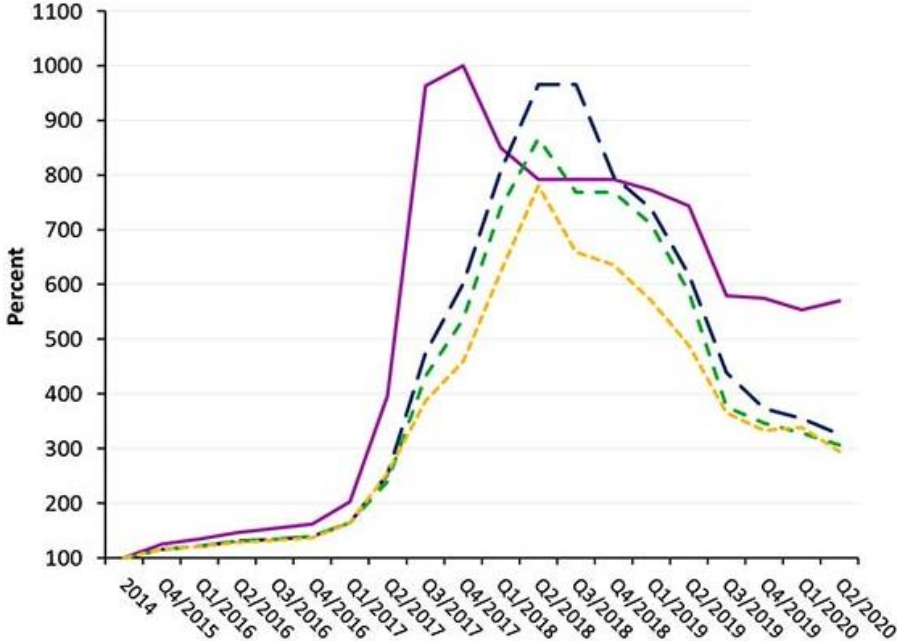
European Impact: Retailers and OEMs



- The Cooling Post 2020

Refrigerant demand and prices fall

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Average purchase prices reported by three large refrigerant distributors. Prices are indexed to the baseline year 2014

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AIM Act Technology Transitions

EPA TT Notice of
Proposed Rulemaking
(NOPR) Commercial
Refrigeration: January
1, 2025

PROPOSED
Note: Most GWP limits
align with AHRI
petition.

	Refrigeration Equipment (Proposed Compliance Date 1/1/25)	GWP
Industrial Process Refrigeration	Systems with refrigerant charge capacities of 200 pounds or greater	150
	Systems with refrigerant charge capacities less than 200 pounds	300
	High temperature side of cascade systems	300
	Chillers	700
Retail Food Refrigeration	Stand-alone units	150
	Refrigerated food processing and dispensing equipment	150
	Supermarket systems with refrigerant charge capacities of 200 pounds or greater	150
	Supermarket systems with refrigerant charge capacities less than 200 pounds charge	300
	Supermarket systems, high temperature side of cascade system	300
	Remote condensing units with refrigerant charge capacities of 200 pounds or greater	150
	Remote condensing units with refrigerant charge capacities less than 200 pounds	300
	Remote condensing units, high temperature side of cascade system	300
	Vending machines	150
Cold Storage Warehouse	Systems with refrigerant charge capacities of 200 pounds or greater	150
	Systems with refrigerant charge capacities less than 200 pounds	300
	High temperature side of cascade system	300
	Ice rinks	150
	Automatic commercial ice machines – selfcontained with refrigerant charge capacities of 500 grams or lower (Note: Does not align with petition)	150
	Transport refrigeration – intermodal containers	700
	Residential refrigeration	150

EPA AIM Act TT
Comfort Cooling
and Foams:

PROPOSED
Note: Slight
change to GWP
limits compared to
AHRI petitions

Comfort Cooling	GWP	Date
Chillers – comfort cooling	700	1/1/2025
Residential and light commercial air conditioning and heat pump systems	700	1/1/2025
Residential dehumidifiers	700	1/1/2025
Residential and light commercial air conditioning – variable refrigerant flow systems	700	1/1/2026

Foam Blowing Agents (Proposed Compliance Date 1/1/25)	GWP
Polystyrene – extruded boardstock and billet	150
Phenolic insulation board and bunstock	150
Rigid polyurethane – slabstock and other	150
Rigid polyurethane – appliance foam	150
Rigid polyurethane – commercial refrigeration and sandwich panels	150
Rigid polyurethane – marine flotation foam*	150
Rigid polyurethane – low pressure, twocomponent spray foam	150
Rigid polyurethane – one-component foam sealants	150
Flexible polyurethane	0
Integral skin polyurethane	0
Polystyrene – extruded sheet	0
Polyolefin	0
Rigid polyurethane and polyisocyanurate laminated boardstock	0

EPA AIM Act TT Proposed Refrigeration Refrigerant Bans

Refrigeration Refrigerant Bans (Proposed Compliance 1/1/25)	
Automatic commercial ice machines – self-contained with refrigerant charge capacities more than 500 grams	R-404A, R-507, R-507A, R-428A, R-422C, R-434A, R-421B, R-408A, R-422A, R-407B, R-402A, R-422D, R-421A, R-125/R-290/R134a/R-600a (55/1/42.5/1.5), R-422B, R-424A, R-402B, GHG-X5, R-417A, R-438A, R-410B, R-407A, R-410A, R-442A, R-417C, R-407F, R-437A, R-407C, RS-24 (2004 formulation), HFC134a
Automatic commercial ice machines – remote	R-404A, R-507, R-507A, R-428A, R-422C, R-434A, R-421B, R-408A, R-422A, R-407B, R-402A, R-422D, R-421A, R-125/R-290/R134a/R-600a (55/1/42.5/1.5), R-422B, R-424A, R-402B, GHG-X5, R-417A, R-438A, R-410B
Transport refrigeration – road systems	R-404A, R-507, R-507A, R-428A, R-422C, R-434A, R-421B, R-408A, R-422A, R-407B, R-402A, R-422D, R-421A, R-125/R-290/R134a/R-600a (55/1/42.5/1.5), R-422B, R-424A, R-402B, GHG-X5, R-417A, R-438A, R-410B
Transport refrigeration – marine systems	R-404A, R-507, R-507A, R-428A, R-422C, R-434A, R-421B, R-408A, R-422A, R-407B, R-402A, R-422D, R-421A, R-125/R-290/R134a/R-600a (55/1/42.5/1.5), R-422B, R-424A, R-402B, GHG-X5, R-417A, R-438A, R-410B

Vending Machines, Automatic Commercial Ice Machine (ACIM), Units

Flammable refrigerant limit for equipment in public corridors and lobbies is 3x the lower flammability limit (LFL)

This limits charge size for Vending Machines/ACIM

Commercial kitchen, open flame 20 ft restriction

Propane 114 g (UL: 114 g propane per refrigerant loop-ask for clarification, and that EPA permit 114 g per loop as well)

Typical A2L approx. 900 g


New Refrigerants must
be approved by EPA
and standards adopted
into building codes

Enabling Refrigerants



Significant New Alternatives Policy (SNAP) Program Rule 25

On July 28, 2022, EPA published the [proposed rule](#) listing refrigerants for chillers and dehumidifiers, acceptable subject to use conditions in the refrigeration and air conditioning sector for chillers.



Docket Number: EPA-HQ-OAR-2021-0836.



SNAP Rule 25 [Fact Sheet](#).



EPA also proposed to update safety standards from SNAP Rule 19.

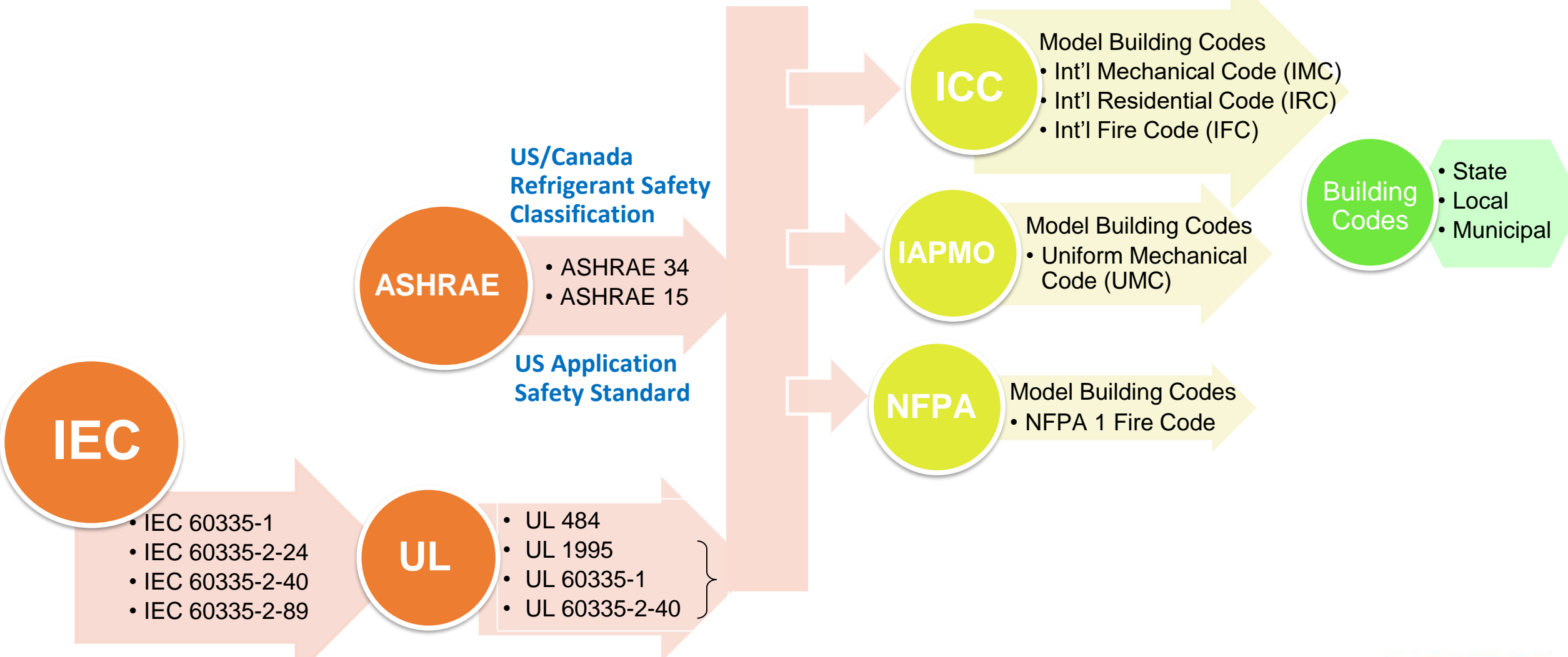
EPA Listings for Refrigerants

UL 60335-2-89 published Oct 27, 2021

EPA must review and incorporate requirements and any necessary deviations into use conditions or listing limits.

Many, many applications to process.

Standards and Building Codes Relationships



**International
Product Safety
Standards**

**US
Product Safety
Standards**

*some are national
adoptions of
international standards
(sometimes with
national differences)*

Key Concepts in HVAC Standard UL 60335-2-40

Limit Refrigerant Charge

Refrigerant Charge Limits

(UL60335-2-40 Annex GG 1.2)

m1, m2, m3

R32 m1=4.1 lbs., m2=26.8 lbs., m3=134.1 lbs.

R-454B m1= 4.0 lbs., m2= 26.0, m3=130.2 lbs.

Minimum Area Check (A_{min})

(UL60335-2-40 Annex GG)

- Safety factor of 4
- Or safety factor of 2 with additional measures

Reduce Refrigerant Leaks

Section 22 and 101.DVG Refrigerant Piping

- Protected lines
- Qualified joints (ISO 14903)
- Field pressure test
- Additional requirements for VRF

Eliminate Ignition Sources

Ignition Source Isolation

- Per Annex FF

No Competent Ignition

- Sources in unit and ducts
Per 22.116, Annex KK, 22,117

Detect Leaks and Take Action

Factory Installed Refrigerant Detection System

- UL60335-2-40 Annex LL, Annex MM
- UL qualification testing
- UL approved
- Safety Circuit Approved
- Factory Calibrated
- Self Test Routine (1once/hr.)
- Fail safe mode with fan on
- Field inspection feature

Active mitigation for leaks

Detect, circulate and dilute
Annex GG

Install and Service

Service Training

Annex DD installation guidelines
Annex MM repair of leak detection system

Labeling and Literature

Per UL60335-2-40
Section 101, Annex DD

Refrigerant
Management:
How do we
look at it
differently?



Refrigerant Charge

- More energy efficient equipment can require the use of larger charge sizes of refrigerant
- Heat pumps can require larger charges of heat transfer fluids than air conditioning alone
- Low global warming potential (GWP) refrigerants typically require smaller charges¹
- All of this makes balancing supply and demand more critical

¹ “Cold Hard Facts” 3 for The Australian Government, Department of the Environment and Energy, by The Expert Group.

<https://www.environment.gov.au/system/files/resources/bd7fa5d0-8da1-4951-bd01-e012e368d5d0/files/cold-hard-facts3.pdf>

Reducing Demand to Balance Supply

OEM/End-user Toolbox

- Use low-GWP refrigerants in new equipment (transition!!)
- Consider smaller charge sizes
- Retrofit existing equipment, A1 -> lower GWP A1
- Reduce leaks
- Use recovered/reclaimed refrigerant



Bottom Line: Future compliance depends on starting now!

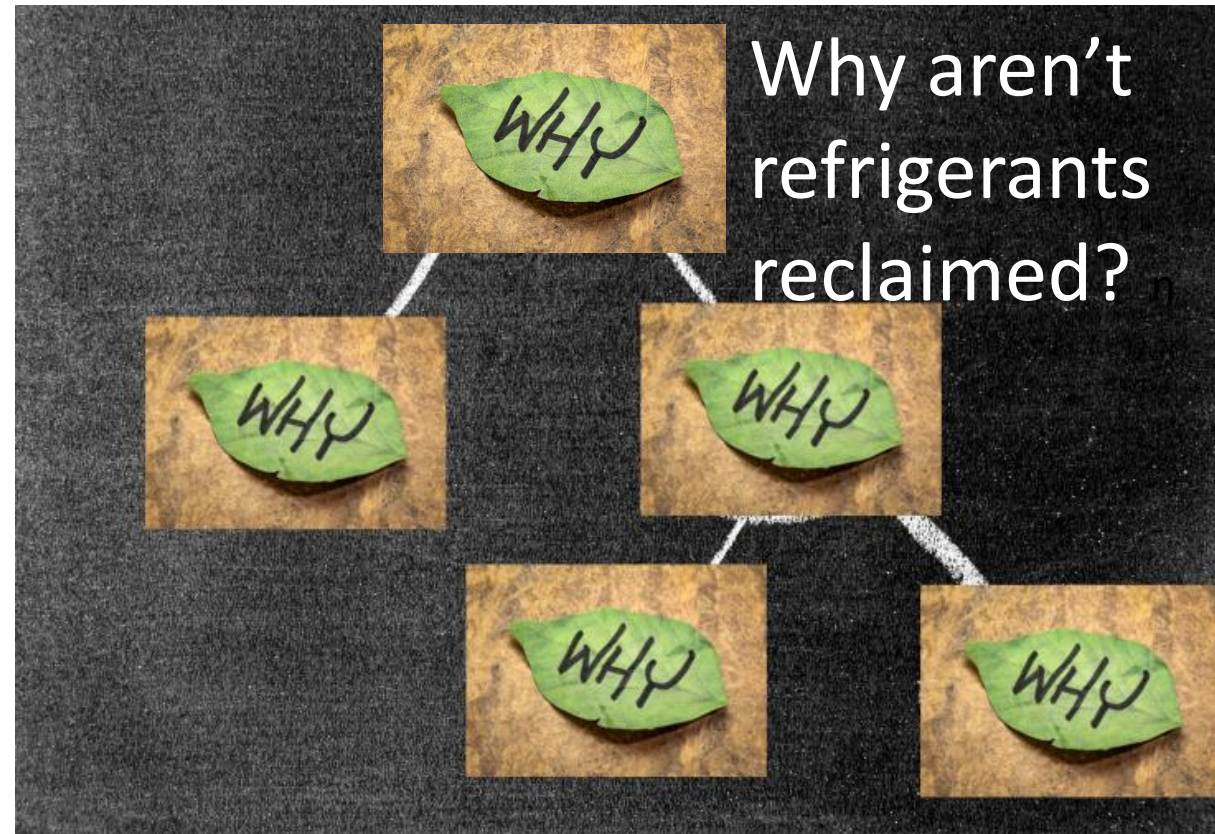
Refrigerant Recovery

- Best in class: 40%
- U.S. Climate Alliance States willing to test options
- If you're interested, contact Helen Walter-Terrinoni or Vivian Cox at hwalter-Terrinoni@ahrinet.org or vcox@ahrinet.org



Traditional Problem-Solving Tools May Help

- Methodologies that might help:
 - Fishbone diagram
 - Traditional fault tree analysis / why tree?
- Interview supply chain, especially technicians?
- Pilot solutions?



AHRI Refrigerant Recovery Survey

Individual surveys focused on your area of expertise:

- [For contractors/technicians](#)
- [For distributors](#)
- [For reclaimers](#)

Vivian Cox (vcox@ahrinet.org), or me (hwalter-terrisoni@ahrinet.org).

2019

- States developing disparate regulations
- Safety standards unavailable for next generation refrigerants
- New refrigerants not allowed by EPA
- Building codes not enabling new solutions
- Training needed
- Questions around transportation

2023

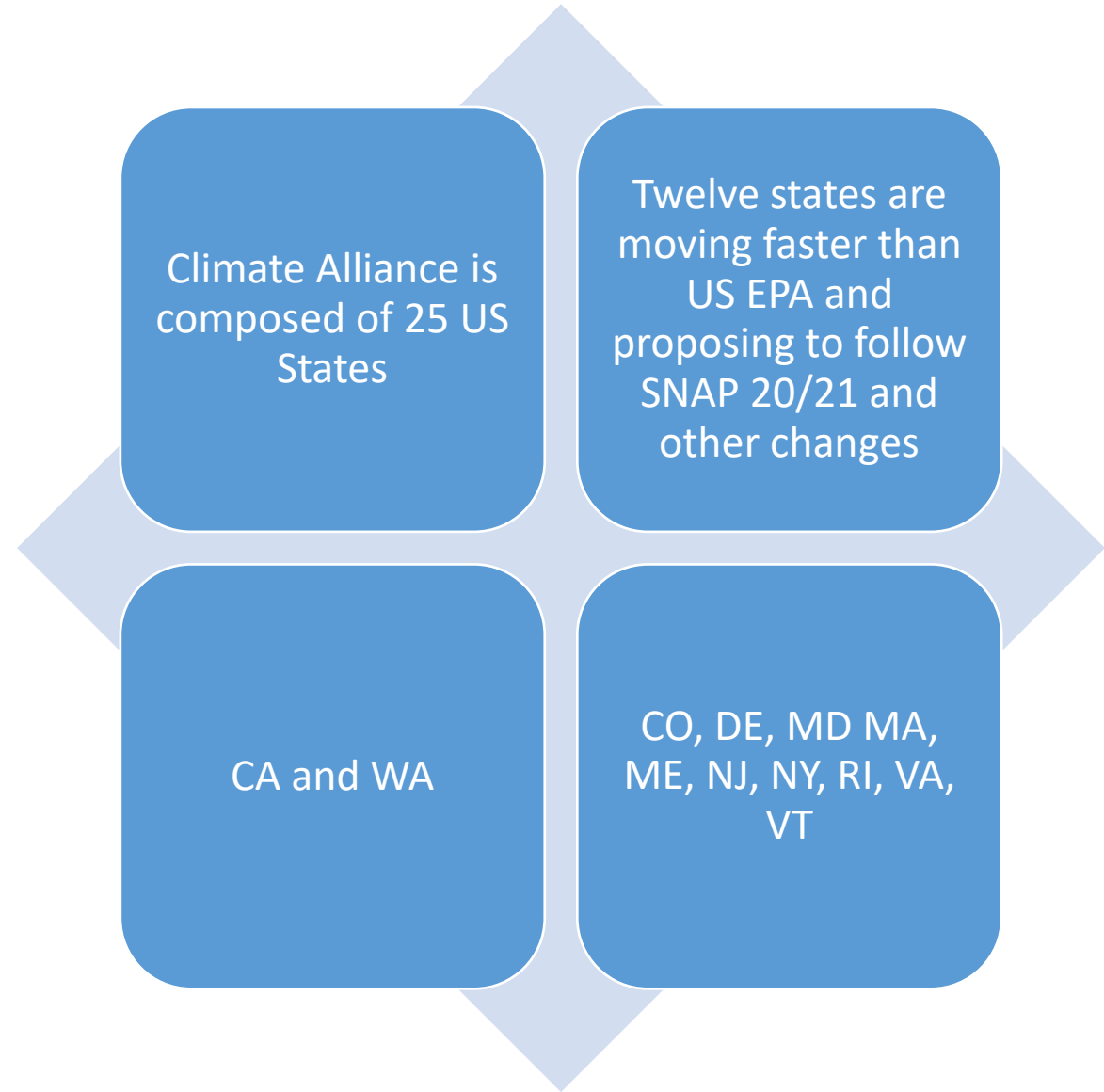
- ✓ Federal regulation through the American Innovation and Manufacturing (AIM) Act
- ✓ Safety standards updated
- ✓ EPA listed refrigerants for air conditioning
- ✓ International Code Council (ICC) National Model Codes enabled the use of next generation refrigerants and storage.
 - ✓ $\frac{3}{4}$ of AC systems are sold into states that have addressed building codes through regulation or legislation
- ✓ Training available for technicians and first responders
- ✓ Department of Transportation (DOT) Letter of Interpretation up to 25 pounds of charge
- ✓ National model code updates

We've come a long way...

We have more work to do

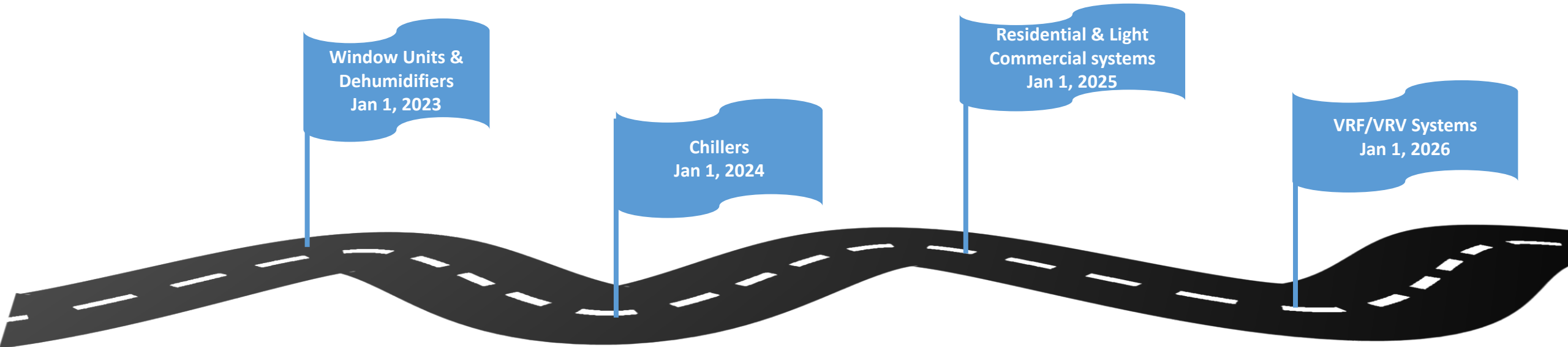
- Increasing refrigerant recovery and reclaim use.
- EPA listing for refrigeration
- Building Codes: Adoption of code changes by remaining states
- DOT and shipping of chillers, horizontal cylinders, and mid-sized systems

US Climate Alliance States



California Air Resources Board (CARB)

A/C- 750 GWP limit for **new** systems



Commercial & industrial refrigeration also have impending regulations.

Proposed Amendments to
CARB's HFC Regulation
New Requirements for
Stationary Refrigeration and Air Conditioning



DECEMBER 10, 2020



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California SB 1206 (Sen. Skinner)

- Originally prohibited a person from offering for sale or distribution bulk HFCs or bulk blends containing HFCs that exceed a 1,400 GWP limit beginning January 1, 2025, and a 750 GWP limit beginning January 1, 2030
- Requires CARB to conduct a rulemaking establishing a deadline for transitioning to ultra-low GWP refrigerants
- Amended to set limits of 2,200 GWP in 2025, 1,500 GWP in 2030, and 750 GWP in 2033

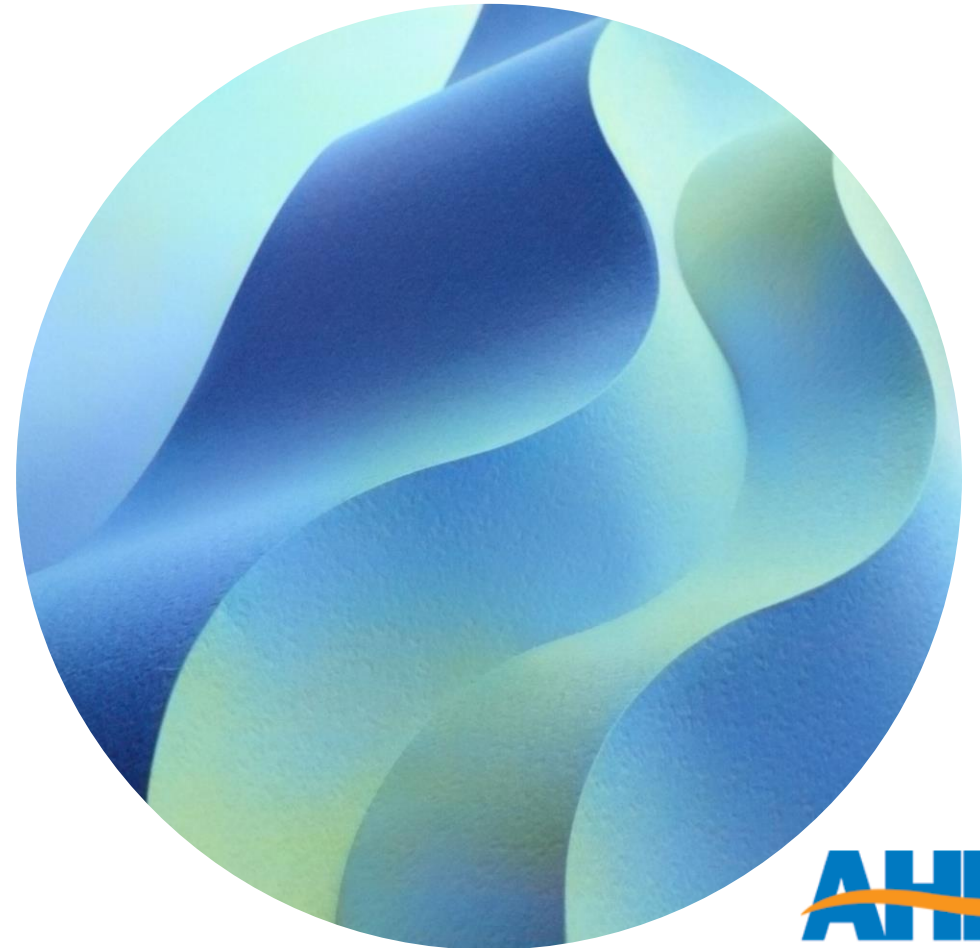
Preparing for a Low Carbon Future



2015: United Nations Framework Convention on Climate Change (UNFCCC)

Paris Climate Agreement

- Reduce greenhouse gases (GHGs) to limit global warming to $< 2\text{ }^{\circ}\text{C}$, and try to limit the increase to $1.5\text{ }^{\circ}\text{C}$.
- Non-binding (no compliance obligation)
- Independent Nationally Determined Contributions (INDCs)



2021 UNFCCC Conference of the Parties (COP) 26 Glasgow Agreement 1.8°C

- Pledge to phase-down coal power
- China-U.S. agreement to “work together”
- International carbon trading deal setting rules to stop double-counting offsets (Article 6)
- Calls for an end to inefficient fossil fuel subsidies
- **>100 countries agreed to slash methane emissions (including U.S.)**
- Greater scrutiny of emissions
- Commitment to stronger plans next year (current plans 2.4°C)
- Support for parties struck by catastrophic climate events
- Banks committed to decarbonize assets

2022: United Nations Climate Change Conference (UNFCCC) Sharm el-Sheikh: Addressing the impacts of Climate Change

- Funding arrangements for loss and damage associated with the adverse effects of climate change
- Matters related to the least developed countries
- Agreed upon metrics, climate observation program, administrative matters

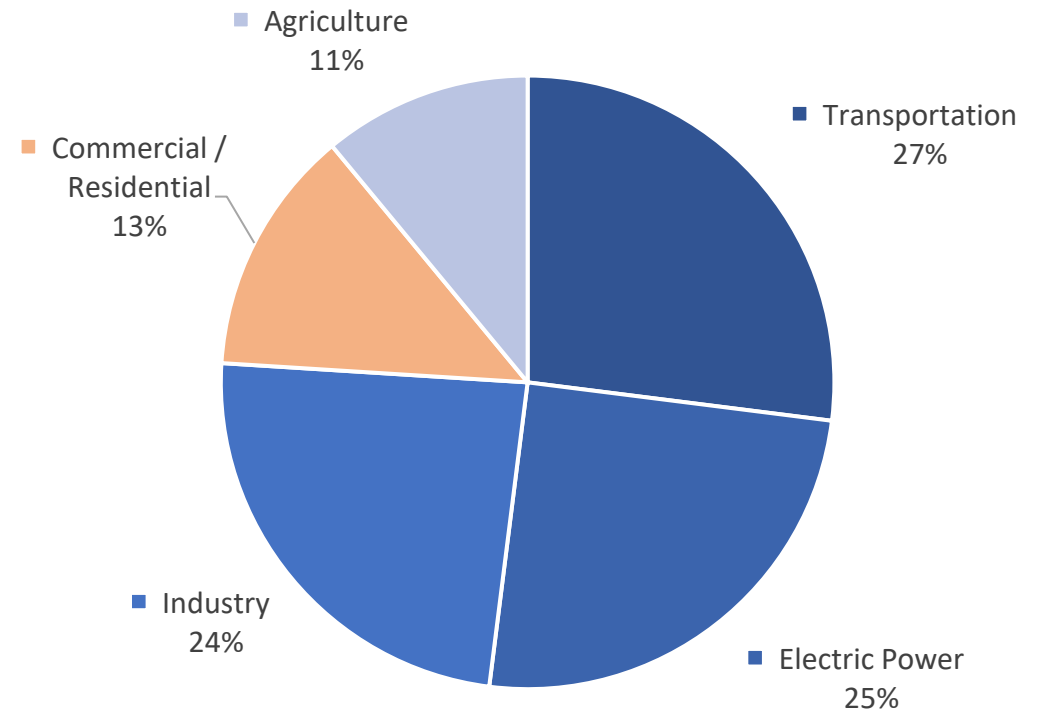
Biden's Climate Goal:

50% -52% reduction from 2005 GHG baseline by 2030

2020 GHGs 21% less than 2005

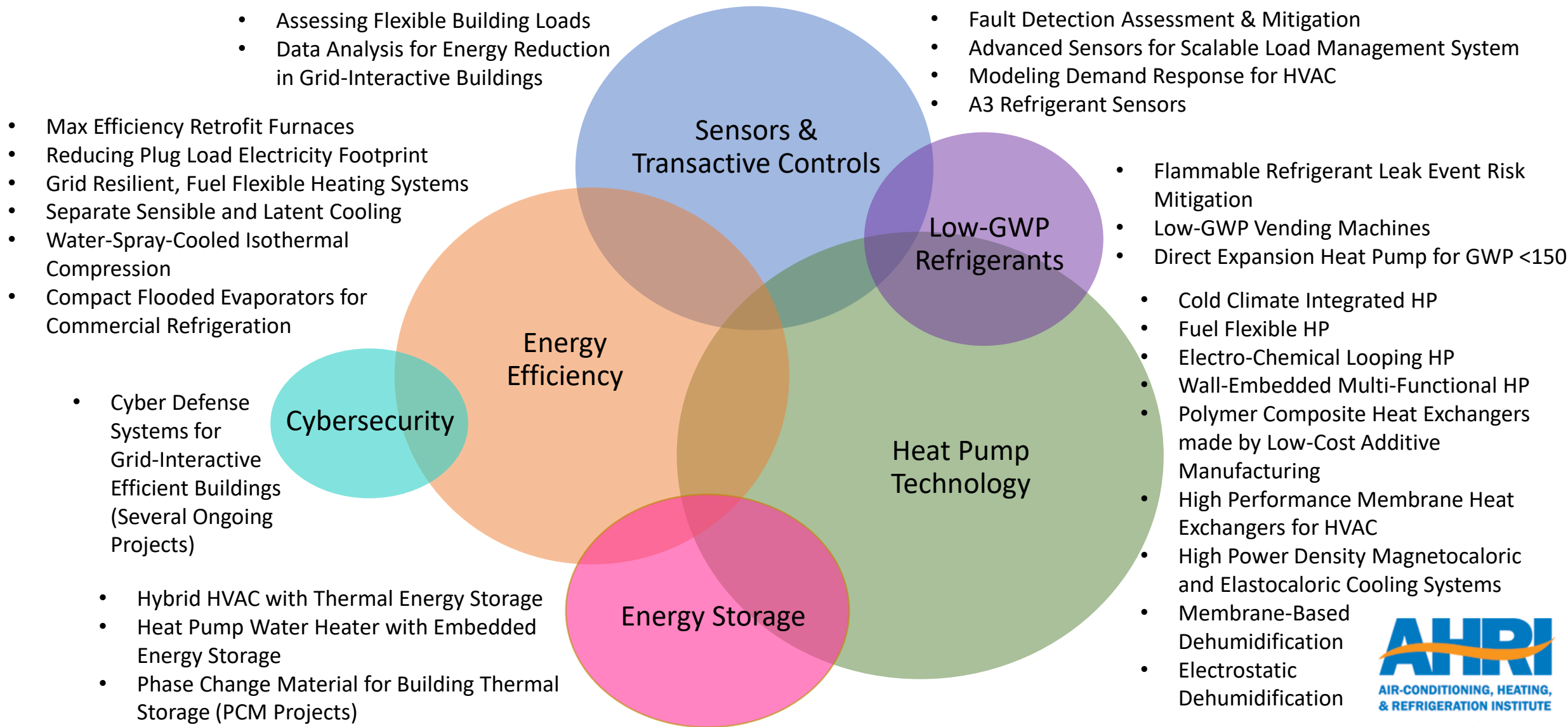
- **100% carbon pollution-free electricity by 2035.**
- Cut emissions and energy costs for families by supporting efficiency upgrades and electrification in buildings.
- Reduce emissions from:
 - Transportation, industrial processes, forests and agriculture
 - Reduce non-CO2 greenhouse gases: i.e., methane, hydrofluorocarbons
- Invest in innovation.
- Enhance carbon sinks.

2020 Sources of GHGs (EPA GHG Inventory)



U.S. Department of Energy Building Technologies Office (BTO) 2021 Peer Review

Current Research Trends



DOE Energy Efficiency Rulemakings

Recently closed or comments submitted:

1. Direct Heating Equipment (DHE): Final Determination: Amended standards unwarranted
2. Consumer Furnace Fans
3. Commercial Three-Phase CAC/HP TP
4. VRF Multi-split Systems TP NOPR
5. Electric Motors Scope and TP
6. Automatic Commercial Ice Makers TP
7. Circulator Pumps
8. Dedicated Purpose Pool Pumps TP and Scope
9. Manufactured Housing standard
10. Commercial Fans and Blowers Standards Proposal
11. Water Heaters TP
12. Single Package Vertical Air Conditioners and Single Package Vertical Heat Pumps TP
13. Miscellaneous Refrigeration Products standards (pTSD)
14. Direct Expansion-Dedicated Outdoor Air Systems (DOAS) ECS NOPR
15. Air Cleaners Standards and TP RFI
16. Commercial Warm Air Furnace Test Procedure NOPR
17. Computer Room Air Conditioner Test Procedure NOPR
18. Electric Motors ECS PTSD
19. VRF Standards NOPR
20. Computer Room Air Conditioner Energy Conservation Standards NOPR

DOE Energy Efficiency Rulemakings (cont)

Recently closed or comments submitted:

21. Consumer Boiler Test Procedure NOPR: 5/16
22. Consumer WH TSD: 5/16
23. Unfired Hot Water Storage Tanks Final Determination: Amended standards unwarranted: Effective 7/25 (Pub 5/24)
24. Direct Heating Equipment TP Final Rule: Compliance 11/16 (Pub 5/20)
25. Air Cooled, Three-Phase, Small Commercial Air Conditioners and Heat Pumps With a Cooling Capacity of Less Than 65,000 Btu/h ECS NOPR: 5/31
26. Residential CAC/HP Test Procedure NOPR: 6/6
27. ACIM ECS Preliminary TSD: 6/7
28. Commercial and Industrial Pumps TP: 6/11
29. Consumer Pool Heaters ECS NOPR: 6/14
30. Small Electric Motors ECS RFI: 6/20
31. WICF TP NOPR: 6/21
32. Commercial Package AC/HP TP RFI: 6/24
33. Commercial Furnace ECS NOPD: 6/27
34. Commercial Boilers ECS pTSD: 7/5
35. Furnace Fans TP NOPR: 7/12
36. Direct Heating Equipment ECS RFI: 7/22
37. Commercial Water Heaters ECS NOPR: 8/1
38. Residential WH TP SNOPR: 8/4
39. PTAC Notice of Proposed Determination: 8/23
40. Commercial Refrigeration TP NOPR: 8/29
41. Commercial Refrigeration ECS pTSD: 8/29
42. Walk-in Coolers and Freezers ECS pTSD: 8/29

Other:

- ASRAC Charter renewed (April 16, 2022)
- Commercial Boilers Final Rule Supplemental Response to Comments (April 20, 2022)

DOE Energy Efficiency Final Rules/Determination

Test Procedures:

1. DOAS Test Procedure Final Rule: Effective 8/26, all DOAS energy efficiency representations must be made by 7/24/23
2. Electric motors Test Procedure Final Rule: Effective 30 days after publication, all EM energy efficiency representations must be made within 180 days of publication. (Mfr. may petition for additional 180 days.)
3. Circulator Pumps Test Procedure Final Rule: Effective 30 days after publication, all EM energy efficiency representations must be made within 180 days of publication. (Mfr. may petition for additional 180 days.)

Standards:

1. Final Rule Pertaining to Standards for Manufactured Housing, Compliance 1 year after publication

Determinations:

1. Notice of Final Determination Pertaining to Air Cleaners as a Covered Consumer Product (July 15, 2022)
2. Final Determination: Miscellaneous Gas Products as a Covered Consumer Product

NRCAN Amendment 18/19

Pre-consultation
process for
Amendments 18 and
19 beginning

Technical bulletins
have been posted –
Comments were due
September 15

Central air conditioners and central heat pumps (3-phase)

Large air conditioners and heat pumps

Electric water heaters

Gas-fired water heaters [with Electric water heaters]

Oil-fired water heaters [with Electric water heaters]

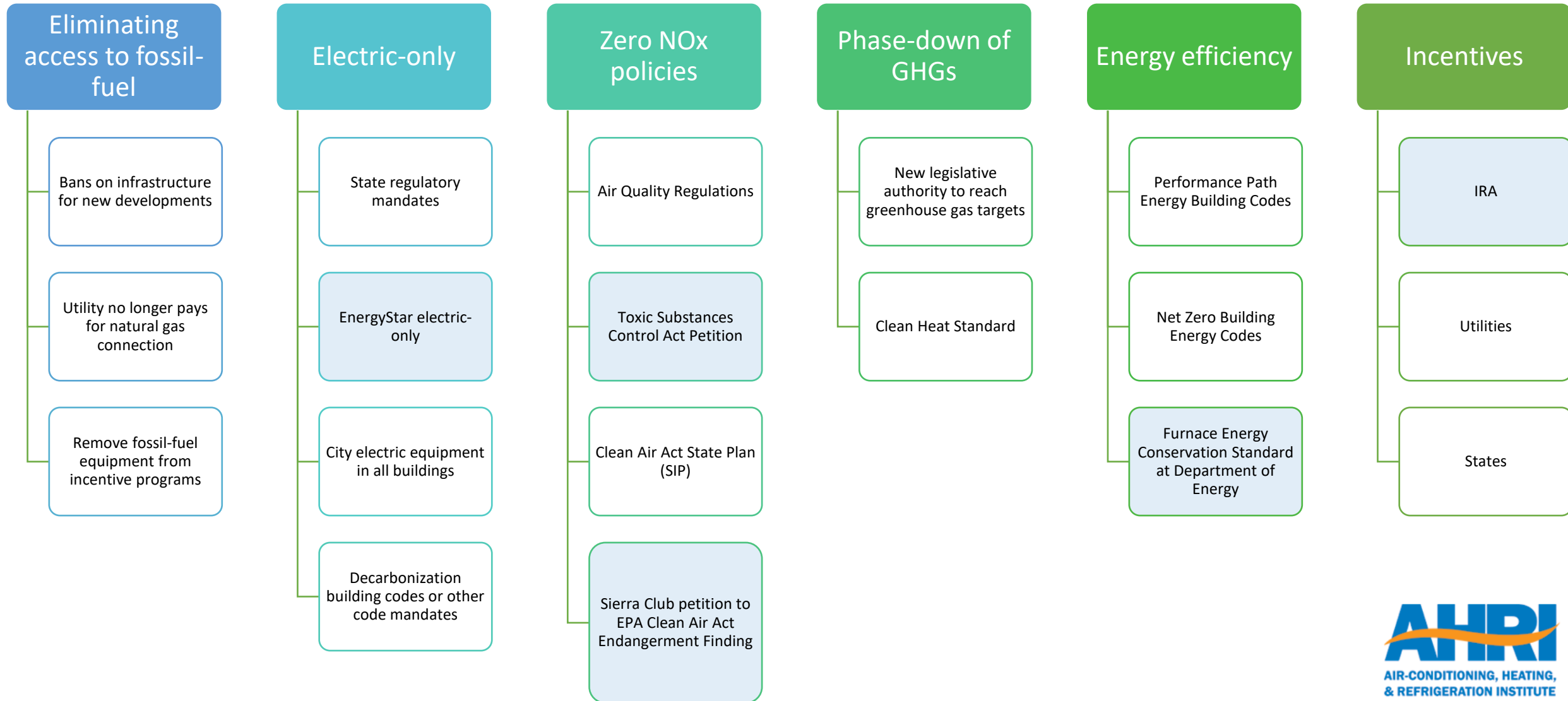
California Energy Commission (CEC)

Timeline



- Air Filters
- Commercial and Industrial Fans
- On March 3rd, CEC opened a docket for the 2025 rulemaking
- 22-BSTD-01: 2025 Energy Code Pre-Rulemaking
- Proposals listed [here](#).

Electrification Policies



Decarbonization
Patchwork
continues to
develop with
numerous
policies



Will electrification lead to reductions in greenhouse gas emissions?

Electric
Equipment

+

Low GHG Grid

“100% carbon pollution-free electricity by 2035.”

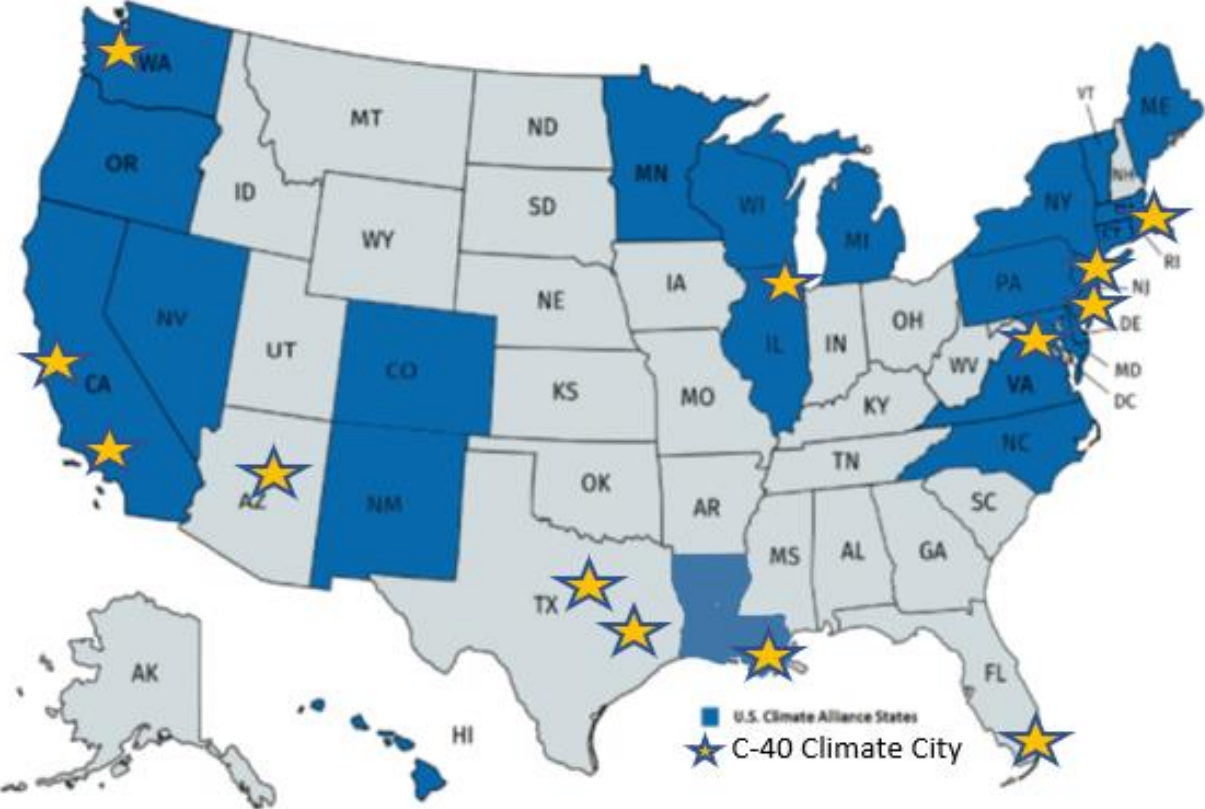
→ Reduced GHGs

<https://www.visualcapitalist.com/how-green-state-or-province/>



Climate Alliance(s)

Two Climate Alliances: One for states and one for cities



States meet weekly to share strategies

Bipartisan Coalition of 25 Governors

- 62% of the U.S. economy
- 56% of the U.S. population
- 43% of U.S. GHG emissions

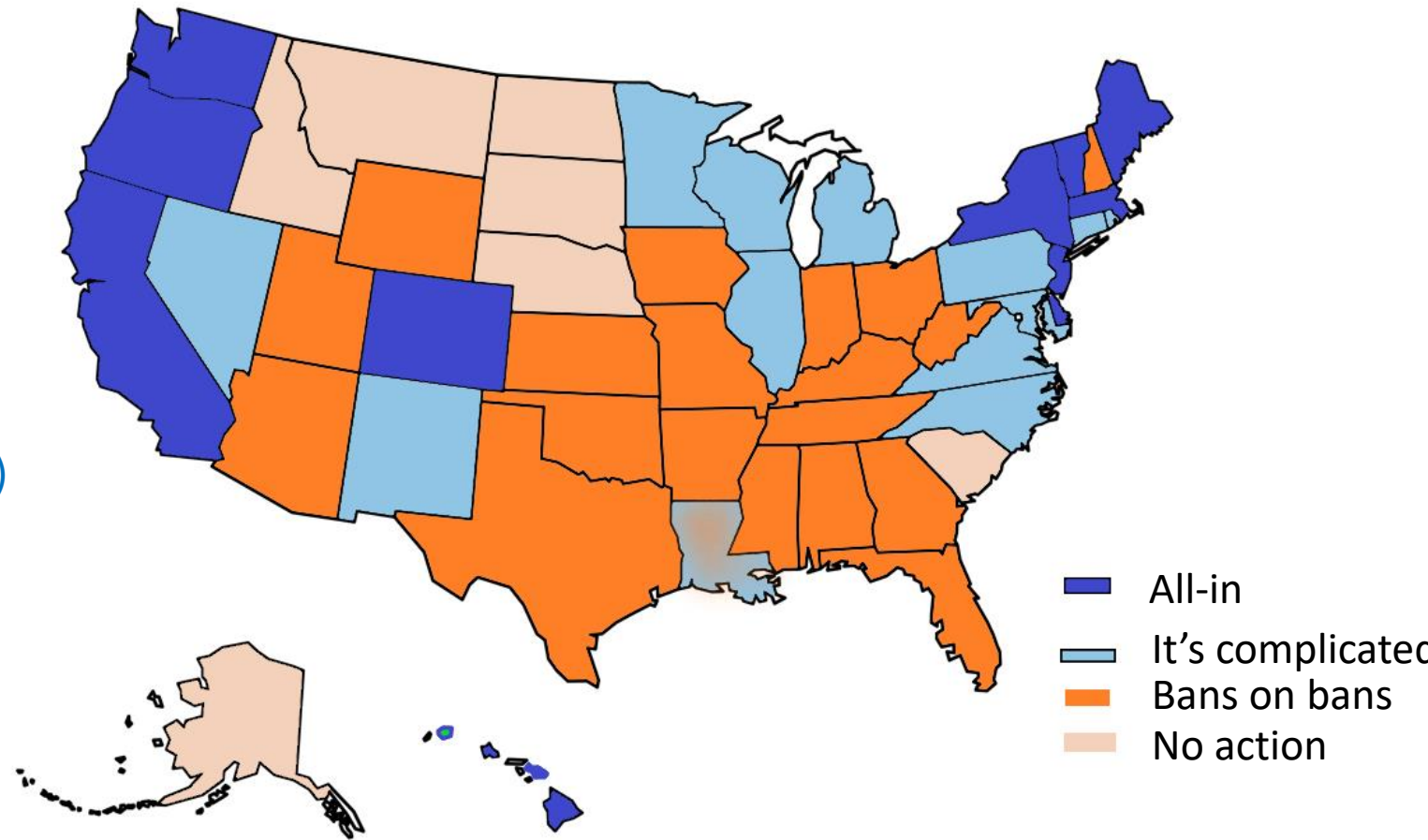
States and cities are committed to advancing the goals of the Paris Agreement, reduce GHG emissions

- 26-28% below 2005 levels by 2025
- 50-52% below 2005 levels by 2034

States are moving in different directions.

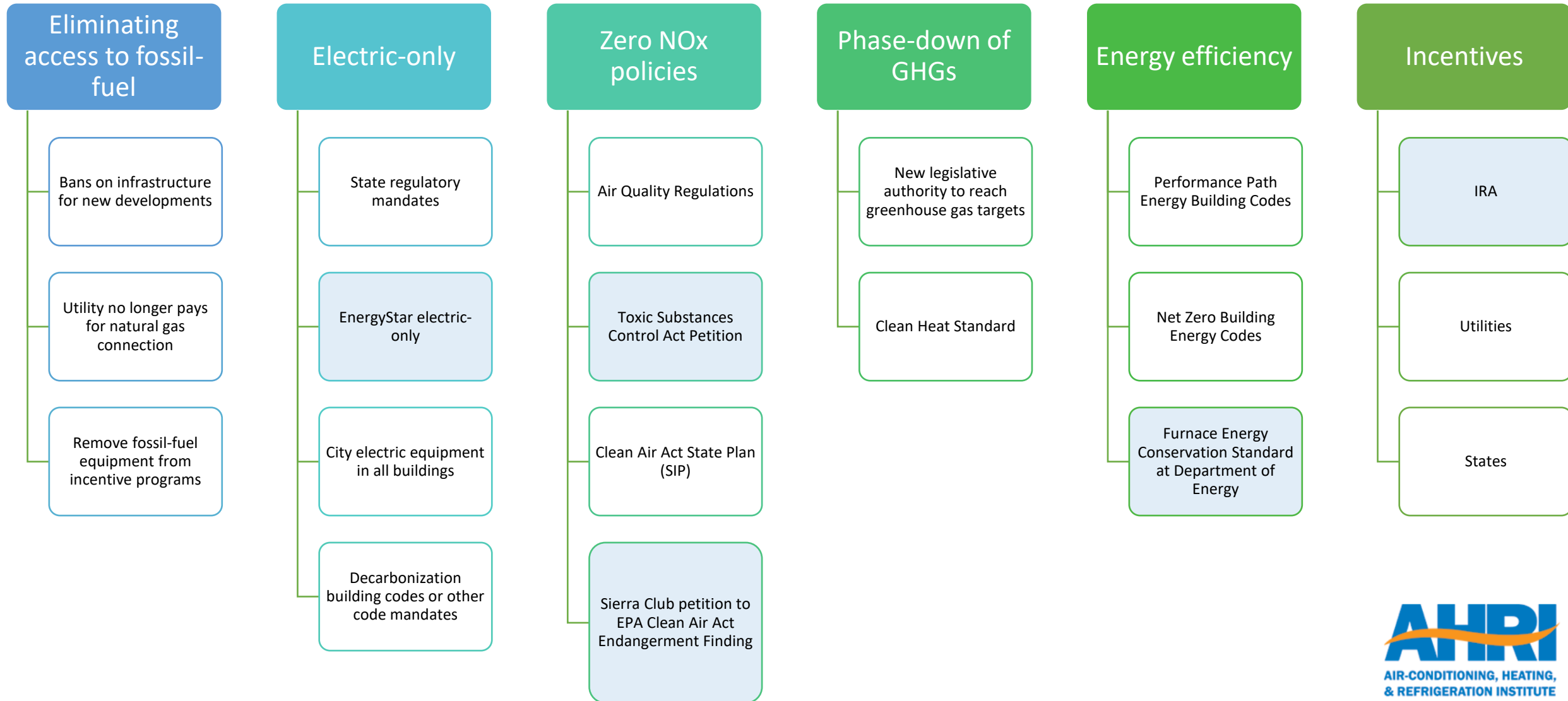
There are very broad levels of activity and interest on how, and whether, to approach decarbonization

- “All-in” (~37% of installed heating)
- “It’s complicated” (~28% of installed heating)
- Bans on natural gas bans (~33% of installed heating)
- No Action (~4% of installed heating)



* Louisiana banned local bans on natural gas infrastructure and is also a member of the U.S. Climate Alliance

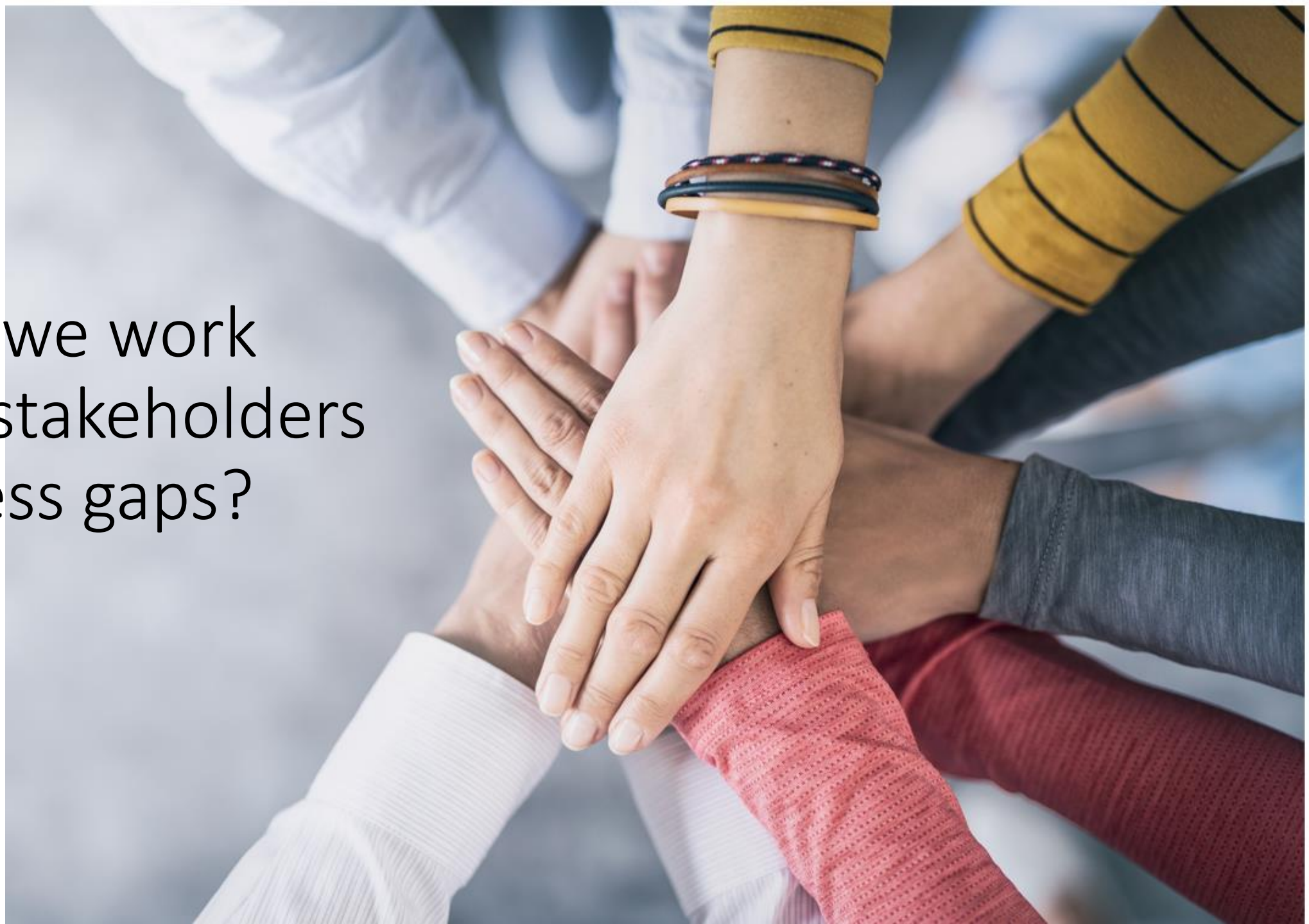
Electrification Policies



Affordable, reliable access to essential heating and cooling while reducing greenhouse gas emissions

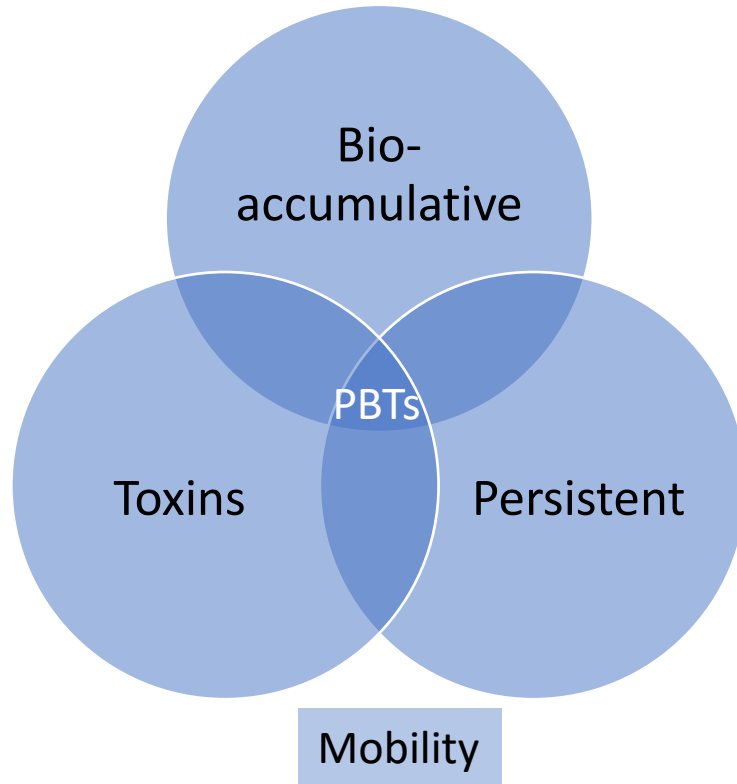


How do we work
with all stakeholders
to address gaps?



Perfluoroalkyl and polyfluoroalkyl substances (PFAS): A Primer

EPA Screens Chemicals Based on Criteria Specified in the Toxic Substances Control Act (TSCA) Section 6(b)(1)(A)



The hazard and exposure potential of the chemical substance;

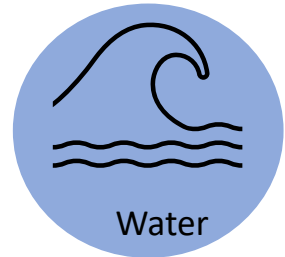
Persistence and bioaccumulation;

Potentially exposed or susceptible subpopulations;

Storage near significant sources of drinking water;

The conditions of use or significant changes in the conditions of use of the chemical substance; and

The volume or significant changes in the volume of the chemical substance manufactured or processed.



United States

Ensure science-based decision-making: National PFAS Testing Strategy

- Starting list of PFAS
 - Dividing PFAS into categories
 - Assembling existing toxicity data
 - Initial test candidate identification
 - Potential tests
 - Phases implementation
-
- Prioritizing chemicals that are manufactured commercially that are lacking toxicity data that have specific structures of concern.

EPA "[whole agency approach](#)" for addressing PFAS, titled "PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024"

- Prioritize protection of disadvantaged communities
- Ensure science-based decision-making:
 - updating guidance on PFAS destruction and disposal,
 - evaluating options for addressing air emissions of PFAS,
 - and identifying opportunities to take broader actions on categories of PFAS.
- Consider the Lifecycle of PFAS account for potential contamination pathways and the impacts on drinking water, wastewater treatment plants, and farming
- Reduce PFAS discharges to waterways (Get upstream) and gather new data on the prevalence, use, and effects of additional PFAS chemicals.
- Hold Polluters Accountable for legacy and ongoing contamination by advancing efforts to designate PFAS as hazardous substances
- Other Agencies and Department have developed goals related to PFAS

Reduce PFAS discharges to waterways: Reporting Requirements

- U.S. EPA is considering requiring reporting of PFAS, excluding refrigerants and TFA, retroactively from 2011.
 - Requires manufacturers and importers to document, report, and retain records of PFAS manufacturing and import in any year since January 1, 2011.
 - Does not exclude chemicals in “articles” or components and parts, such as articles containing PFAS as part of surface coatings.
 - Currently accepting comments on re-evaluation of cost analysis

TSCA Section 8(a)(7) Reporting and Recordkeeping Requirements for Perfluoroalkyl and Polyfluoroalkyl Substances Notice of Proposed Rulemaking (NOPR)

Hold Polluters Accountable: Proposed Designation of PFOA and PFOS as CERCLA Hazardous Substances

- Designate PFOA and PFOS, including their salts and structural isomers, as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or Superfund.
- Increase transparency around releases of these harmful chemicals and help to hold polluters accountable for cleaning up their contamination.
- Immediately report releases of PFOA and PFOS that meet or exceed the reportable quantity to the National Response Center and local responders.
 - Entities would not be required to report past releases of PFOA or PFOS as they were not yet listed as hazardous substances.

Definitions

Article

- Article “means a manufactured item (1) which is formed to a specific shape or design during manufacture, (2) which has end use function(s) dependent in whole or in part upon its shape or design during end use, and (3) which has either no change of chemical composition during its end use or only those changes of composition which have no commercial purpose separate from that of the article, and that result from a chemical reaction that occurs upon end use of other chemical substances, mixtures, or articles; except that fluids and particles are not considered articles regardless of shape or design.”
- Title 40, Chapter I, Subchapter R, Part 704, Subpart A, §704.3

Maine Per- and Polyfluoroalkyl Substances (PFAS) Regulations

Chemicals Policy (PFAS) - Maine

- [Maine LD 1503](#)
 - Contains definition of PFAS as "Perfluoroalkyl and polyfluoroalkyl substances" or "PFAS" means substances that include any member of the class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom.
 - By January 1, 2023, the law will require any manufacturer of a product for sale in the State that contains intentionally added PFAS to provide notification, including product descriptions, purpose of the PFAS added to the product, the amount of PFAS used, and other administrative information on the product and manufacturer.
 - By January 1, 2030, the law requires that a person may not sell, offer for sale or distribute for sale in this State any product that contains intentionally added PFAS, unless the department has determined by rule that the use of PFAS in the product is a currently unavoidable use.
- **Status:**
 - Enacted on July 15, 2021.

Maine DEP Second Stakeholder Meeting

- DEP working to clarify reporting requirements and program implementation based on comments received
 - **Categories:** The 2nd draft proposes Global Product Classification (GPC) brick codes for reporting, rather than the UPC codes proposed in the first draft.
 - **Fees:** The 2nd draft proposes fees of \$250 for the first 3 notifications by a company and \$50 for each notification thereafter.
 - **Currently Unavoidable Use:** The 2nd draft includes definitions adding clarity to how DEP will consider currently unavoidable uses.
 - **Carpet Definition:** The second concept draft clarifies which products are prohibited from sale in 2023 as carpet or rugs. Program email address: PFASProducts@maine.gov

International

European Evaluation

- Five European states agreed to prepare a joint restriction proposal to limit risks from a wide range of Perfluoroalkyl and polyfluoroalkyl substances (PFAS) 5/11/20
- PFAS defined as “Substances that contain at least one aliphatic -CF₂- or -CF₃ element”
- “Aim to restrict all PFAS in non-essential uses”
- The possible date of entry into force of this restriction is expected in 2025
- Essential use exemptions, similar to the process used in the Montreal Protocol, under consideration
- January 13, 2023, National authorities of Denmark, Germany, the Netherlands, Norway and Sweden submitted a proposal to the European Chemicals Agency (ECHA) to restrict per- and polyfluoroalkyl substances (PFAS) under Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH)

European Essential Use Concept for PFAS

The Chemicals Strategy for Sustainability Towards a Toxic-Free Environment will “define criteria for essential uses to ensure that the most harmful chemicals are only allowed if their use is necessary for health, safety or is critical for the functioning of society and if there are no alternatives that are acceptable from the standpoint of environment and health.”

Schedule

- Comment period will open soon and there will be targeted interviews.
- REACH consultation ended 4/15/22
- Impact Assessment of REACH Regulation completed September 2022.
- Commission to present proposal for the REACH revision by year end.

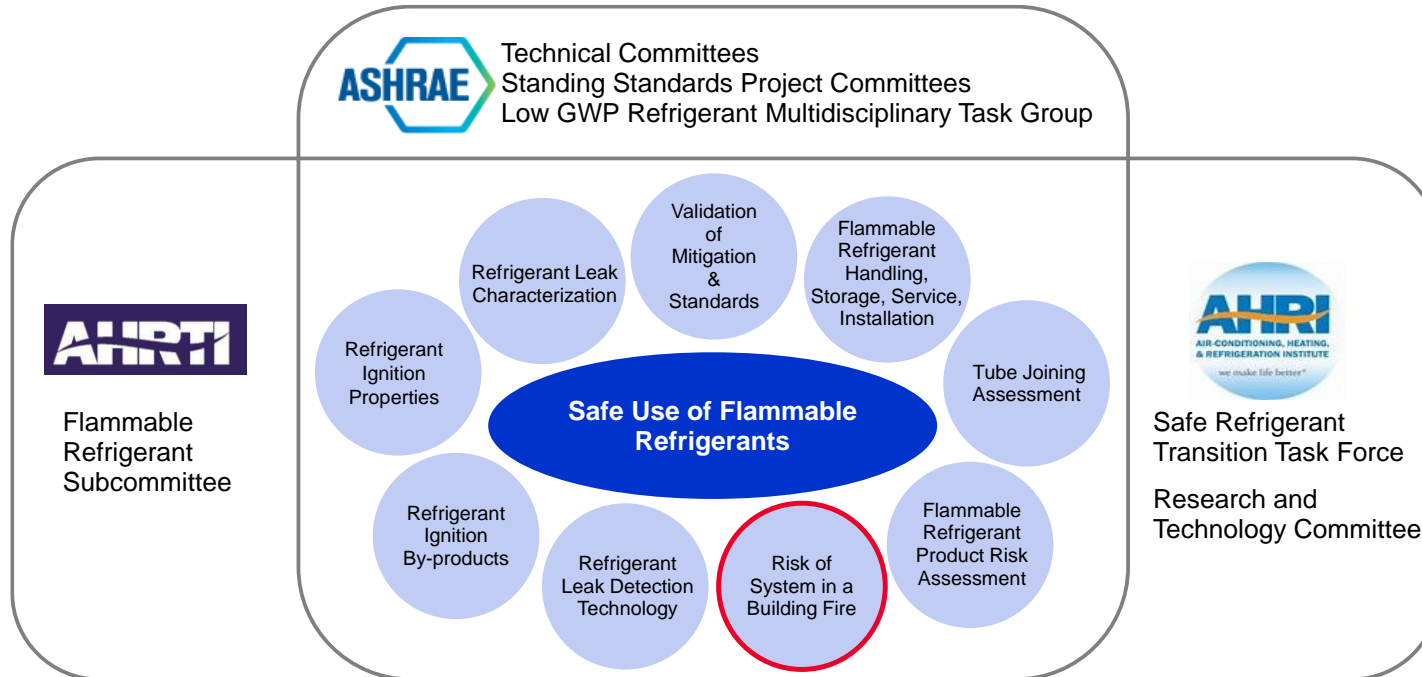
Perfluorooctane sulfonate (PFOS) and Perfluorooctanoic acid (PFOA)

- 2017: Canadian Environmental Protection Act, 1999 (CEPA) and by Prohibition of Certain Toxic Substances Regulations
- 2018: Australian study to examine PFAS contamination and potential implications for human health
- 2019: Stockholm Convention "decided to eliminate production and use of two important toxic POPs, PFOA..." as recommended by the United Nation's Stockholm Convention's Persistent Organic Pollutants Review Committee ; later adding "Perfluorohexane sulfonic acid (PFHxS), its salts, and PFHxS-related compounds"

Questions

Back-up Slides

Refrigerants and Firefighter Tactical Considerations



FLAMMABLE REFRIGERANTS

This course will identify the hazards posed by different refrigerants and provide tactical considerations based on experimental results that can be incorporated into operating procedures to improve firefighter safety.

START COURSE

FIREFIGHTER SAFETY RESEARCH INSTITUTE

<https://training.ulfirefightersafety.org>
Designed by firefighters for firefighters

First project of its kind related to fire impinging on refrigerants and equipment to provide practical information for first responders for the purpose of developing training

>\$ 7 Million in Research on Flammable Refrigerants

• Testing

- AHRTI-9007: Benchmarking Risk by Whole Room Scale Leaks and Ignitions Testing
- AHRTI-9013: A2L Consequence Study
- AHRTI-9012/Oak Ridge National Laboratory (ORNL): Real-world Leak Assessments of Alternative Flammable Refrigerants
- AHRTI-9008: Investigation of Hot surface Ignition Temperature (HSIT) for A2L Refrigerants
- AHRI-8017: Investigation of Energy Produced by Potential Ignition Sources in Residential Application

• Modeling

- ASHRAE-1806: Flammable Refrigerants Post-Ignition Simulation and Risk Assessment Update
- ORNL: Investigate the Proper Basis for Setting Charge Limits of A2L, A2, and A3 for Various Types of Products
- NIST: Modeling tools for low-GWP Refrigerant Blends Flammability

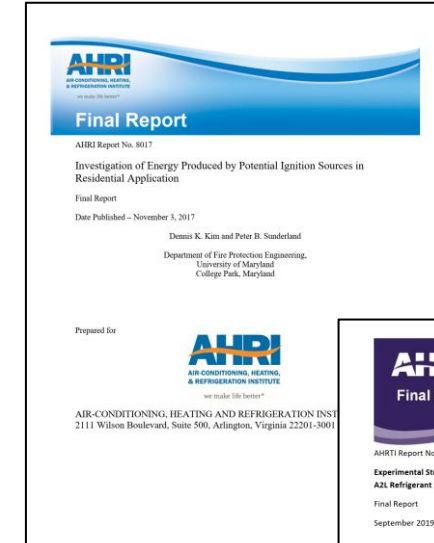
• Servicing

- ASHRAE-1807: Guidelines for Flammable Refrigerant Handling, Transporting, Storing and Equipment Servicing, Installation and Dismantling
- ASHRAE-1808: Servicing and Installing Equipment using Flammable Refrigerants: Assessment of Field-made Mechanical Joints

• Detection

- AHRTI-9009: Leak Detection of A2L Refrigerants in HVACR Equipment

*This is not a comprehensive list (excludes NFPA, Japan, Europe, Manufacturers, etc.)





- [AHRI Safe Refrigerant Transition Task Force webinar series](#)
- HVACR technician training: [ACCA](#), [ESCO](#), and North American Technician Excellence ([NATE](#)).
- [Safe Refrigerant Transition Task Force Newsletter](#)

- Webinar 1: Air Conditioning Applications
- Webinar 2: Commercial Refrigeration Applications
- Webinar 3: Understanding Refrigerant Sensors
- Webinar 4: Predictive Tools for Refrigerant Behaviors
- Webinar 5: Refrigerant Ignition in Open Flame/Hot Surfaces: Has Anything Fundamentally Changed?
- Webinar 6: A2L Refrigerant Behavior in a Structure Fire
- Webinar 7: Refrigerant Detection Systems 101
- Webinar 8: Servicing A2L Refrigerant Systems
- Webinar 9: A2L Refrigerants and Tactical Considerations for Firefighters
- Webinar 10: Codes and Standards "Unlocked"
- Webinar 11: Joint Types and A2L Refrigerants
- Webinar 12: HVACR Equipment Needed for the Safe Refrigerant Transition



Sector Transition Petitions Rulemaking Starts

NRDC/IGSD – [Reinstate SNAP Rules 20 & 21 under AIM](#)

AHRI – [Air Conditioning 750 GWP 2025](#); [Refrigeration Step 1](#), [Refrigeration Step 2](#)

EIA – [All California requirements](#)

AHAM – [AC, dehumidifiers 750 GWP](#)

IGSD – [Auto DIY](#)

DuPont – [XPS 134a transition](#)

CPI – [PU Foam SNAP Rules](#)

IIAR – [Commercial Refrigeration](#)

HCPA – [Aerosol SNAP Rules](#)

Climate Alliance States – [SNAP Rules and](#) California requirements

Training

June 15, 2022 View Web Version | Text Only Version



SAFE REFRIGERANT TRANSITION NEWS

Addressing every step of the supply chain in the safe refrigerant transition to low-global warming potential refrigerants

Model Building Codes

IAPMO Electronic Ballot



Last month, Safe Refrigerant Transition Task Force (SRTTF) members attended the International Association of Plumbing and Mechanical Officials (IAPMO) technical meetings. Several important updates were made to the Uniform Mechanical Code by aligning sections of Chapter 11 with ASHRAE 15. The next step requires technical committee members to re-confirm their voting results via an electronic balloting process that closed on Friday, June 10. Electronic ballots require a two-thirds affirmative majority to move motions forward. Results will be collected in a monograph and discussed at the IAPMO Annual Conference from September 11-15, in Charlotte, N.C.

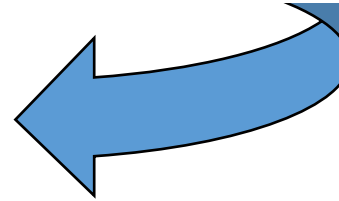
ASHRAE Offers Introduction to Refrigerants Course



ASHRAE is offering an on-demand course that presents a basic overview of how refrigerants are used in cooling applications and how governmental policies influence the impact of refrigerants on the environment. It covers terminology, refrigerant types, classification, and regulations, including environmental considerations. The course also reviews ASHRAE Standard 34 refrigerant designation and safety classifications. Successful completion of this online course will provide 1.5 CEUs. It is available [here](#).

[Return to Top](#)

Snippet of content from recent monthly newsletter



- Monthly updates regarding refrigerant transition
- Registration is free via website sign-up at https://www.magnetmail.net/actions/subscription_form.cfm?user_id=AHRI&subId=1949
- AHRI is working with two organizations to bring additional training directly to AHJs and installers.

ASHRAE 34 Refrigerant Safety Classifications

ASHRAE 34 Classification

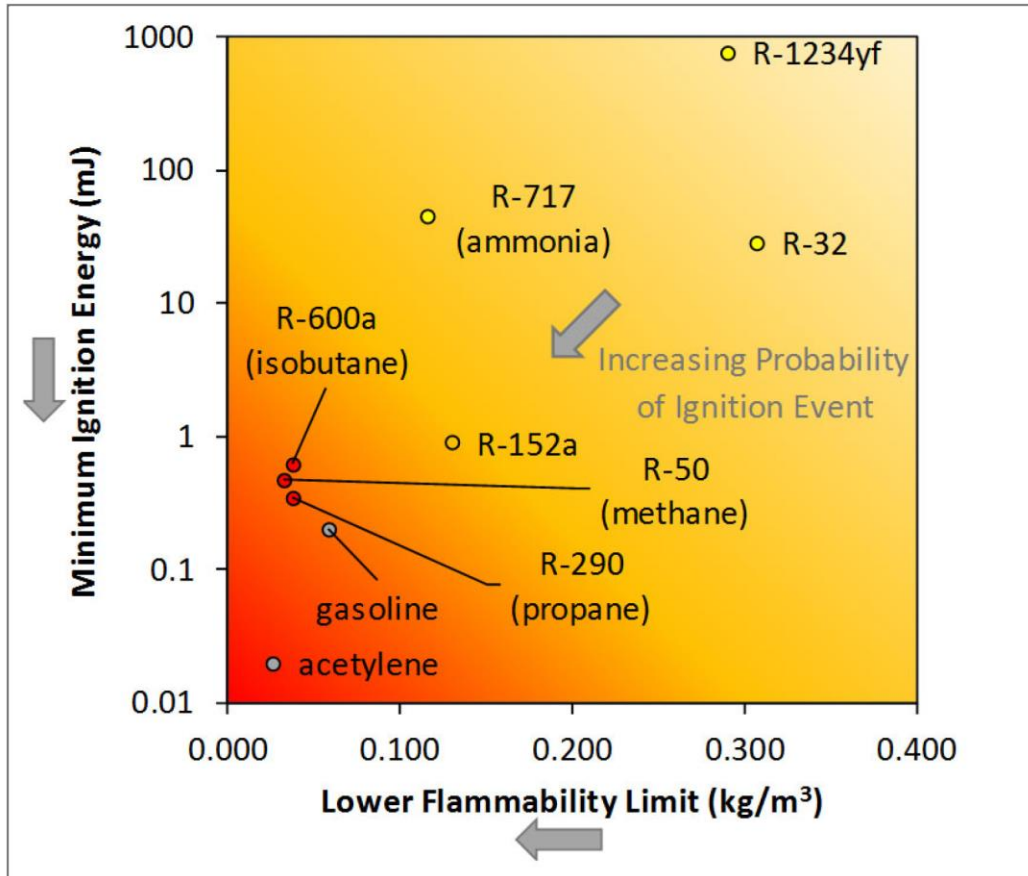
Higher Flammability	A3	B3
Flammable	A2	B2
Lower Flammability	A2L	B2L
No Flame Propagation	A1	B1
	Lower Toxicity	Higher Toxicity

- Refrigerant transition will require lower (A2L) and higher (A3) flammability refrigerants to comply with regulations
- Lower flammability or A2L refrigerants are characterized as having a low flame speed ($BV < 10$ cm/sec) and lower heat of combustion (HOC)
- Higher flammability refrigerants (A3) include hydrocarbons such as propane and butane that have higher flame speeds and HOC

Hazards for current and future refrigerants

- Combustion products for all fluorinated refrigerants include HF gas and HF acid after water is used
- Oxygen Deprivation is possible in tight and enclosed spaces
- Frostbite is possible due to quickly releasing liquid refrigerant
- PPE including SCBA is a necessary part of firefighting

AHRTI – 8017 A2L Potential Residential Ignition Sources



No Ignition when tested with

- cigarette insertion
- barbeque lighter
- plug & receptacle
- light switch
- hand mixer
- cordless drill
- friction spark
- hair dryer
- toaster
- hot plate insertion
- space heater insertion

Ignition Sources

hot wire, safety match, lighter flame insertion, leak impinging on candle

Bottom Line: Open flames can be ignition sources for A2L refrigerants.

Perfluorooctane sulfonate (PFOS) and Perfluorooctanoic acid (PFOA)

Some references

https://www.epa.gov/sites/production/files/2017-12/documents/ffrrofactsheet_contaminants_pfos_pfoa_11-20-17_508_0.pdf
<https://www.theguardian.com/us-news/2019/may/23/pfas-everyday-products-toxics-guide>
https://www.cdc.gov/biomonitoring/PFOA_FactSheet.html
<https://www.atsdr.cdc.gov/pfas/health-effects/us-population.html>

Safe Application of A2L Refrigerants – Machinery Room



Refrigerant Detector per 8.13.9

- Detect each refrigerant designation
- Response times
- Set points less than RCL or OEL or upper limit of detector
- Automatic self-testing
- Tested during installation and annually, for set points and response times



Electrical Protection

No Flame-Producing Device or Hot Surfaces Above 1290°F
in units, rooms or ducts per 8.13.1

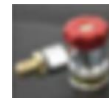


Safety / Ventilation Control Interface & Inspection

Remote Control

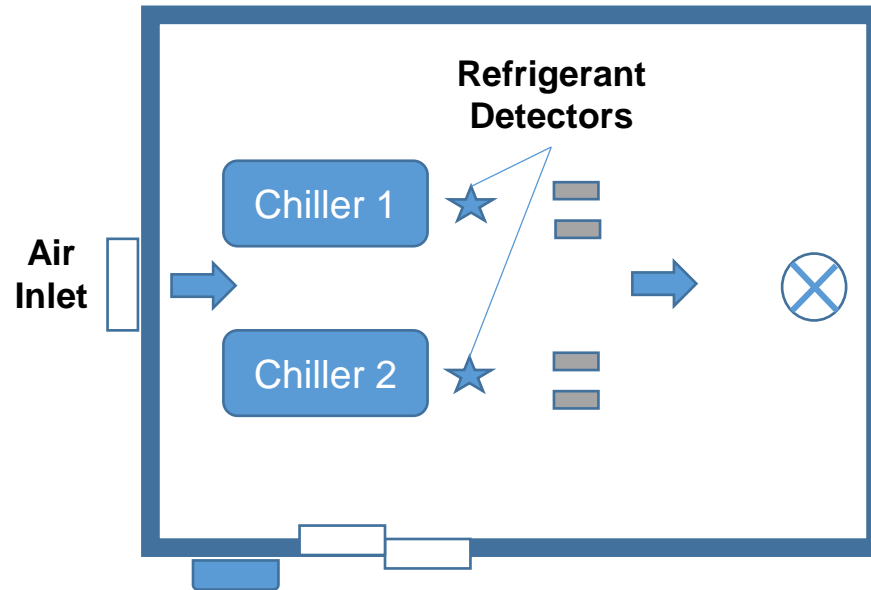


Relief Valves Vented Outdoors
And refrigerant relief on waterside



Red Pantone Service Port
EPA requirement

Revised/Increased Ventilation
as function of charge



Active Mitigation for Leaks that exceed set point

- De-energize equipment per 8.13.6.2
- Visual and audible alarms per 8.13.10
- Detect and exhaust per section 8.13.11
 - Mechanical ventilation
 - Electric motors shall not be in ducts; fan rotating elements shall be nonferrous or non-sparking
 - Makeup air ducts required
 - Exhaust inlets within one foot of lowest point for refrigerants heavier than air; one foot from ceiling if lighter than air
 - Exhaust to outdoors
 - Level 1 and Level 2 ventilation rates if set point based upon OEL or RCL, respectively



Routine Inspection & Leak Checking
CARB EPA Section 608 > 50 lb
as function of charge

Industry Readiness

What Actions Can I Take Now?



Establish an
Accurate
Inventory and
Baseline



Develop a
Refrigerant
Transition
Roadmap



Set and Govern
Standards for
Future
Equipment
Purchases



Track and
Monitor Leaks
through Service
Programs

Proposed Industry Transition Dates

REFRIGERATION APPLICATIONS

Product Category (New Equipment ¹)	AR4 GWP Limit	Transition Date
Standalone/Self-contained Refrigeration Systems	SNAP Rules 20/21 Prohibitions	January 1, 2022
Remote Refrigeration Systems (> 50 lbs. refrigerant charge)	1500	January 1, 2022
Remote Refrigeration Systems (<= 50 lbs. refrigerant charge)	2200	January 1, 2022
Industrial and Processing Refrigeration (w/o chillers)	1500	January 1, 2022
ACIM (> 50 lbs. refrigerant charge)	2200	January 1, 2022
Transport Refrigeration	2200	January 1, 2023

Exceptions: ACIM < 50lbs charge, Medical, Scientific and Research Applications

Proposed Industry HFC Phase-down Regulations

AIR CONDITIONING AND INDUSTRIAL PROCESS REFRIGERATION (IPR)

Chillers

AR4 GWP Limit

Transition Date

Chillers (designed for chilled fluid leaving temperature $> +35^{\circ}$ F)

≤ 750

January 1, 2024

Chillers (designed for chilled fluid leaving temperature $\leq +35^{\circ}$ and $> -10^{\circ}$ F)

≤ 1500

January 1, 2024

Chillers (designed for chilled fluid leaving temperature $\leq -10^{\circ}$ to -50° F)

≤ 2200

January 1, 2024

Chillers (< 20 lbs charge) (designed for chilled fluid leaving temperature $< +35^{\circ}$ F)

≤ 2200

January 1, 2024

Exceptions: Chillers < -50 F, Medical, Scientific and Research Applications

EPA: Determine baseline and mandatory allocations for exemptions

- Framework regulation
 - Metered-dose inhalers
 - Defense sprays*
 - Marine and trailer structural composite preformed polyurethane foam*
- Electronic gases
 - Etchant for semiconductor material or wafers
 - Cleaning of chemical vapor deposition chambers within the semiconductor manufacturing sector
- Fire suppression in mission-critical military end uses

*States may need to take action regarding preemption provision for products included in SNAP Rules 20 and 21