



pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bureau of Air Quality

Concepts for the Phasedown of Hydrofluorocarbons (HFC)

Small Business Compliance Advisory Committee

April 22, 2020

Harrisburg, PA

Tom Wolf, Governor

Patrick McDonnell, Secretary

Agenda

- What are HFCs?
- History of Atmospheric Chemical Phasedowns
 - Montreal Protocol – Success in Phasedown of CFCs and HCFCs
 - Kigali Amendment – Focus on Phasedown of HFCs
- HFC Phasedown
 - Federal: EPA’s Significant New Alternatives Policy (SNAP) Program
 - State-level: U.S. Climate Alliance (USCA) Model Rule and State Initiatives
- HFC Emissions and Trends in Pennsylvania
- USCA HFC Model Rule Sectors
- Anticipated Timeline for Proposed Rulemaking

What are HFCs?

- HFCs are gaseous organic compounds containing hydrogen and fluorine.
- HFCs are used in a variety of applications:
 - Air conditioning
 - Refrigeration
 - Foam blowing
 - Aerosol propellants
- HFCs are also used for solvent cleaning.
 - Solvent cleaning is not one of the end uses under consideration for phasedown.

What are HFCs?

- HFCs are potent greenhouse gases (GHG) with high global warming potentials (GWP).
- GWP_{100} is a relative factor used to compare the climate-based impact of a substance to the impact of 1 ton of CO_2 on a 100-year timeframe.

Example HFCs	GWP_{100}
HFC-134A	1430
HFC-245fa	1030
HFC-227ea	3220
HFC-236fa	9810
HFC-125	3500

IPCC 2007, Fourth Assessment Report (AR4)

History of Atmospheric Chemical Phasedowns

- Montreal Protocol in 1989 – focused on ozone depleting substances (ODS).
 - The ODS chemical groups chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) phased down.
 - HFCs began replacing ODS.

CFCs and HCFCs Pre-Montreal Protocol 1930s-1990	HFCs Post-Montreal Protocol 1990s-2010s
<ul style="list-style-type: none">- Generally longer atmospheric lifetimes- Ozone depleting- Significant global warming impact	<ul style="list-style-type: none">- Generally shorter atmospheric lifetimes- Non-ozone depleting- Significant global warming impact

History of Atmospheric Chemical Phasedowns

- Kigali Amendment (2016) to Montreal Protocol, focus is now on HFCs.
 - Countries now reducing their use of HFCs.
- Today, many HFC alternatives are available with zero ozone depleting potential and very low global warming potential, including Hydrofluoroolefins (HFOs) and natural refrigerants.

CFCs and HCFCs Pre-Montreal Protocol 1930s-1990	HFCs Post-Montreal Protocol 1990s-2010s	HFOs & Natural Refrigerants Post-Kigali Amendment 2010s-Present
- Generally longer atmospheric lifetimes - Ozone depleting - Significant global warming impact	- Generally shorter atmospheric lifetimes - Non-ozone depleting - Significant global warming impact	- Generally shorter atmospheric lifetimes - Non-ozone depleting - Less global warming impact

Significant New Alternatives Policy (SNAP)

- Section 612 of the Clean Air Act (CAA) addresses safe alternatives to the use of ODS.
- EPA's SNAP program consists of a series of regulations under Section 612 of the CAA.
- Under SNAP, EPA evaluates substitutes to ODS to reduce overall risk to human health and the environment with the goal of smooth transition to safer alternatives as they become available.
- SNAP lists acceptable and unacceptable substitutes for each major industrial use sector.
- HFCs previously listed as acceptable.

SNAP HFC Prohibitions Challenged

- In 2015 and 2016, EPA SNAP Rules 20 and 21 included a phasedown schedule for certain HFCs in specific end uses.
 - More than one acceptable substitute is available for each category.
- The HFC prohibitions in the 2015 and 2016 EPA SNAP rules were challenged.
- August 8, 2017 – U.S. Court of Appeals for the D.C. Circuit ruled EPA lacks authority under CAA Section 612 to require the phase down of HFCs because HFCs are not ODS.

SNAP – Next Steps

- Industry was already implementing the phasedown of HFCs according to the implementation schedule in the EPA SNAP rules.
 - January 1, 2016, through January 1, 2025.
 - Based on sector and end-use.
- In the absence of federal action, state efforts are underway to support industry progress and prevent increasing HFC emissions in the U.S.
- Industry and environmental groups have been supportive of state efforts to provide HFC phasedown requirements.

Governor Wolf's Executive Order

- On January 8, 2019, Governor Wolf issued Executive Order 2019-1, "Commonwealth Leadership in Addressing Climate Change and Promoting Energy Conservation and Sustainable Governance."



- Reducing HFCs is a recommended strategy for reducing GHG emissions in the 2018 PA Climate Action Plan.

Air Pollution Control Act

- Section 5(a)(I) of the Air Pollution Control Act (35 P.S. § 4005(a)(I)).
- Provides statutory authority to adopt rules and regulations for the prevention, control, reduction and abatement of air pollution in this Commonwealth.

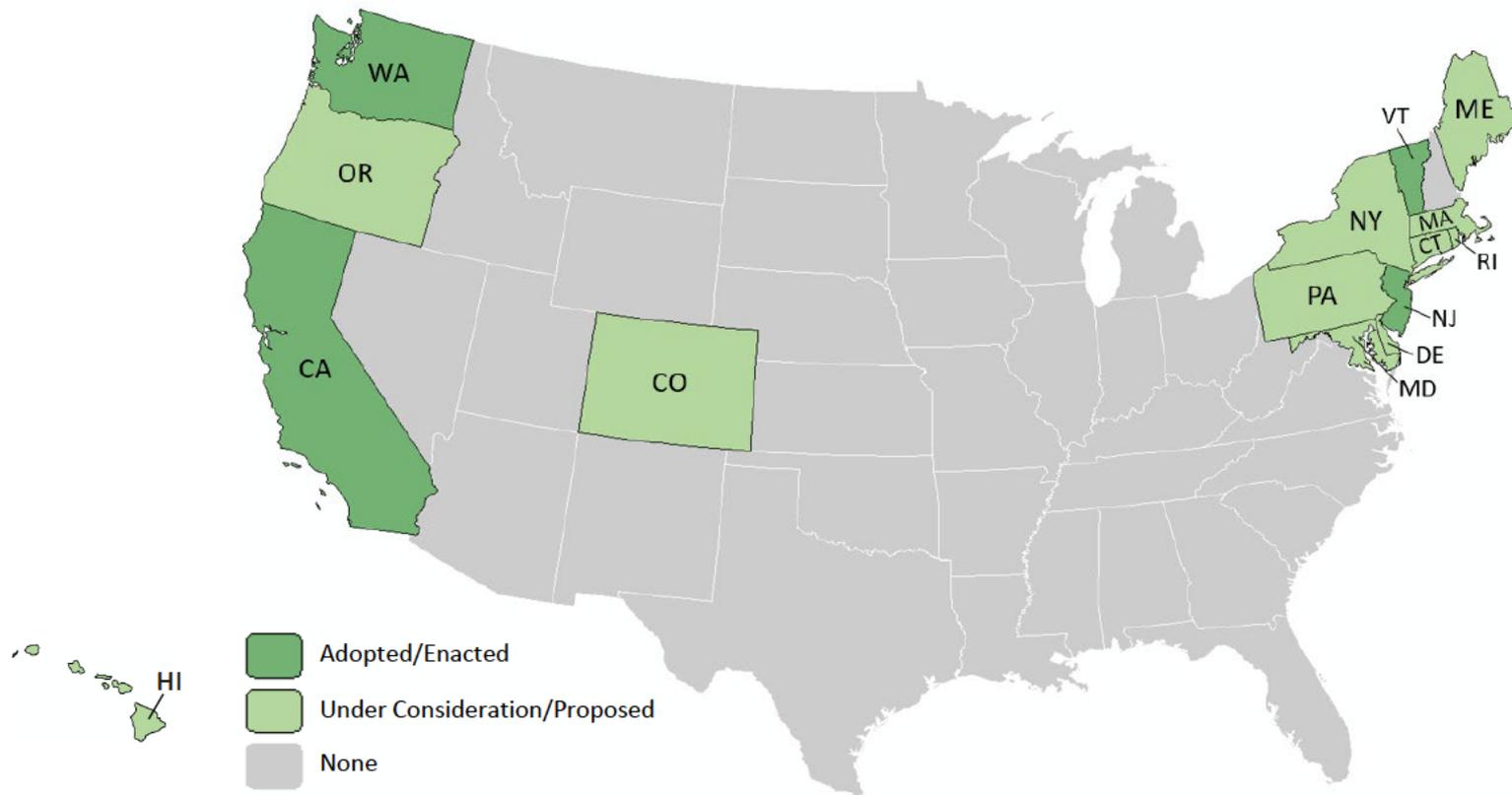
U.S. Climate Alliance (USCA)

- April 29, 2019 – Governor Wolf joined the USCA.
- The USCA is a bipartisan coalition of 25 governors committed to reducing GHG emissions.
- Basic mission of the USCA is to meet the goals of the Paris Climate Agreement.
- Nearby states that are USCA members include MD, NJ, NY, and DE.

USCA Model Rule

- The USCA developed a model rule to support development of state requirements to implement the HFC phasedown to replace the EPA SNAP HFC prohibitions.
- Pennsylvania is working with other USCA states to develop consistent HFC requirements based on the USCA model rule.
- Industry feedback on other state proposals has emphasized the importance of consistency in state requirements.

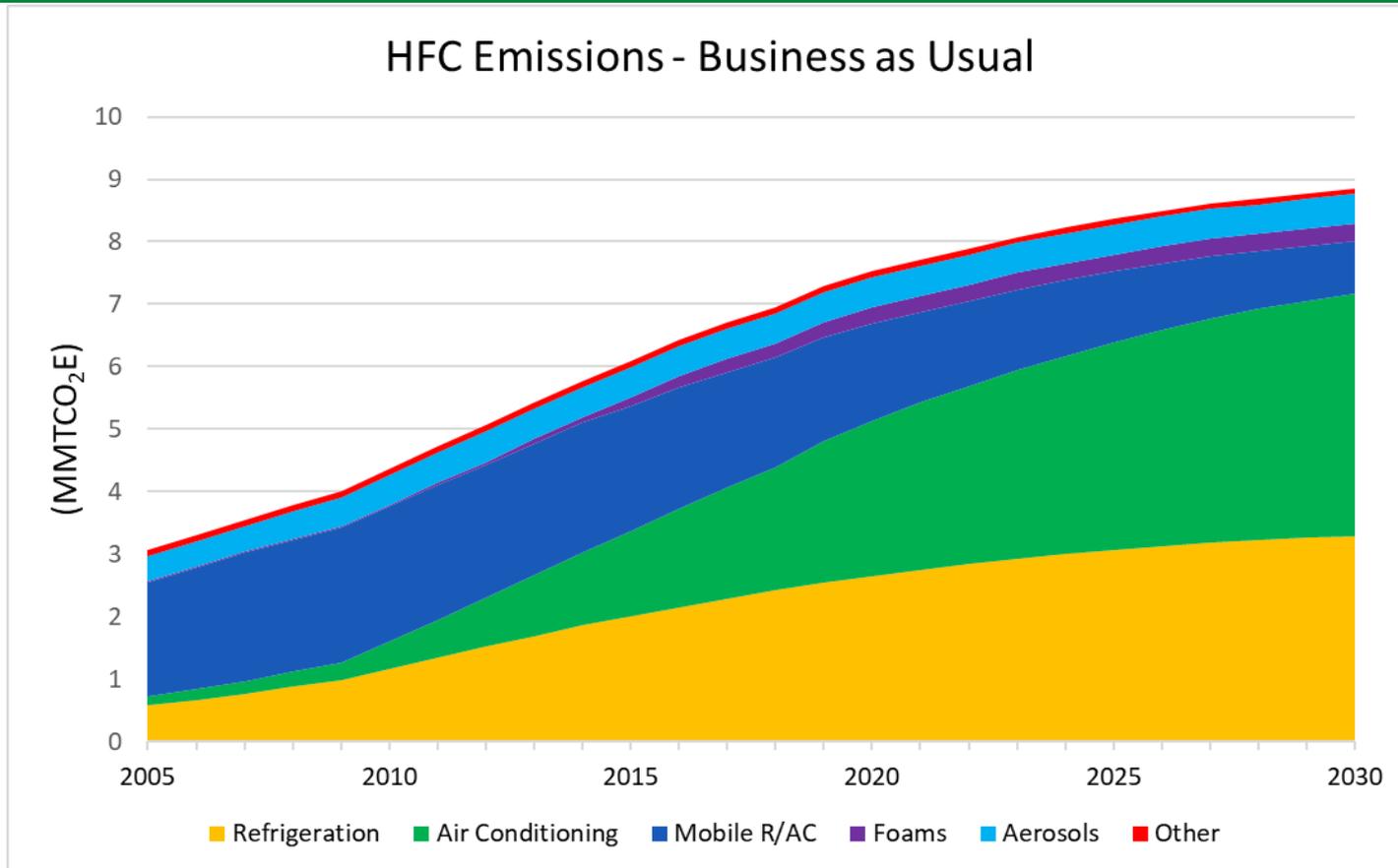
State HFC Initiatives



- Pennsylvania joins 14 other states in developing regulations and/or legislation to phase down HFCs, including most states in the Northeast and Mid-Atlantic.

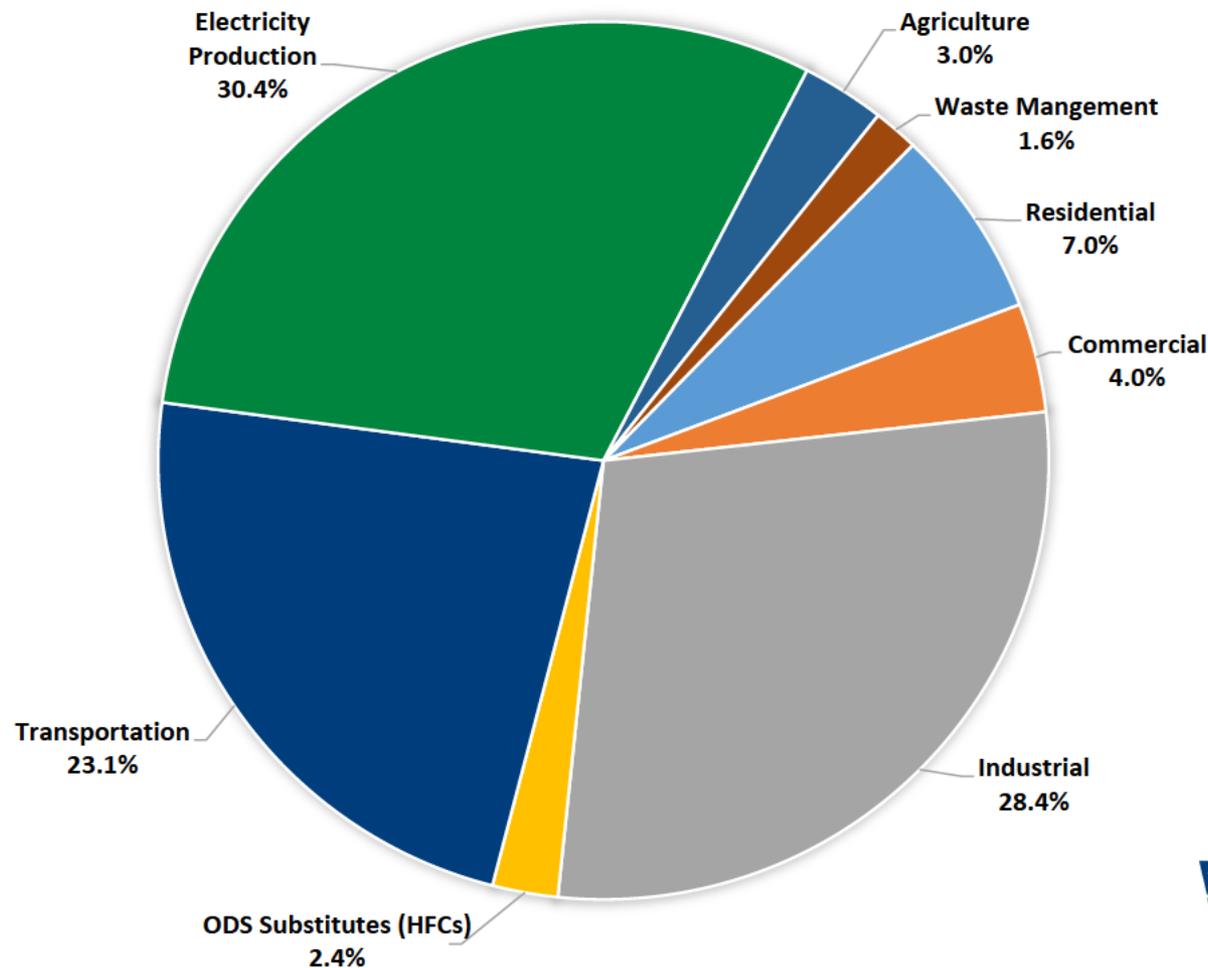


Pennsylvania Projected HFC Emissions



Source: Inventory trend and projection generated using the USCA HFC Inventory Tool

Pennsylvania GHG Breakdown by Sector



Total Pennsylvania GHG Emissions (2016):
264.4 MMTCO₂E



USCA Model Rule

End-Use Sectors Addressed by the USCA Model Rule:

- Aerosol Propellants
- Air Conditioning
- Refrigeration
- Foams

Anticipated Timeline

- April 2020 – Regulatory concepts presented to advisory committees.
- Fall 2020 – Present draft proposed rulemaking Annex A to advisory committees.
- Spring 2021 – Present draft proposed rulemaking to EQB for consideration.



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