AIM ACT REFRIGERANT TRANSITION

ESSENTIAL INFORMATION FOR GROWERS AND FACILITIES ON UPCOMING REFRIGERANT CHANGES

AIM ACT TRANSITION

What are HFCs?

Hydrofluorocarbons (HFCs) are potent greenhouse gases developed and manufactured as replacements for ozone-depleting substances. These fluorinated chemicals have no known natural sources. They can have impacts on the climate hundreds to thousands of times greater than the same amount of carbon dioxide (CO_2). The impact is measured by the global warming potential (GWP) of a substance; one kilogram of a greenhouse gas with a GWP of 700 has an impact on the climate that is 700 times stronger than one kilogram of CO_2, which has a GWP of 1. Unlike ozone-depleting substances, HFCs do not deplete the stratospheric ozone layer.

Where are HFCs used?

Climate-damaging HFCs are used in many of the same sectors where ozone-depleting substances have been used: refrigeration and air conditioning, fire suppression, solvents, foam blowing, aerosols, and semiconductor manufacturing. As of 2018, about 75% of total HFC use in the United States occurred in refrigeration and air conditioning equipment in homes, commercial buildings and industrial operations; approximately 8% in air conditioning in vehicles and refrigerated transport.

Why have HFCs been increasing in use?

HFCs have been increasing in the atmosphere due to increased demand globally for refrigeration and air conditioning, and because they are the primary substitutes for ozone-depleting substances, which are being phased out worldwide due to the global agreement the Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol). HFC emissions had previously been projected to increase substantially over the next several decades. However, in 2016, in Kigali, Rwanda, countries agreed to adopt an amendment to the Montreal Protocol, known as the Kigali Amendment, which provides for a global phasedown of the production and consumption of HFCs. The United States ratified the Kigali Amendment on October 31, 2022. According to the World Meteorological Organization's 2022 Scientific Assessment of Ozone Depletion, global adherence to the Kigali Amendment would substantially reduce future emissions, leading to a peaking of HFC emissions before 2040.

What are the impacts of HFCs on the environment?

HFCs are extremely powerful greenhouse gases that accelerate climate change, which threatens society with costly health and environmental impacts such as floods, wildfires, drought, and increasingly severe weather events. Find more information on climate change.

What is the AIM Act?

The American Innovation and Manufacturing Act of 2020 (AIM Act) was enacted on December 27, 2020. The AIM Act mandates the phasedown of HFCs by 85 percent from historic baseline levels by 2036 and authorizes EPA to address HFCs in three main ways: (1) phasing down HFC production and consumption through an allowance allocation program, (2) facilitating sector-based transitions to next-generation technologies, and (3) issuing certain regulations for purposes of maximizing reclamation and minimizing releases of HFCs from equipment.

(Source: www.epa.gov)

Under the AIM Act, a transition to A2L refrigerant systems is expected. However, A1 refrigeration systems will remain in service for many years, and manufacturers will continue producing A1 refrigerants to support these existing systems and help manage costs.

Still, production of A1 refrigerants will decline significantly over time as part of the mandated phasedown schedule.

AIM Act Production Phasedown Schedule (relative to baseline levels):

2022: Production reduced to 90% of baseline capacity
2024: Production reduced to 60% of baseline capacity
2029: Production reduced to 30% of baseline capacity

A2L Refrigerants

PROS

Improved Energy Efficiency
- Many A2L refrigerants have better thermodynamic properties than older A1 refrigerants, potentially lowering electricity costs—important for long-duration storage seasons.

Lower Global Warming Potential (GWP)
- A2Ls meet AIM Act goals and reduce long-term environmental impact, helping storage operations remain compliant and future-proof.

Longer-Term Refrigerant Availability
- As A1 refrigerants are phased down, A2Ls will remain increasingly available and economical, reducing risk of supply shortages for aging systems.

New Equipment Often Offers Better Control
- Next-generation A2L systems are typically paired with modern controls, allowing more precise temperature and humidity management—critical for preventing sprouting and decay in potatoes and onions.

Potential for Reduced Operating Costs Over System Life
- Although initial installation may be higher, long-term savings come from efficiency gains, lower refrigerant cost volatility, and fewer regulatory hurdles.

CONS

Mild Flammability
- A2Ls are not highly flammable but still require engineering controls, such as:
  - Proper ventilation
  - Leak detection
  - Electrical safety measures
- This may require facility upgrades, especially in older potato sheds or onion warehouses.

Higher Initial Equipment and Installation Cost
- Existing A1 systems typically cannot be retrofitted to A2L refrigerants.
- New A2L-compatible equipment, safety controls, and facility modifications can increase capital cost.

Potential Training Requirements
- Refrigeration technicians and facility staff need training for:
  - Safe handling
  - Emergency response
  - Monitoring systems
- Not all rural regions have fully trained A2L-capable service providers yet.

Code and Compliance Complexity
- Must meet ASHRAE 15, local building/fire codes, and electrical classifications.
- Some older storage buildings may require structural or ventilation changes to comply.

Limited Field Experience in Certain Agricultural Storage Applications
- While A2Ls are widely used in HVAC and supermarket refrigeration, their long-term performance in onion and potato storage is still emerging, meaning:
  - Fewer case studies
  - Less contractor familiarity
  - Potential uncertainty during the transition period

Refrigerant Charge Limit Considerations
- A2L systems often have maximum allowable refrigerant charges per circuit.
- Large storage buildings may require:
  - Modular systems
  - Multiple circuits
  - Distributed refrigeration designs
- This can add complexity and cost.

How Growers and Storage Managers Should Prepare

- **Inventory Current Refrigeration Systems**
  Assess all cooling and storage equipment to determine which units use A1 refrigerants and their remaining service life
- **Evaluate Refrigerant Needs and Future Availability**
  Estimate long-term refrigerant requirements for existing A1 systems, considering reduced production and potential price increases.
- **Plan for Transition to A2L-Compatible Systems**
  Begin evaluating future equipment purchases that use A2L low-GWP refrigerants, including safety requirements and facility readiness.
- **Budget for Rising Refrigerant Costs**
  Anticipate increasing costs of A1 refrigerants as phasedown progresses, especially after major reductions in 2024 and 2029.
- **Improve System Efficiency to Reduce Refrigerant Demand**
  Maintain equipment, check for leaks, and implement preventive maintenance to minimize refrigerant loss and extend system life.
- **Engage Qualified Refrigeration Contractors**
  Work with technicians trained in both A1 and A2L refrigerants to ensure compliance, safe handling, and proper maintenance.
- **Review Facility Safety Requirements for A2L Systems**
  Understand ventilation, monitoring, and code requirements (ASHRAE 15, UL standards) if planning to adopt A2L systems.
- **Develop a Long-Term Replacement Strategy**
  Align equipment replacement schedules with the AIM Act phasedown timeline to avoid shortages or emergency upgrades.
- **Stay Informed on Regulatory Updates**
  Monitor EPA guidance, state codes, and industry updates as rules for refrigerant use, service, and allowable equipment evolve.

TRANSITION

Understanding the AIM Act and its importance for sustainable practices in agriculture.

COMPLIANCE

Familiarizing your facility with new refrigerants

ACTION STEPS

Initial checklist for growers to prepare for adherence to the AIM Act requirements.

NORTH AMERICA POTATO STORAGE ORGANIZATION

NAPSO

www.napso.info

RESOURCES

FOR MORE INFORMATION VISIT WWW.NAPSO.INFO FOR MORE RESOURCES AND UPDATES.

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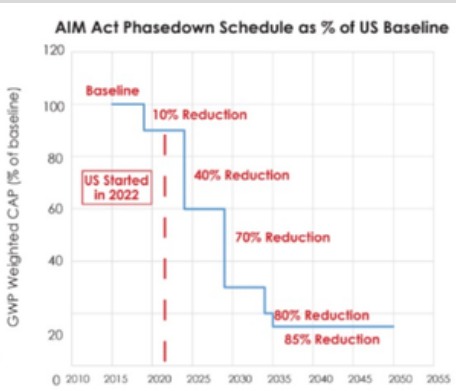
(Source: www.epa.gov)

Year	% of Cap
2019*	90%
2022**	90%
2024	60%
2029	30%
2036	15%

* Start date for developed countries
** US start date



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