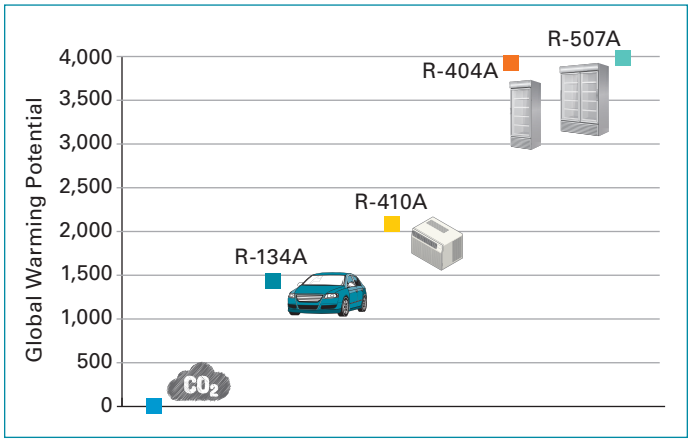
REDUCING HFC EMISSIONS
in the Federal Sector

What Are HFCs?

Hydrofluorocarbons (HFCs) are extremely potent greenhouse gases (GHGs) commonly used in refrigerators, air conditioners, and a variety of other applications within federal facilities (see Figure 1). The use and emissions of HFCs are growing rapidly as they are increasingly adopted as replacements for ozone-depleting substances (ODS) being phased out under the Clean Air Act and as economic growth spurs demand for new equipment, especially in the refrigeration/air-conditioning (AC) sector.

Figure 1: Key HFC Refrigerants Used in the United States and their Climate Impact Relative to Carbon Dioxide*



*Global Warming Potentials (GWPs) are based on the 100-year direct GWPs provided in the Intergovernmental Panel on Climate Change Fourth Assessment Report (2007).

Where Are HFCs Used in the Federal Sector?

HFCs are found in a wide variety of applications used by federal agencies, including:

- Building and room AC (refrigerant)
- Motor vehicle AC (refrigerant)
- Large commercial food refrigeration systems (refrigerant)
- Refrigerators and freezers (refrigerant and foam)
- Dehumidifiers (refrigerant)
- Vending machines (refrigerant)
- Water coolers (refrigerant)
- Building insulation (foam)
- Fire extinguishing systems (fire suppressant)
- Aerosols and cleaning solvents for electronics, aircraft, and optical equipment
- Aerosol/computer keyboard dusters

These equipment or product types can be found in federal offices, warehouses, hospitals, housing units, and other buildings, as well as in the vehicle fleet.

How Are HFCs Being Addressed in the United States?

The Environmental Protection Agency (EPA) uses its authority under the **Significant New Alternatives Policy (SNAP) Program** to identify and approve climate-friendly alternatives while prohibiting certain uses of the most harmful chemical alternatives. The United States established the SNAP Program in 1994 to evaluate and regulate substitutes for the ODS that are being phased out under Title VI of the Clean Air Act Amendments of 1990. The SNAP Program has reviewed over 400 substitutes—including HFCs—for the following industrial sectors: refrigeration/AC; foams; solvent cleaning; fire suppression and explosion protection; aerosols; sterilization; and adhesives, coatings, and inks.

Executive Order 13693 on *Planning for Sustainability in the Next Decade* includes various energy and sustainability requirements for agencies and departments within the Federal Government.[1] This Executive Order sets GHG emission reduction targets and requires annual federal GHG inventory reporting for domestic source emissions and the tracking of such emissions relative to reduction targets.

General Services Administration (GSA) invited technology manufacturers and industry stakeholders, including those that offer HFC refrigerant alternatives, to submit information on innovative and transformational building technologies that can be used in Federal buildings through its **Green Proving Ground (GPG)** program. The GPG program leverages GSA's real estate portfolio as a "proving ground" to evaluate emerging building technologies that promise to improve the environmental performance of GSA's portfolio while reducing operational costs. Technologies selected by the program are being matched with federally owned buildings and evaluated to inform public- and private-sector investment decisions and accelerate the commercialization and adoption of such technologies within the Federal Government.

Similarly, the Department of Energy (DOE) is providing new funding for research and development into next generation cooling technologies to reduce energy use and replace HFC refrigerants in U.S. buildings. Likewise, the Department of Defense (DoD) is implementing research and development projects to advance low-GWP refrigerants and fire suppressants for military applications and is demonstrating leadership by installing transcritical CO_2 refrigeration systems at several U.S. commissaries.

What Are the HFC Reporting Requirements for Federal Agencies?

Federal agencies must report annually an inventory of absolute GHG emissions for the preceding fiscal year to the White House Council on Environmental Quality (CEQ) Chair and the Office of Management and Budget Director. Agencies must conduct all GHG reporting and inventories in accordance with the CEQ Guidance and the latest Technical Support Document. Currently, the Federal Greenhouse Gas Accounting and Reporting Guidance[2] and Technical Support Document[3] provide ways to estimate emissions of HFCs from the refrigeration/AC sector.

In 2015, federal agencies reported HFC emissions of nearly 1.6 million metric tons of carbon dioxide equivalent, with six agencies accounting for 96% of reported emissions (DoD, DOE, Tennessee Valley Authority, National Aeronautics and Space Administration (NASA), United States Postal Service, and GSA).[4]

What Should Agencies Consider in Their HFC Reporting?

When developing annual GHG emission inventories, federal agencies should consider a broad list of equipment that commonly emit HFCs. This equipment includes:

- Motor vehicle AC systems
- Stationary AC systems (e.g., chillers, commercial unitary AC systems, and packaged terminal AC systems)
- Small commercial refrigeration systems found in cafeterias (e.g., plug-in display cases, glass door bottle coolers, and ice cream freezers and condensing units)
- Large commercial refrigeration systems found in commissaries (e.g., condensing units and rack systems)
- Domestic refrigerators

Other sources may also be considered as appropriate and feasible, such as aerosol products, solvents, fire suppression, and explosion inerting.

Support for estimating HFC emissions from federal agencies can be found here.

How Does the Federal Acquisition Regulation Address High-GWP HFCs?

In May 2016, the DoD, GSA, and NASA issued a final rule to amend the FAR to implement the Executive branch policy in the CAP to procure, when feasible, alternatives to high-GWP HFCs. This amendment came into effect June 15, 2016. In particular, the FAR refers to EPA's SNAP program to identify safe alternatives for HFCs, including chemicals with lower GWPs and non-chemical or "not-in-kind" alternatives (e.g., pump sprays instead of aerosol cans, aqueous cleaning instead of solvent cleaning). The final rule also encourages improved refrigerant management and the use of reclaimed (instead of virgin) HFCs as examples of sustainable procurement under the FAR.

To help agencies monitor progress, the amendment also requires contractors to keep track of and report on the amounts of HFCs added or removed during routine maintenance, repair, and disposal of all government equipment, appliances, and supplies. The reporting requirement applies only for equipment or appliances normally containing 50 pounds or more of HFCs or refrigerant blends containing HFCs.

In November 2016, DoD, GSA, and NASA published a final rule amending the FAR to have certain offerors to the federal government "indicate if and where they publicly disclose greenhouse gas emissions and greenhouse gas reduction goals or targets." This supports efforts to reduce greenhouse gas emissions at the Federal level by improving understanding of "both direct and indirect greenhouse gas emissions that result from Federal activities." The requirement for representation applies to offerors that are registered in the System for Award Management (SAM) database and received $7.5 million or more in Federal contract awards in the prior Federal fiscal year.

Case Study: Lackland AFB Commissary

The Defense Commissary Agency (DeCA) retrofitted the refrigeration system at its 117,000 square foot commissary in San Antonio, Texas with an ammonia (NH_3)/carbon dioxide (CO_2) cascade system. This system was selected to control future capital and operating costs and to help meet its energy and sustainability goals. Compared to the previous R-404A system, the new system is expected to reduce refrigerant and maintenance costs by 90% and 40%, respectively. Key lessons learned include the need to actively engage the community from the start to alleviate any concerns about adopting an ammonia system and the need to prepare maintenance teams and maintain spare parts on hand. DeCA is adopting NH_3/CO_2 cascade systems and CO_2 transcritical systems at other commissaries.

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[1] Exec. Order No. 13693, 3 C.F.R. 15871 (2015). Available online at: https://www.gpo.gov/fdsys/pkg/FR-2015-03-25/pdf/2015-07016.pdf.

[2] Executive Office of the President. 2012. "Federal Greenhouse Gas Accounting and Reporting Guidance". Available at: http://www.whitehouse.gov/sites/default/files/microsites/ceq/revised_federal_greenhouse_gas_accounting_and_reporting_guidance_060412.pdf.

[3] Executive Office of the President. 2012. "Federal Greenhouse Gas Accounting and Reporting Guidance: Technical Reporting Guidance". Available at: http://www.whitehouse.gov/sites/default/files/federal_greenhouse_gas_accounting_and_reporting_guidance_technical_support_document.pdf.

[4] U.S. Department of Energy (DOE). 2016. FY 2015 Comprehensive Annual Energy Data and Sustainability Performance. Available online at: http://ctsedwweb.ee.doe.gov/Annual/Report/ComprehensiveGreenhouseGasGHGInventoriesByAgencyAndFiscalYear.aspx.

For more information and references, please see www.epa.gov/ozone/snap/.

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