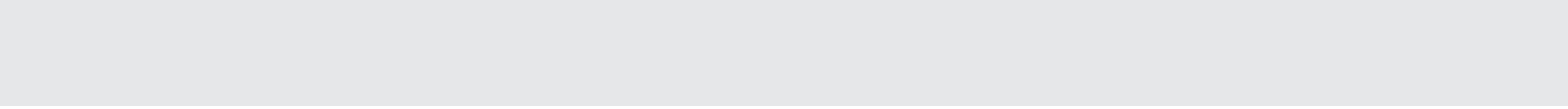


A large, stylized number "15" in a gold color. The "1" is a simple vertical bar, and the "5" has a curved top and a tail that ends in an arrow pointing downwards and to the right.

15
YEAR
ANNIVERSARY

of the Responsible Appliance
Disposal (RAD) Program



What is RAD?

The Responsible Appliance Disposal (RAD) Program is a partnership program that was launched in October 2006 to reduce emissions of ozone-depleting substances (ODS) and their substitutes (e.g., hydrofluorocarbons (HFCs)) to protect the ozone layer, reduce waste, cut greenhouse gas (GHG) emissions, and provide additional environmental benefits to communities. The RAD Program recognizes Partners that commit to collecting and disposing of old refrigerated appliances using the best environmental practices available and going beyond what is required by federal law.

Federal regulations require proper handling of the refrigerant and hazardous substances (e.g., used oil, mercury switches, and polychlorinated biphenyls (PCBs)) contained in refrigerated appliances, including refrigerators, freezers, air conditioning (AC) units, and dehumidifiers, at end of life. However, no regulations currently address the handling of insulating foam when those units are retired. Insulating foam found in refrigerated appliances can contain ODS and potent GHGs. Typically, this insulating foam is shredded and sent to a landfill, releasing the harmful gases into the atmosphere and taking up valuable landfill space. RAD Partners commit to handling the insulating foam using best environmental practices—the RAD way. They do this by working with a recycler that removes the foam using a manual or automated process and sends it to an approved destruction facility that captures the emissions when the foam is destroyed.

RAD Partners also help save energy by removing old appliances from the grid. Up to 25 percent of disposed refrigerators and freezers are typically resold onto the secondary market, and the continued use of these older, less efficient models demands more energy from the nation's grid. By permanently retiring these inefficient appliances, RAD Partners help to reduce energy consumption.

Partners in EPA's RAD Program implement best practices for the disposal of these units, including:



Recovering
appliance foam



Complying with laws
on the recovery of
refrigerant, used oil,
mercury, and PCBs



Promoting recycling of all
durable goods



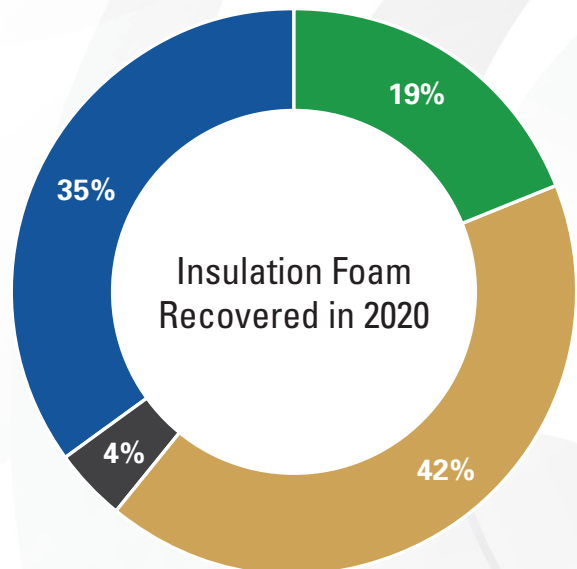
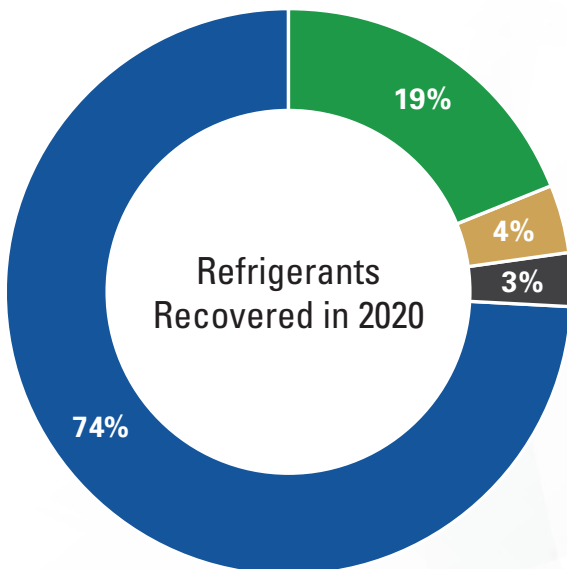
Promoting the permanent
retirement of old,
inefficient appliances to
save energy

As a result of their commitments, RAD Partners prevent emissions that are harmful to the environment, prevent the release of hazardous substances, save landfill space through recycling, and reduce energy consumption.

15 Years of RAD Achievements

In 2006, the RAD Program was launched with nine utilities representing nine states in the western United States that committed to reducing their emissions of ODS and GHGs as the inaugural Partners of the RAD Program. These nine Partners collected and responsibly disposed of nearly 200,000 units in the first full year of program implementation. Since then, the RAD Program has continued to grow, now with more than 46 Partners and Affiliates nationwide. **By 2020, the quantity of refrigerated appliances collected and processed by RAD Partners had grown exponentially, reaching a cumulative total of over 9 million refrigerant-containing appliances. This encompasses:**

	Refrigerators	AC Units	Dehumidifiers	Stand-Alone Freezers
2020	222,010	8,839	5,867	25,957
Cumulative	8,168,372	106,525	42,194	877,460



● CFC-12 ● HCFC-22 ● R-410A ● HFC-134a

● CFC-11 ● HCFC-141b ● HFC-245Fa ● HFC-134a

15 Years of RAD Achievements

Environmental Benefits

RAD Partners go above and beyond federal regulations, taking dedicated steps to protect the ozone layer, reduce GHG emissions, and protect communities by diverting the disposal of hazardous materials from landfills. Take a look at the graphic below to learn more about how proper appliance disposal helps protect the environment and communities.

The proper recovery of refrigerant and insulation foam helps to **protect Earth's climate and ozone layer**. Older refrigerators contain refrigerants and foam-blowing agents that are both potent ODS and GHGs.

Recovering and disposing of the foam from **1,000 refrigerators** is equivalent to avoiding the GHG emissions from **115 cars driven in one year**.

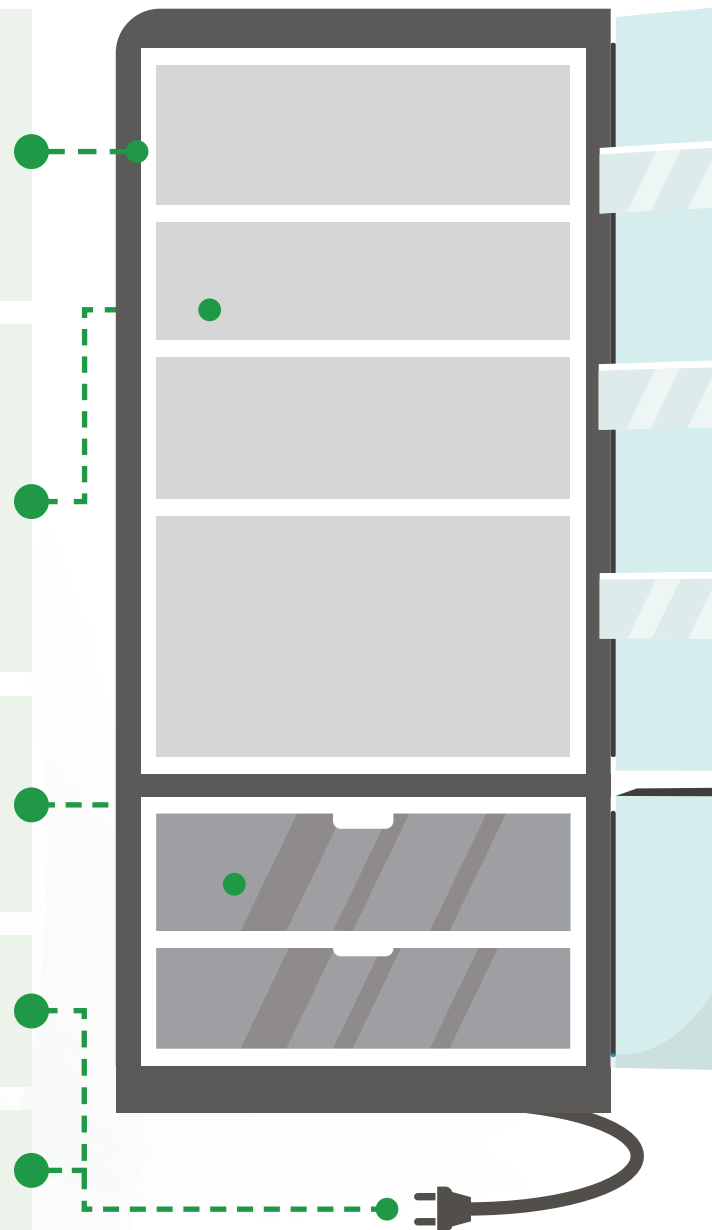
Properly recovering and disposing of **used oil, PCBs, and mercury-containing components** in old appliances helps avoid risks to human health, including:

- ▶ Carcinogenic and other effects from exposure to **PCBs**
- ▶ Impaired neurological development and other problems with the nervous system from exposure to **mercury**
- ▶ Damage to the liver, brain, and immune and reproductive systems from exposure to **used oil**

Nearly all the durable materials that make up a refrigerator can be **recycled**. Recovering and recycling these materials **protects the environment and the health of communities** by keeping materials out of landfills and ensuring the proper handling and disposal of hazardous waste.

The energy savings associated with the permanent retirement of **1,000 old refrigerators** is equivalent to avoiding the CO₂ emissions from charging more than **63 million smartphones**.

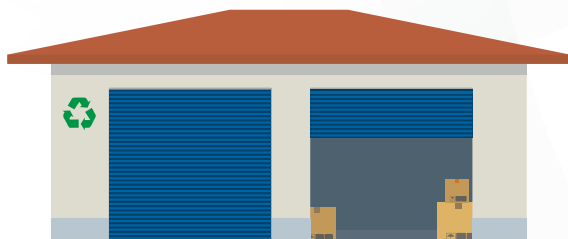
The removal of an old, inefficient refrigerator could save you up to **\$50 a year** in energy costs.



15 Years of RAD Achievements

2020 and Cumulative RAD Partner Achievements

	2020 Benefits	Cumulative Benefits
Properly Handled Hazardous Waste	Properly disposed of:	
	18,000 Gallons of used oil	826,000 Gallons of used oil
	5,000 Mercury-containing components	213,000 Mercury-containing components
Reduced Greenhouse Gas Emissions	Achieved a reduction of:	
	1.1 Million Metric tons carbon dioxide equivalent (MTCO ₂ eq)	39.3 Million MTCO ₂ eq
Ozone Layer Protection	Avoided the release of:	
	32 Ozone Depletion Potential (ODP)-weighted tons	1,974 ODP-weighted tons
Durable Material Recycling	Recycled rather than landfilled:	
	43 Million pounds of durable material	1,508 Million pounds of durable material
Energy Savings	Reduced energy use by:	
	1.0 Billion kWh	30.5 Billion kWh



15 Years of RAD Achievements



Ozone Layer Protection

Older refrigerated appliances may still contain ODS, which are harmful to the climate and the ozone layer. Since program inception, RAD Partners have **avoided the release of nearly 2,000 ODP-weighted tons.**



Energy Savings

RAD Partners have reduced energy use by **30.5 billion kWh**, and those energy savings equate to nearly **\$4 billion** in consumer savings.



Reduced GHG Emissions

Since 2007, RAD Partners have **avoided nearly 40 million MTCO₂eq***, which is equivalent to:

- ▶ The CO₂ emissions from nearly **5 trillion smartphones** charged or nearly **5 million homes'** energy use for one year.
- ▶ The GHG emissions from more than **8 million cars** driven for one year.



Landfill Diversion and Handling of Hazardous Waste

Refrigerated appliances may contain hazardous materials like used oil, toxic chemicals, and heavy metals, in addition to their durable materials, which are harmful to the environment and potentially dangerous to human health. RAD Partners have disposed of:

- ▶ More than **1.5 billion pounds of durable materials**, including ferrous and non-ferrous metals, glass, and plastic.
- ▶ More than **800,000 gallons of used oil**, **300,000 PCB-containing capacitors**, and **200,000 mercury-containing components.**

* Includes emissions avoided by recovery of ODS and HFC refrigerant and foam-blowing agent, emissions avoided by increased recycling of durable goods, and reduced energy consumption through early appliance retirement.

How Does RAD Work?

The RAD Program invites utilities, retailers, manufacturers, state and local governments, and other qualifying organizations to become Partners. The RAD Program also invites other entities, such as states, relevant industry groups or networks, and other organizations that may promote proper appliance disposal, to become RAD Affiliates. RAD Affiliates promote the program to potential partners and increase environmental benefits for their states and communities.

RAD Partners work with recyclers to ensure the proper recovery of foam from end-of-life refrigerated appliances. While recyclers may use differing methods for the processing and disposal of refrigerated appliances to RAD standards, they all lead to significant environmental benefits as compared to business-as-usual disposal practices. The graphic below explains how RAD Partners work to protect the environment and responsibly dispose of refrigerated appliances.

The RAD Process in Action

1

RAD Partners collect used refrigerated appliances, including refrigerators, freezers, window air conditioners, and dehumidifiers, from consumers



2

RAD Partners work with recyclers to ensure the used appliances are disposed of using best environmental practices

- ▶ Complying with laws on the recovery of refrigerant, used oil, and PCBs
- ▶ Retiring old, inefficient appliances to save energy
- ▶ Recovering appliance insulating foam
- ▶ Recycling durable goods



3

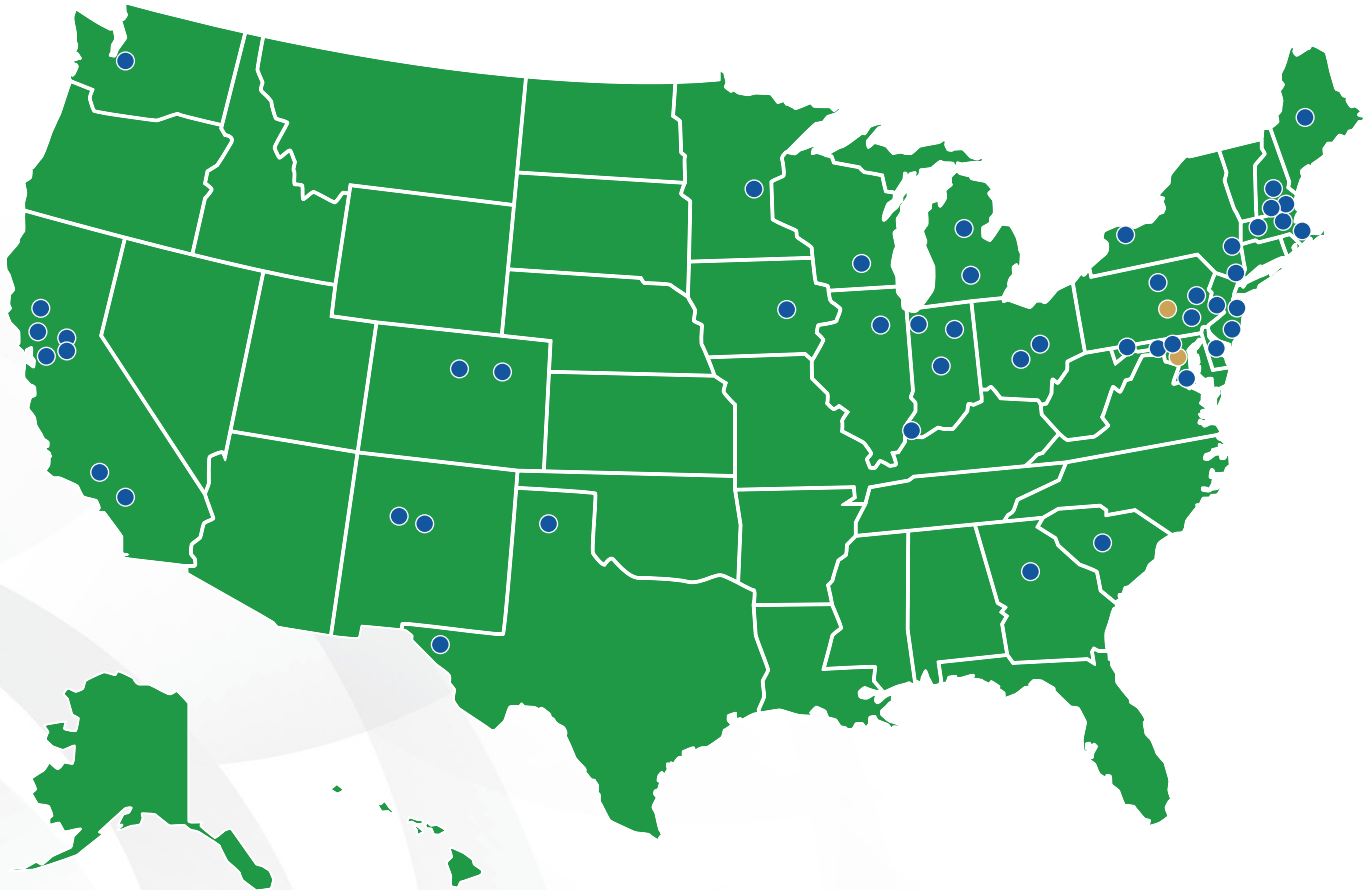
As a result of their commitments, RAD Partners:

- ▶ Reduce energy consumption
- ▶ Avoid the release of ODS and GHGs
- ▶ Avoid the release of used oil, mercury, and PCBs that can cause adverse human health effects
- ▶ Save landfill space and energy by recycling—rather than landfilling—the metals, plastics, and glass contained in appliances



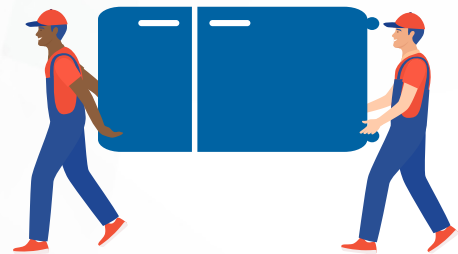
How Does RAD Work?

RAD Partners and Affiliates Are Located Across the United States



Key

- Partner
- Affiliate



RAD Partners and Affiliates

Partners



Affiliates



Benefits to RAD Partnership

Inaugural RAD Leadership Awards Program

In 2020, the RAD Program launched its Leadership Awards Program to recognize high-achieving RAD Partners for their accomplishments in reducing emissions of ODS and GHGs through appliance insulation foam recovery. The RAD Leadership Awards Program contains three categories of recognition—RAD Champion, RAD Program Growth, and RAD Ambassador—and recipients are determined based on an evaluation of both quantitative and qualitative metrics.

The **RAD Champion** award recognizes Partners with the highest rates of appliance foam recovery in units processed. These Partners often recover appliance foam from 100% of the units they process. The **RAD Program Growth** award celebrates the top three RAD Partners with the greatest annual increase in units processed. The **RAD Ambassador** award recognizes one Partner that demonstrates exemplary Partner practices, including promoting the RAD Program and sustainable appliance disposal; significant collaboration and participation with the RAD Program; and/or launching innovative programs or campaigns. Receiving the RAD Ambassador award signifies dedication and diligence to the RAD Program and environmental best practices.



Joining the RAD Program is a win-win for Partners' organizations and the environment. RAD Partners are publicly recognized by EPA and provided with an array of tools and resources related to responsible appliance disposal, including case studies, guidance documents and fact sheets, and outreach materials communicating the benefits of RAD. The RAD Program also supports Partners in achieving and tracking their environmental benefits with its reporting process, annual reports, and cumulative Partner statistics, which help Partners document their achievements and benchmark progress made over time. The RAD Program provides its Partners, Recyclers, and Affiliates with access to a national network of like-minded organizations and the use of the EPA RAD logo on their respective marketing materials and communications. Use of the RAD logo distinguishes RAD Partners' organizations as industry leaders and demonstrates to others how they are protecting the environment and supporting communities.

Recently, the RAD Program has been engaging with its Partners to identify opportunities to better support underserved communities and Tribes, as well as to broaden awareness of the benefits of responsible appliance disposal.



Benefits to RAD Partnership

RAD Leadership Award Recipients

Recognition Category	Inaugural 2020 Award Recipients	2021 Award Recipients
RAD Champion		
Partners with the greatest percentage of units processed with foam recovery	<ul style="list-style-type: none"> ▶ AEP Ohio ▶ Commonwealth Edison ▶ Consumers Energy ▶ FirstEnergy ▶ Focus on Energy ▶ General Electric Appliances ▶ Los Angeles Department of Water and Power ▶ National Grid ▶ PPL Electric Utilities ▶ Xcel 	<ul style="list-style-type: none"> ▶ General Electric Appliances* ▶ Consumers Energy* ▶ Los Angeles Department of Water and Power* ▶ Northern Indiana Public Service Company (NIPSCO) ▶ Butler County Recycling and Solid Waste District* ▶ Palo Alto Utilities ▶ Delmarva Power ▶ Silicon Valley Power ▶ UGI Utilities ▶ Modesto Irrigation District
RAD Program Growth		
Partners with the greatest relative increase in the number of units processed compared to the previous reporting year	<ul style="list-style-type: none"> ▶ Butler County Recycling and Solid Waste District ▶ National Grid ▶ New Jersey Board of Public Utilities 	<ul style="list-style-type: none"> ▶ New York State Electric & Gas ▶ Unitil ▶ Liberty Utilities
RAD Ambassador		
Partner that demonstrates exemplary Partner practices, including: <ul style="list-style-type: none"> ▶ Promoting the RAD Program and safe appliance disposal ▶ Collaboratively engaging with existing Partners or recruiting new Partners to join RAD ▶ Significant participation in RAD Partner events (including Partner meetings, webinars, etc.) ▶ Launching innovative programs or campaigns that raise awareness for the importance of safe appliance disposal 	<ul style="list-style-type: none"> ▶ Consumers Energy 	<ul style="list-style-type: none"> ▶ Sacramento Municipal Utility District (SMUD)

* Partner was also a RAD Leadership Award recipient in 2020.

Partner Spotlights



“NIPSCO values being a RAD Partner as it gives us the capability to receive useful information and data on the benefits of recycling appliances. The incentives program for recycling appliances has created great value and provided useful intel on the energy and environmental savings.”



PPL Electric Utilities

“PPL Electric Utilities became a RAD Partner in 2017. Since that time, we have processed well over 39,000 units—making it one of our most popular energy efficiency customer programs. One of the many benefits the RAD Program provides Partners is a variety of tools and resources related to responsible appliance disposal. By using the EPA RAD logo on our marketing materials and website, it helps to distinguish our organization as an industry leader and communicates our environmental commitment to our customers. We are proud to be a RAD Partner and Champion and to have a positive impact on the environment.”



“Since joining RAD, I believe my company has been most impacted by RAD’s awesome focus on increasing refrigerated appliance recycling in disinvested communities. The newly created literature that simplifies the program parameters and benefits has allowed my company to better engage with communities most in need. I am also excited about being able to work alongside RAD as we work to collaborate with local government around RAD’s best practices!”

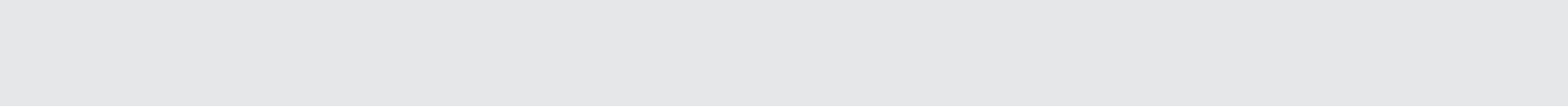


Looking Forward

On December 27, 2020, Congress enacted the American Innovation and Manufacturing (AIM) Act, which directs EPA to address climate-damaging HFCs in three ways, including phasing down their production and consumption by 85% by 2036, establishing requirements for the management of HFCs and their substitutes in equipment, and facilitating the transition to next-generation technologies through sector-based restrictions on the use of HFCs. On September 23, 2021, EPA issued a final rule establishing the landmark HFC phasedown program, which helps advance the Agency's efforts to tackle the climate crisis. EPA Administrator Michael S. Regan stated, "Cutting these climate 'super pollutants' protects our environment, strengthens our economy, and demonstrates that America is back when it comes to leading the world in addressing climate change and curbing global warming in the years ahead."

In coming years, the RAD Program expects the number of refrigerant-containing appliances collected and processed to continue to increase. RAD Partners play an important role in reducing emissions of HFCs, as HFCs account for a growing proportion (over 40% in 2020) of the refrigerants and insulating foam blowing agents recovered from refrigerated appliances. This proportion will increase over the coming years as more HFC-containing appliances are collected. Since the program's inception 15 years ago, RAD Partners have collected nearly 2.4 million pounds of HFCs from refrigerated appliances. Continuing to raise awareness about recycling and recycle appliances the RAD way will be important to reducing emissions of HFCs from refrigerated appliances and will help protect our environment from these climate-damaging chemicals.

EPA looks forward to building on these last 15 years with even more Partners, innovative approaches, and enhanced outreach to ensure further achievements in ozone layer and climate protection.





For more information on the RAD Program:

www.epa.gov/rad



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