



**10TH Anniversary OF THE
Responsible Appliance Disposal Program**

Who is RAD?

2006

2012

RAD PARTNERS AND AFFILIATES



west virginia department of environmental protection



A Sempra Energy utility



2006



2017

Why Join RAD?

- RAD partners are **publically recognized** by EPA
- EPA provides partners with a variety of **tools and resources** related to responsible appliance disposal
- RAD helps partners **achieve and track** environmental benefits
- RAD provides **access to a national network** of like-minded organizations



At the RAD program's launch in October 2006, former EPA Region 9 Administrator, Wayne Nastri (left), honored firms that help collect and recycle appliances as part of the RAD program including (from left to right): Garth Williams, Snohomish Public Utility District; Gene Rodrigues, Southern California Edison; Mark Gaines, San Diego Gas and Electric; and Jim Parks, Sacramento Municipal Utility District.

Sears. We see our participation in EPA's RAD program since 2008 as a demonstration of our strong commitment to the environment and our customers. Sears Home Services has long been a champion of energy efficient appliances, and we're proud to be a RAD partner and promote both responsible appliance use and disposal. We aspire to have a positive impact by taking action to mitigate adverse environmental results while encouraging our industry to do the same.

SMECO. The annual RAD partner meetings have been a great venue for connecting with other RAD partners and learning about the innovations they've implemented in their own recycling programs. These connections have helped us identify new ways to improve our appliance recycling program since joining the RAD program in 2012.

Commonwealth Edison. Our long-standing partnership with RAD enables us to assure our customers that the disposal of each refrigerated appliance is done using the best environmental practices available to protect the climate and ozone layer.

West Virginia Department of Environmental Protection. West Virginia was the first state affiliate to join the RAD program in 2010. We are proud to promote the reduction of ozone depleting substances and greenhouse gases from old appliances through the West Virginia Energy Efficiency Appliance Rebate Program. The publicity we have received from the RAD program has helped spread awareness about appliance recycling efforts in our state.

City of Burbank Water and Power. Since partnering with RAD in 2008, we've been able to save energy through encouraging the responsible disposal of refrigerated appliances. Our marketing efforts—including our website, social media, utility bill inserts, and newsletters—have also increased our customers' awareness of the environmental benefits of responsible appliance disposal.

The RAD Program over Time

IN 2006,

- 8 million refrigerators/freezers,
- 4 million air conditioning units, and
- 1 million dehumidifiers

were disposed of in the United States, representing a significant source of ODS and GHG emissions. Nine utilities representing nine states in the western United States committed to reducing their emissions of ODS and GHGs in the first full year of the partnership.

Today,

the quantity of refrigerated appliances disposed of annually has nearly doubled to:

- 12 million refrigerators/freezers,
- 9 million air conditioning units, and
- 2 million dehumidifiers.



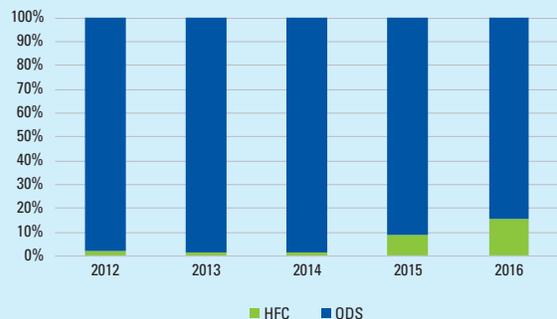
Utilities, retailers, manufacturers, and states have responded to this growth by joining RAD and increasing the responsible disposal of appliances. RAD partners now cover the entire United States, collecting and processing an estimated four percent of the total quantity of refrigerated appliances disposed of in a year.

REFRIGERANTS



As illustrated in these figures, RAD partners have historically processed appliances that primarily contain ODS refrigerants and foam-blowing agents. In recent years, however, RAD partners have begun to collect and process an increasing number of appliances containing ODS substitutes, including hydrofluorocarbons (HFCs).¹

FOAM-BLOWING AGENTS



¹ Since 2012, the number of appliances containing HFC refrigerant has almost doubled, while those containing HFC foam has increased by seven-fold. The number of HFC-containing appliances entering the disposal stream will continue to increase in the coming years, as the stock of older chlorofluorocarbon (CFC) and hydrochlorofluorocarbon (HCFC) units decreases and more HFC units are retired.

Program Results

From 2007 to 2016, RAD partners collected and processed a total of over seven million refrigerant-containing appliances, representing an estimated four percent of the total number disposed in the United States. This includes:



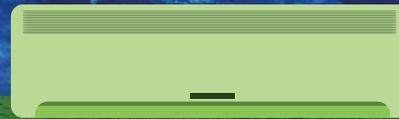
6,382,700
Refrigerators



656,100
Stand-Alone Freezers

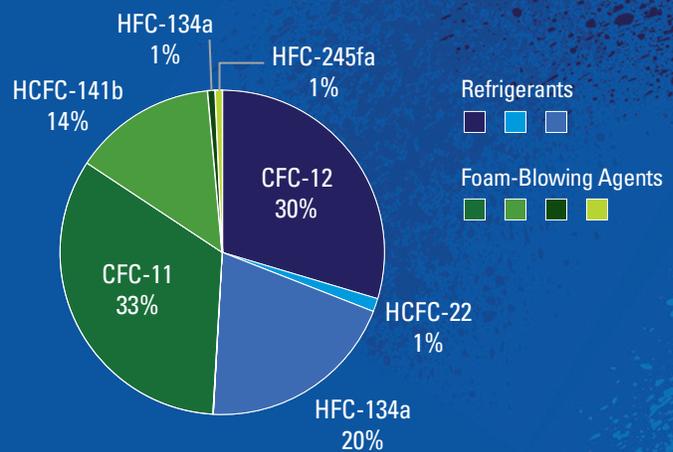


11,900
Dehumidifiers



51,800
Air Conditioning Units

By disposing of these units using the best environmental practices, RAD partners have helped reduce emissions of ODS and GHGs by safely recovering significant amounts of refrigerants and foam-blowing agents. In coming years, RAD expects the number of refrigerant-containing appliances collected and processed to continue to increase, furthering these emissions reductions.

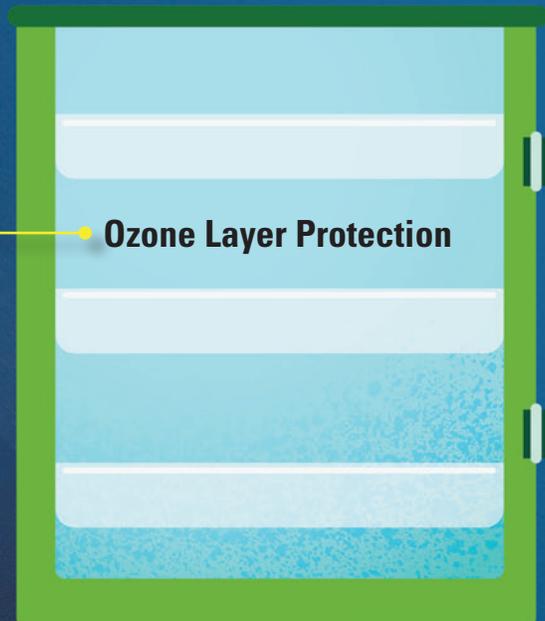


A Decade of Protecting the Planet

RAD partners recover appliance foam.

While federal law does not require the recovery and proper treatment of the insulating foam that lines the walls of refrigerators and freezers, this foam contains substances that may, depending on the vintage of the unit, deplete the ozone layer.

Ozone depletion causes increased amounts of UV radiation to reach the Earth's surface. Overexposure to UV radiation can cause a range of health effects, including skin cancer (melanoma and non-melanoma), premature aging of the skin and other skin problems, cataracts and other eye damage, and suppression of the immune system.



Ozone Layer Protection

RAD partners promote the permanent retirement of old, inefficient appliances to save energy.

RAD's utility partners are committed to ensuring that old, inefficient appliances being disposed of by one household do not get reused by other households. This reduces indirect GHG emissions associated with the generation of electricity and saves consumers money.



Energy Savings and Reduced GHG Emissions

Durable Material Recycling

Handling of Hazardous Waste

RAD partners comply with laws on the recovery of refrigerant, used oil, mercury, and PCBs.

RAD partners ensure the proper, lawful handling of refrigerants and hazardous waste, including used oil, PCB-containing capacitors, and mercury-containing components. Improperly handled used oil can pollute drinking water; PCBs may cause cancer and liver damage as well as have negative impacts on the neurological development of children and the human reproductive, immune, and endocrine systems; and mercury exposure may cause tremors, headaches, respiratory failure, reproductive and developmental abnormalities, and potentially, cancers.

RAD partners promote recycling of all durable materials.

Units that are not fit for resale are typically sent to scrap metal companies, where valuable metals are salvaged for sale on the recycling market. However, plastics, glass, and other durable materials are typically shredded and landfilled. RAD partners ensure that all materials are recycled properly, saving landfill space and energy.

Ozone Layer Protection

Older refrigerated appliances that were manufactured with ODS refrigerants and foam-blowing agents are being retired today and safely disposed of by RAD partners. Since program inception, the RAD program has avoided the release of:

1,721 Ozone Depletion Potential (ODP)-Weighted Tons of Refrigerants and Foam-Blowing Agents.

OZONE LEVELS

Image of the monthly-averaged total ozone over the Antarctic pole in September 1987 as the Montreal Protocol was being signed (left) and in September 2017 (right). The blue and purple colors represent areas with the least ozone, and the yellow and red colors represent areas with the most ozone.

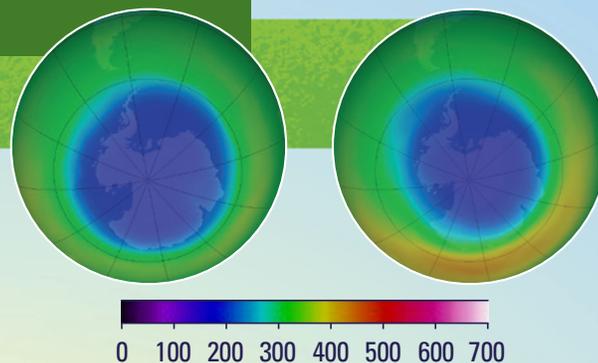


Photo Credit: National Aeronautics and Space Administration (NASA) Ozone Hole Watch, September 2017.

Reduced GHG Emissions

31.6 million Metric Tons of Carbon Dioxide Equivalent (MTCO₂eq).

Since 2007, RAD partners achieved a reduction of 31.6 million MTCO₂eq, which is equal to the carbon emissions associated with...

- Generating enough electricity to power nearly **4.74 million** homes for one year...
- Over **37.2 million** acres of forests in one year—approximately the size of Florida...
- Or consuming more than **3.6 billion** gallons of gas.

Durable Material Recycling

Over the last 10 years, RAD partners have recycled rather than landfilled the following durable materials:

- **909 million** lbs of ferrous metals (e.g., steel)
- **79 million** lbs of non-ferrous metals (e.g., copper)
- **159 million** lbs of plastic
- **25 million** lbs of glass

Proper Handling of Hazardous Waste

In addition to durable materials, refrigerated appliances contain used oil as well as toxic chemicals and heavy metals. Since 2007, RAD partners have properly disposed of:

- **671,000** gallons of used oil
- **280,000** PCB-containing capacitors
- **160,000** mercury-containing components

Energy Savings

In total, RAD utility partners reduced energy use by **23.8 billion kWh**. These energy savings translate to consumer savings of **\$2.9 billion**.



For more information on the RAD program:
www.epa.gov/rad



U.S. Environmental Protection Agency
Stratospheric Protection Division (6205T)

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www.epa.gov/rad

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