



Responsible Appliance
Disposal Program

RAD



**Webinar for National Association of State
Energy Officials
March 2010**

Scope of Briefing

- Why Is EPA Emphasizing Responsible Appliance Disposal through RAD?
 - Environmental Benefits!
- Why Reach out to NASEO?
 - Similar Goals for RAD, State Energy Professionals
 - Climate Benefits a Key Goal, and For Older Appliances, a Time-Limited One

Scope of Problem

- **Currently in the U.S., there are:**
 - 132 million household refrigerators
 - 54 million stand-alone freezers
- **15% - 20% of households have 2nd refrigerator/ freezer in basement or garage (~23 million units)**
 - Typically, these are older units that are less energy efficient
- **~ 5% of units are disposed each year (~8 million refrigerators/freezers)**
 - Few are disposed in an environmentally-sound manner
- **A household refrigerator made 20 years ago consumes twice the energy of a unit that has earned the government's ENERGY STAR® label**

What Happens To Old Appliances?

Old appliances collected by municipalities and retailers may be either...

– Disposed

- Refrigerant may or may not be recovered and reclaimed/destroyed, as required by law
- Foam is landfilled
- Fate of used oil, PCBs, mercury uncertain
- Metal components scrapped

OR

– Resold

- Old units continue to strain energy demand
- Ultimate disposal uncertain



Proper Appliance Disposal Gets More for the Environment than Replacement Alone

- **Taking Old Appliances off the Grid:**
 - Reduces energy demand
 - Replacing older appliances with new ENERGY STAR® units can save 700 kWh/year
 - Saves consumers money
 - Removing an energy-inefficient unit can save over \$140/year
 - Replacing older appliances with new ENERGY STAR® units can save over \$70/year
 - Improves air quality
 - Reduced electricity generation reduces emissions of some criteria air pollutants
- **Proper Disposal:**
 - Prevents Emissions of Ozone Depleting Substances (ODS), Greenhouse Gases (GHGs) & Other Harmful Substances
 - Saves landfill space
 - Saves energy needed to manufacture virgin materials by recycling metals, glass, plastics

A Refrigerator Manufactured Before 1995 Typically Has...

Metal, Plastic, and Glass Casing/Refrigerator Shell

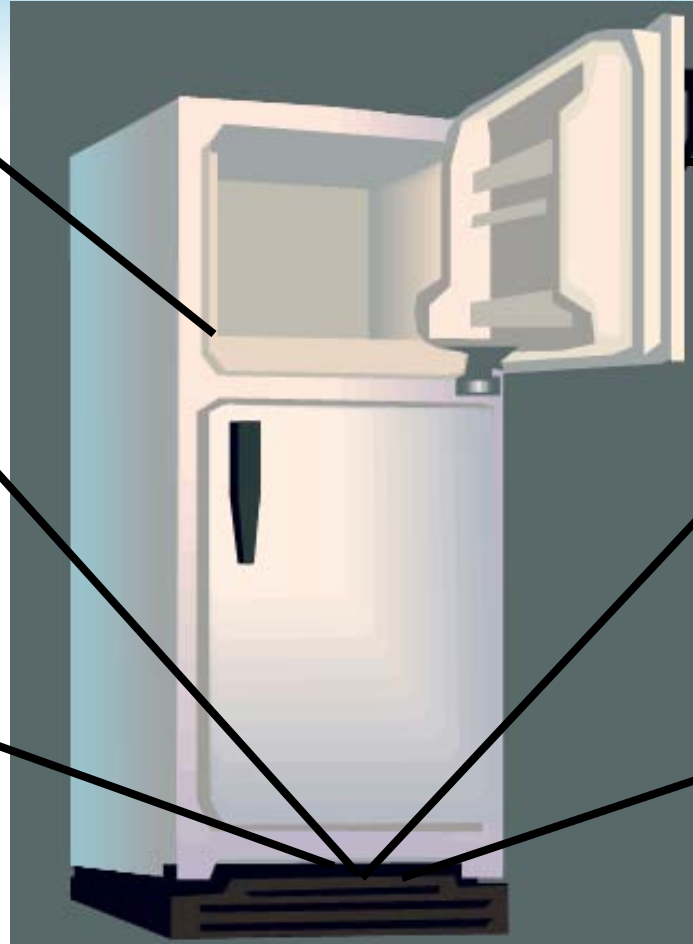
140 lbs metal
20 lbs plastic
3 lbs glass

Used Oil

(May be contaminated)
0.5 lb

PCBs

(Capacitor)
Small quantities



CFC-11
Foam Insulation
1.0 lb

CFC-12
Refrigerant
0.5 lb

Mercury Switch
0.003 lb

Proper recycling/destruction of these substances is key

EPA Disposal Regulations

- **Federal Regulations**

- Section 608(b) of the CAA requires that ODS contained in bulk in appliances be removed prior to recycling or disposal (40 CFR Part 82 Subpart F)
- Section 608 also requires the recovery of all **refrigerants** for destruction or reclamation (40 CFR Part 82 Subpart F)
- Subtitle C of the Resource Conservation & Recovery Act (RCRA) and Subpart D of the Toxic Substances Control Act (TSCA) require proper management and storage of universal waste (e.g., **mercury**), **used oil**, and **PCBs** (40 CFR Parts 273, 279, 761)

Environmental Impacts of ODS & ODS Substitutes

Foam Blowing Agent

CFC-11



HCFC-141b

Refrigerant

CFC-12



HFC-134a

Transition in mid-1990s

Chemical	Atm Lifetime	Ozone Depletion Potential	Global Warming Potential
CFC-11	50	1.0	4,750
CFC-12	102	1.0	10,890
HCFC-141b	9.4	0.1	713
HFC-134a	14.6	0	1,300

Atmospheric lifetime based on IPCC (2001); ODPs based on 40 CFR; GWPs based on WMO (2006), IPCC (1995)

Benefits of Responsible Appliance Disposal

For every 1,000 refrigerators retired & disposed of under RAD, greenhouse gas emissions reduced by 8,200 MMTCO₂e. This is equivalent to:

11.4 million kWh of electricity saved



Annual electricity use of over 1,100 homes



RAD Program Objectives

Work with utilities, retailers, manufacturers, state energy offices & municipalities to:

- **Prevent ODS emissions**
 - Through recovery & proper disposal of ODS refrigerants & foam blowing agents from disposed appliances
- **Reduce GHG emissions by reducing**
 - energy demand associated with older appliances
 - emissions of refrigerants, foam blowing agents with high global warming potentials
- **Support and recognize partners**
 - Encourage recovery of ODS refrigerant & foam by sharing information about best available technologies & practices
 - Recognize leaders going above and beyond legal requirements

State & Local Governments Ideal RAD Partners

- **RAD can be important component of city & state climate goals; NASEO members can encourage State and Local Government participation**
- **State partners promote RAD to utilities, retailers, and local governments with in the state**
 - Information dissemination and strategic outreach
- **Some Local Governments need more effective appliance collection programs**
 - recognizing residents' need for appropriate disposal options to prevent abandoned appliances & illegal refrigerant release

Utilities Also RAD Partners

- **Encourage retirement of old, energy inefficient refrigerators, freezers, and/or AC units**
 - By offering monetary incentive to pick up old units
 - By offering rebates on purchase of new ENERGY STAR® units when old units are turned in
- **Collect & responsibly dispose of old units using third party contractor**
- **NASEO members can encourage utility participation**

Appliance recycling programs a cost-effective way for utilities to reduce energy demand: taking old, inefficient units off the grid costs less than generating more electricity.

→ Benefit/Cost ratio = 3:1

RAD Partners



Partners from AZ, CA, CO, ID, IL, NM, NV, OR, TX, UT, WA, WY



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www.epa.gov/ozone/partnerships/rad/index.html