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U.S. Environmental Protection Agency
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Scope of Briefing

- Why Is EPA Emphasizing Responsible Appliance Disposal through RAD?
Environmental Benefits!
- Why Reach out to Energy Star Partners?
 - Similar Goals: Get New Energy Star Appliance into homes and Old Units Disposed of through RAD
 - Climate Benefits a Key Goal, and For Older Appliances, a Time-Limited One

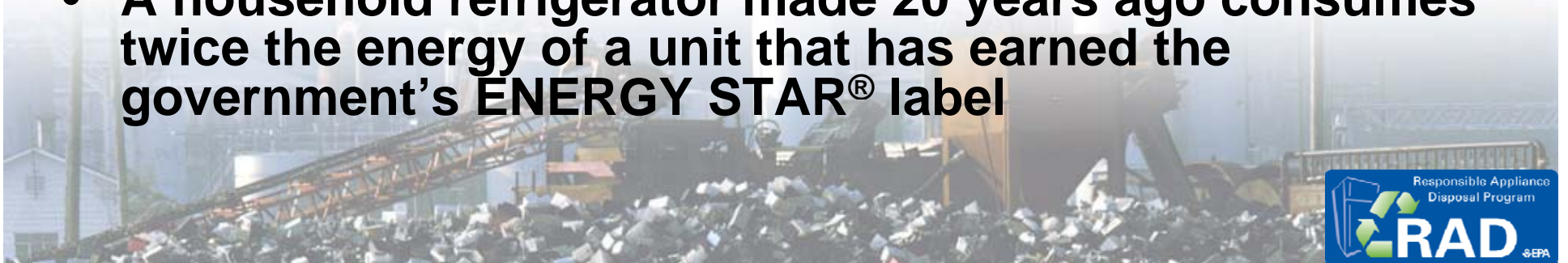
Responsible Appliance Disposal (RAD) Program

- RAD is EPA's voluntary program that builds on the Safe Disposal regs to capture ODS foam blowing agents in appliances
- RAD partners ensure disposal of refrigerant-containing appliances using a multi-media approach and the best environmental practices available
- RAD partners include:
 - Utilities
 - Retailers
 - Manufacturers
 - State & Local Governments
 - Universities



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

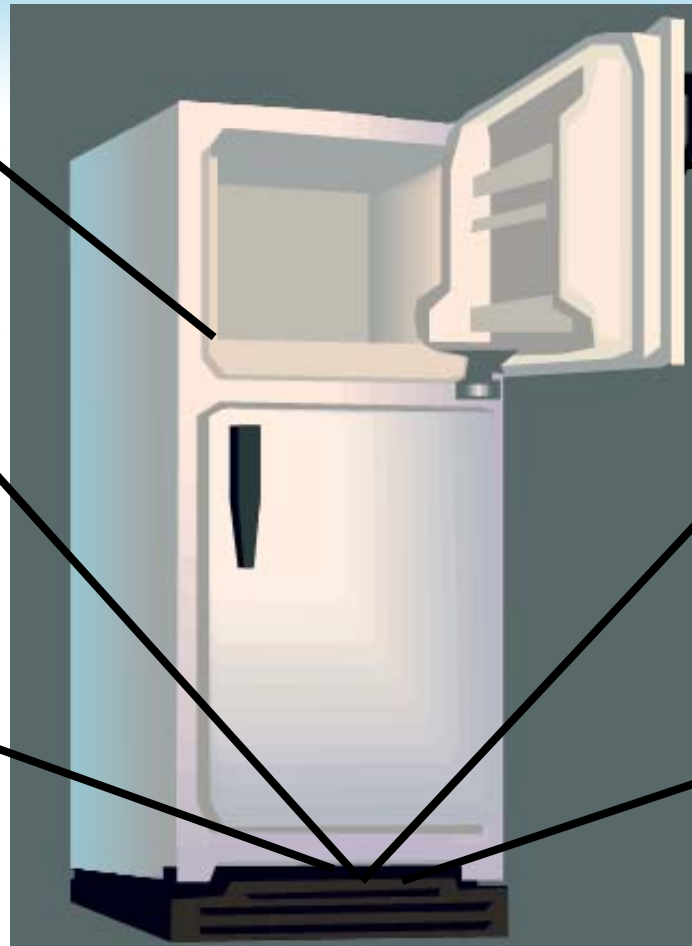
140 lbs metal
20 lbs plastic
3 lbs glass

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)



RAD Program Objectives

Work with utilities, retailers, manufacturers, state & local governments, and universities 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

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 prematurely 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



2009 RAD Program Results

- In 2009 RAD partners processed over 680,000 appliances, preventing:
 - Emissions of over 4,000 pounds of ODS
 - Emissions of 3.35 MMTCO₂e or annual emissions of over 640,000 cars
 - Over 100 million pounds of metal plastic and glass from going into landfill
 - And the proper handling of used oil, PCBs, and mercury

RAD Program Requirements

RAD partners use best practices to dispose of appliances; they ensure that:

1. Refrigerant is recovered and reclaimed or destroyed
2. Insulation foam is recovered and destroyed, or the blowing agent is recovered and reclaimed
3. Metals, plastic, and glass are recycled
4. Polychlorinated biphenyls (PCBs), mercury, and used oil are recovered and properly disposed of

Partners report results to EPA on an annual basis

Current RAD Partners

- 1) Southern California Edison
- 2) PG&E, CA
- 3) Snohomish PUD, WA
- 4) Sacramento Municipal Utility District, CA
- 5) Fort Collins Utilities, CO
- 6) PacifiCorp
- 7) Nevada Power & Sierra Pacific Power, NV
- 8) San Diego Gas and Electric, CA
- 9) Austin Energy, TX
- 10) City of Palo Alto Utilities, CA
- 11) City of Richland Energy Services, MA
- 12) PNM, New Mexico
- 13) Burbank Water and Power, CA
- 14) Commonwealth Edison, IL
- 15) SRP, AZ
- 16) Sears Home Services
- 17) Nebraska Public Power District
- 18) Energy Trust of Oregon
- 19) Dayton Power and Light, OH
- 20) AEP (American Electric Power), OH
- 21) WPPI, WI
- 22) Georgia Power, GA
- 23) Baltimore Gas & Electric, MD
- 24) Great River Energy, MN
- 25) Consumers Energy, MI
- 26) Hoosier Energy REC, Inc., IN
- 27) Arizona Public Services, AZ
- 28) West Virginia Department of Environmental Protection
- 29) Vectren Energy Delivery, IN
- 30) Best Buy
- 31) Appliance Smart
- 32) Silicon Valley Power
- 33) Idaho Power
- 34) Puget Sound Energy



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