Melissa Fiffer
U.S. Environmental Protection Agency
ENERGY STAR Partner Products Meeting
November 9, 2011
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

• 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 2\textsuperscript{nd} 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\textsuperscript{®} 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

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

OR
Proper Appliance Disposal Gets More for the Environment than Replacement Alone

- **Taking Old Appliances off the Grid:**
  - Reduces energy demand
    - Replacing an older appliance with a new ENERGY STAR® unit can save over 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 (Capacitor)
- 0.003 lb

Proper recycling/destruction of these substances is key
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

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Atm Lifetime</th>
<th>Ozone Depletion Potential</th>
<th>Global Warming Potential</th>
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<td>CFC-11</td>
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<td>HFC-134a</td>
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Atmospheric lifetime based on IPCC (2007); ODPs based on 40 CFR; GWPs based on IPCC (2007)
Benefits of Responsible Appliance Disposal

For every 1,000 refrigerators prematurely retired & disposed of under RAD, greenhouse gas emissions are reduced by 8,200 MMTCO$_2$e. This is equivalent to:

- 11.4 million kWh of electricity saved
- Annual electricity use of over 1,100 homes
2010 RAD Program Results

• In 2010 RAD partners processed over 735,000 appliances, preventing:
  – Emissions of over 417,000 pounds of ODS
  – Emissions of 1.41 MMTCO2e or annual emissions of over 276,000 cars
  – Over 100 million pounds of metal plastic and glass from going into landfill
  – And the proper handling of used oil, PCBs, and mercury
GHG Emissions Avoided by RAD Partners 2007-2010

[Chart showing GHG emissions avoided from 2007 to 2010, with data points for Foam Recovery and Refrigerant Recovery.]
RAD Program

Requirements

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

1. Refrigerant is recovered and either 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
Partner Events

Right: Sears event to announce joining the RAD Program

Above: WV announces joining RAD Partnership
Below left and right: GE event in Philadelphia
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) American Electric Power (AEP), 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
35) Cape Light Compact
36) Avista Utilities
37) Lodi Electric Utilities, CA
38) Indiana Michigan Power (AEP)
39) General Electric
40) Northern Indiana Public Service Company
41) Riverside Public Utilities, CA
42) New York State Energy Research and Development Authority (NYSERDA)
43) National Grid
44) Home Depot
Want to be the next RAD partner?
Contact Us:

Melissa Fiffer
202-343-9464
fiffer.melissa@epa.gov

Evelyn Swain
202-343-9956
swain.evelyn@epa.gov

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