Appliance Recycling &
Accelerated Replacement

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Accelerated Replacement/ Early Retirement

What is it?

- **Accelerated Replacement**
  - Encourage consumers to replace old and inefficient appliances prior to the end of their useful life

- **Early Retirement**
  - Ensure that the replaced appliance is put out of service

- **Example**
  - Encourage the replacement of older refrigerators, and ensure that the old ones are not kept in the basement
Accelerated Replacement/ Early Retirement Strategy

- Industry supports voluntary accelerated replacement and early retirement programs

- Two key elements of an effective program:
  - ensure that the replaced appliances are not kept in service;
  - and
  - ensure that the replaced appliances are disposed of properly

- Second element already in place – appliance disposal and recycling is already established and effective
Appliance Recycling in North America

Characteristics

- A successful, economically-driven system
- Estimated that almost 90% of major appliances at the end-of-life enter the recycling stream
- Over two million tons of steel are recycled from appliances each year
- Industry is engaged in research to examine the North American market
Appliance Recycling in North America

Characteristics

- Success driven by the market for recovered materials, including:
  - Steel
  - Copper
  - Aluminum
  - Other metals
- Active for over 100 years
- Coordinated through over 4,000 recycling centers in the U.S.
- One of the most successful recycling programs – rates have doubled over the past 10 years
- Steel alone saves equivalent energy to electrically power about 18 million households for a year
Recycling Rates for Appliances Continue to Climb
Older Appliances – Rich in Recoverable Materials

Refrigerators

Ranges

Washers

Metals

Metals

Metals

AHAM
association of home appliance manufacturers
Appliance Recycling in N. America
How has success been achieved?

- Many municipalities offer appliance recycling
- Retailers typically take older appliances at time of delivery
- Private entrepreneurs find used appliances
- Over 12,000 appliance recycling locations available across the US.
- Work done by Steel Recycling Institute to educate local officials about appliance recycling opportunities
  - www.recycle-steel.org contains database on where to take used appliances
Age of Appliances

- The useful life of appliances can vary by type
- Today’s appliances are highly energy-efficient and present opportunities provide energy savings
Age Distribution of All Sampled Refrigerators and Ref./Freezers in Recycling
Sample of 222 Refrigerators and Ref./Freezers in Recycling Facilities in 1997

Mean = 21.5 years
Std. Deviation = 8.007 yrs.
Age of Appliances in Field Clothes Washers

Age Distribution of Sampled Clothes Washers in Recycling
Sample of 93 Clothes Washers in Recycling Facilities in 1997

Mean = 20.1 yrs.
Std. Deviation = 7.64 yrs.

Ages in Years

Number of Units

0 1 2 3 4 5 6 7 8 9 10

45 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2
Accelerated Replacement/ Early Retirement Benefits

Can have a positive effect on the environment, including:
- Total energy use
- Peak energy use
- Water use (i.e. clothes washers)
- CO$_2$ emissions
- Natural resource conservation
Accelerated Replacement/ Early Retirement Benefits

- If assuming average age of refrigerators is 19 years and we can encourage replacement 5 years earlier (i.e. to 14 years)
  - Could save 2 Quads of energy
- With clothes washer, could perhaps save an additional 1.6 Quads.
- Programs to remove second refrigerators from the grid would enhance savings further
Conclusion

- Industry supports Accelerated Replacement and Early Retirement programs
- Effective only if coupled with proper disposal and recycling