# BALTIMORE FORUM 2007
## RESPONSIBLE PACKAGING SOLUTIONS

# Welcome


** Publisher of "Paper or Plastic" by Dan Imhoff*

# Green Supply Chain Example

Tom Wright
Sustainable Business Practices

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Green Mission Project
www.sustainablebizness.com
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# A Green Claim Assumes …

**The earth is a single living system.**

- **Open to energy from the sun**
- **Closed to matter**

# The principles of the science of ecology determine the validity of a green claim.

The author of Biomimicry, Janine Benyus explains ecology:

Nature runs on sunlight.
Nature uses only the energy it needs.
Nature fits form to function.
Nature recycles everything.
Nature rewards cooperation.
Nature banks on diversity.
Nature demands local expertise.
Nature curbs excesses from within.
Nature taps the power of limits.

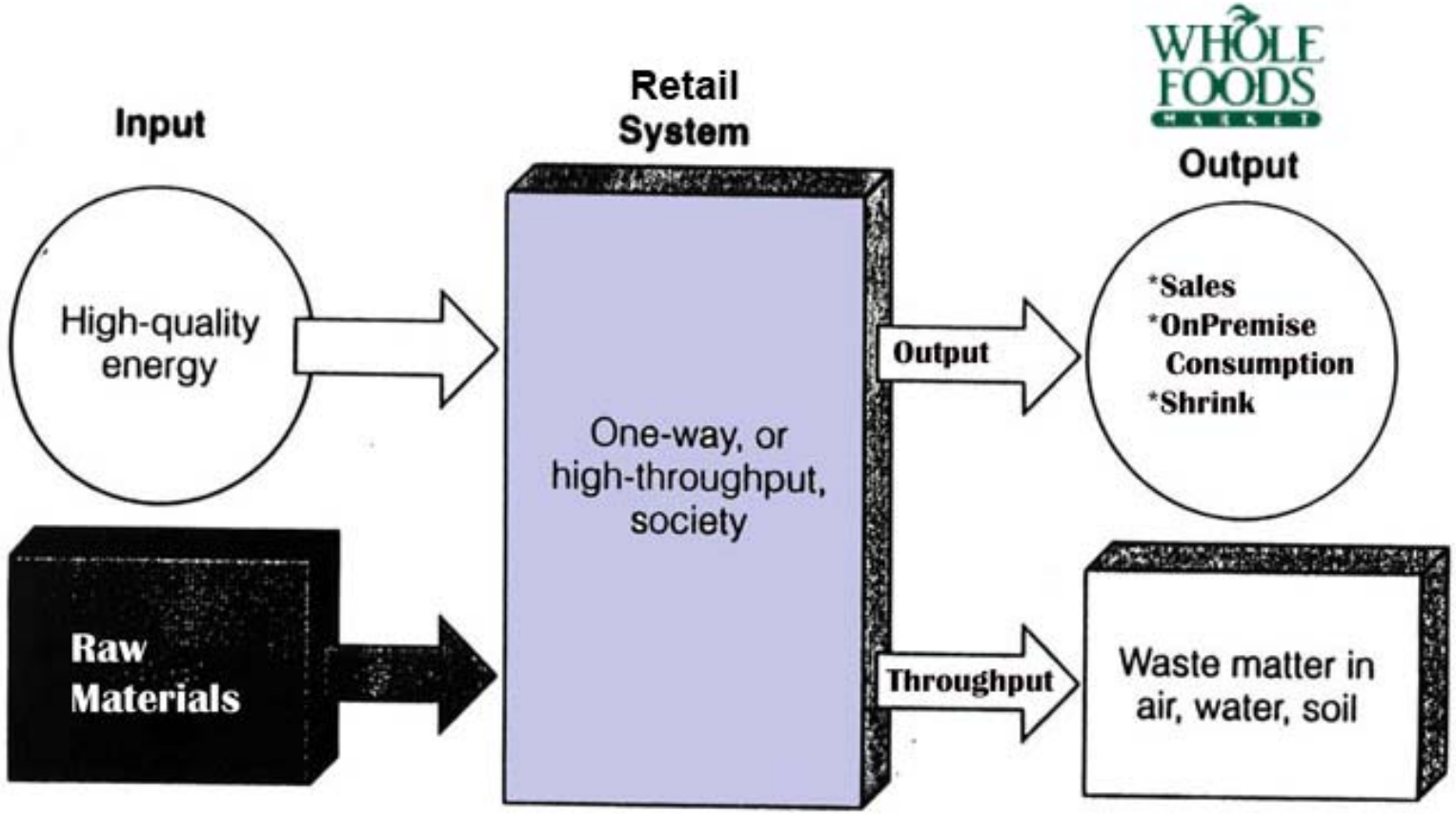
# Sustainability:
# 2 simple rules to follow

- Live off of current solar income

- The cyclic principle: waste = food for something else; there is no bioaccumulation of persistent human-made molecules

# Input Output Throughput

All stores and facilities have energy and material input, output and throughput (often what we call “waste”).




**Waste matter in air, water and soil needs to be food for something!**

“Sinks” for throughput.
(a term for the destination of a flow.)

- Recycling: it becomes itself again
- Composting: top soil amendment
- Water
- Landfill
- Air (includes incineration)
- Crust of the earth

# Redesign

Rethink

Reduce

Reuse

Recycle

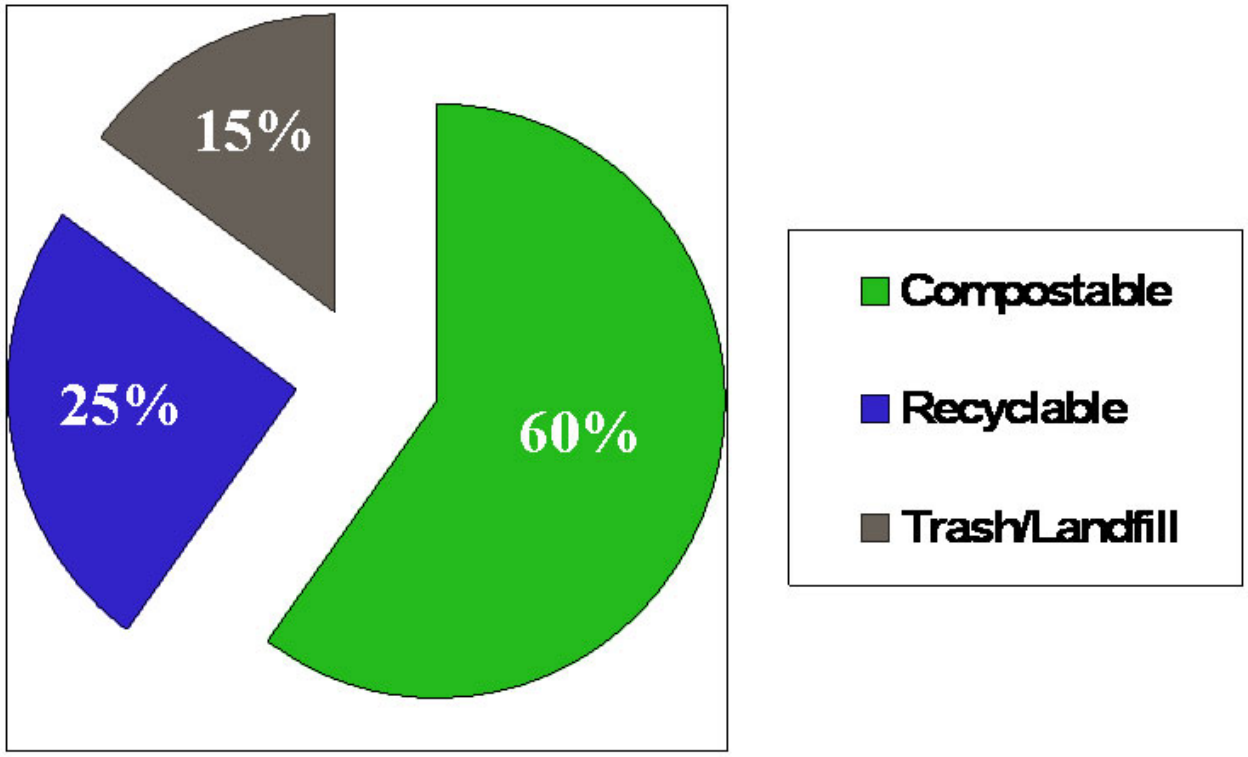
# Infrastructure

- How many US have curbside for beverage containers:  50% - 60%
- How many states have deposit laws: 8 (and they recycle at 4 times the rest)
- How many industrial scale composters take food wastes: 18 with grinders
- How many cities take food waste compostables at curbside: 10 -20

# 3 basic streams

- Recyclables: #1 and #2 rigid plastics, glass, aluminum, paper ( also cardboard and film plastics).
- Compostables: “green wastes”
- Trash/Landfill: like food soiled petro-plastics.

# 60% Compostables: zero waste initiative



# Cardboard

Cardboard is valuable.

All dry cardboard needs to be bailed. Wet or food-soiled cardboard can be composted.

# Film Plastics

Laundry Bag Holder
Used for Film Plastics

A laundry bag holder with a clear plastic bag is a good receptacle for shrink wrap recycling in receiving.

# Compostable Green Waste

WHOLE FOODS MARKET

# Single Stream Sign

# Zero Waste is the Goal.

- Zeri.org:
- Transition to no landfill
- Then no incineration (molecular garbage in the air)
- Then no mining of toxic materials

# What is recycling?

- Involves the separation and collection of materials for processing and remanufacturing into new products .

- A material becomes itself again, and again.  (e.g. clear glass)

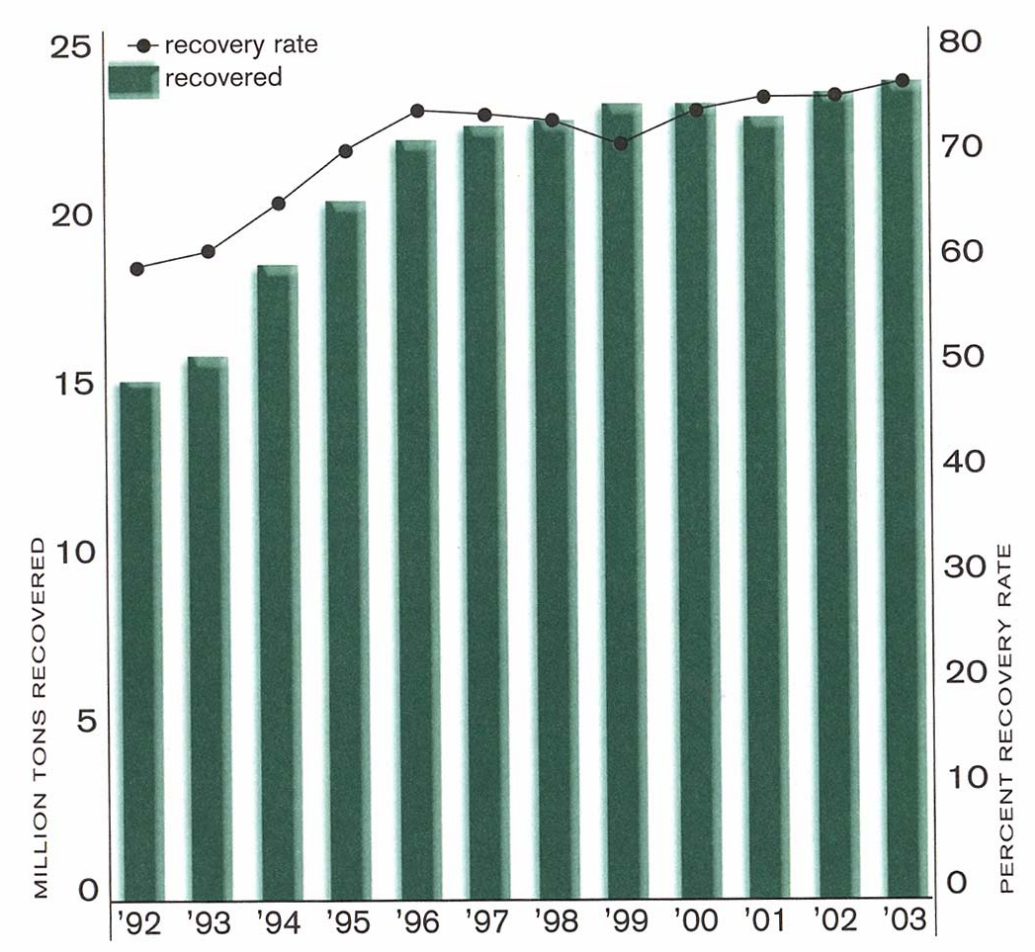
# Downcycling

- You say that recycling, as it's currently practiced, is "downcycling." What we call recycling is typically the product losing its quality. Paper gets mixed with other papers, re-chlorinated and contaminated with toxic inks. The fiber length gets shorter, allowing more particles to abrade into the air, where they get into your lungs and nasal passages, and cause irritation. And you end up with gray, fuzzy stuff that doesn't really work for you. That's downcycling.

  -Cradle to Cradle

# Recovery and Use of Old Corrugated Containers (OCC)

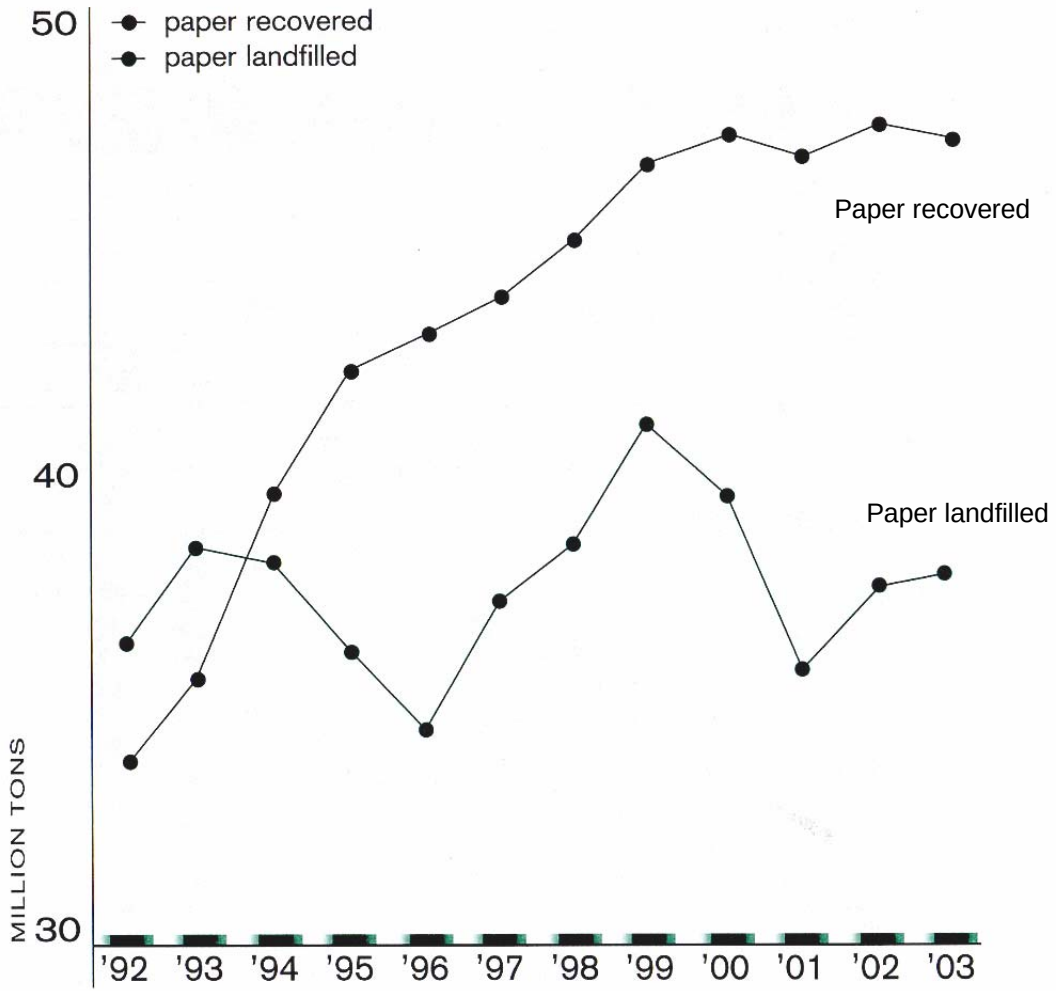
Recovery of old corrugated containers rose 2.2% in 2003 to a record-high 23.7 million tons. The recovery rate for OCC approached 76% in 2003, up from 54% in 1990.



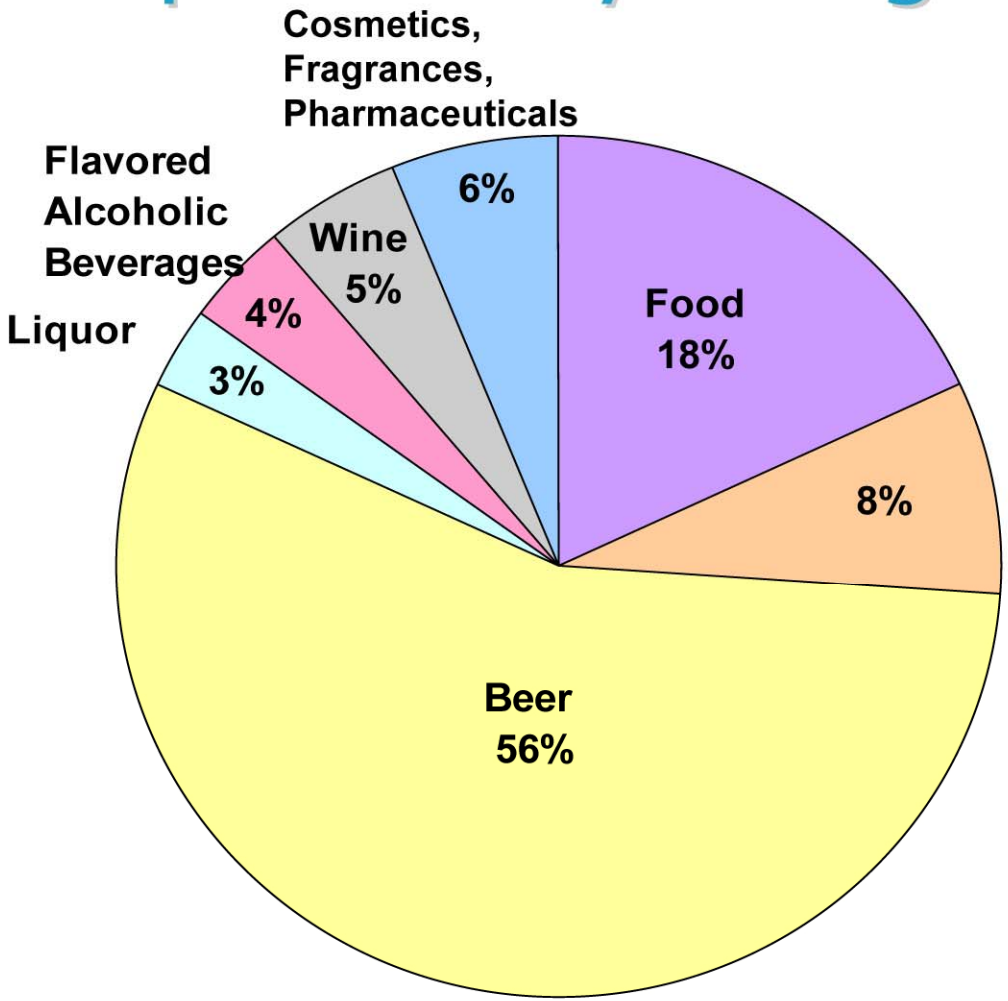
**53.4 percent of the paper consumed in the U.S. (53.5 million tons) was recovered for recycling in 2006**

# Paper Recovery versus Landfilling

Currently far more paper is recovered for recycling than is landfilled. In addition to landfilling, paper that is not recycled may go to waste-to-energy facilities or wind up in permanent or semi-permanent applications such as construction products.

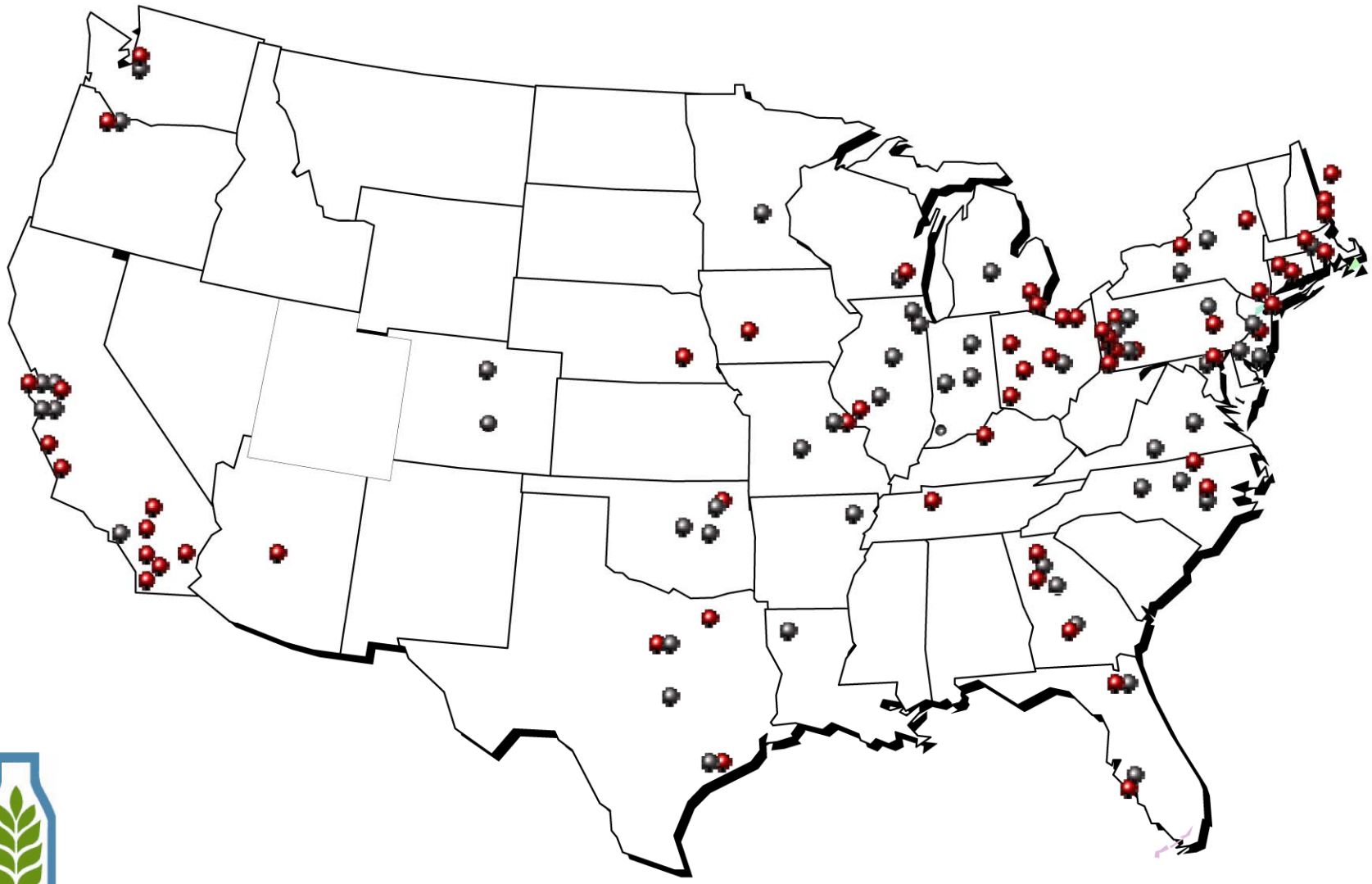


# 2006 (est.) U.S. Glass Container Shipments By Category




75% of glass container shipments are for beverages

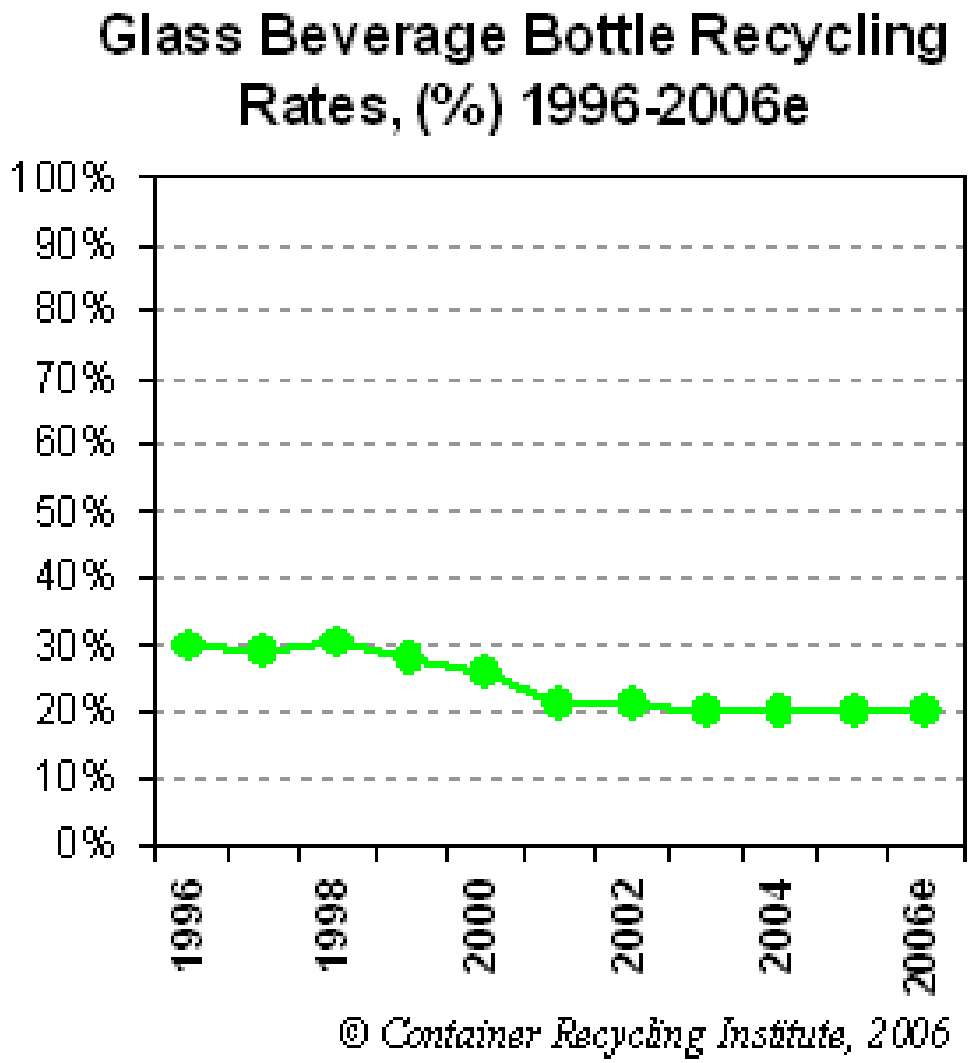
glass packaging institute

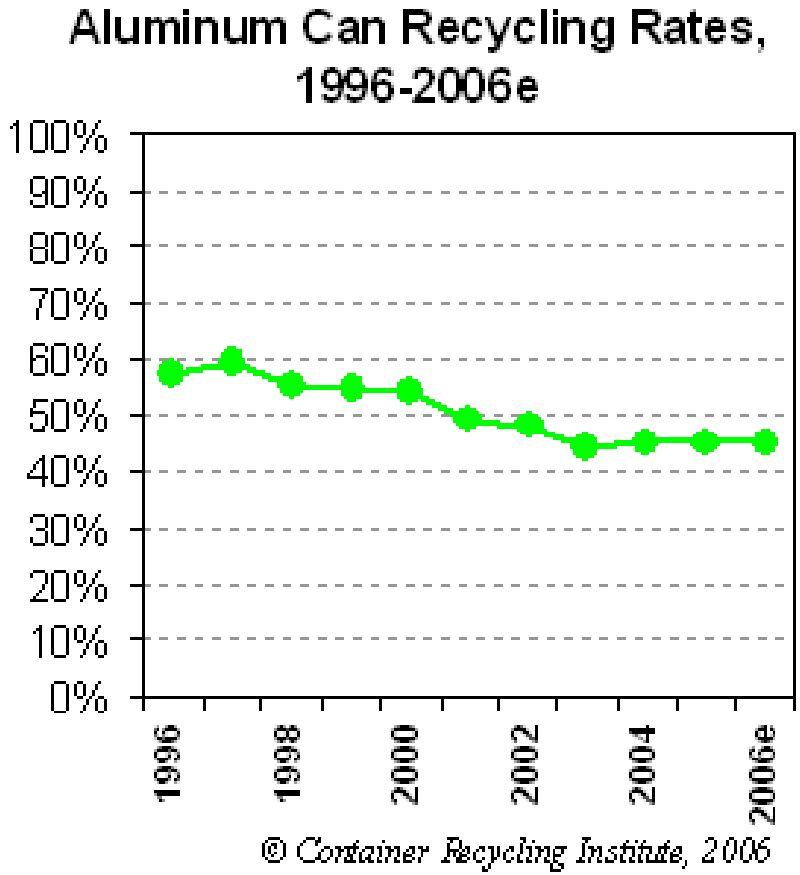


49 Glass Container Plants in 23 states

66 Cullet Processors in 25 states

glass packaging institute

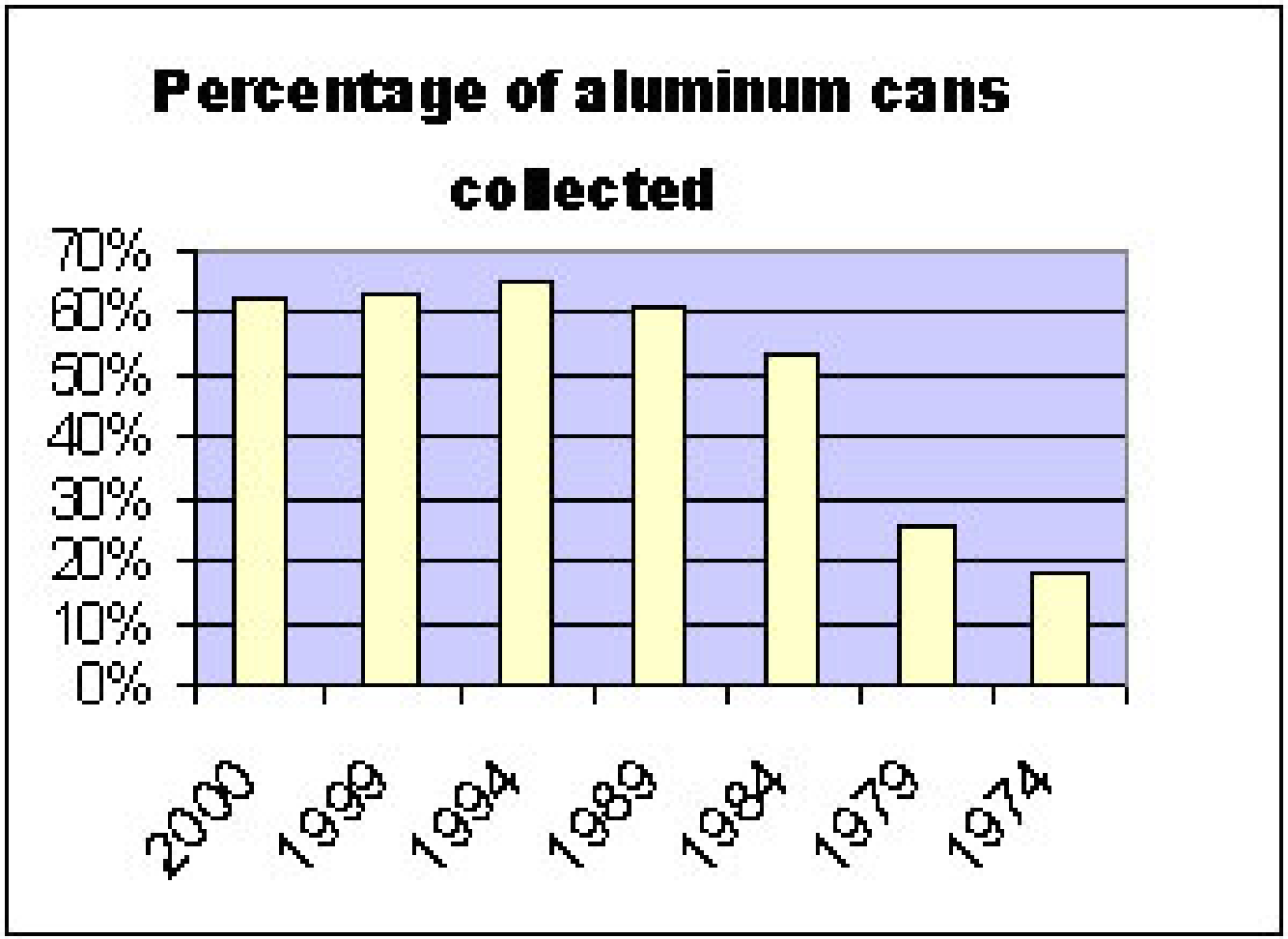

Glass Beverage Bottle Recycling Rates, (%) 1996-2006e
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1996
1998
2000
2002
2004
2006e
© Container Recycling Institute, 2006


Aluminum Can Recycling Rates,
1996-2006e
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1996
1998
2000
2002
2004
2006e
© Container Recycling Institute, 2006

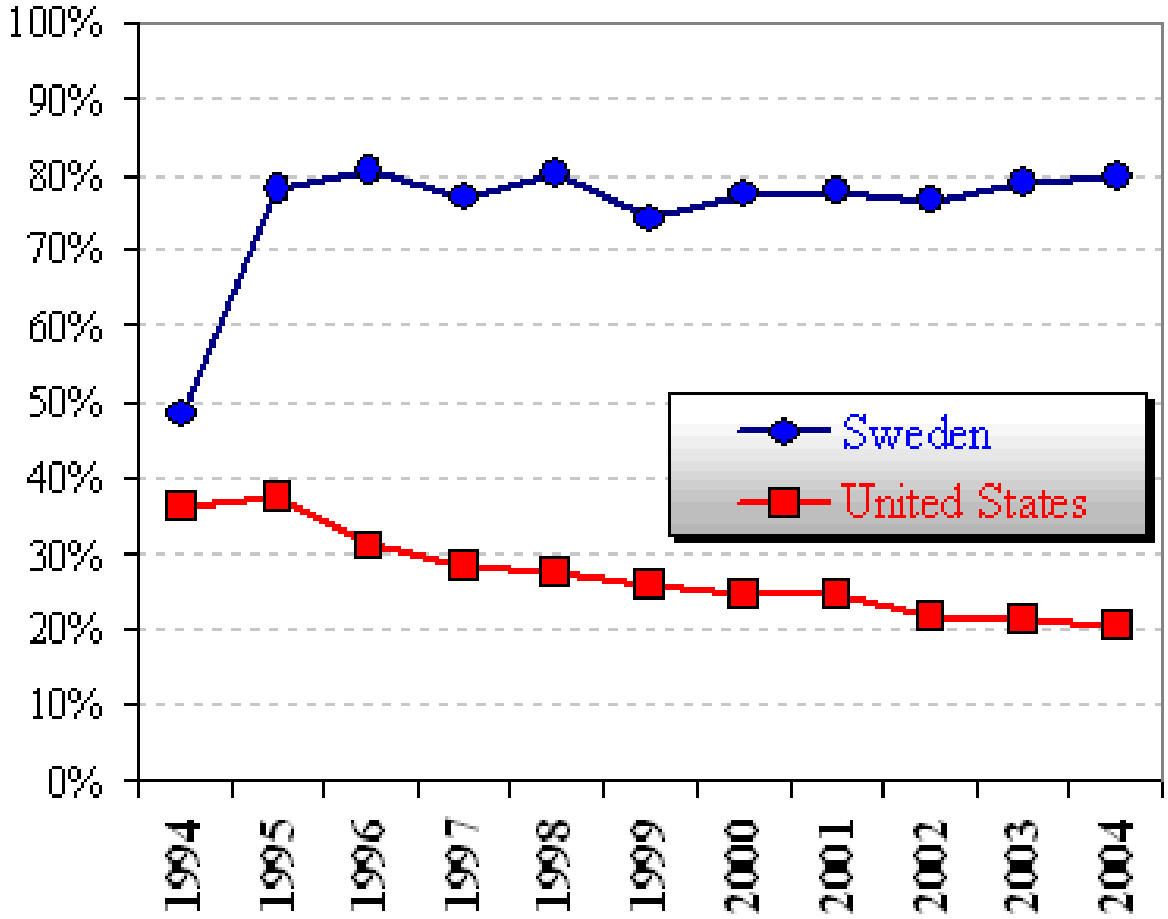
# Aluminum Can Reclamation

| Year | Pounds of Aluminum Collected (millions)• | Number of cans/pound of aluminum | Number of cans collected•• | Number of Cans Shipped (billions)••• | Pct. of aluminum cans collected |
|---|---|---|---|---|---|
| 2003 | 1,479 | 33.72 | 49.9 | 99.7 | 50.0 |
| 2004 | 1,518 | 33.92 | 51.5 | 100.5 | 51.2 |
| % change | 2.6 | 0.6 | 3.2 | 0.8 | 1.2 |

**Source:** The Aluminum Association, Inc.
Can Manufacturers Institute
Institute of Scrap Recycling Industries, Inc.


Percentage of aluminum cans collected
70%
60%
50%
40%
30%
20%
10%
0%
2000
1998
1996
1994
1992
1990
1988

# Plastic Bottle Recycling Rates



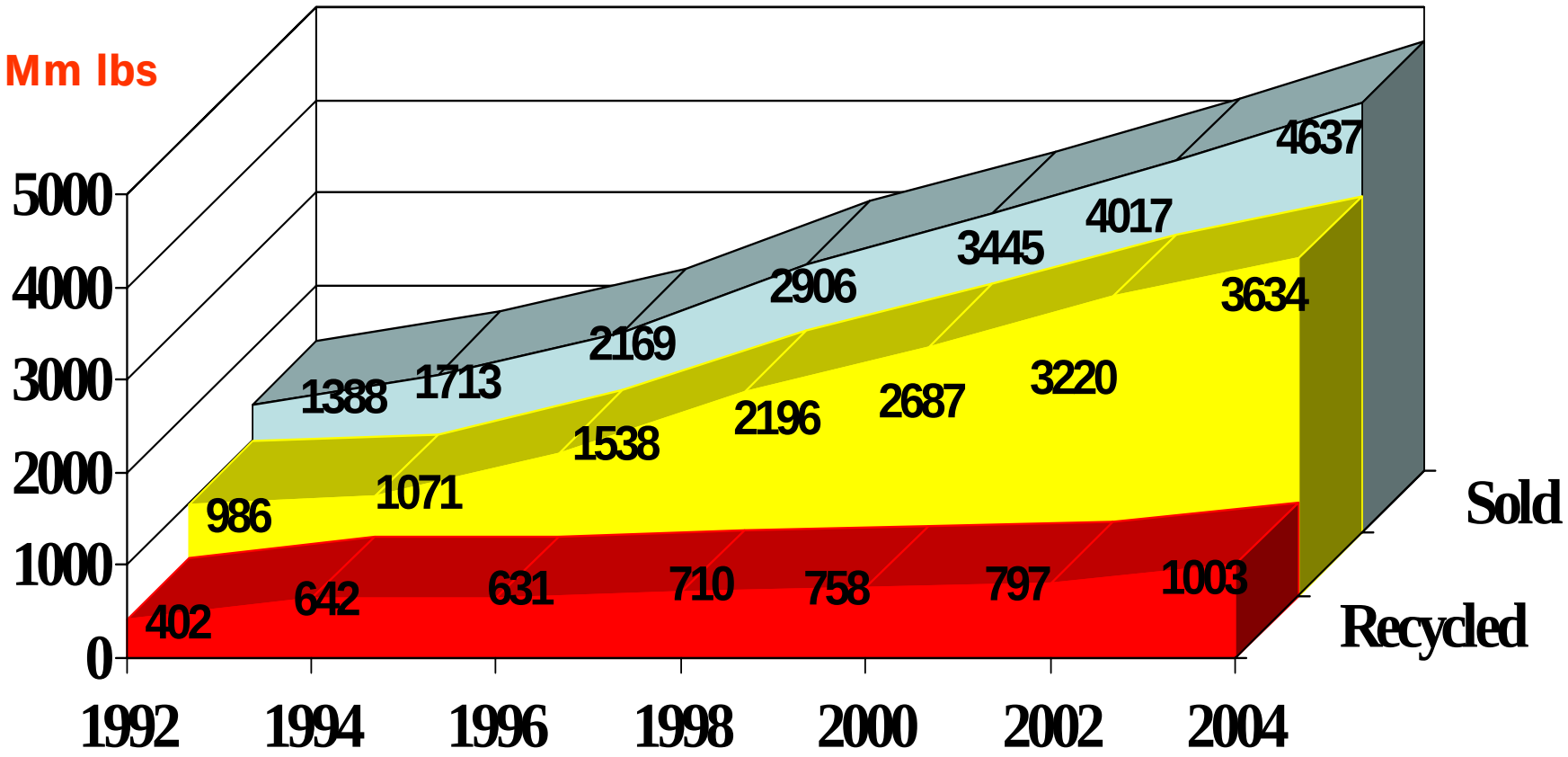

Sources: US data derived from NAPCOR and the American Plastics Council; Swedish data from AB Svenska Returpack

© *Container Recycling Institute, 2005.*

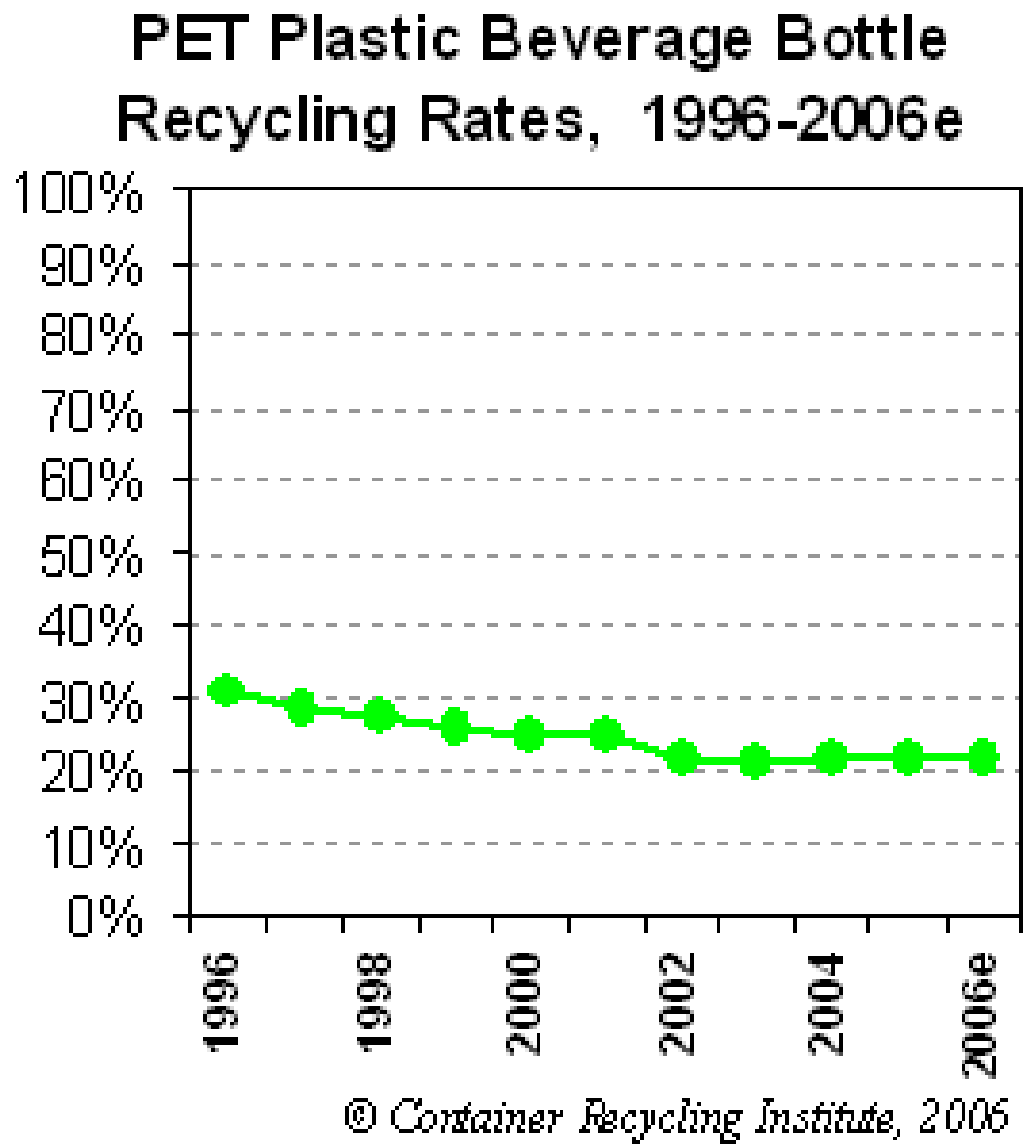
CRI
CONTAINER RECYCLING INSTITUTE

# PET Bottle Recycling Not Keeping Pace with Sales

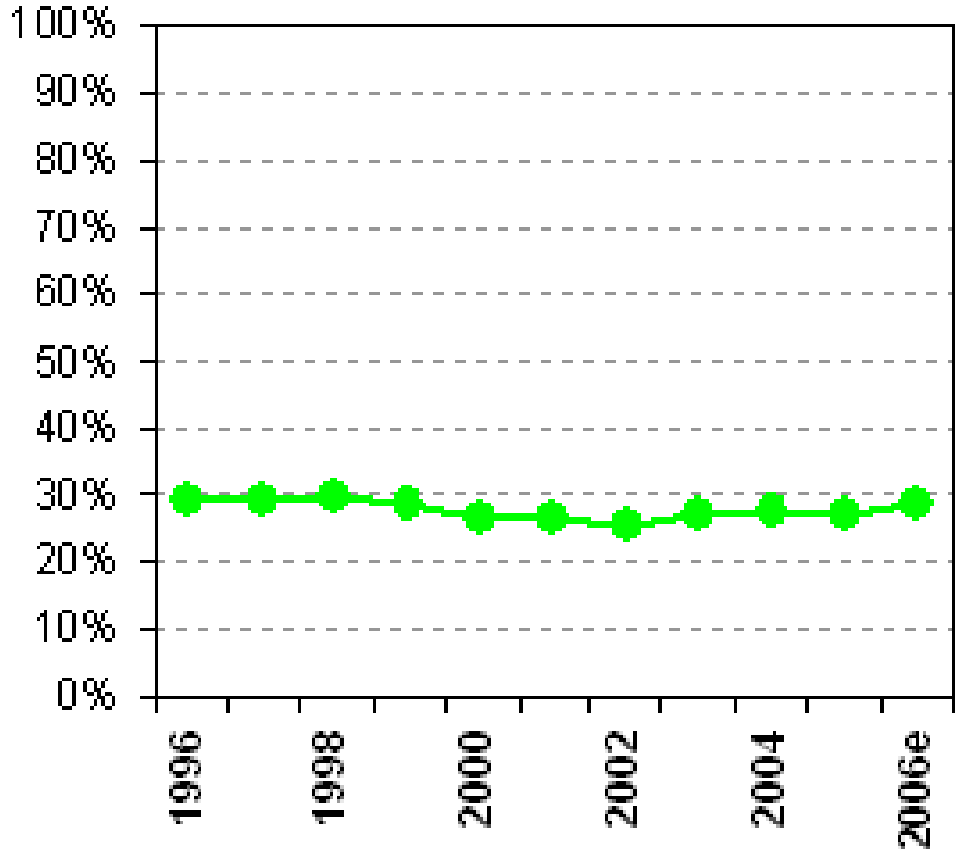
1992 - 2004




Source: "2004 National Post-Consumer Plastics Recycling Report." R.W. Beck, Inc. for the American Plastics Council. 2005.

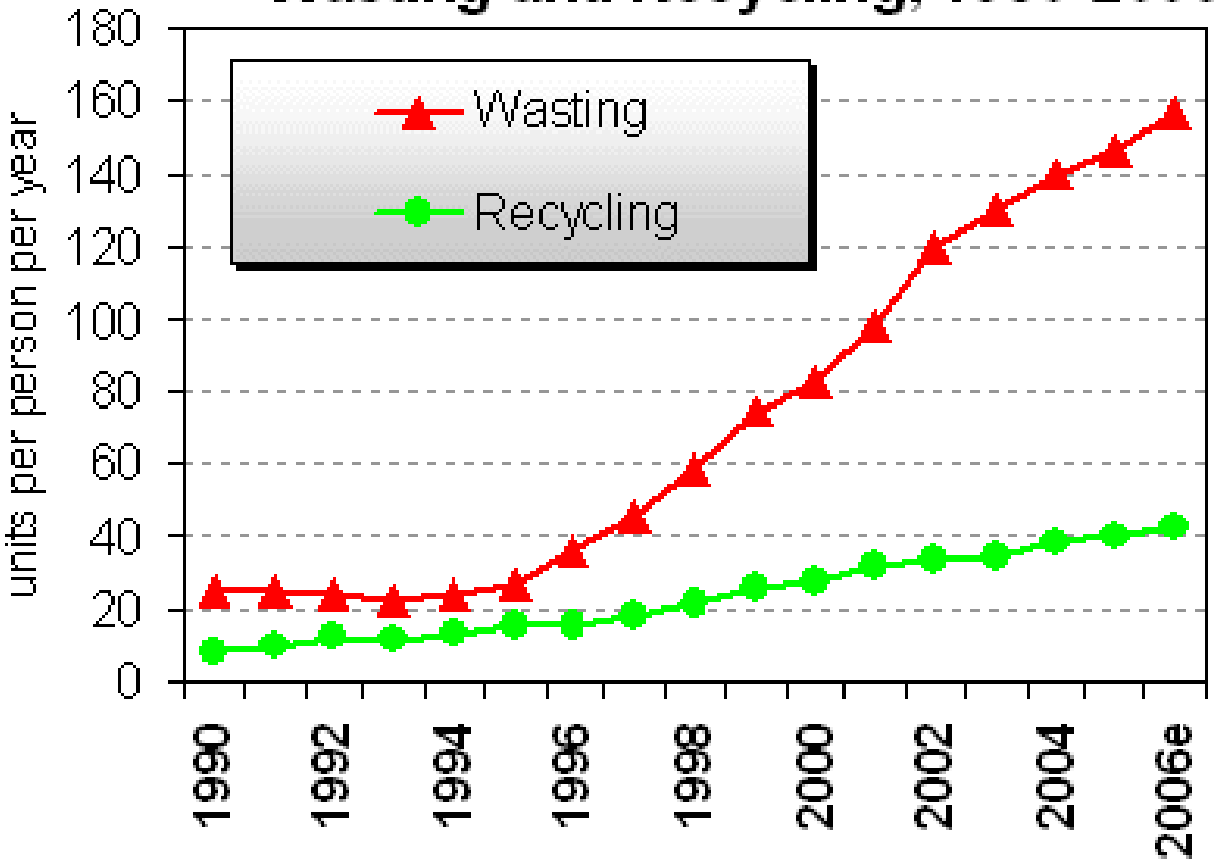

PET Plastic Beverage Bottle
Recycling Rates, 1996-2006e
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1996
1998
2000
2002
2004
2006e
© Container Recycling Institute, 2006

## HDPE Plastic Beverage Bottle Recycling Rates, (%) 1996-2006e




© Container Recycling Institute, 2006

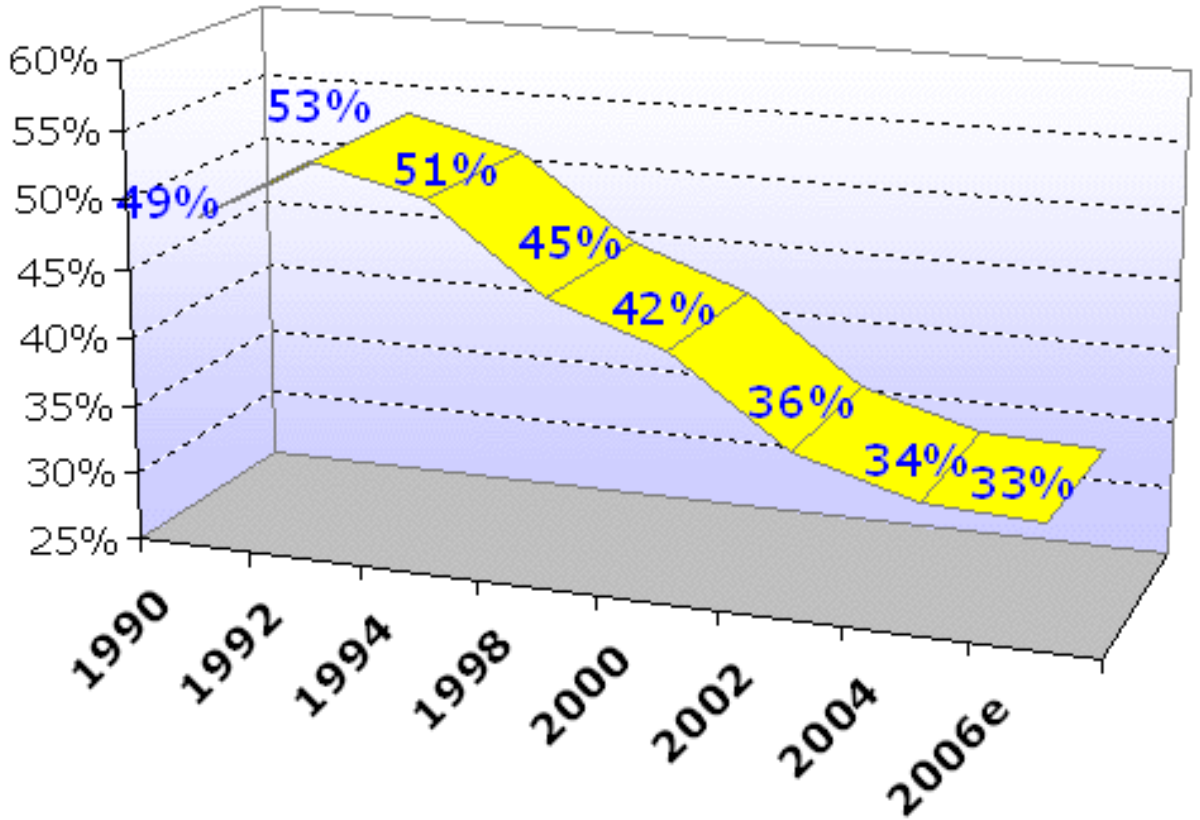
## Per Capita PET Beverage Bottle Wasting and Recycling, 1990-2006




Source: data derived from the American Plastics Council and the National Association of PET Container Resources.

*© Container Recycling Institute, 2006*

## Overall Beverage Container Recycling Rate in the United States, 1990-2006

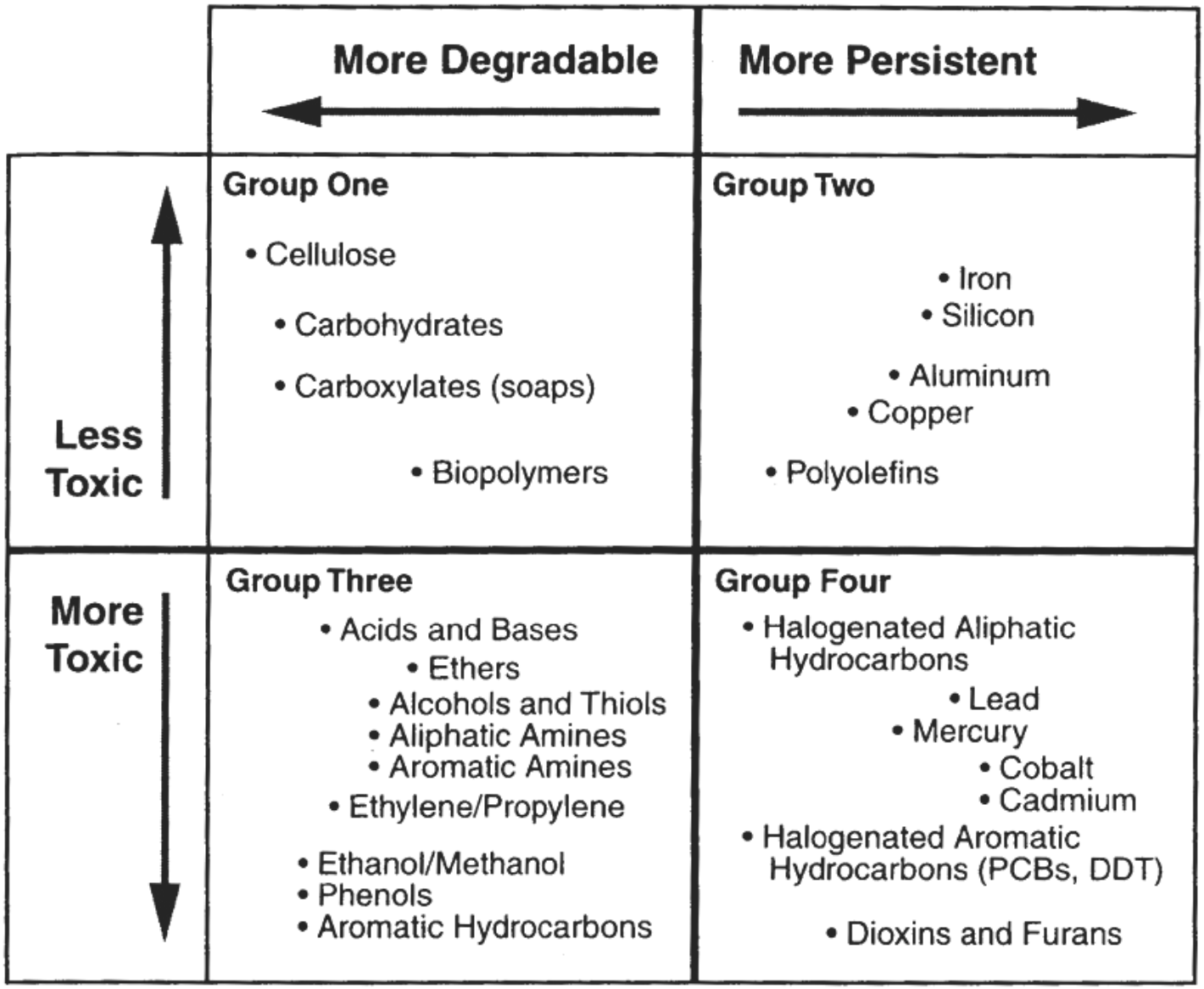



CRI data derived from Aluminum Association, U.S. Commerce Dept., U.S. EPA Office of Solid Waste, American Plastics Council, National Association of PET Container Resources. Indudes aluminum, steel, glass, PET plastic, HDPE plastic. Includes dairy.

*© Container Recycling Institute, 2006*

# Moving Materials Towards Sustainability

The following matrix describes a way to think about all the materials on earth. They range from very toxic and very persistent, to non-toxic and compostable. Sustainability implies making group four obsolete, and making group one the primary operating realm.


More Degradable
More Persistent
Group One
• Cellulose
• Carbohydrates
• Carboxylates (soaps)
• Biopolymers
Group Two
• Iron
• Silicon
• Aluminum
• Copper
• Polyolefins
Less Toxic
More Toxic
Group Three
• Acids and Bases
• Ethers
• Alcohols and Thiols
• Aliphatic Amines
• Aromatic Amines
• Ethylene/Propylene
• Ethanol/Methanol
• Phenols
• Aromatic Hydrocarbons
Group Four
• Halogenated Aliphatic Hydrocarbons
• Lead
• Mercury
• Cobalt
• Cadmium
• Halogenated Aromatic Hydrocarbons (PCBs, DDT)
• Dioxins and Furans

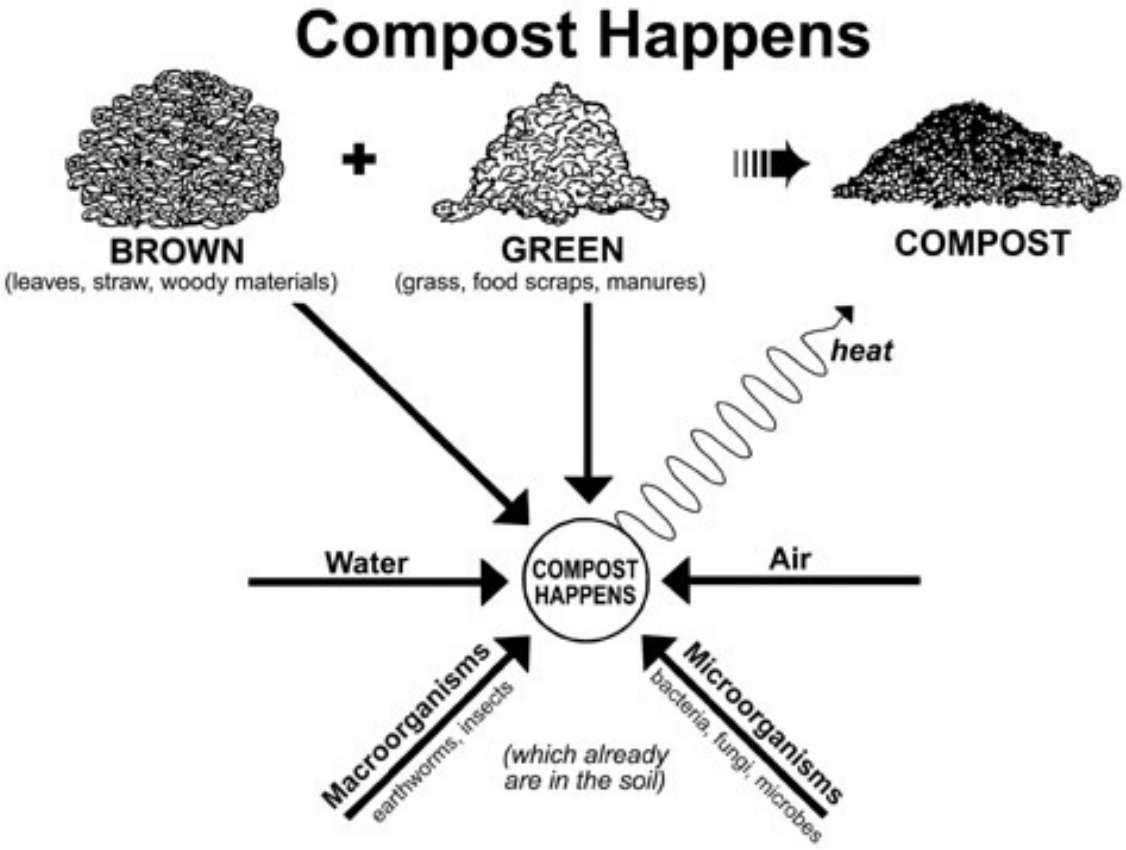
# What is industrial-scale composting?

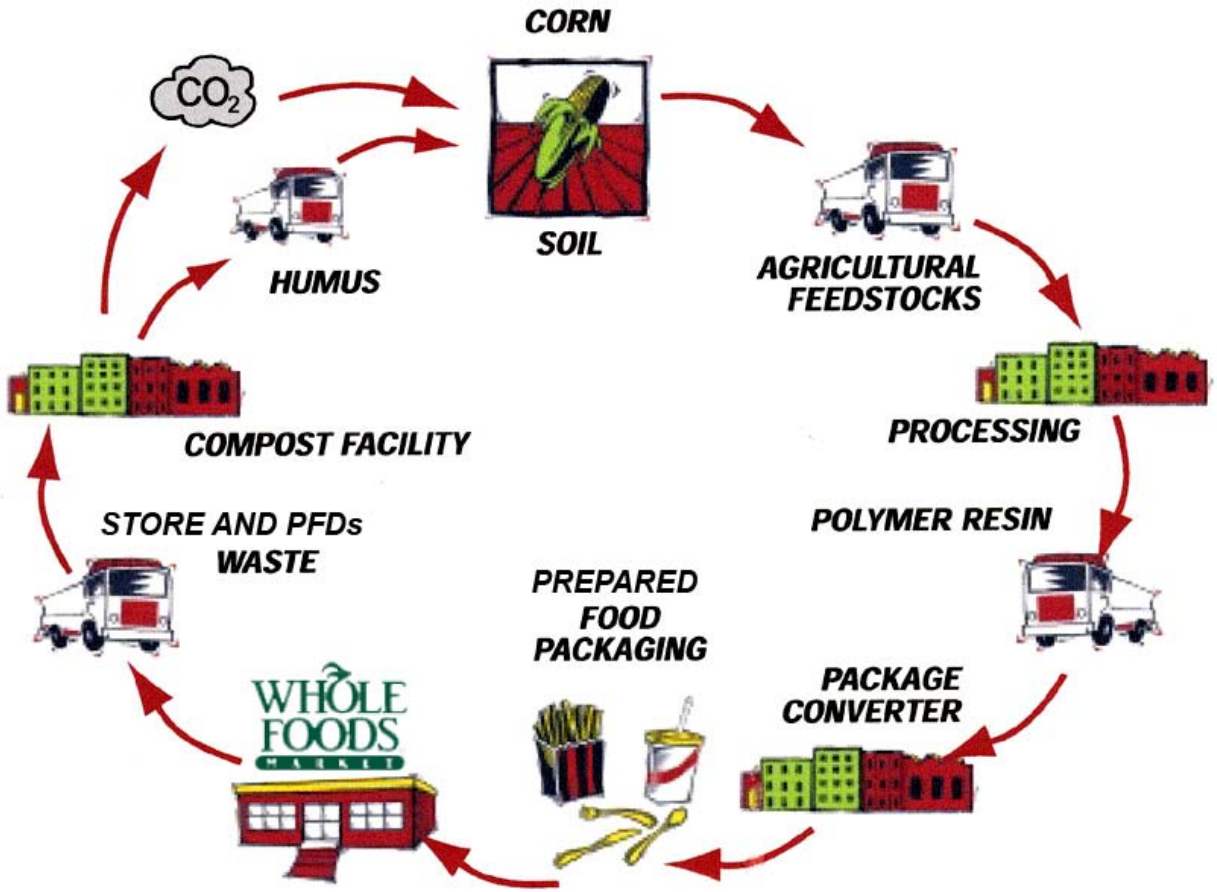
- Large-scale facilities designed to process organic “wastes” into stable, humified and re-usable products which can be used in landscaping, horticulture and agriculture and a number of specialized applications
- Controlled decomposition of organic “wastes” with minimum impacton air, soil and water quality
- Hot composting process –achieve pasteurization of materials (>55°C)
- Key infrastructure to recycle organic “wastes” into re-usable products, and to reduce our dependence on landfilling
- Facilities designed to process organic materials on a regional basis from municipal, commercial / industrial and construction / demolition sources

# Composting as Very Normal System.

In the Netherlands and Germany, many products can be recycled by composting. More than 95% and 60%, respectively, of all households have access to industrial composting plants; containers ("bio bins") are provided for the collection of organic household refuse. In the EU, organic matter makes up 30-40 percent of total domestic refuse. Composting is the most favorable method for recovery, since incineration requires a high calorimetric value and landfill is not suitable for organic materials (creates methane).

# Food wastes blend with yard wastes.

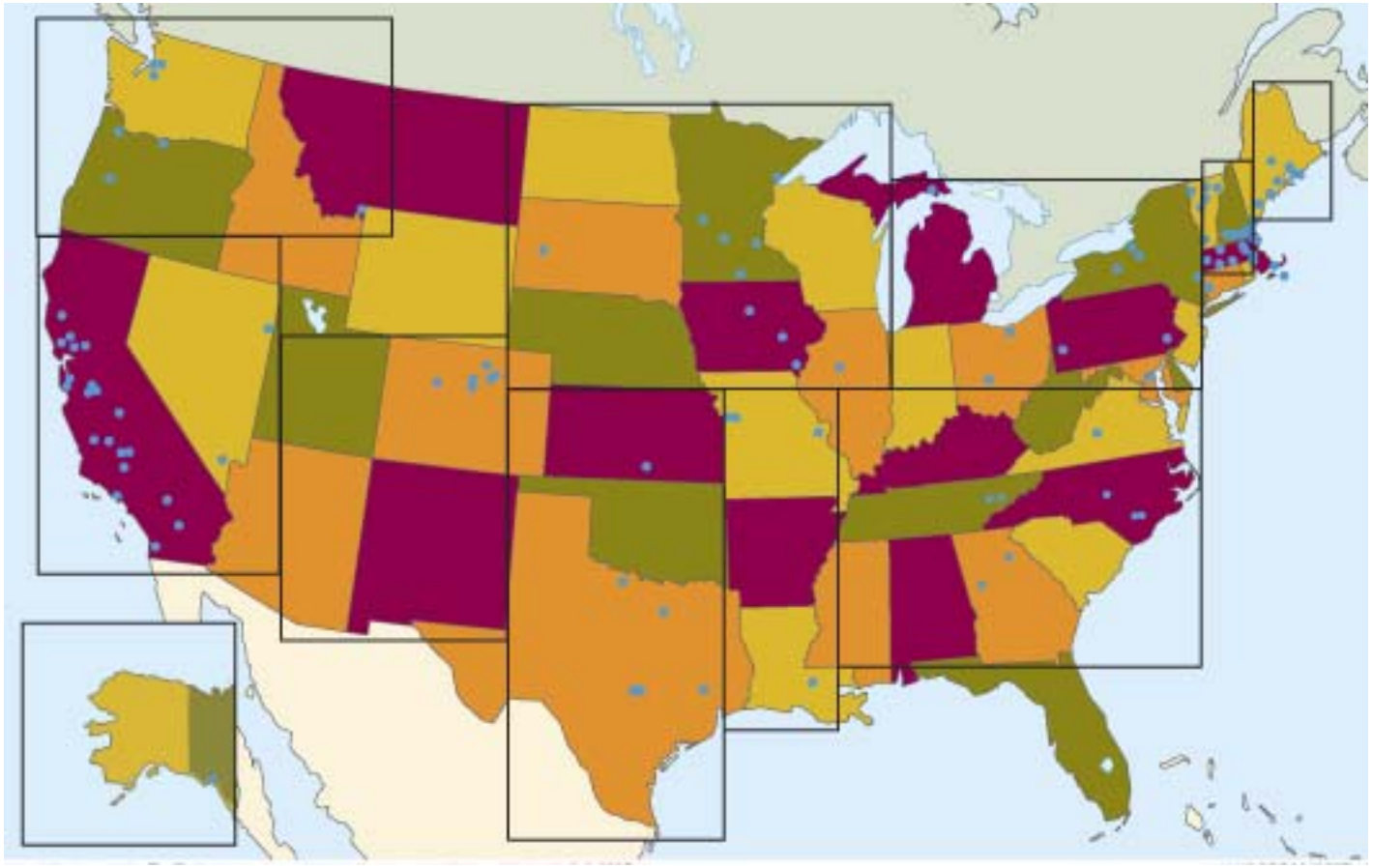





# The Green Cell Packaging Cycle

This is an example of moving towards group one.

# Food Composting Facilities



# Released November 30, 2006

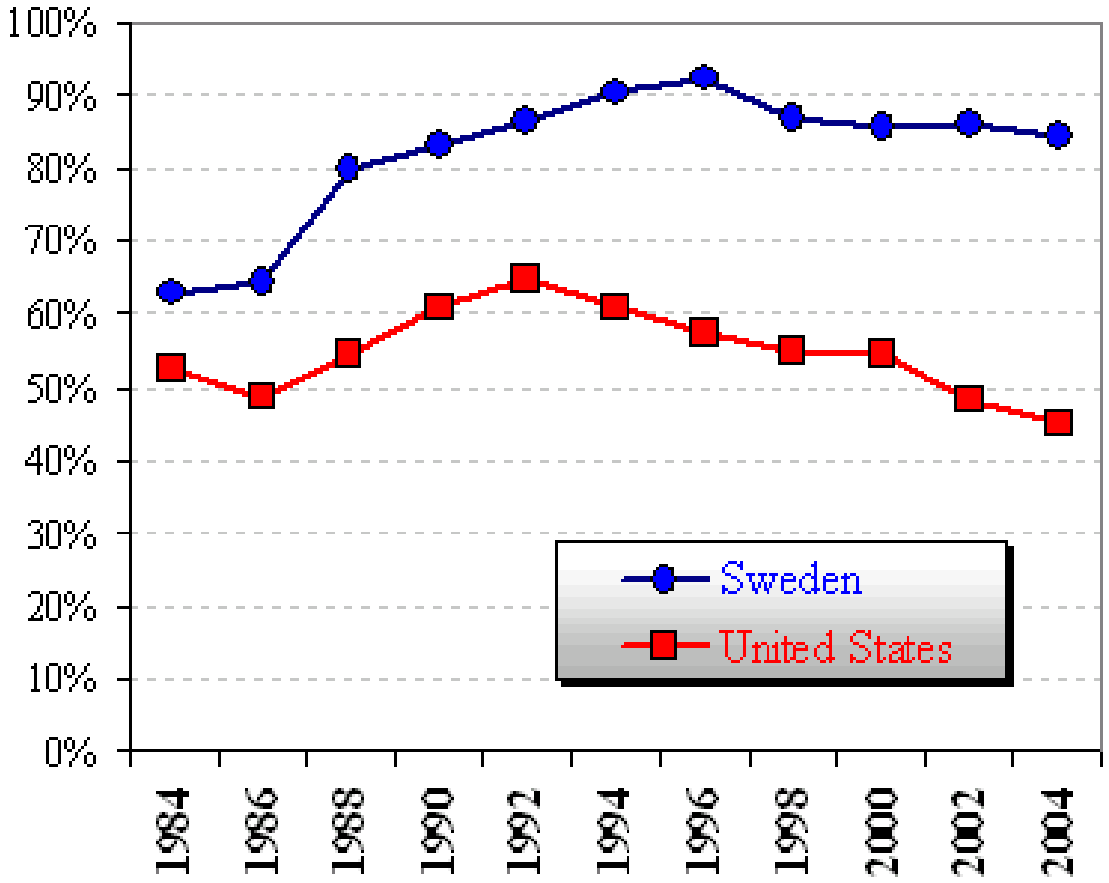
## PET RECYCLING RATE UP FOR SECOND STRAIGHT YEAR

*NAPCOR and APR Report Increased Rate and Record Volume of Recycled PET Containers*

SONOMA, CALIFORNIA, November 30, 2006 -- The National Association for PET Container Resources (NAPCOR) and the Association of Postconsumer Plastic Recyclers (APR) today announced a Polyethylene Terephthalate (PET) recycling rate of 23.1% and a collected volume of 1.170 billion pounds for PET post consumer containers in the United States for the year ended December 31, 2005.

At 23.1%, the 2005 recycling rate is an improvement over 2004's rate of 21.6% – which was in itself an increase over 2003 – and reflects the highest PET container collection volume to date, a 16.7% increase over 2004. The volume of PET containers available for recycling in the U.S. also grew in 2005 to 5,075 million pounds, a 9.4% increase over 2004. This growth was driven primarily by strong sales of still water and isotonic beverages.

# Deposits Work




Sources: The Aluminum Association; U.S. Department of Commerce; AB Svenska Returpack.

© Container Recycling Institute, 2005.

# Reuse works.

**Refillable container materials.** Refillable bottles can be made from glass and from several types of plastics, the most common of which is polyethylene terephthalate (PET). Soft drinks, water, and beer come in refillable PET bottles. Polyethylene naphthalate (PEN), which is superior to PET in many ways, is being used for refillable beer bottles in Denmark. Refillable bottles can also be made of high-density polyethylene (HDPE), which is commonly used for one-way milk and water jugs and commonly called #2 plastic. For refillable plastic milk bottles, however, many dairies who operate refilling systems have used polycarbonate (PC) rather than HDPE.

Experience with the **German Ordinance** on **Packaging Waste** showed that reduction…

of the beverage containers, **beer bottles** are reused 15 times

**MANAGEMENT OF MSW Overview**

EPA's integrated waste management hierarchy includes the following four components, listed in order of preference:

- Source reduction (or waste prevention), including reuse of products and on-site (or backyard) composting of yard trimmings
- Recycling, including off-site (or community) composting
- Combustion with energy recovery
- Disposal through landfilling or combustion without energy recovery.

After trying several collection schemes, including curbside recycling programs, the aluminum industry determined that the only way they could achieve a 75 percent rate was through a deposit/refund system. The aluminum can recycling rate was 63 percent when PLM introduced the voluntary system in March 1984. By 1987 the recycling rate had increased to 75 percent, and in 1995 the rate was 92 percent, 30 percentage points higher than the U.S. rate. (Fig. 1)

| Industry Group | Key Opportunities for Additional Diversion<br>(Figure in parentheses indicates percent of disposed waste stream by weight) |
|---|---|
| Full-service restaurants | • Food and compostable paper (up to 74%)<br>• Cardboard (4%)<br>• Plastic bottles and containers, tin/steel cans, aluminum cans (3%)<br>• Newspaper and other recyclable papers (3%)<br>• Glass bottles and containers (2%) |
| Food stores | • Food, compostable paper, and leaves and grass (up to 75%)<br>• Cardboard (4%)<br>• Lumber (4%)<br>• Recyclable papers (2%) |
| Durable goods wholesale distributors | • Lumber (29%)<br>• Cardboard (10%)<br>• Recyclable papers (6%)<br>• Ferrous metal (5%)<br>• Industrial plastic packaging film (4%)<br>• Gypsum board (3%) |

California
June 2006

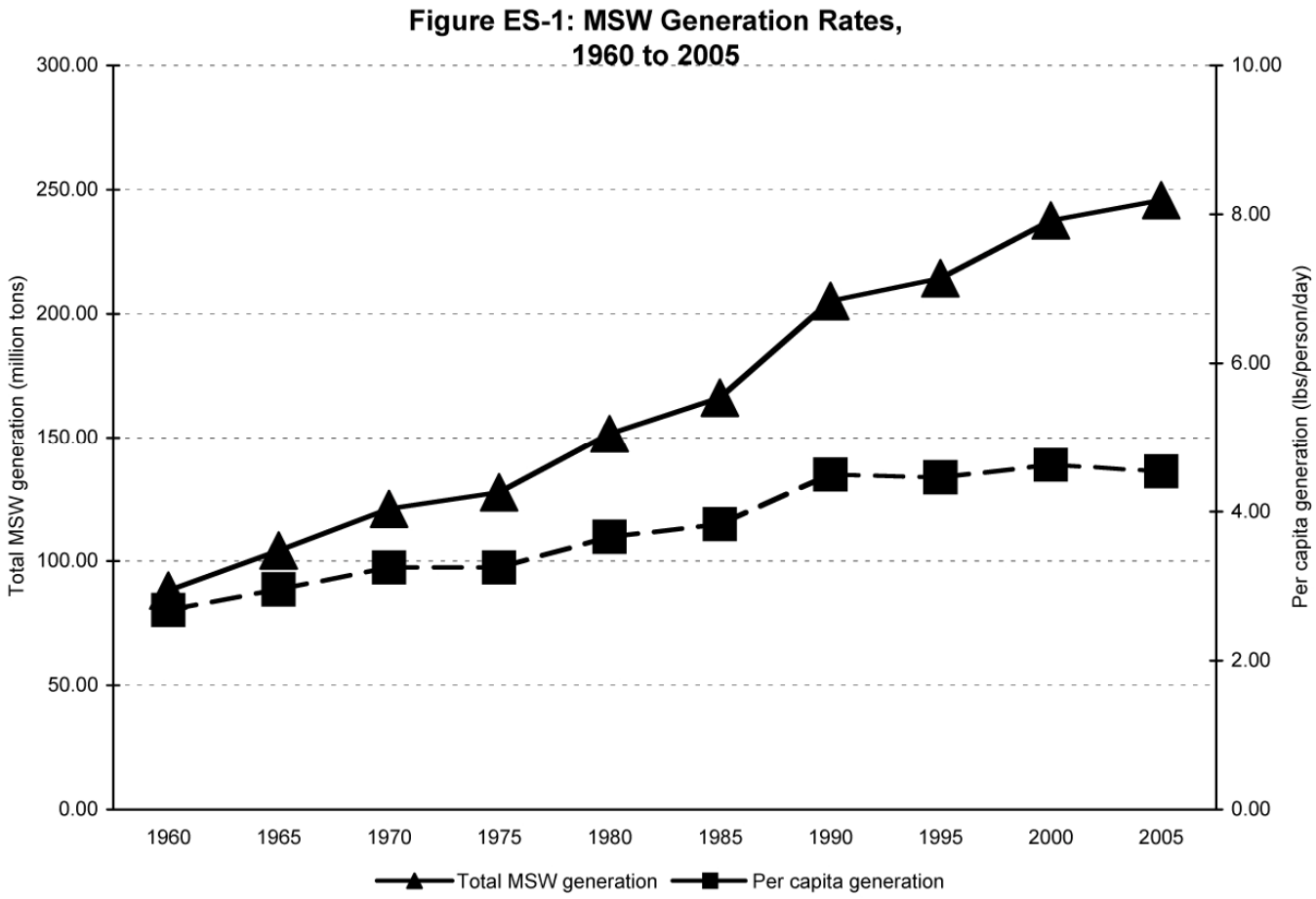
# Excerpts

**Table 2: Industry Group Summary: Disposal, Diversion, Generation, and Diversion Rate**

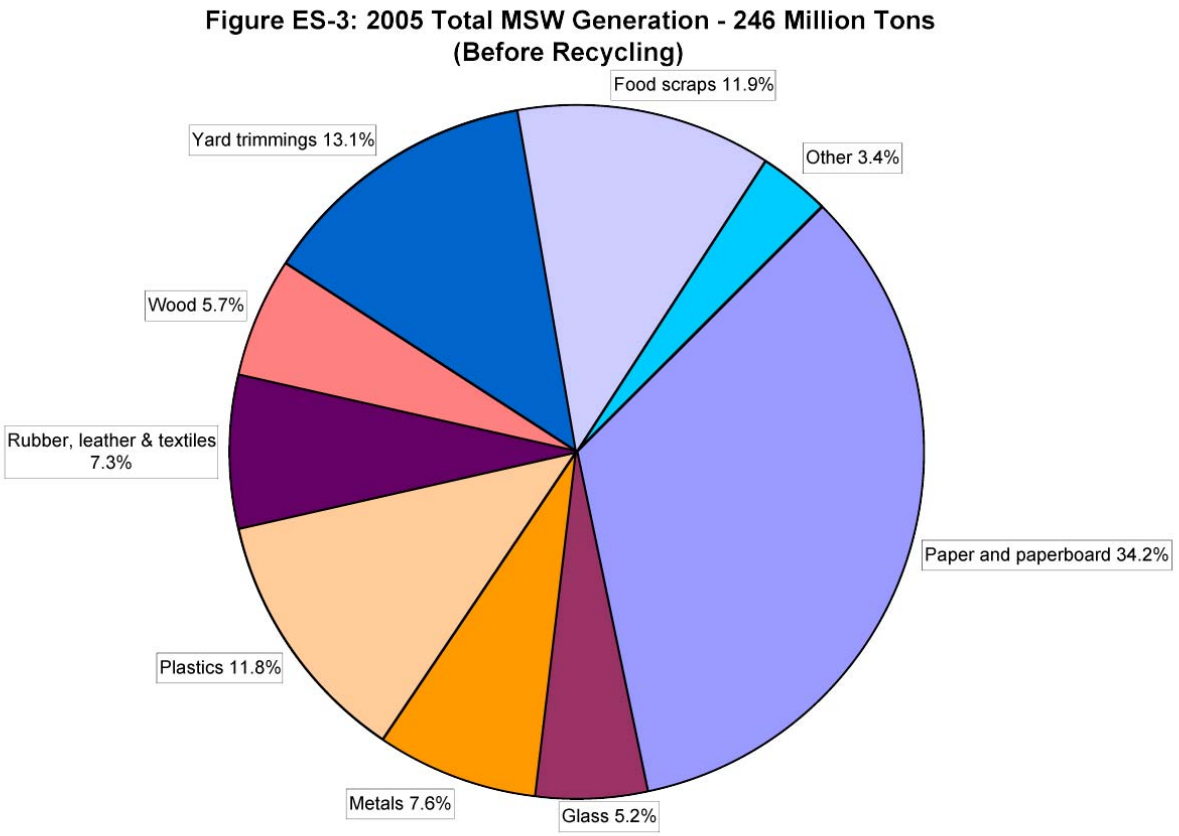
| Industry Group | Disposal (pounds per employee) | Diversion (pounds per employee) | Waste Generation (pounds per employee) | Diversion Rate |
|---|---|---|---|---|
| Food Stores | 4,754 | 11,825 | 16,578 | 71.3% |
| Retail, Big Box Stores | 2,866 | 4,932 | 7,798 | 63.3% |
| Non-Durable Wholesale Distributors | 2,861 | 4,070 | 6,931 | 58.7% |
| Retail, Other Stores | 1,719 | 1,995 | 3,714 | 53.7% |
| Durable Wholesale Distributors | 2,460 | 2,259 | 4,719 | 47.9% |
| Anchor Stores at Shopping Malls *(pounds per 1,000 sq ft)* | 2,103 | 1,418 | 3,520 | 40.3% |
| Fast-Food Restaurants | 4,262 | 2,267 | 6,528 | 34.7% |
| Full-Service Restaurants | 4,403 | 2,034 | 6,437 | 31.6% |
| Building Material & Gardening, Big Box Stores | 6,343 | 2,689 | 9,031 | 29.8% |
| Public Venues & Events *(pounds per 100 visitors)* | 172 | 72 | 244 | 29.0% |
| Building Material & Gardening, Other Stores | 3,481 | 1,118 | 4,599 | 24.3% |
| Large Hotels | 3,903 | 1,145 | 5,049 | 22.7% |
| Shopping Malls *(pounds per 1,000 sq ft)* | 2,028 | 471 | 2,499 | 18.9% |
| Large Office Buildings *(pounds per 1,000 sq ft)* | 1,866 | 132 | 1,998 | 6.6% |

*Note: More detailed information on disposal rates can be found in Table 21 of Appendix A of the complete report.*

# Trash grows with population

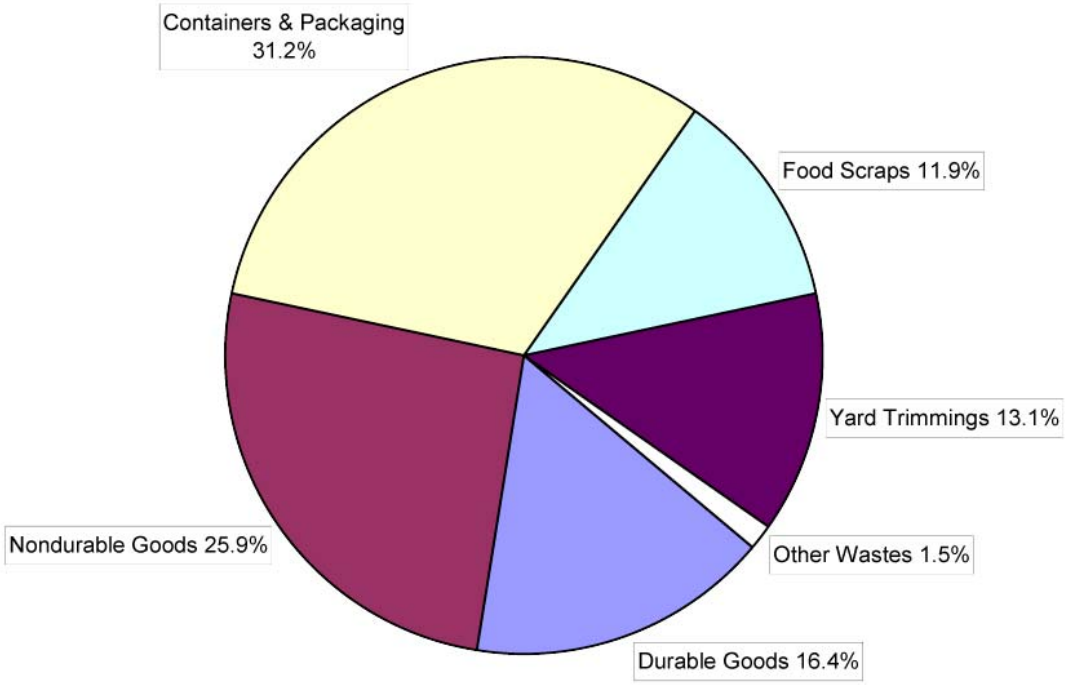


# Trash before some recyclabes are recovered.



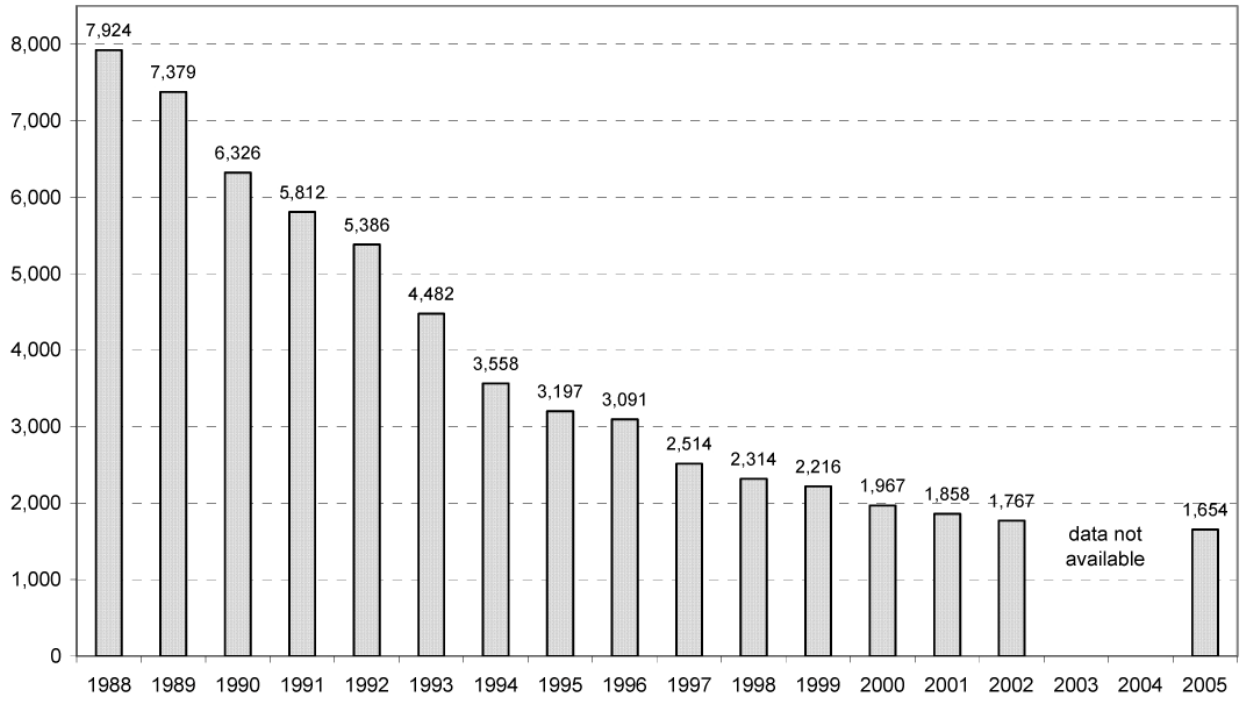
# What could NOT be trash?

**Figure ES-4: Products Generated in MSW, 2005**
**(Total Weight = 246 million tons)**



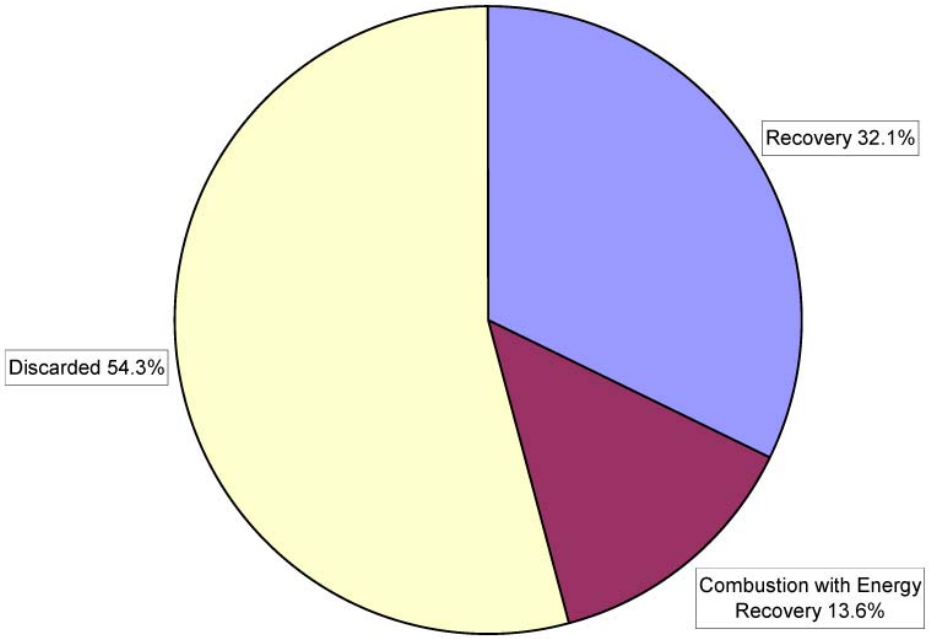
# Landfills are being closed, and there are good reasons.

**Figure ES-5: Number of Landfills in the United States, 1988-2005**



# What happens to the trash stream

**Figure ES-6: Management of MSW in the United States, 2005**



# About 40% of packaging can be recovered.

**Table ES-5**
**GENERATION AND RECOVERY OF PRODUCTS IN MSW**
**BY MATERIAL, 2005**
**(in millons of tons and percent of generation of each product)**

| Products | Weight Generated | Weight Recovered | Recovery as a Percent of Generation |
|---|---|---|---|
| **Containers and Packaging** | | | |
| Steel | 2.37 | 1.50 | 63.3% |
| Aluminum | 1.90 | 0.69 | 36.3% |
| *Total metals* | 4.27 | 2.19 | 51.3% |
| Glass | 10.9 | 2.76 | 25.3% |
| Paper and paperboard | 39.0 | 22.9 | 58.8% |
| Plastics | 13.7 | 1.28 | 9.4% |
| Wood | 8.56 | 1.31 | 15.3% |
| Other materials | 0.24 | Neg. | Neg. |
| ***Total containers and packaging*** | 76.7 | 30.5 | 39.8% |

# As trash increases, so has recovery of recyclables

**Table ES-1**
**GENERATION, MATERIALS RECOVERY, COMPOSTING, COMBUSTION WITH ENERGY RECOVERY, AND DISCARDS OF MUNICIPAL SOLID WASTE, 1960 - 2005**
**(in millions of tons)**

| Activity | 1960 | 1970 | 1980 | 1990 | 2000 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|
| **Generation** | 88.1 | 121.1 | 151.6 | 205.2 | 237.6 | 240.4 | 247.3 | 245.7 |
| Recovery for recycling | 5.6 | 8.0 | 14.5 | 29.0 | 52.7 | 55.8 | 57.2 | 58.4 |
| Recovery for composting* | Neg. | Neg. | Neg. | 4.2 | 16.5 | 19.1 | 20.5 | 20.6 |
| **Total materials recovery** | 5.6 | 8.0 | 14.5 | 33.2 | 69.1 | 74.9 | 77.7 | 79.0 |
| **Combustion with energy recovery†** | 0.0 | 0.4 | 2.7 | 29.7 | 33.7 | 33.7 | 34.1 | 33.4 |
| **Discards to landfill, other disposal‡** | 82.5 | 112.7 | 134.4 | 142.3 | 134.8 | 131.9 | 135.5 | 133.3 |

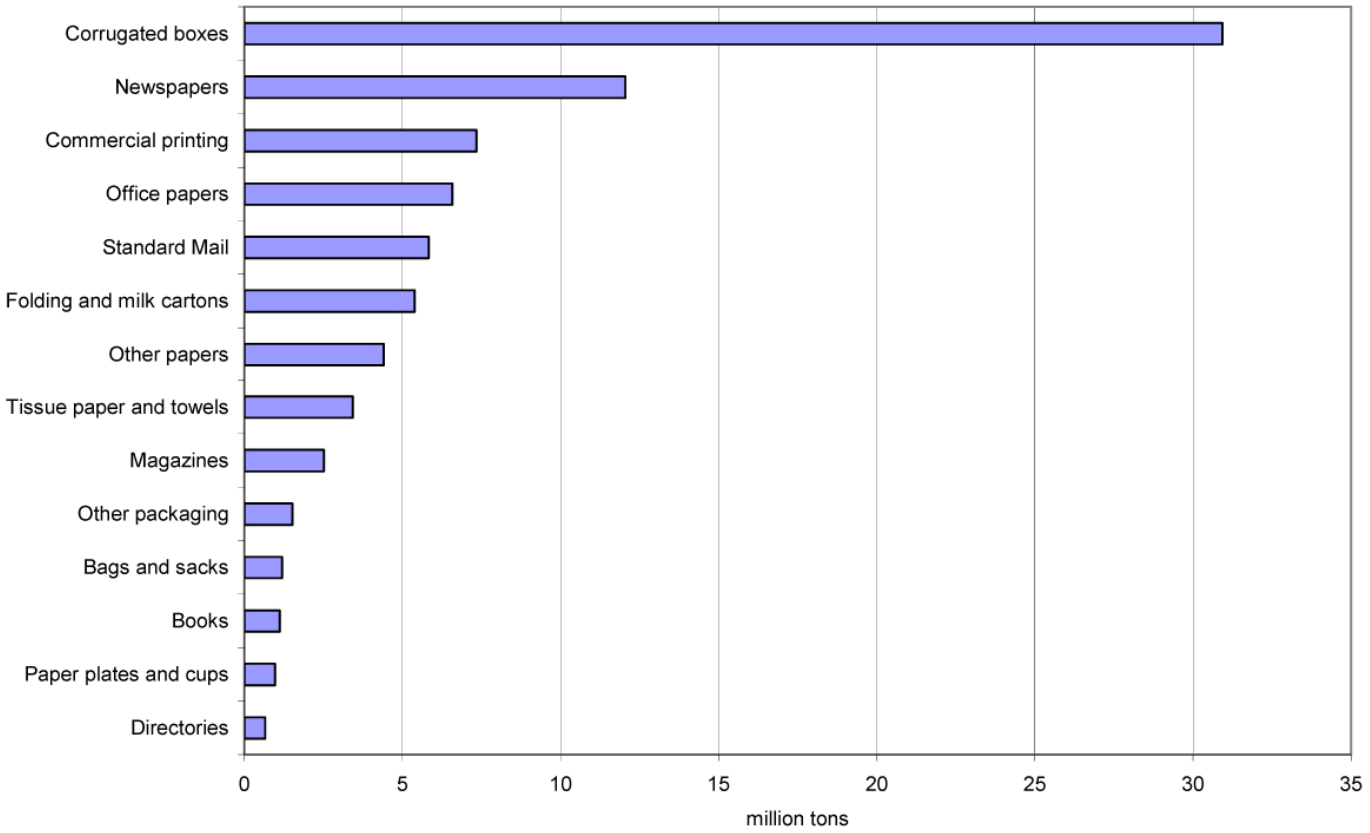
* Composting of yard trimmings, food scraps and other MSW organic material.
Does not include backyard composting.

† Includes combustion of MSW in mass burn or refuse-derived fuel form, and combustion with energy recovery of source separated materials in MSW (e.g., wood pallets and tire-derived fuel).

‡ Discards after recovery minus combustion with energy recovery. Discards include combustion without energy recovery.
Details may not add to totals due to rounding.

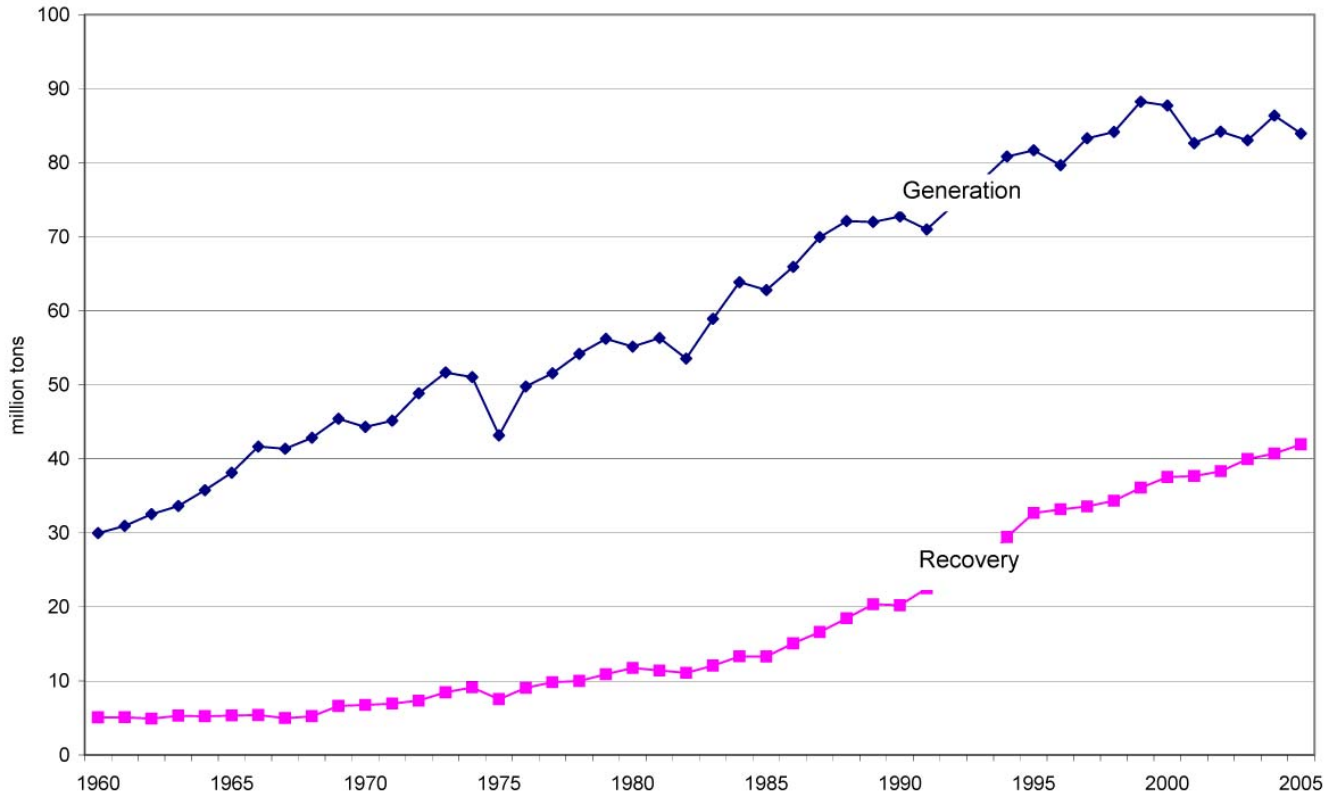
# These stats do not include internal (trade) recovery and recycling

**Figure 2. Paper and paperboard products generated in MSW, 2005**



# Paper recovery grows at same rate as trashed paper.

**Figure 3. Paper and paperboard generation and recovery, 1960 to 2005**



# Single service glass bottles are majority of waste.

**Figure 4. Glass products generated in MSW, 2005**

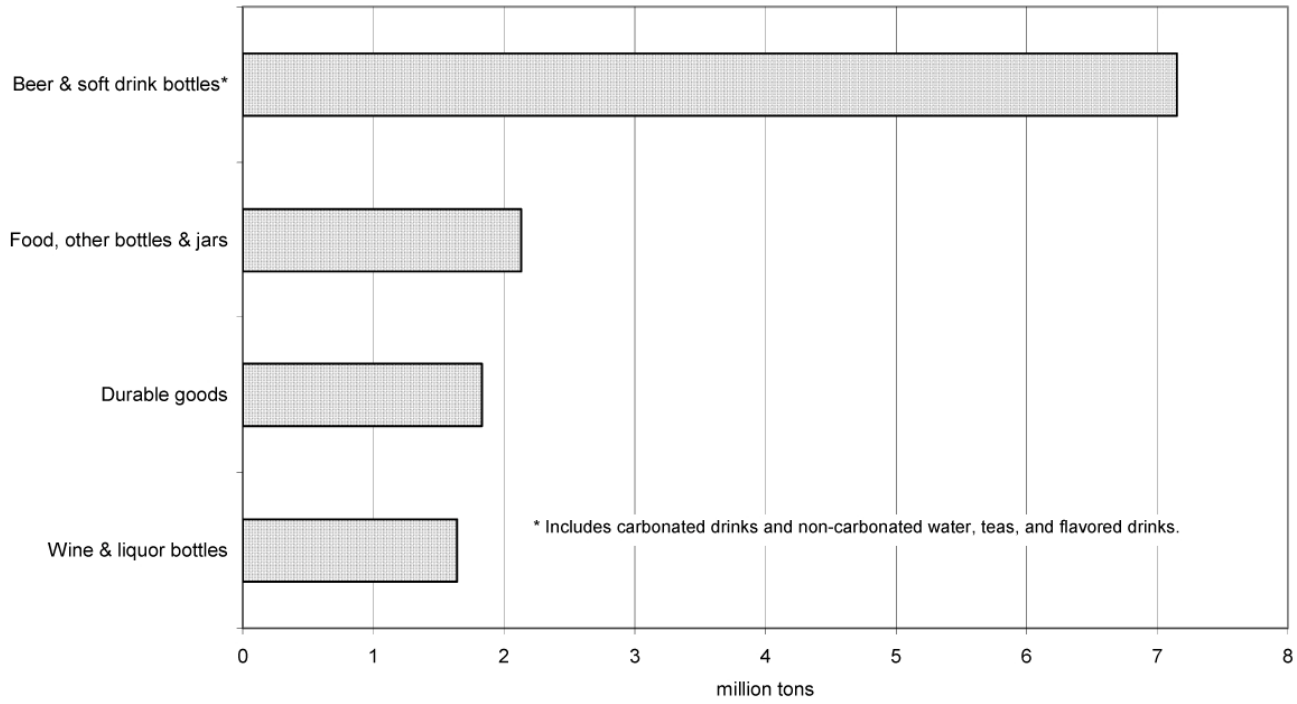


**Figure 5. Glass generation and recovery, 1960 to 2005**

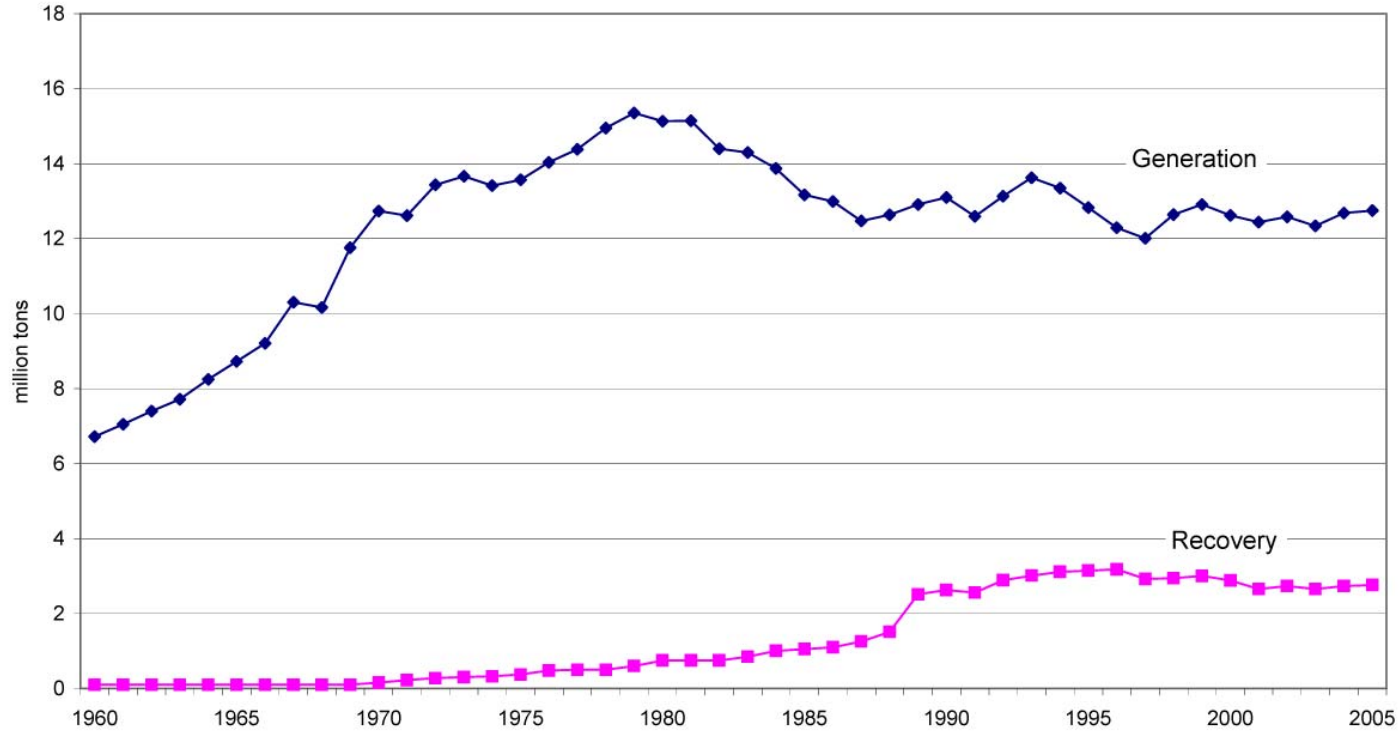
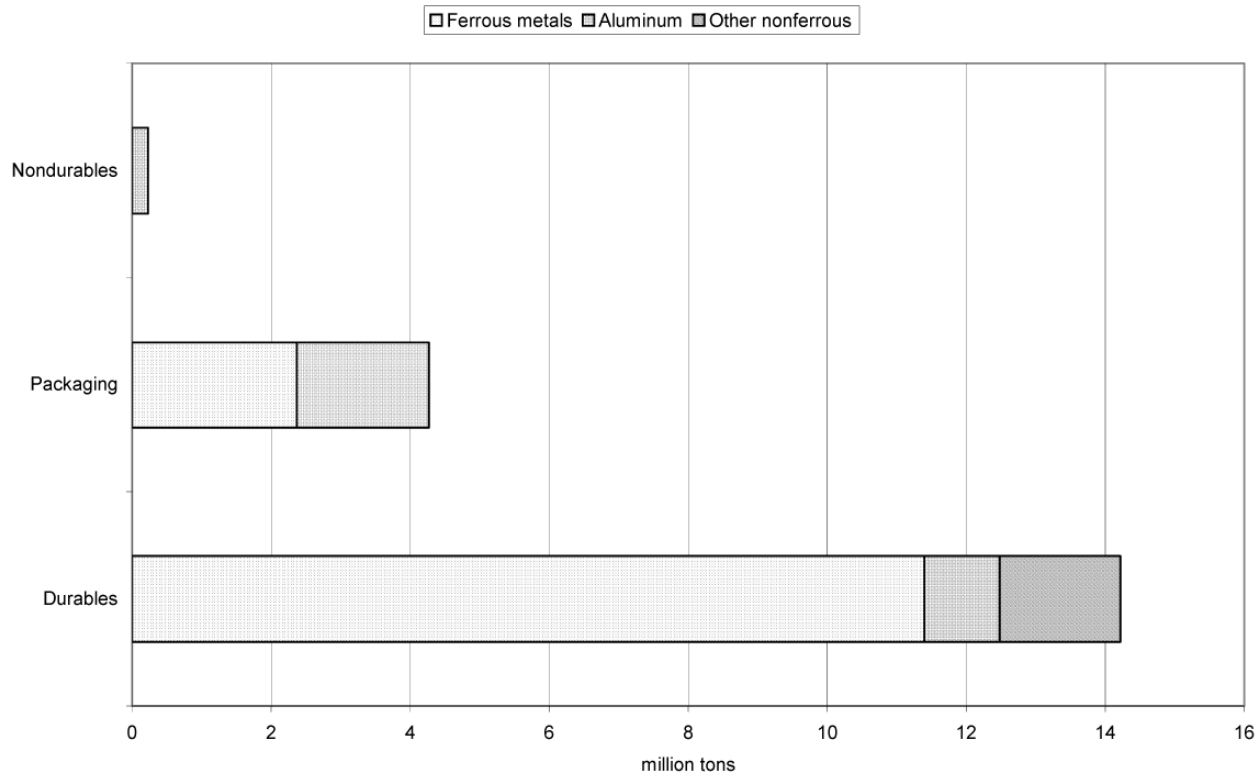
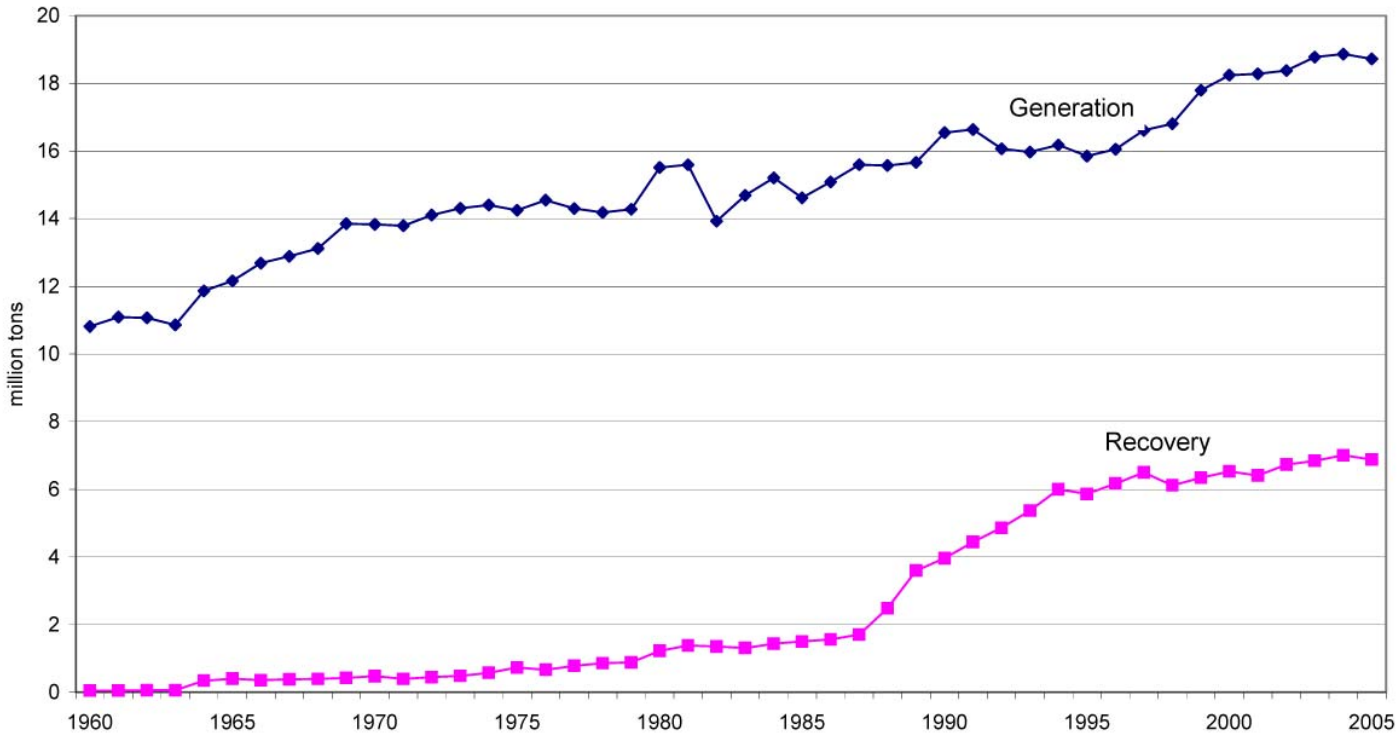


**Figure 6. Metal products generated in MSW, 2005**



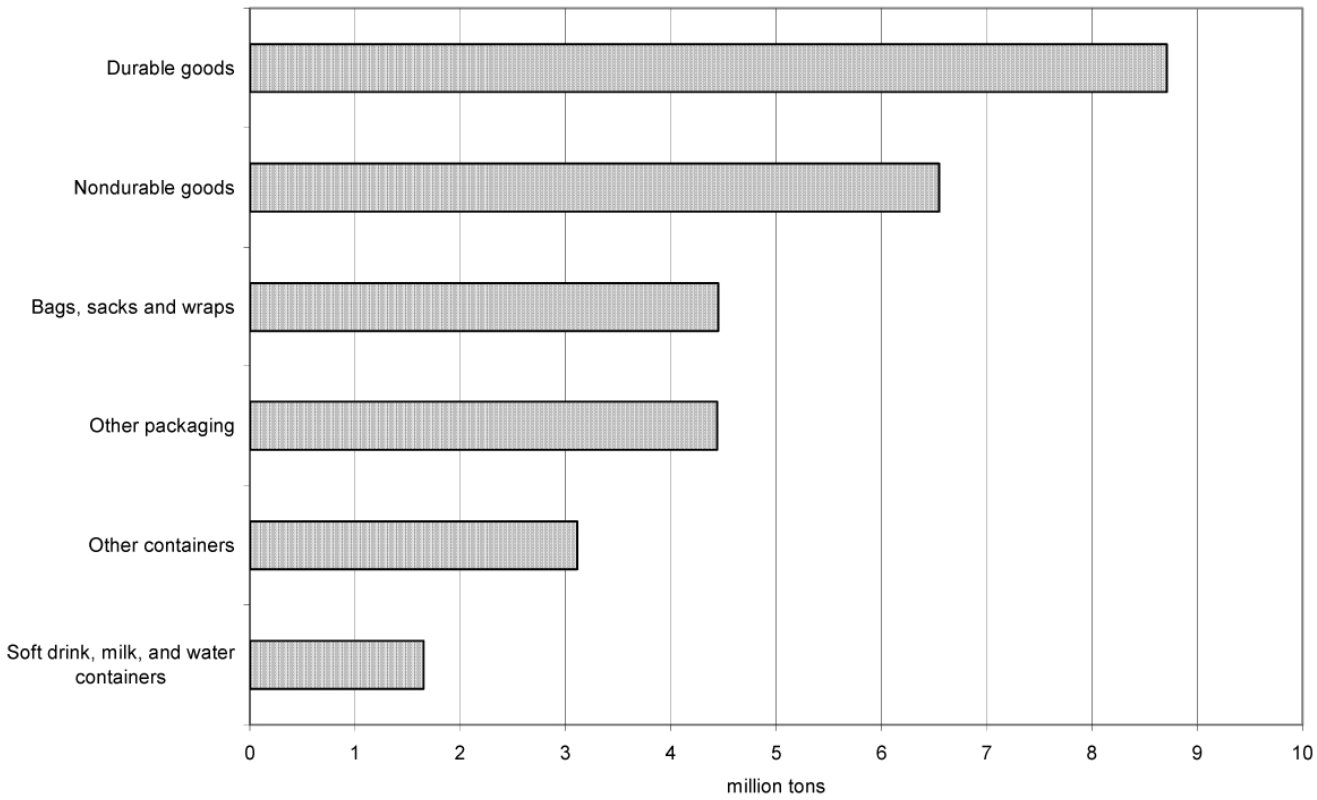
# Metals recovery is increasing

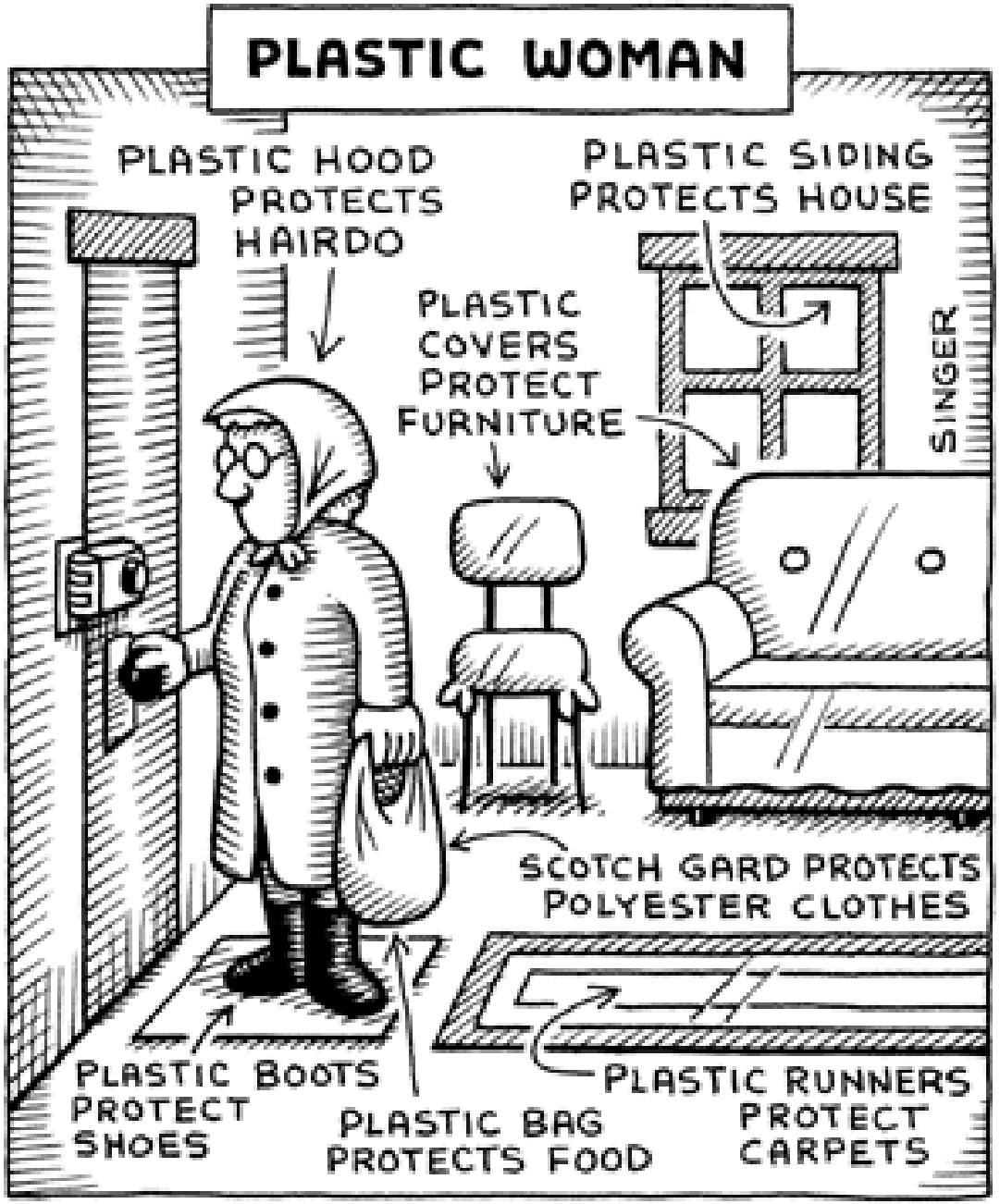
**Figure 7. Metals generation and recovery, 1960 to 2005**



# Plastic Trash Generation

**Figure 8. Plastics products generated in MSW, 2005**




PLASTIC WOMAN
PLASTIC HOOD PROTECTS HAIRDO
PLASTIC SIDING PROTECTS HOUSE
PLASTIC COVERS PROTECT FURNITURE
SINGER
SCOTCH GARD PROTECTS POLYESTER CLOTHES
PLASTIC BOOTS PROTECT SHOES
PLASTIC BAG PROTECTS FOOD
PLASTIC RUNNERS PROTECT CARPETS

# Hydrocarbon Plastics – (The Myth of) the Chasing Arrows







# Recycle Logos

Here's what the numbers represent:

#1 - Polyethylene Terephthalate (PET)
#2 - High Density Polyethylene (HDPE)
#3 - Vinyl (Polyvinyl Chloride or PVC)
#4 - Low Density Polyethylene (LDPE)
#5 - Polypropylene (PP)
#6 - Polystyrene (PS)
#7 - Other (which commonly includes: Polycarbonate, ABS, Nylon, Acrylic or a composite of 2 or more resins)

# Only 4.2% of Durable Fossil Plastics get recycled.

**Table 7**

**PLASTICS IN PRODUCTS IN MSW, 2005**
**(In thousands of tons, and percent of generation by resin)**

| Product Category | Generation (Thousand tons) | Recovery (Thousand tons) | Recovery (Percent of Gen.) | Discards (Thousand tons) |
|---|---|---|---|---|
| **Durable Goods** | | | | |
| PET | 480 | | | |
| HDPE | 650 | | | |
| PVC | 510 | | | |
| LDPE/LLDPE | 770 | | | |
| PP | 1,370 | | | |
| PS | 730 | | | |
| Other resins | 4,200 | | | |
| ***Total Plastics in Durable Goods*** | 8,710 | 370 | 4.2% | 8,340 |

# Non-Durable Single Use does not get recycled.

**Table 7**

**PLASTICS IN PRODUCTS IN MSW, 2005**
**(In thousands of tons, and percent of generation by resin)**

| Product Category | Generation (Thousand tons) | Recovery (Thousand tons) | Recovery (Percent of Gen.) | Discards (Thousand tons) |
|---|---|---|---|---|
| **Nondurable Goods** | | | | |
| Plastic Plates and Cups | | | | |
| LDPE/LLDPE | 20 | | | 20 |
| PS | 910 | Neg. | | 910 |
| ***Subtotal Plastic Plates and Cups*** | 930 | | | 930 |
| Trash Bags | | | | |
| HDPE | 280 | | | 280 |
| LDPE/LLDPE | 780 | | | 780 |
| ***Subtotal Trash Bags*** | 1,060 | | | 1,060 |
| All other nondurables* | | | | |
| PET | 240 | | | 240 |
| HDPE | 430 | | | 430 |
| PVC | 660 | | | 660 |
| LDPE/LLDPE | 1,630 | | | 1,630 |
| PP | 900 | | | 900 |
| PS | 600 | | | 600 |
| Other resins | 100 | | | 100 |
| ***Subtotal All Other Nondurables*** | 4,560 | | | 4,560 |

# Non-packaging NonDurables do not get recycled at all.

**Table 7**

**PLASTICS IN PRODUCTS IN MSW, 2005**
**(In thousands of tons, and percent of generation by resin)**

| Product Category | Generation (Thousand tons) | Recovery (Thousand tons) | Recovery (Percent of Gen.) | Discards (Thousand tons) |
|---|---|---|---|---|
| **Total Plastics in Nondurable Goods, by resin** | | | | |
| PET | 240 | | | 240 |
| HDPE | 710 | | | 710 |
| PVC | 660 | | | 660 |
| LDPE/LLDPE | 2,430 | | | 2,430 |
| PP | 900 | | | 900 |
| PS | 1,510 | | | 1,510 |
| Other resins | 100 | | | 100 |
| ***Total Plastics in Nondurable Goods*** | 6,550 | Neg. | Neg. | 6,550 |

# Rigid Fossil Plastics: only #1 (PET) and #2 (HDPE) get recycled.

**PLASTICS IN PRODUCTS IN MSW, 2005**
**(In thousands of tons, and percent of generation by resin)**

| Product Category | Generation (Thousand tons) | Recovery (Thousand tons) | Recovery (Percent of Gen.) | Discards (Thousand tons) |
|---|---|---|---|---|
| **Plastic Containers & Packaging** | | | | |
| Soft drink bottles | | | | |
| PET | 850 | 290 | 34.1% | 560 |
| Milk and water bottles | | | | |
| HDPE | 800 | 230 | 28.8% | 570 |
| Other plastic containers | | | | |
| PET | 1,040 | 210 | | 830 |
| HDPE | 1,410 | 230 | | 1,180 |
| PVC | 90 | | | 90 |
| LDPE/LLDPE | 40 | | | 40 |
| PP | 80 | | | 80 |
| PS | 0 | | | 0 |
| Other resins | 450 | | | 450 |
| ***Subtotal Other Containers*** | 3,110 | 440 | 14.1% | 2,670 |

# Fossil Plastics Film: only #4 and #2 get recycled

**PLASTICS IN PRODUCTS IN MSW, 2005**
**(In thousands of tons, and percent of generation by resin)**

| Product Category | Generation (Thousand tons) | Recovery (Thousand tons) | Recovery (Percent of Gen.) | Discards (Thousand tons) |
|---|---|---|---|---|
| Bags, sacks, & wraps | | | | |
| HDPE | 790 | 40 | | 750 |
| PVC | 70 | | | 70 |
| LDPE/LLDPE | 2,680 | 190 | | 2,490 |
| PP | 710 | | | 710 |
| PS | 0 | | | 0 |
| Other resins | 200 | | | 200 |
| ***Subtotal Bags, Sacks, & Wraps*** | 4,450 | 230 | 5.2% | 4,220 |
| Other Plastics Packaging** | | | | |
| PET | 250 | 40 | | 210 |
| HDPE | 1,530 | 20 | | 1,510 |
| PVC | 310 | | | 310 |
| LDPE/LLDPE | 530 | | | 530 |
| PP | 940 | 10 | | 930 |
| PS | 350 | | | 350 |
| Other resins | 530 | 20 | | 510 |
| ***Subtotal Other Packaging*** | 4,440 | 90 | 2.0% | 4,350 |

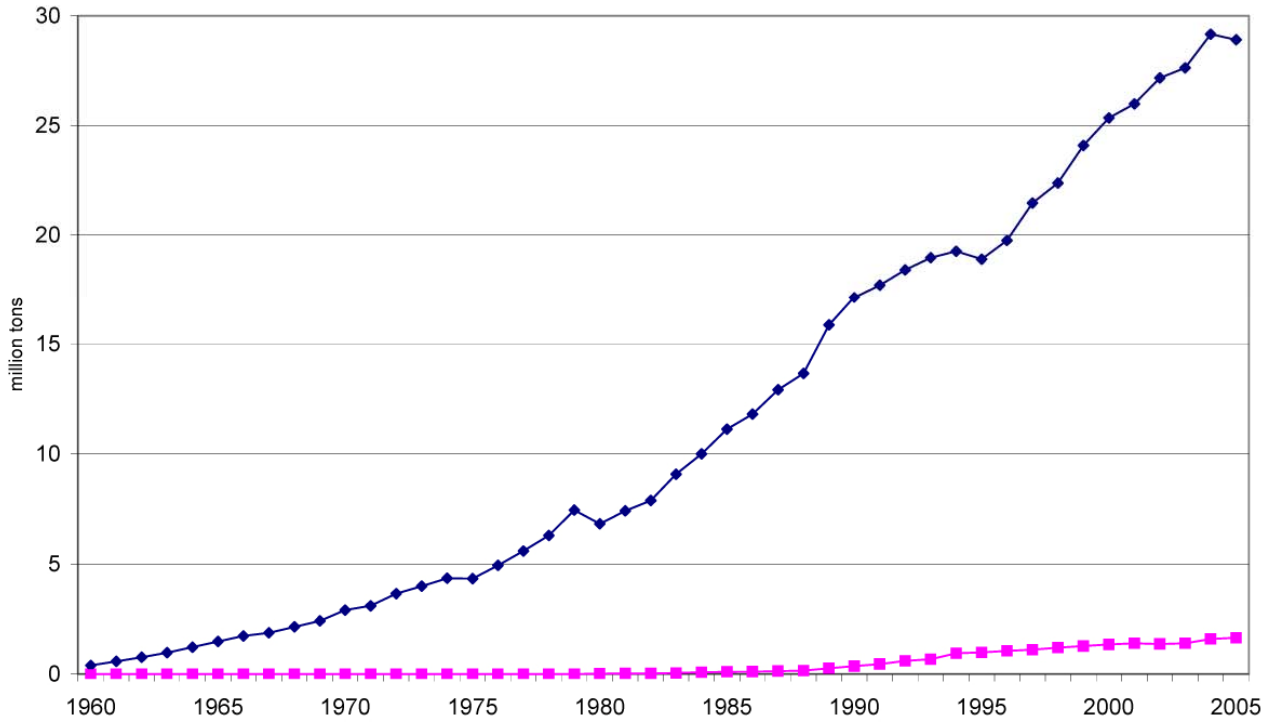
# Plastics recovery: no PVC (#3) or PS (#6)

**PLASTICS IN PRODUCTS IN MSW, 2005**
**(In thousands of tons, and percent of generation by resin)**

| Product Category | Generation (Thousand tons) | Recovery (Thousand tons) | Recovery (Percent of Gen.) | Discards (Thousand tons) |
|---|---|---|---|---|
| **Total Plastics in Containers & Packaging, by resin** | | | | |
| PET | 2,140 | 540 | | 1,600 |
| HDPE | 4,530 | 520 | | 4,010 |
| PVC | 470 | | | 470 |
| LDPE/LLDPE | 3,250 | 190 | | 3,060 |
| PP | 1,730 | 10 | | 1,720 |
| PS | 350 | | | 350 |
| Other resins | 1,180 | 20 | | 1,160 |
| ***Total Plastics in Cont. & Packaging*** | 13,650 | 1,280 | 9.4% | 12,370 |
| **Total Plastics in MSW, by resin** | | | | |
| PET | 2,860 | 540 | | 2,320 |
| HDPE | 5,890 | 520 | | 5,370 |
| PVC | 1,640 | | | 1,640 |
| LDPE/LLDPE | 6,450 | 190 | | 6,260 |
| PP | 4,000 | 10 | | 3,990 |
| PS | 2,590 | | | 2,590 |
| Other resins | 5,480 | 390 | | 5,090 |
| ***Total Plastics in MSW*** | 28,910 | 1,650 | 5.7% | 27,260 |

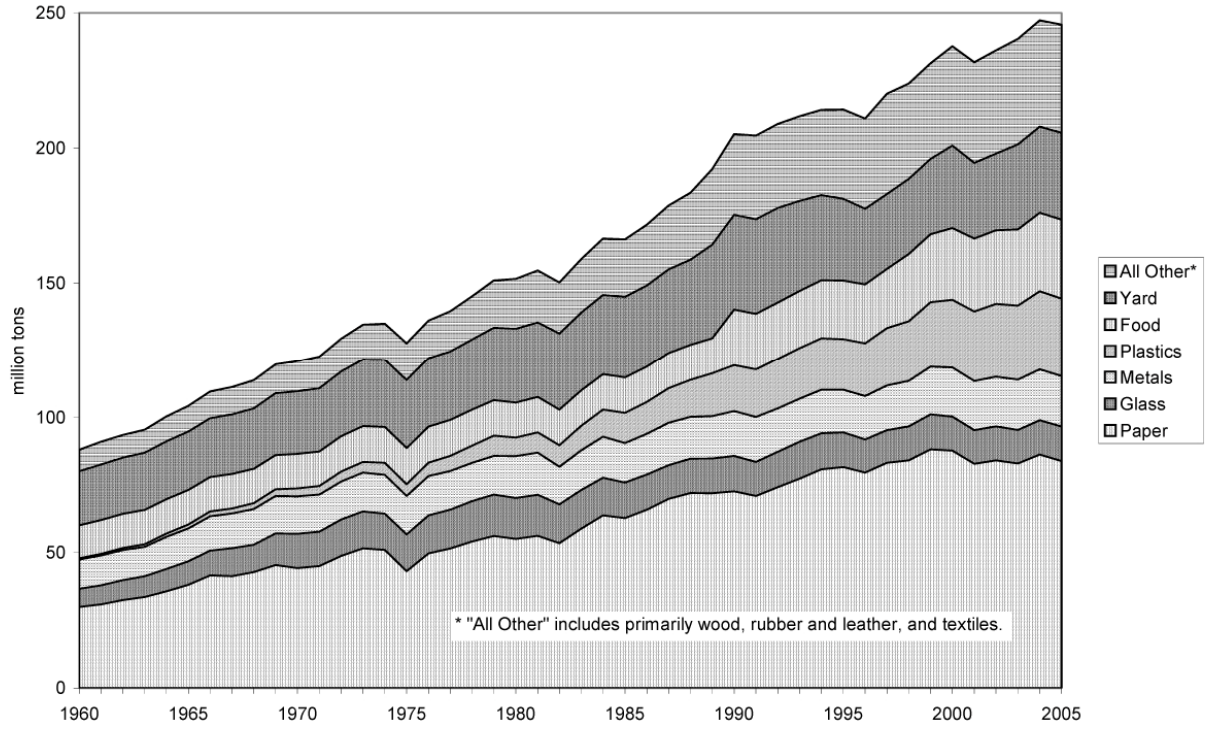
# Plastics generated and recovered

**Figure 9. Plastics generation and recovery, 1960 to 2005**



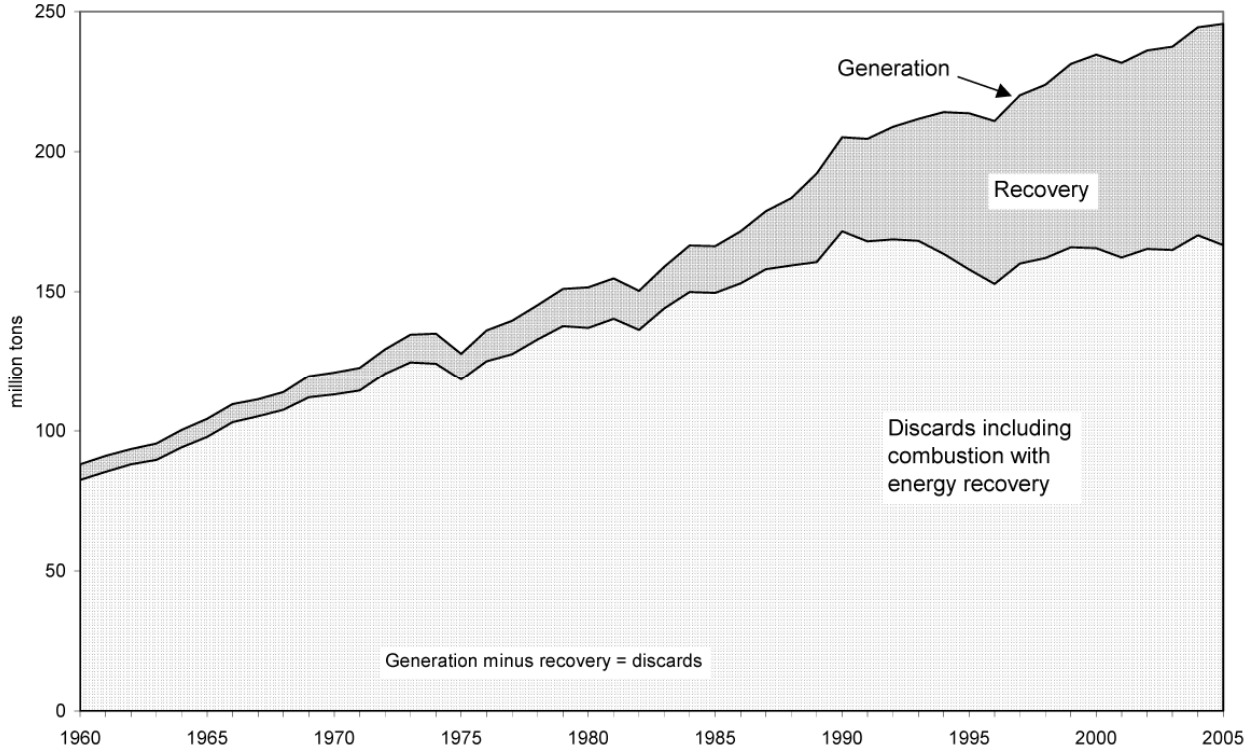
# All trash generated

**Figure 10. Generation of materials in MSW, 1960 to 2005**



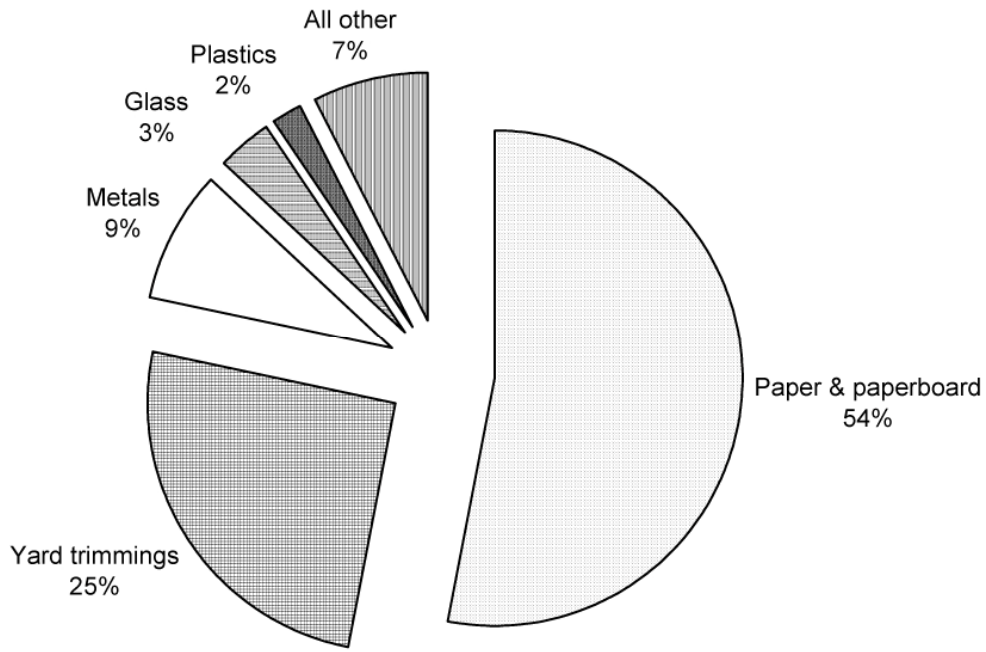
# Trash increases, recovery flattens

**Figure 11. Recovery and discards of materials in MSW, 1960 to 2005**



# Garbage collection recovery

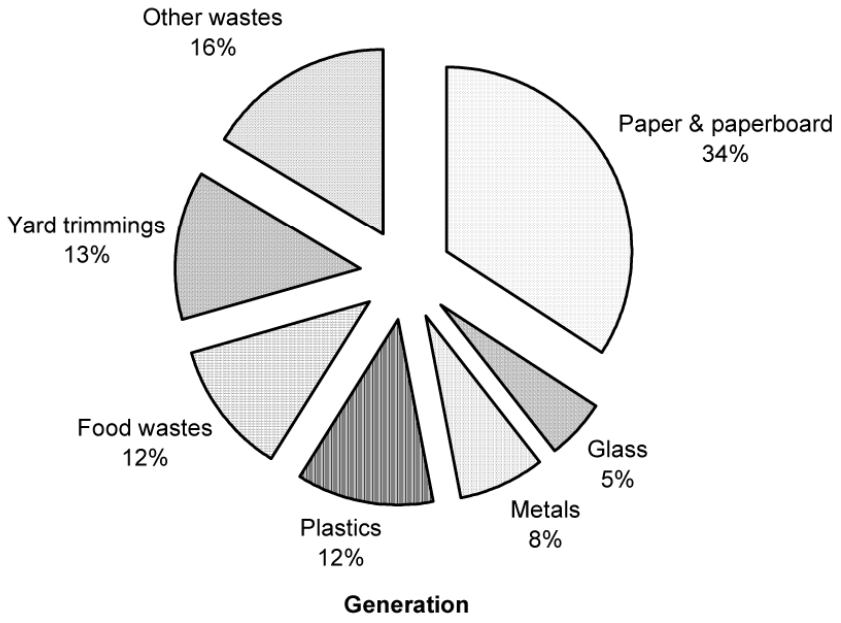
**Figure 12. Materials recovery,* 2005**




* In percent by weight of total recovery

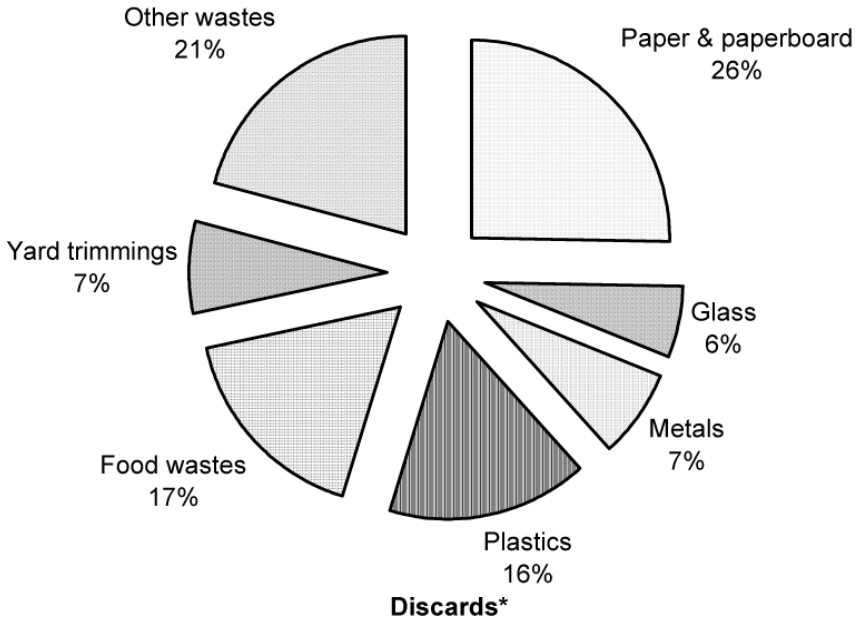
# Materials discarded 2005

**Figure 13. Materials generated and discarded* in municipal solid waste, 2005**
**(In percent of total generation and discards)**



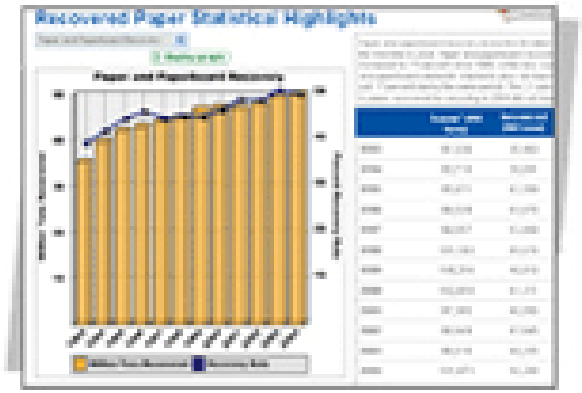
# Materials discarded

**Figure 13. Materials generated and discarded* in municipal solid waste, 2005**
**(In percent of total generation and discards)**




*Discards in this figure include combustion with energy recovery.

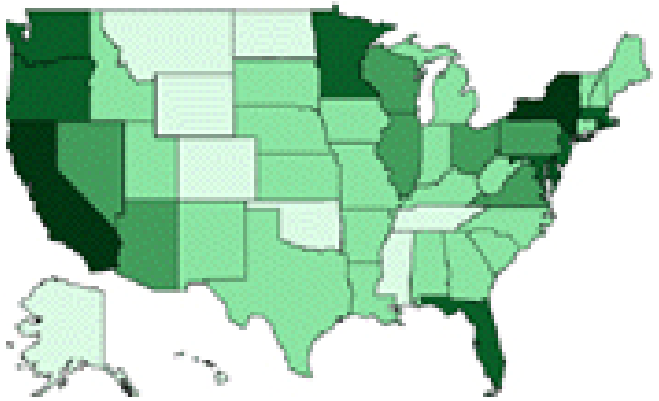
## 2006 Recovered Paper Annual Statistics




In 2006, a record 53.4 percent of the paper consumed in the U.S. was recovered for recycling. Americans recovered an extraordinary 53.5 million tons, averaging 360 pounds per person.

In this section you will find detailed information about how much paper by grade is produced, consumed, and recovered in the U.S. Also included are charts reflecting what new products are being made from the paper grades being recovered for recycling.

## National Paper Recycling Access



Since 1994, the American Forest & Paper Association (AF&PA) has performed a series of national surveys to measure the extent and track the growth of access to community-level paper and paperboard recycling. This map features the findings of the 2005 survey, and highlights the availability of curbside and/or drop-off paper recycling programs for each state.

# Anticipatory Design

- “Significant competitive advantage lies with those organizations and individuals who anticipate well in turbulent times.”

  -- Peter Drucker

# Redesign

Rethink

Reduce

Reuse

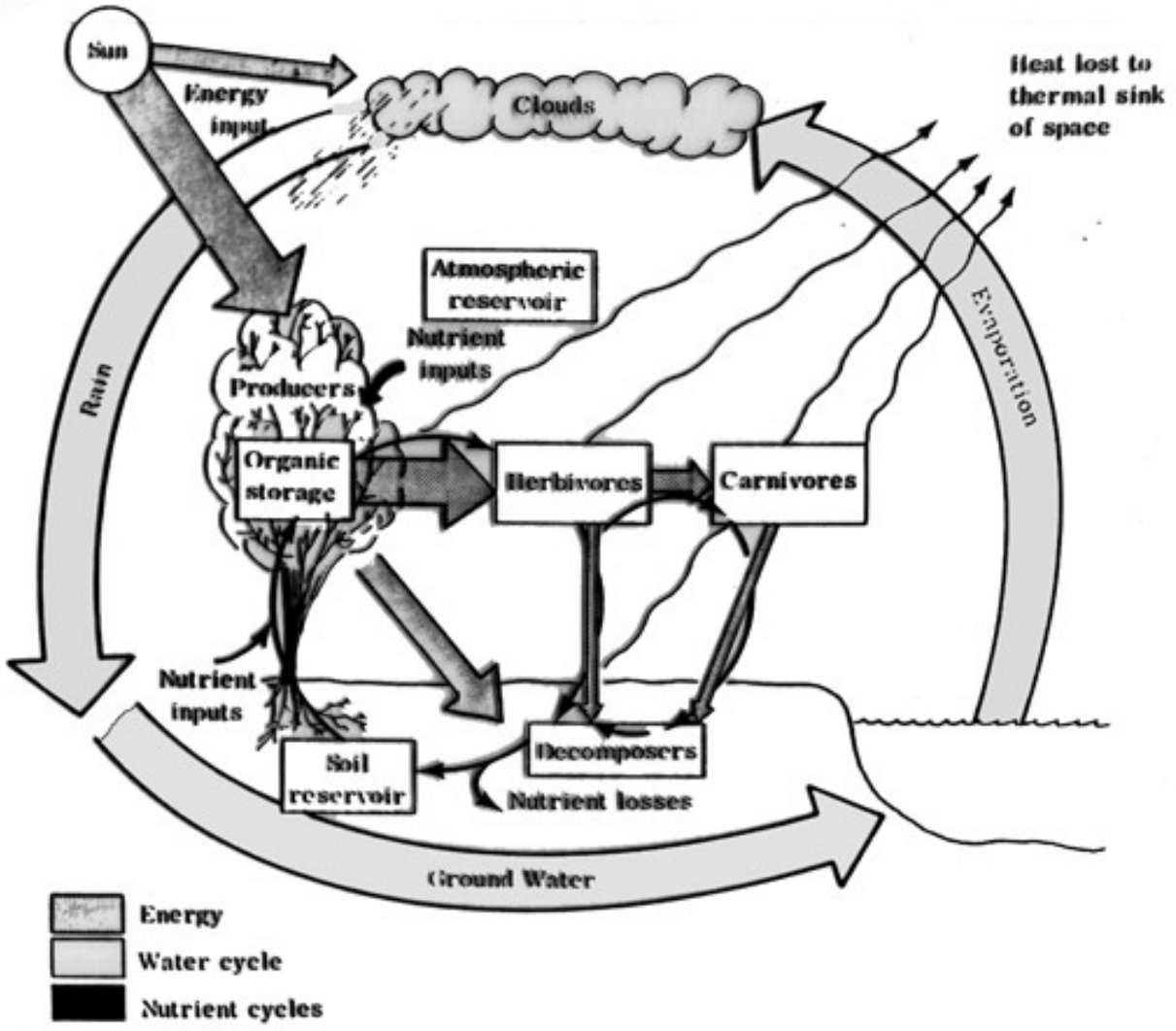
Recycle

# Infrastructure:

The lack of an infrastructure to close the technical and biological loop present huge challenges to sustainable packaging. This includes few industrial-scale composting systems, many different plastics in the waste stream, sorting problems, underfunded local government programs, etc.

***What steps could the natural foods industry take to address this "system" issue?***

The simple idea is to redesign commerce so that it mimics these ecological cycles.




**A model showing the flow of energy, the cycling of water, and the association of biogeochemical cycles with both**

# Major change:  A Paradigm Shift

- Industrial >> informed-ecological
- Ancient sunlight >> current sunlight
- Scarce resources >> regenerative resource
- Disposable >> recyclable and/or compostable
- Chemical Agriculture >> Organic Agriculture’s Principles
- Reactive to the past >> anticipate the future needs
- Short term results >> long term planning

# Common Ground

- Single living system
- Operating Principles of Ecology
- Regenerative Economics

Tom Wright
Sustainable Business Practices

925-376-0327

Green Mission Project
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# The Shopping Bag Dilemma

- Who is responsible for the shopping bags or carriers?
- What would be a ‘best practice’?
- Should shopping bags be ‘free’ and why?
- What would make a good material(s) for a shopping bag?
- What standard should a bag have, if any?
- What would help make the shopping part of a sustainable system?