

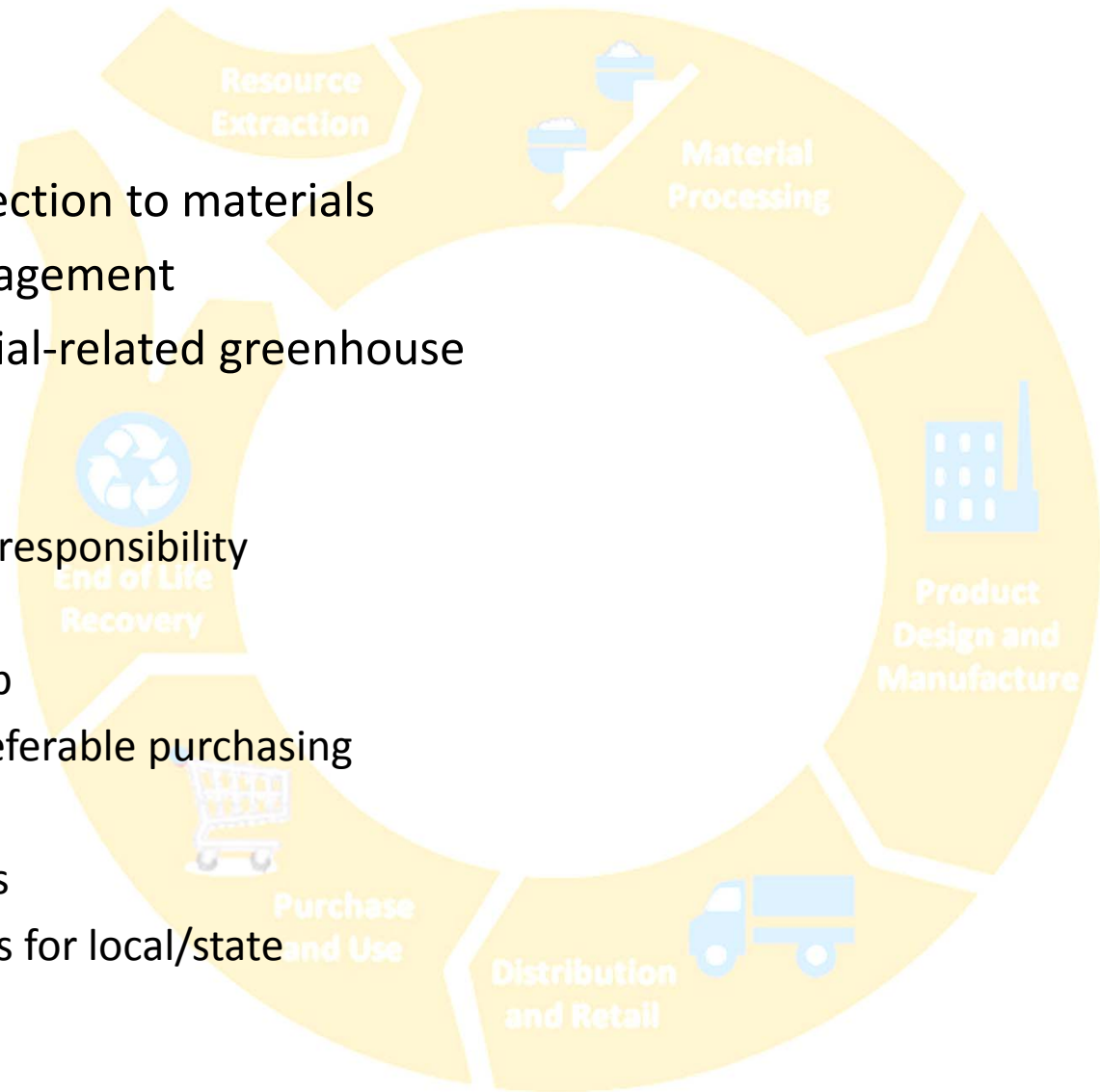
West Coast Climate and  
Materials Management Forum  
Monday, May 7, 2012

# **Materials Management and Climate Change**

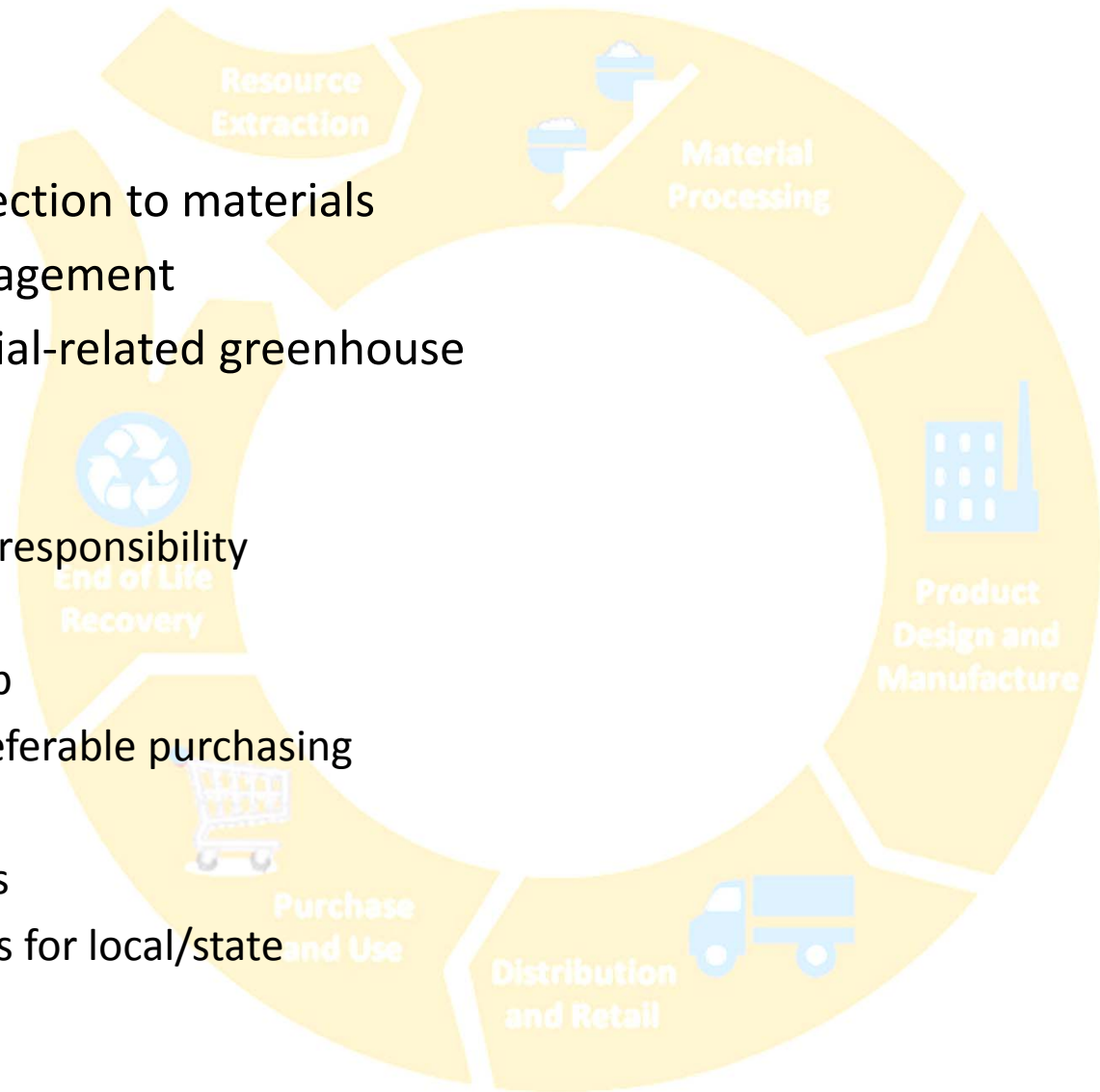
## **An Introduction**

Shannon Davis, EPA  
Davis.shannon@epa.gov

- 1) Consumption patterns
- 2) Greenhouse gas connection to materials
- 3) Role of materials management
- 4) Ways to reduce material-related greenhouse gases
  - a) Recycling
  - b) Extended producer responsibility
  - c) Limits of recycling
  - d) Product stewardship
  - e) Environmentally preferable purchasing
  - f) Consuming less
  - g) Government actions
  - h) Additional resources for local/state governments

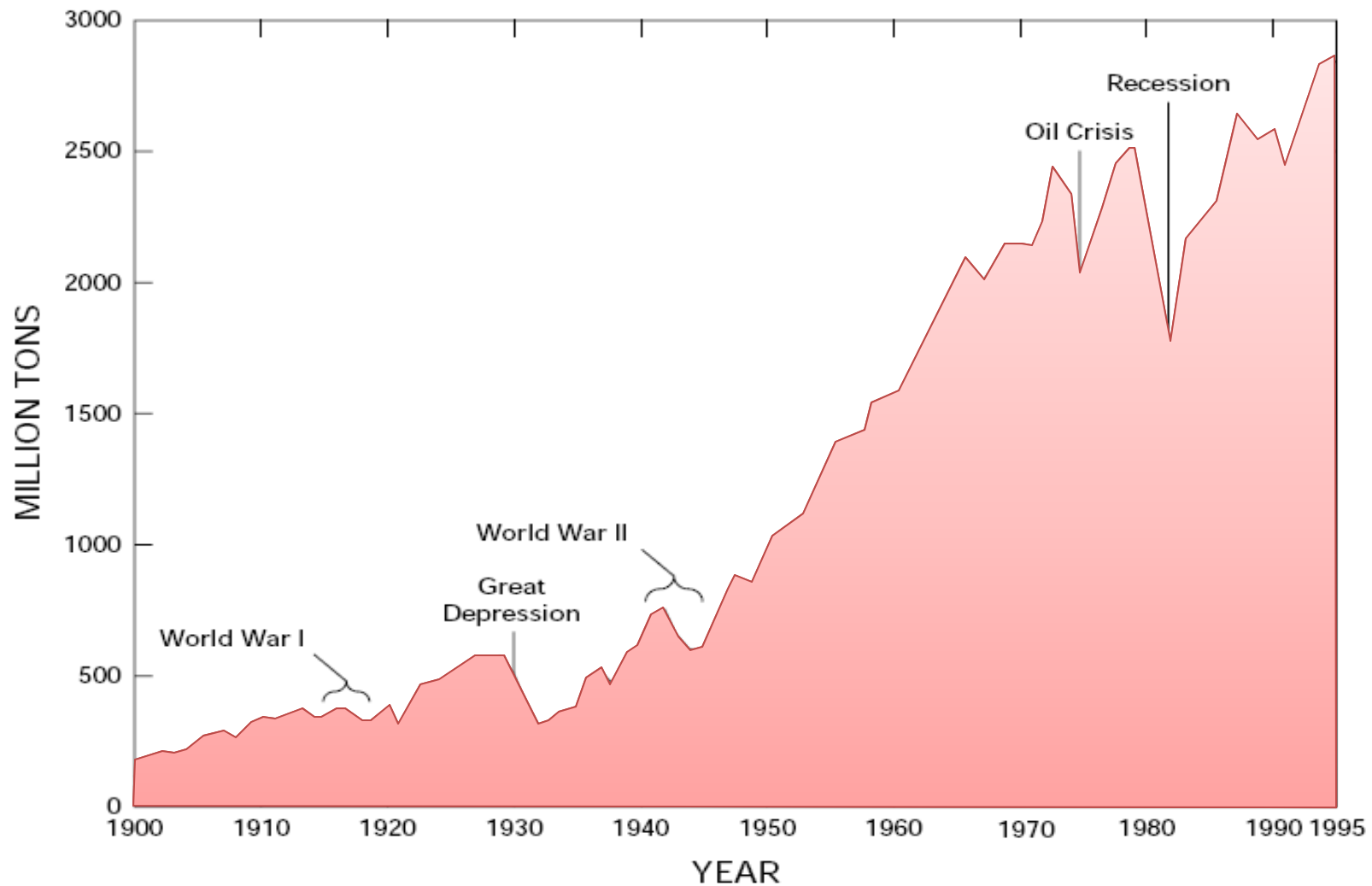


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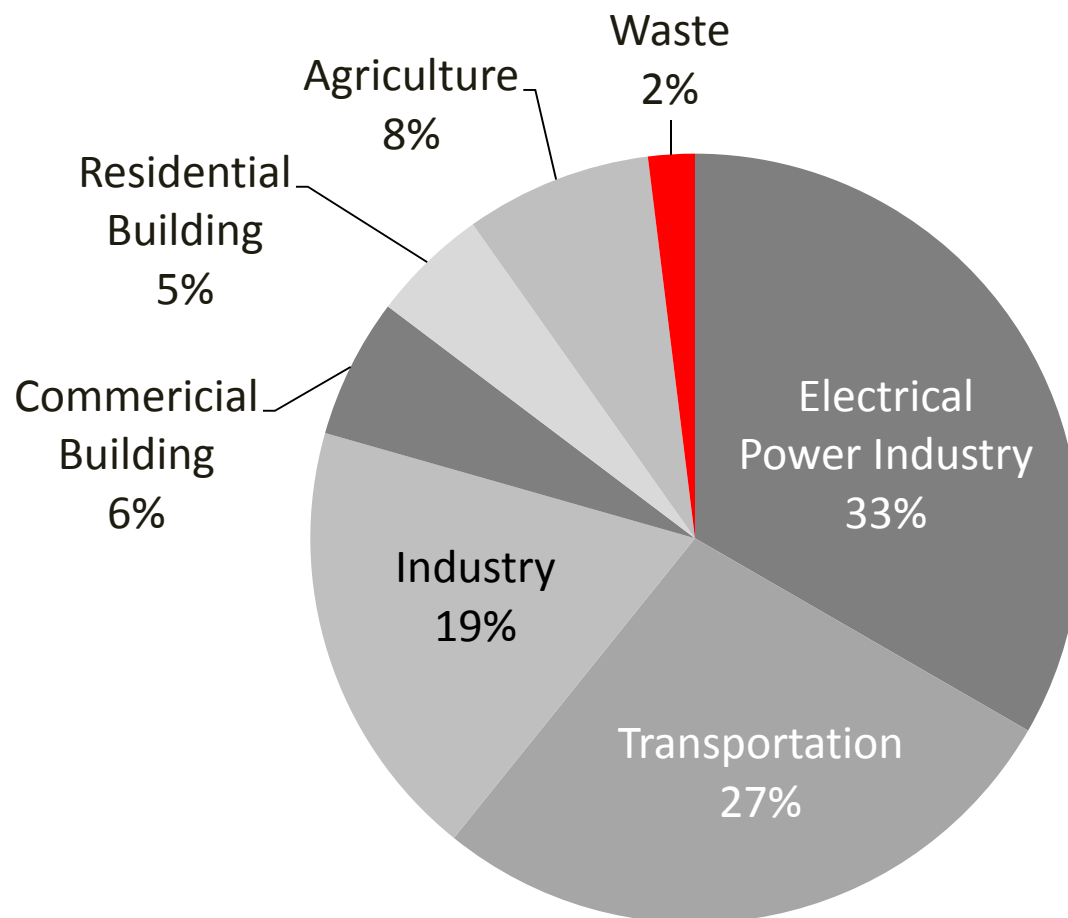
Define “materials”.



Use of materials in the United States, 1900-1995. Modified from Matos and Wagner, 1998, p. 110.

# Materials Consumption





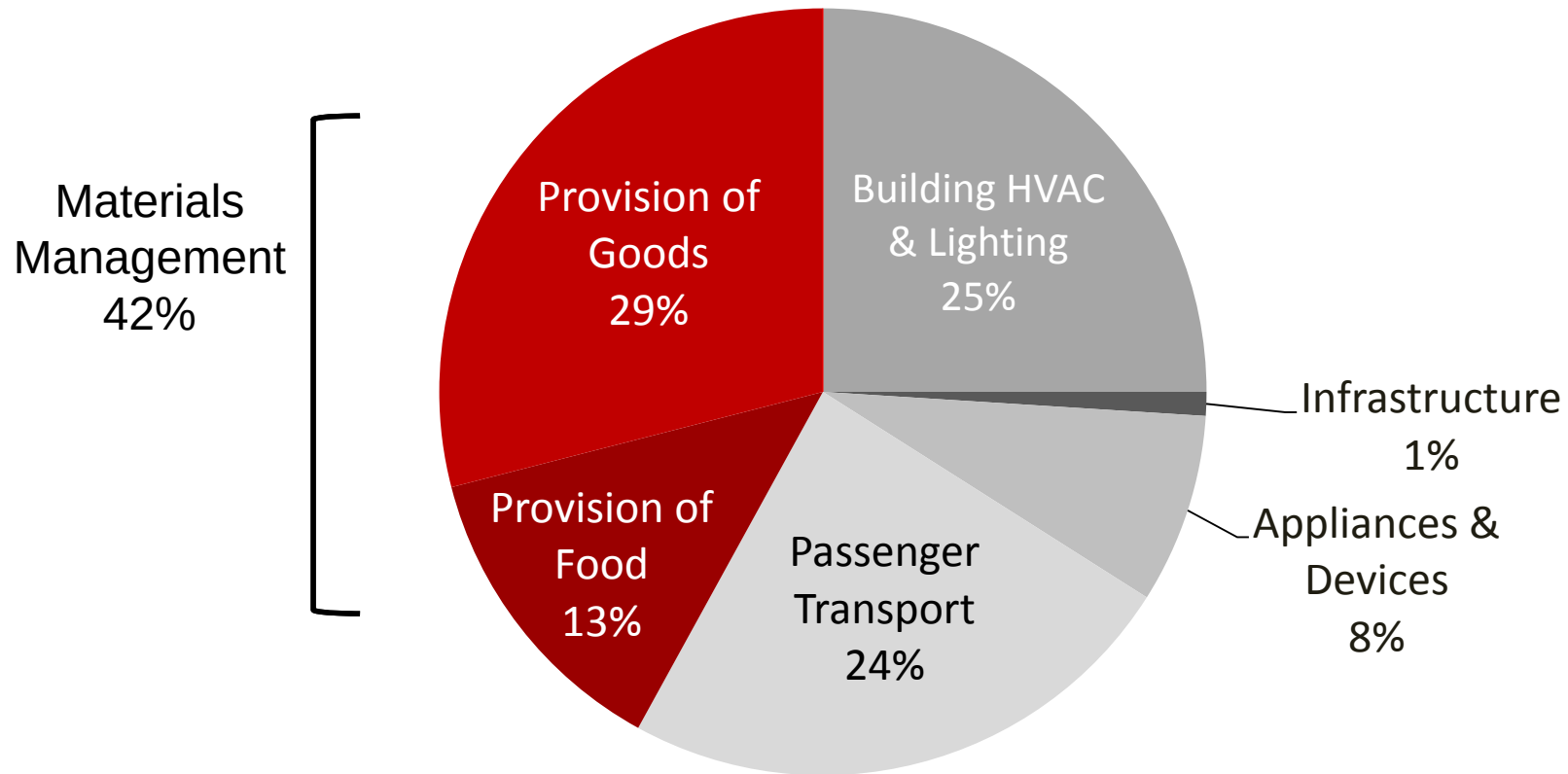
Source: U.S. Inventory of GHG Emissions and Sinks : 1990-2006 (US EPA, 2008)

**US Greenhouse Gas Emissions (2006)**



Source: U.S. Inventory of GHG Emissions and Sinks : 1990-2006 (US EPA, 2008)

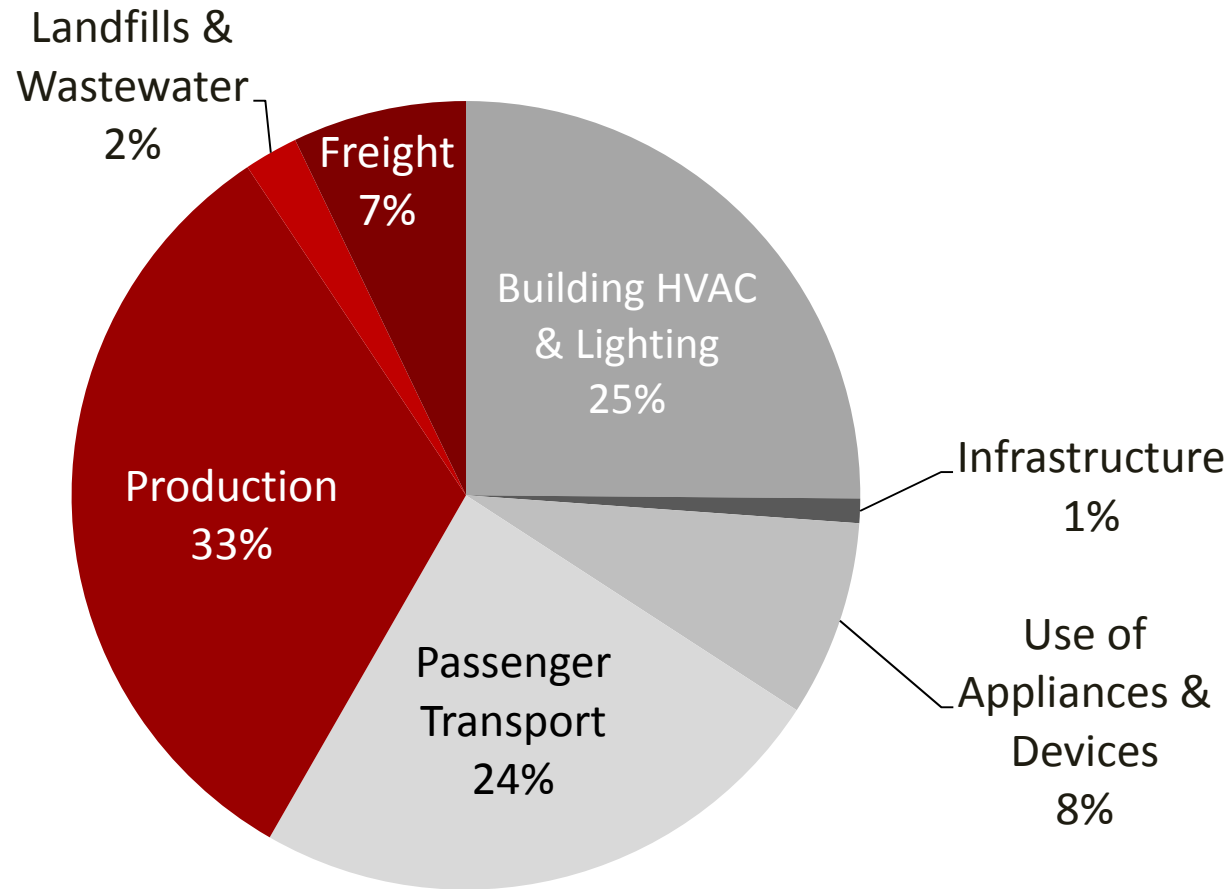
# US Greenhouse Gas Emissions (2006)



Source: *Opportunities to Reduce Greenhouse Gas Emissions through Materials and Land Management Practices*. U.S. EPA.

US Greenhouse Gas Emissions (2006)





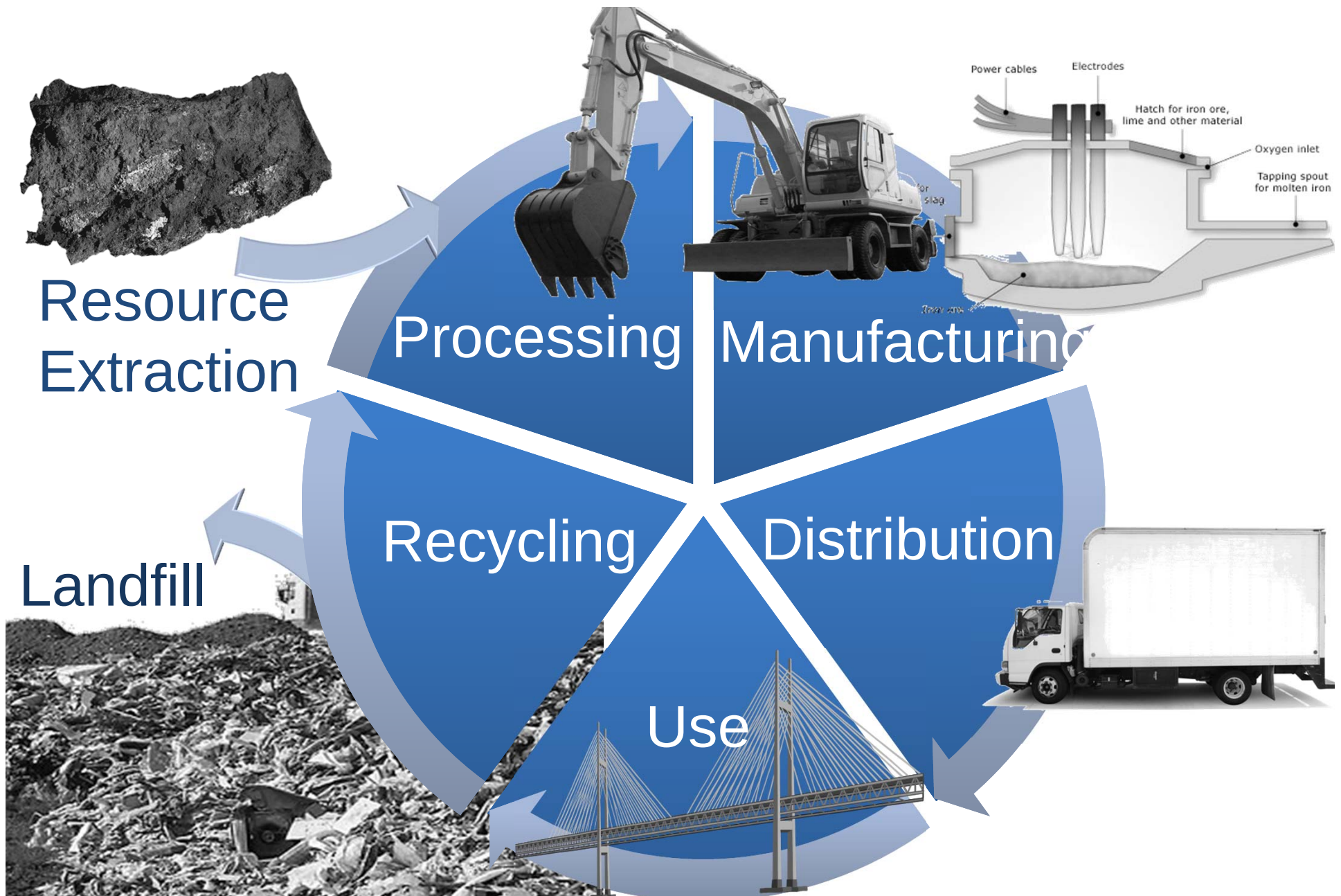
Source: *Opportunities to Reduce Greenhouse Gas Emissions through Materials and Land Management Practices*. U.S. EPA

**Materials: Production Dominates Emissions**

# WASTE management vs. MATERIALS management



Product Lifecycle



Lifecycle of Steel

*“Materials management is an approach to using and reusing resources most efficiently and sustainably throughout their lifecycles. It seeks to minimize materials used and all associated environmental impacts.”*

- From EPA, [Opportunities to Reduce Greenhouse Gas Emissions through Materials and Land Management Practices \(PDF\)](#) (98pp, 1.5MB)

**Materials Management: A Working Definition**

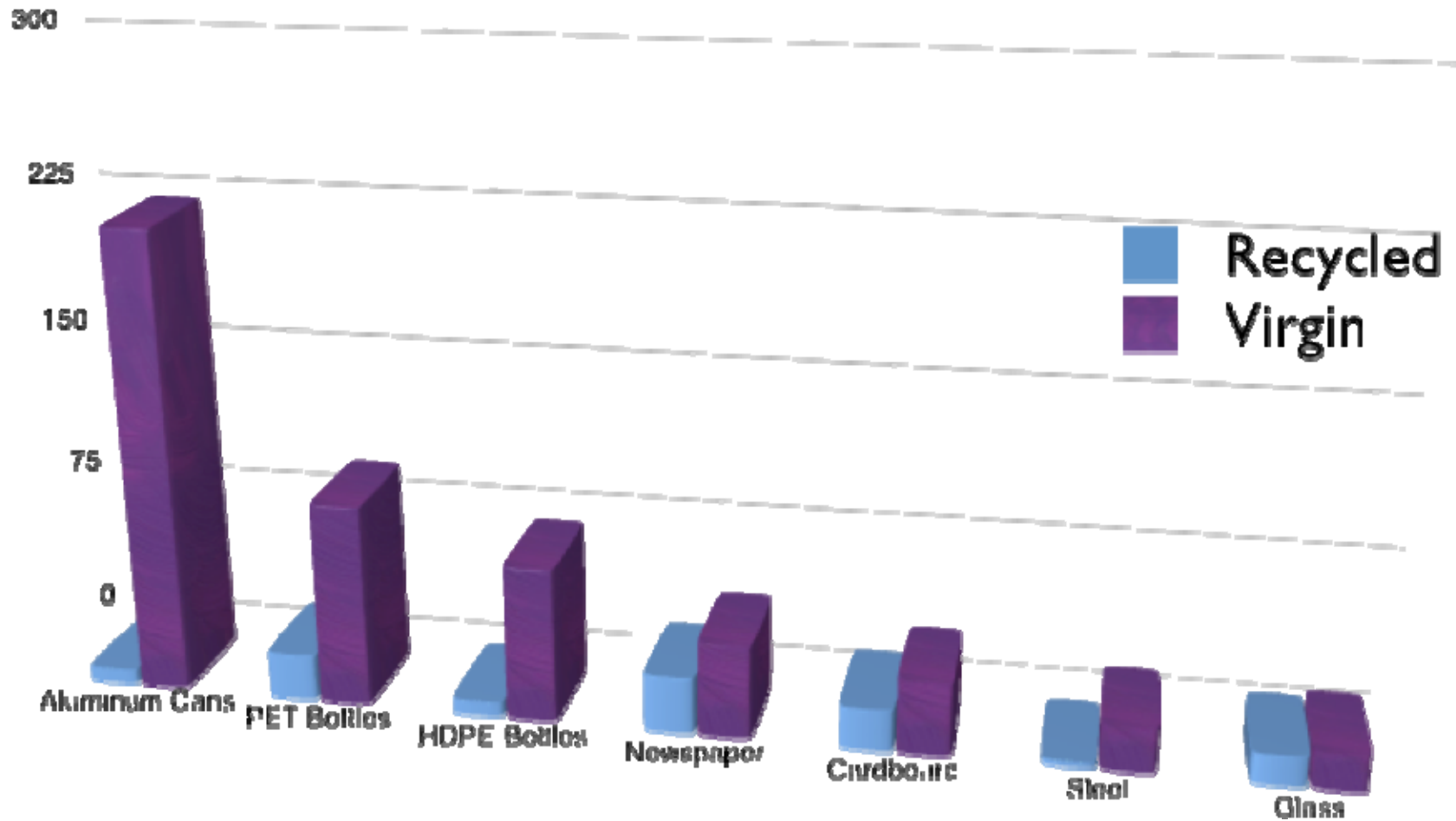




# Reducing the Impacts of Our Consumption

Photo credit: flickr Nick Bramhall, licensed under Creative Commons Attribution-Non-Commercial 2.0 license

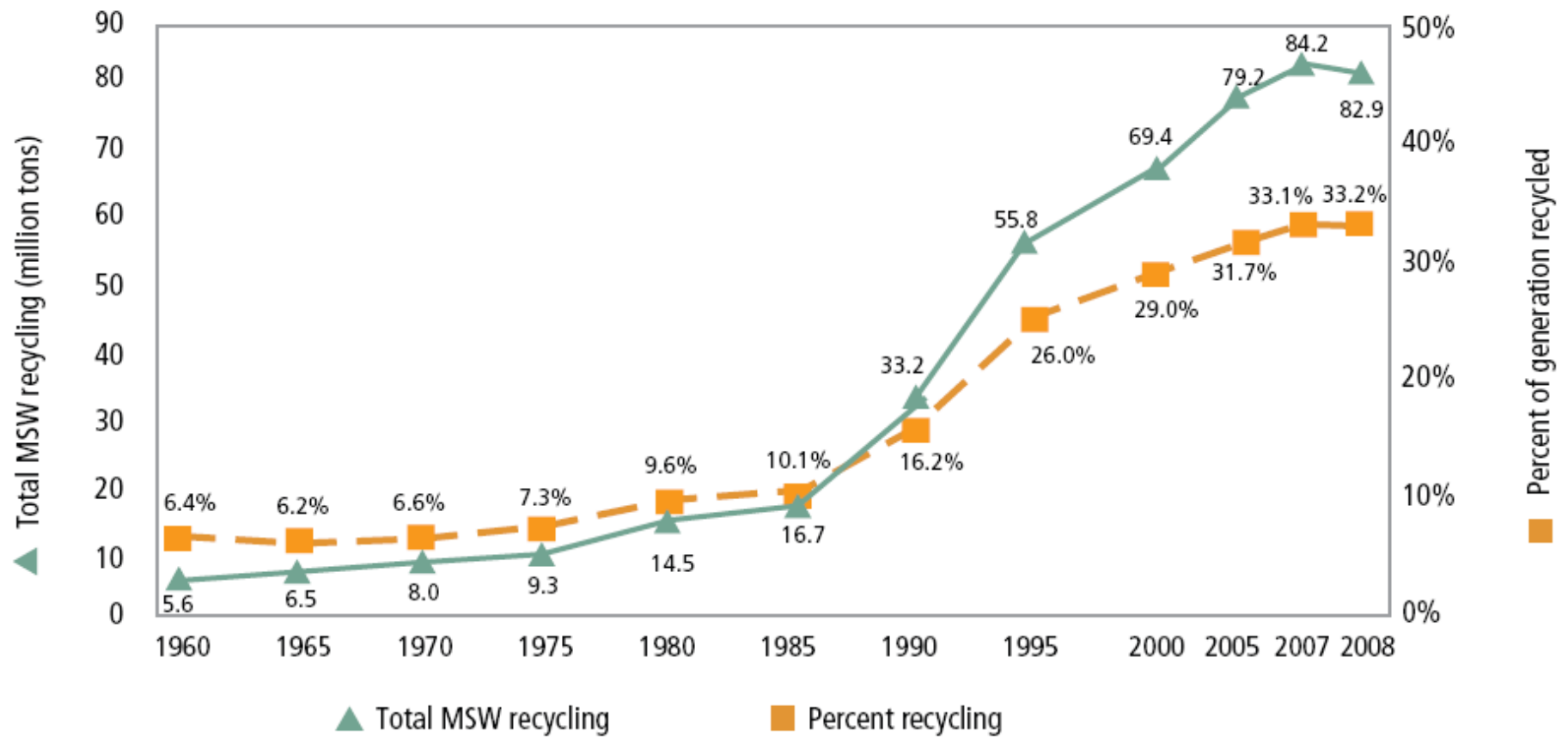
Energy Use: Recycled vs. Virgin Content Products  
(million BTUs/ ton)



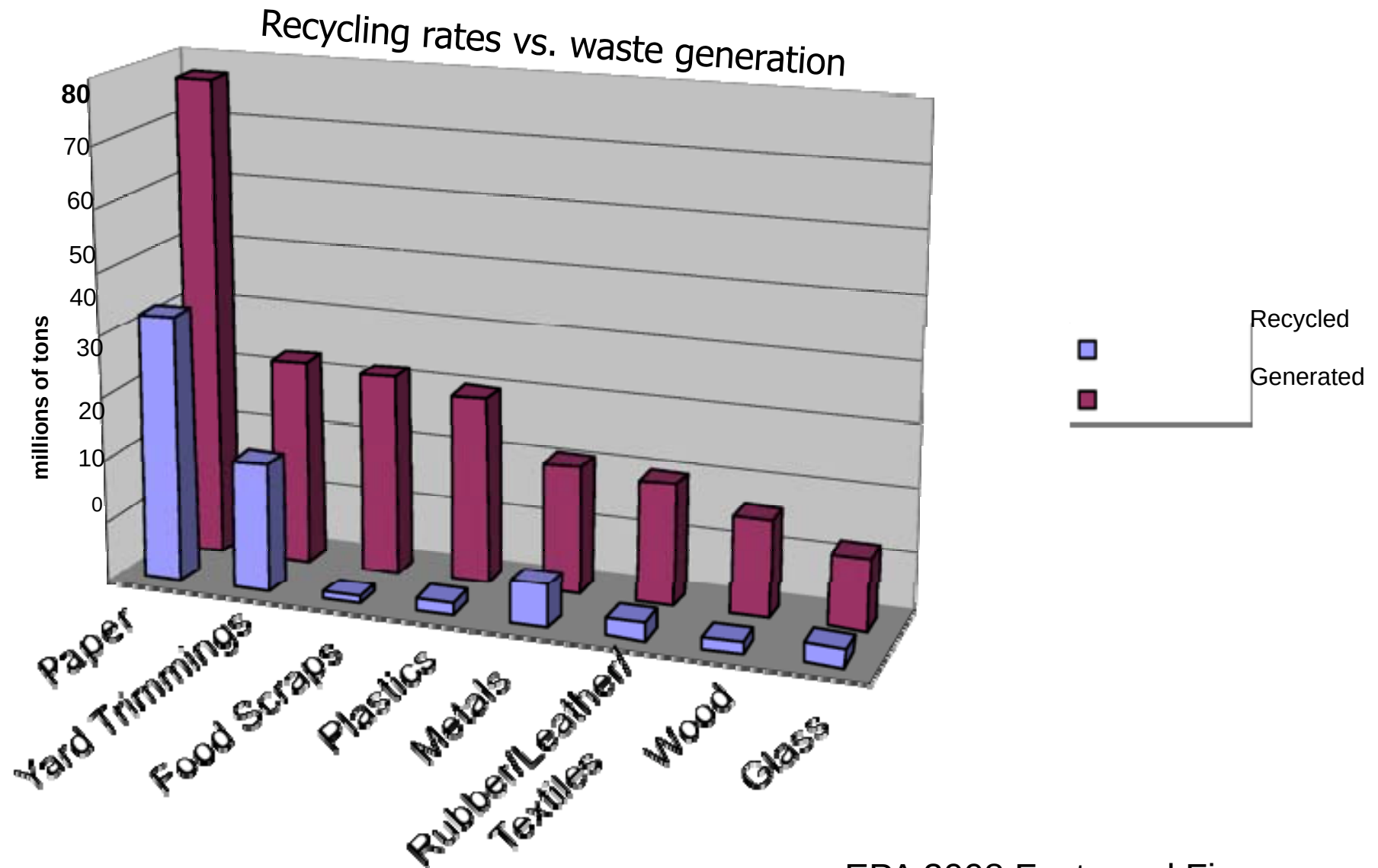
Recycling Conserves Energy



Figure 2. MSW Recycling Rates, 1960 to 2008



Recycling Rates



EPA 2008 Facts and Figures

Recycling vs. Waste Generation



**39 million  
cars off the road**



**22 million  
homes heated/  
year**



**50  
power plants  
avoided**



**400 million  
barrels of oil  
conserved**



**Impacts from Recycling Rate (33%)**

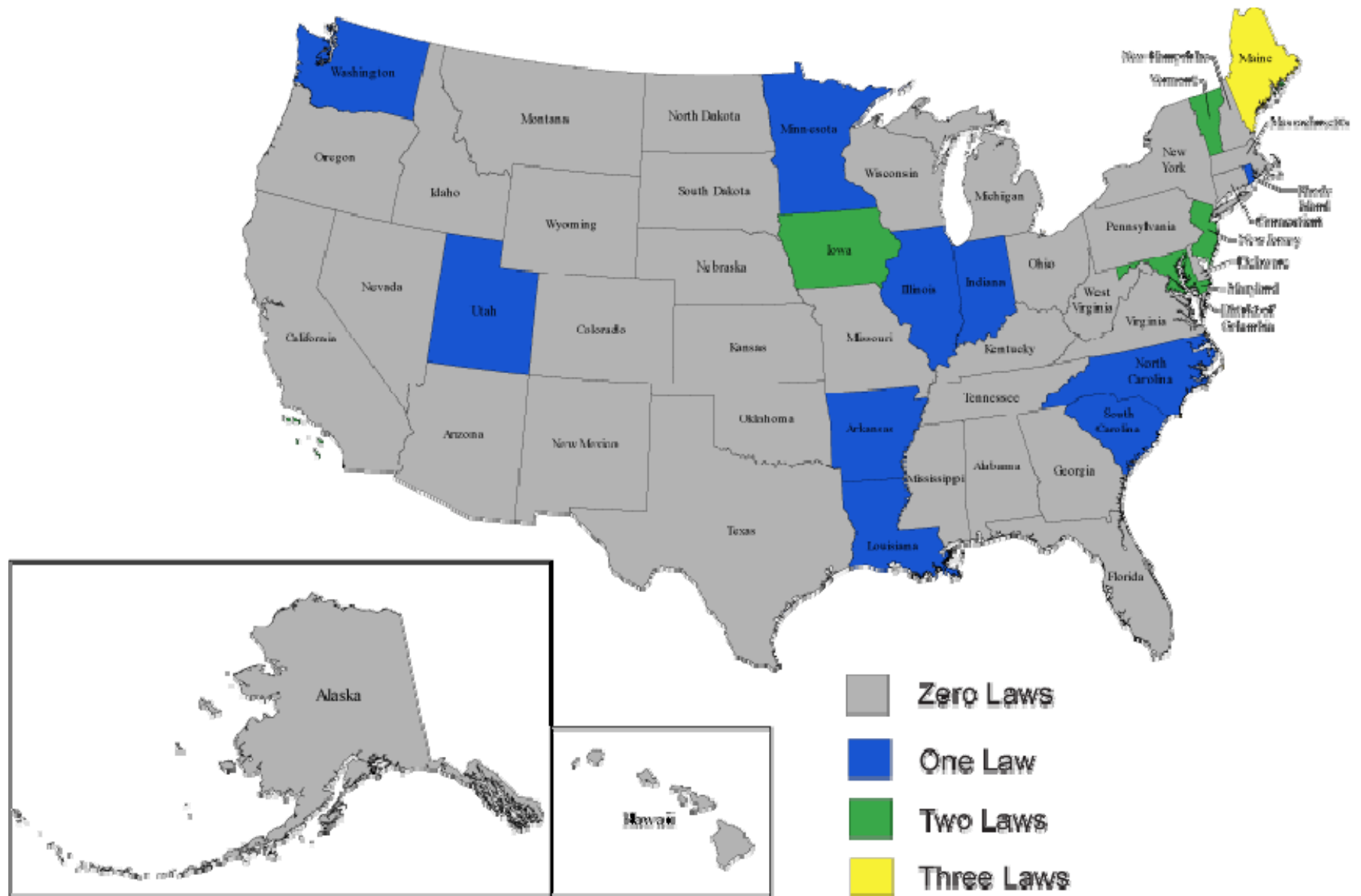


**EPSON got to zero waste**  
**\$300,000 saved**



**HP eliminated 90% of waste**  
**\$870,564 saved**



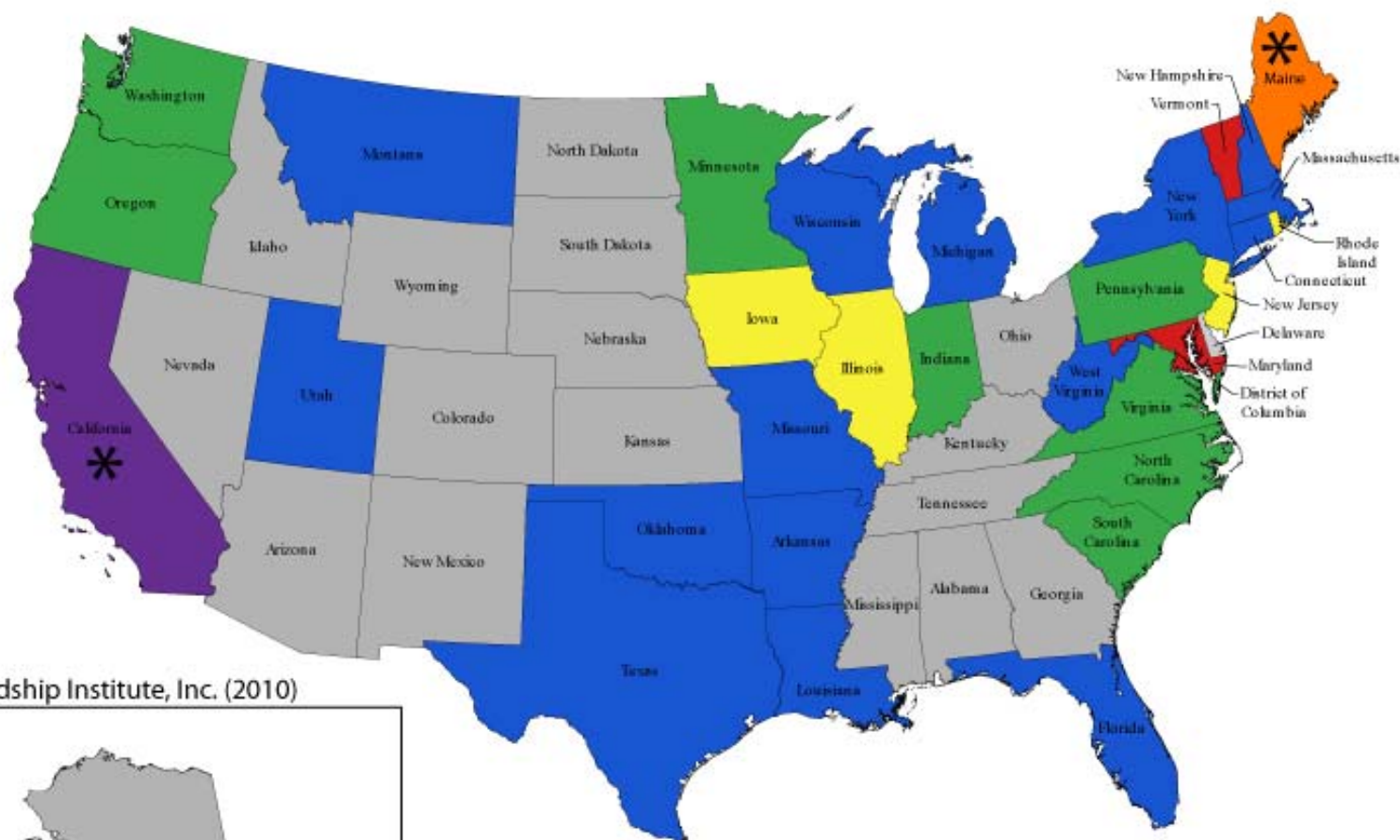


# Extended Producer Responsibility Laws 2006



### Product Categories

- Auto Switches
- Batteries
- Carpet
- Cell Phones
- Electronics
- Fluorescent Lighting
- Mercury Thermostats
- Paint
- Pesticide Containers



Source: Product Stewardship Institute, Inc. (2010)

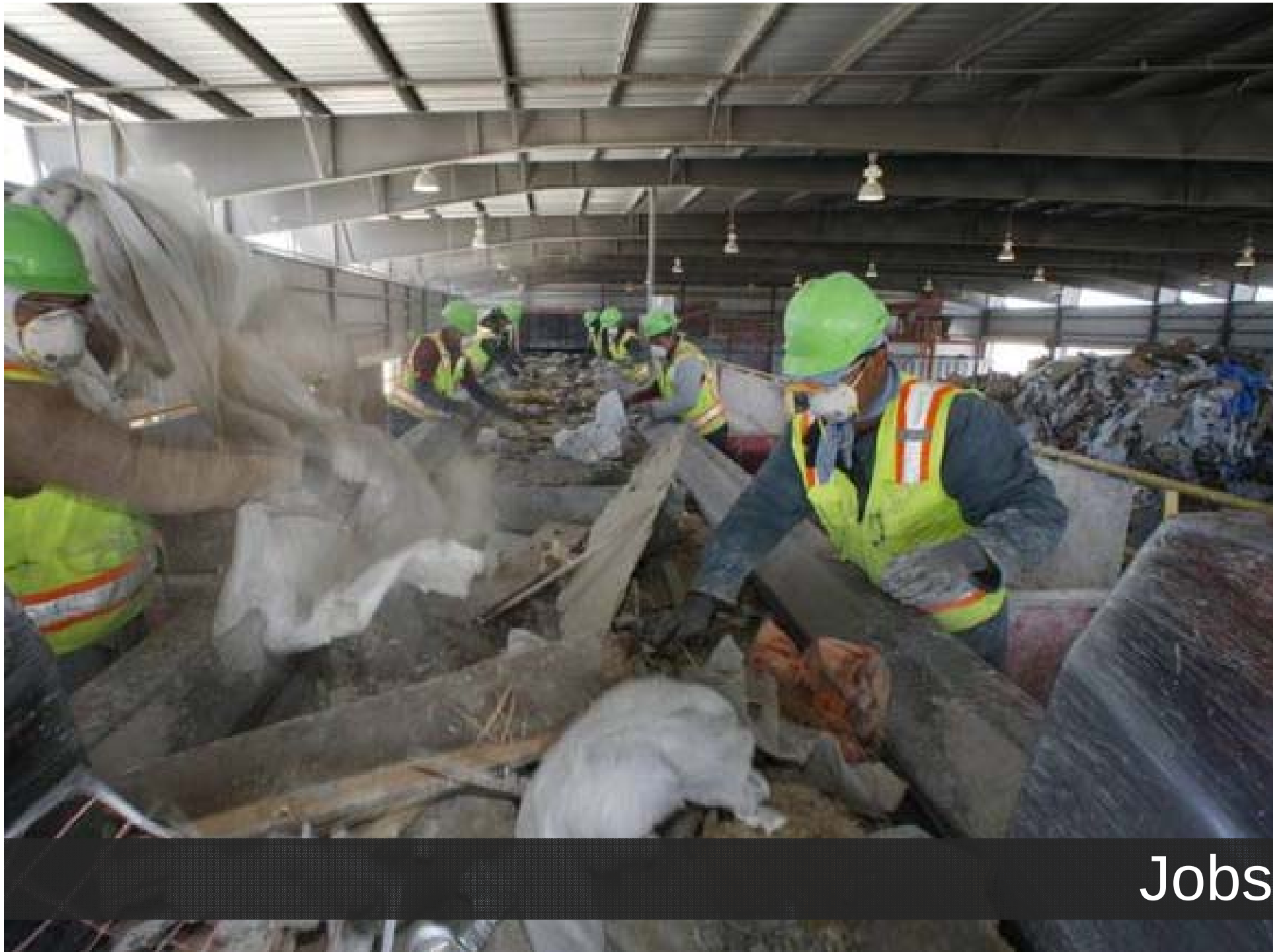


### Number of Product Categories Covered by EPR Law



\* Other laws authorizing agencies to require EPR, including Framework laws.

# Extended Producer Responsibility Laws 2010



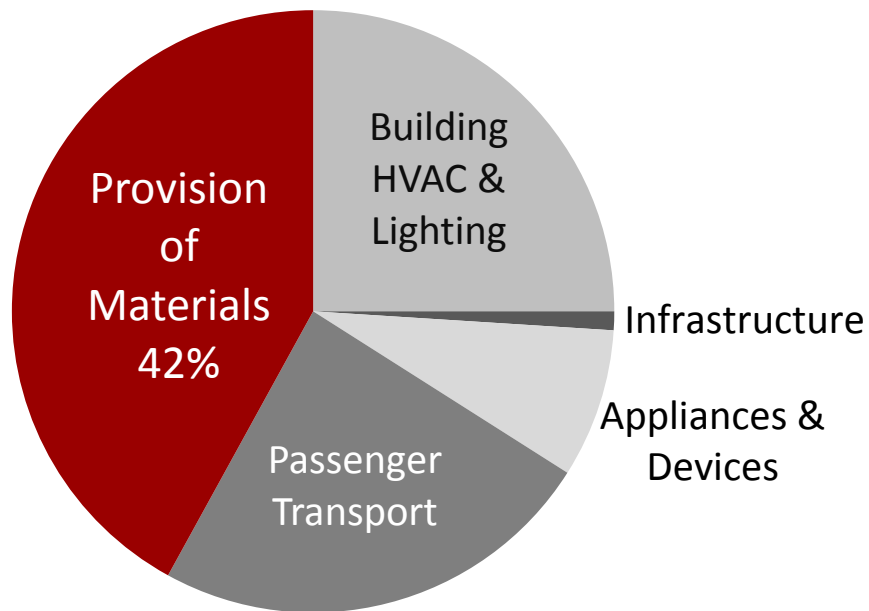
Jobs

Increase to 100% recycling nationally yields:

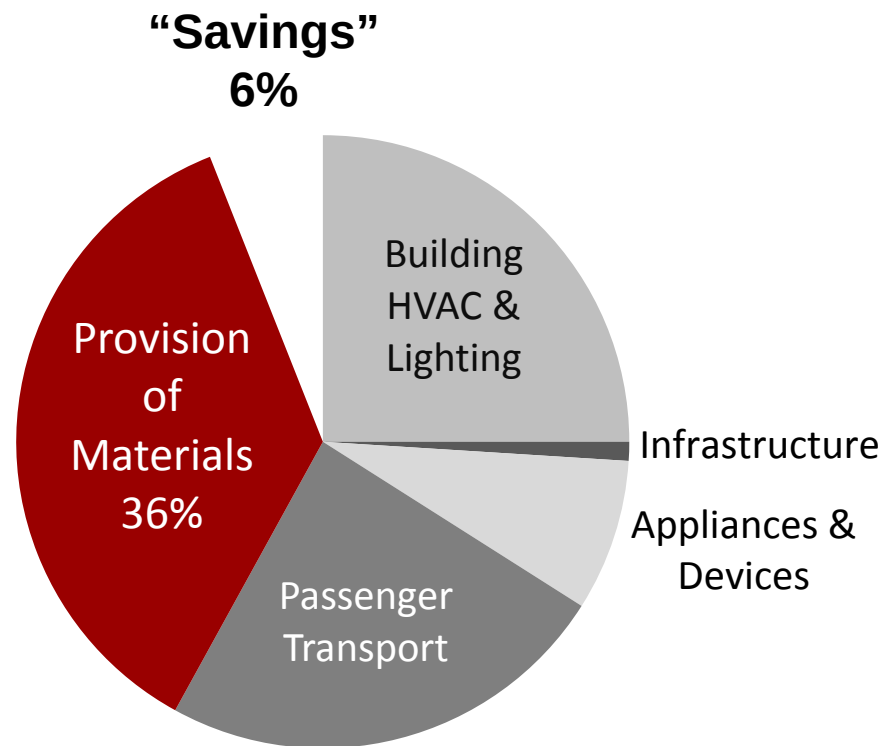
- 450 million metric tons of greenhouse gas reductions per year
- Includes all municipal solid waste MSW and construction, remodel, and demolition debris.



GHG Reduction Potential



2006 U.S. GHG inventory  
with 32% recovery  
(municipal solid waste)



2006 U.S. GHG inventory with  
hypothetical recovery rate  
(~100% municipal solid waste + construction and  
demolition debris)

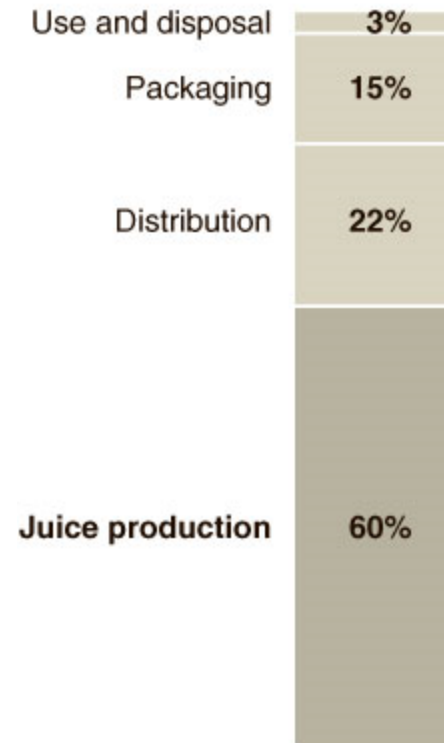
## Limitations of Recycling and Composting





## Sources of carbon dioxide emissions

### THROUGHOUT PRODUCT LIFE CYCLE



### DURING JUICE PRODUCTION\*

#### PROCESSING

8% Electricity

30% Natural gas

#### AGRICULTURE

3% Transportation

58% Fertilizer production and application

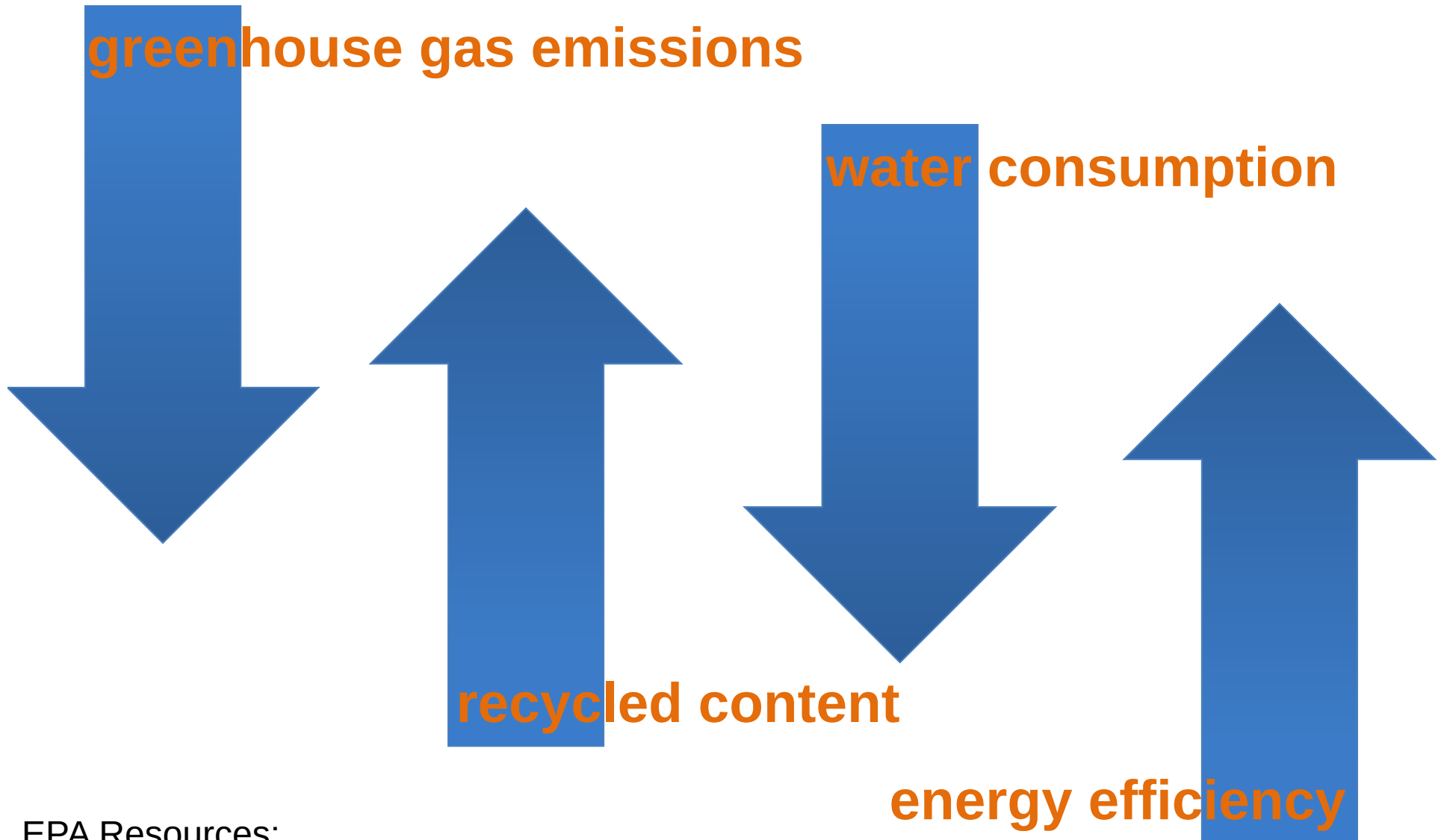
\*Percentages do not total 100 percent, because of rounding.

Source: Tropicana

THE NEW YORK TIMES

# Product Stewardship

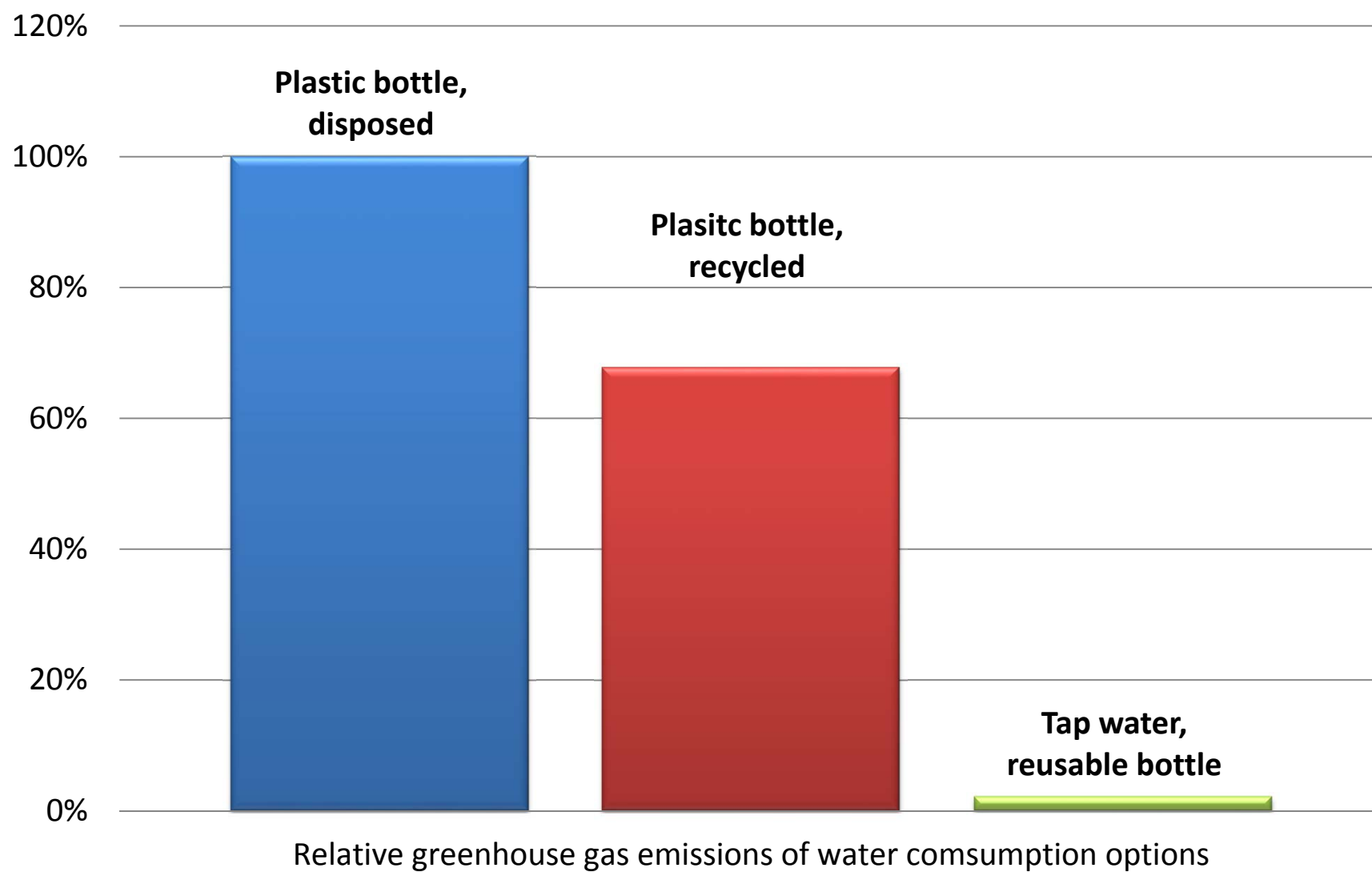
## Tropicana Orange Juice



EPA Resources:

- Electronic purchasing: <http://www.epa.gov/epp/pubs/products/epeat/index.htm>
- Recycled content purchasing: [http://www.epa.gov/climatechange/wycd/waste/calculators/ReCon\\_home.html](http://www.epa.gov/climatechange/wycd/waste/calculators/ReCon_home.html)

**Environmentally Preferable Purchasing**



# Water Consumption

Source: A study commissioned by Oregon Dept of Environmental Quality

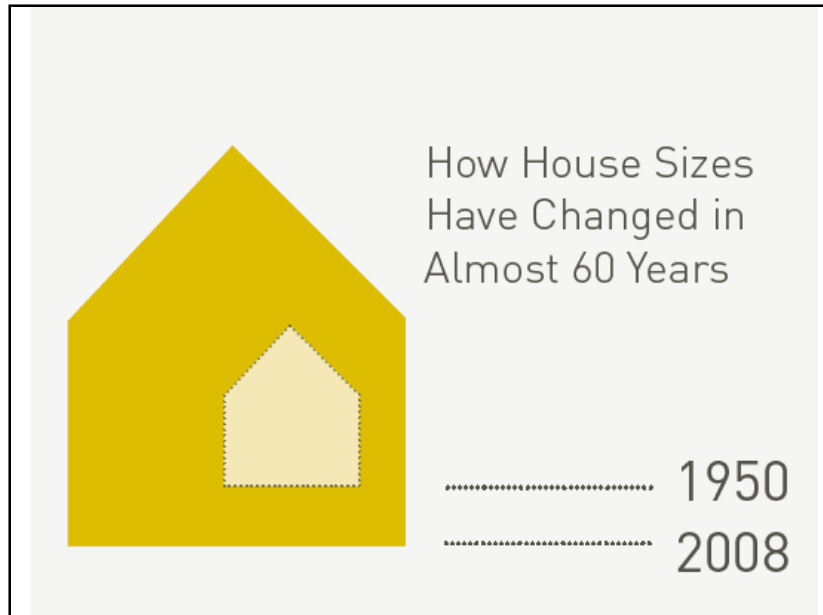
Shipping bags – even if made from virgin resources and not recycled – have lower environmental burdens in most categories than cardboard boxes – even if the boxes contain high levels of recycled content.



# Packaging

Source: A study commissioned by Oregon Dept of Environmental Quality





| YEAR | HOME SIZE | FAMILY SIZE | SQ. FT. PER PERSON |
|------|-----------|-------------|--------------------|
| 1950 | 983       | 3.8         | 258.7              |
| 2008 | 2500      | 2.6         | 961.5              |

## Building Materials

Source: Oregon DEQ, Cascadia GBC



Design for Deconstruction





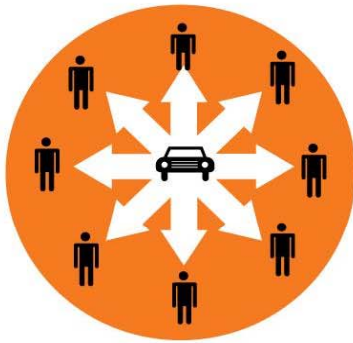
# Reduced Consumption

Photo credit: flickr user jesusalı, licensed under Creative Commons Attribution-Non-Commercial 2.0 license



Collaborative Consumption

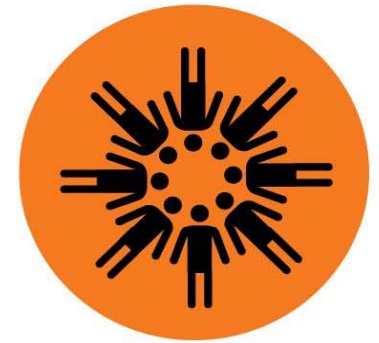




PRODUCT SERVICE SYSTEMS



REDISTRIBUTION MARKETS



COLLABORATIVE LIFESTYLES

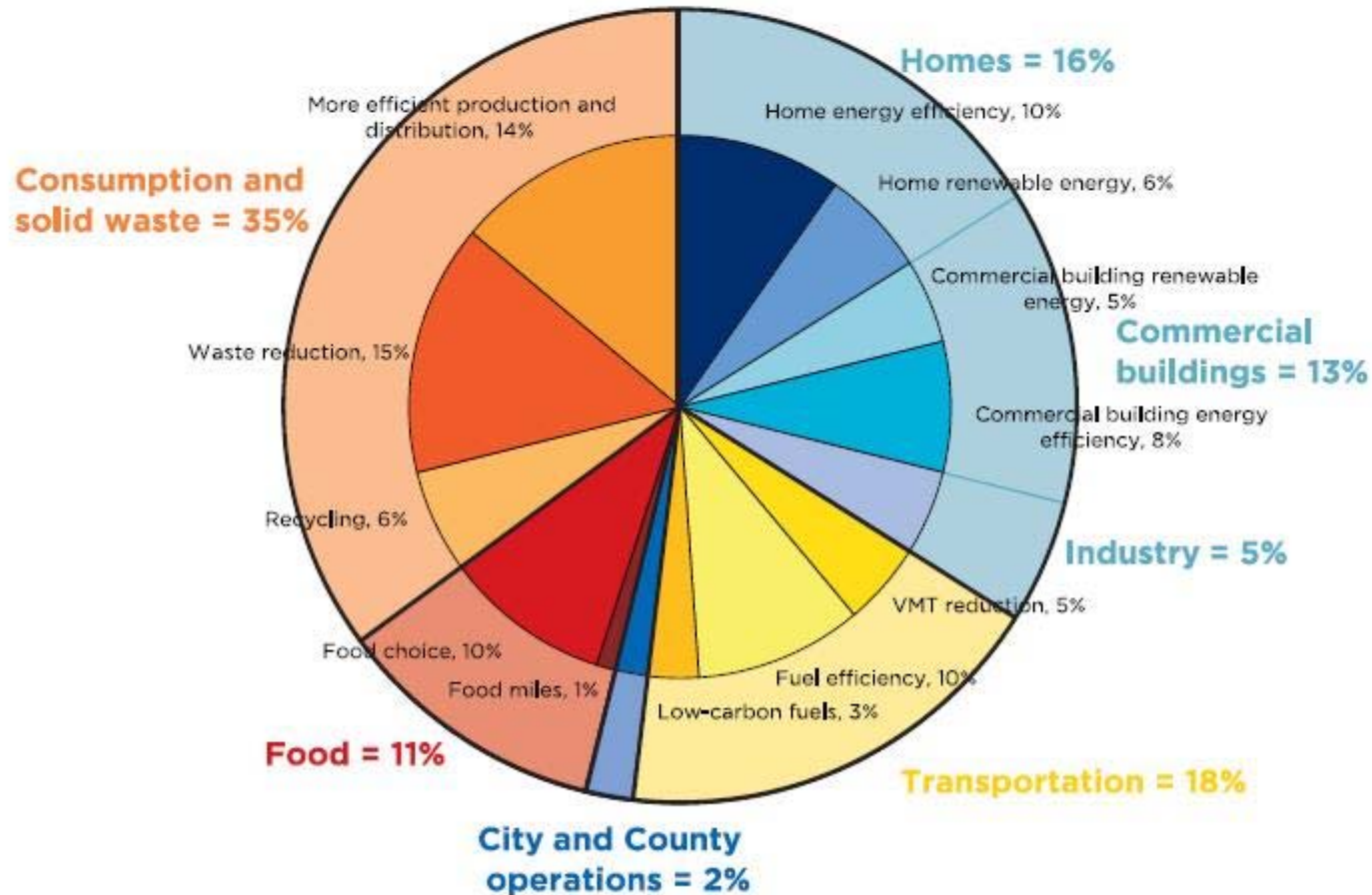
# Collaborative Consumption



Lending Libraries

# CLIMATE ACTION PLAN

(APPROXIMATE CONTRIBUTION TO 2030 EMISSION-REDUCTION GOAL)



State and Local Government Actions





# State and Local Government Actions

Photo credit: flickr kate\*, licensed under Creative Commons Attribution-Non-Commercial 2.0 license





**PROCUREMENT**



**SPECIFICATIONS**



**LABELING**



**FOOTPRINTING**

**State and Local Government Actions**

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# Materials Management Approaches for State and Local Climate Protection

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- Home Page
- We Want to Hear from You
- Background & Motivation
- Greenhouse Gas Inventories
- Setting Targets
- Climate Protection Actions
- Measuring Results
- Resources
- Glossary
- Acknowledgements

## Our Purpose - Reducing Greenhouse Gases through Materials Management

Materials Management strategies reduce greenhouse gas (GHG) emissions associated with waste, materials and products through a lifecycle and systems approach.

This wiki is a materials management toolkit of:

- Climate Protection Actions
- Example Climate Action Plans
- New approaches to GHG Inventories
- Measurement Tools
- Links to resources
- And more...see links at left

[We want to hear from you.](#) This beta version toolkit was launched on 9/8/10. Help us improve it with your feedback. Let us know what materials management approaches you are adding to your Climate Action Plan.

### Who Should Use This Toolkit

- State and Local Government Climate Change Staff
- Recycling, Composting and Solid Waste Professionals

**Climate Change Impacts of Material Consumption and Waste Management**

[www.captoolkit.wikispaces.com](http://www.captoolkit.wikispaces.com)

Tools and Resources

- 1) Connection between product consumption and greenhouse gas emissions
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  - i) Additional resources for local/state governments



# Summary

<http://yosemite.epa.gov/R10/ECOCOMM.NSF/climate+change/wccmmf>

Shannon Davis

[Davis.shannon@epa.gov](mailto:Davis.shannon@epa.gov)

415-972-3440

We welcome your feedback and ideas.