Plastic Packaging and Sustainability

Plastic Packaging Sustainability

Plastics Division

American Chemistry Council

Overview

- Plastic raw materials, resins
- Key plastic sustainability benefits
  - Product protection-Freshness
  - Reduce
  - Reusable
  - Recyclable
- Sustainability Case Studies
- Conclusion

Plastics are:

- a valuable choice for your bottom line,
- a responsible choice for the environment, and
- in many applications the right choice for sustainability goals.

PLASTICS 101

Plastics (polymers): Materials that can be molded or extruded into objects or films or filaments. The polymer is a high molecular weight chain composed of monomers, often hydrocarbons

•Hydrocarbons can come from natural gas, oil, coal, or renewable plant material

•Domestic natural gas is the source of most major plastics in the US

- •69 % Natural Gas
- •24% Oil
- •7% Other

Why Do We Use Plastics?

- Reduce Material Use and Weight
- Maintain Freshness
- Reduce Breakage
- Reduce transportation costs through light weighting
- Economical

Plastics also can have superior environmental attributes

Plastics reduce energy use by 26% and greenhouse gas emissions by 56% across variety of applications compared to alternatives.[1]

[1] GUA - Gesellschaft für umfassende Analysen, “The Contribution of Plastic Products to Resource Efficiency,” Vienna, 2005

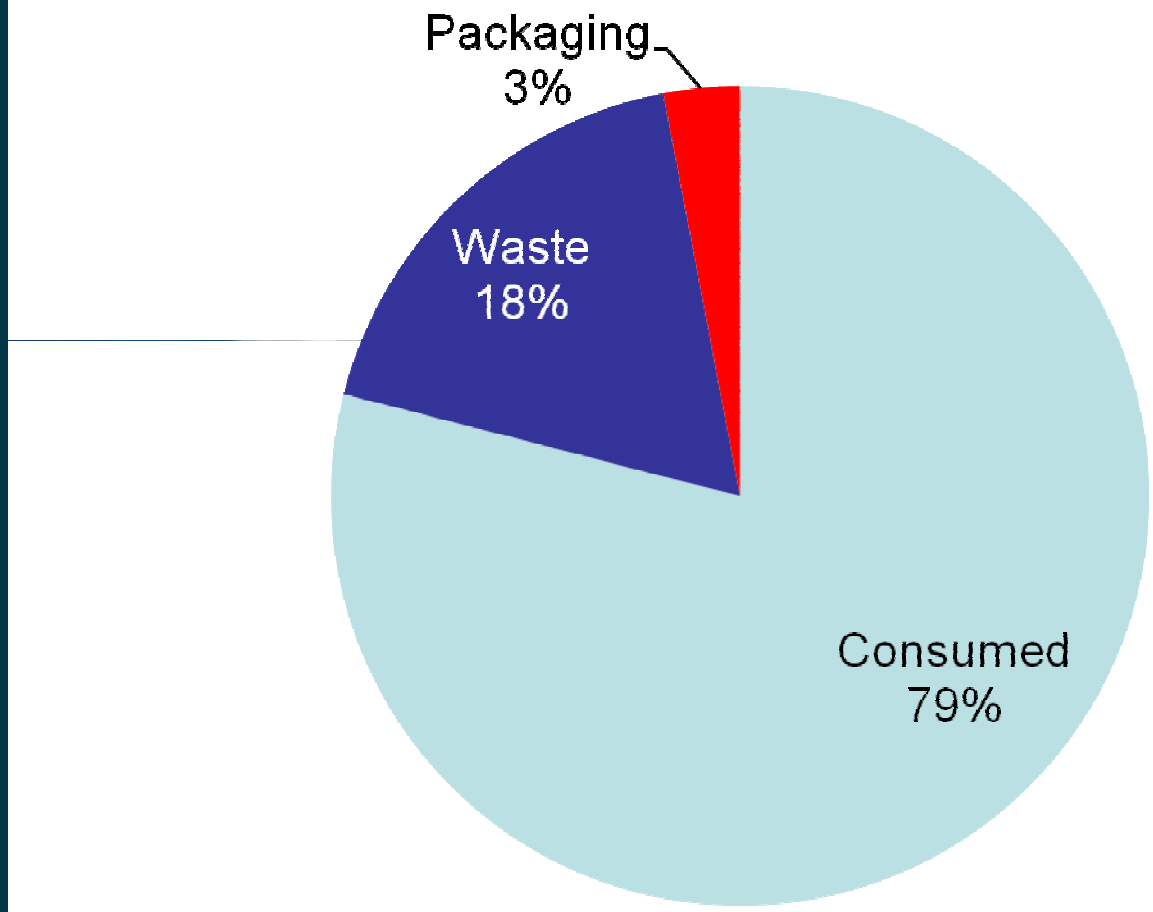

Fresh

Plastics help keep food fresh, reducing waste and protecting products from farms to grocery shelves to kitchen tables.

Protecting the safety and integrity of the product are among the important aspects of sustainable packaging.

90% of energy in product life cycle, only 10% packaging

Plastics Reduce Energy Use by Extending Shelf Life



Energy Used 700 gram loaf of bread, source STFI-Packfork

Reduce

Wal-Mart Goal

- "Our Packaging Network aims to reduce the amount of packaging in our supply chain by 5 percent by 2013"

Reduced Package Weight Positively Impacts 6 of 9 Metrics in Packaging Scorecard Directly:

- Greenhouse Gas Metric
- Sustainable Material Metric
- Average Distance to Transport Metric
- Package to Product Ratio Metric
- Recycled Content Metric
- Recovery Metric

Plastics News 6/20/08

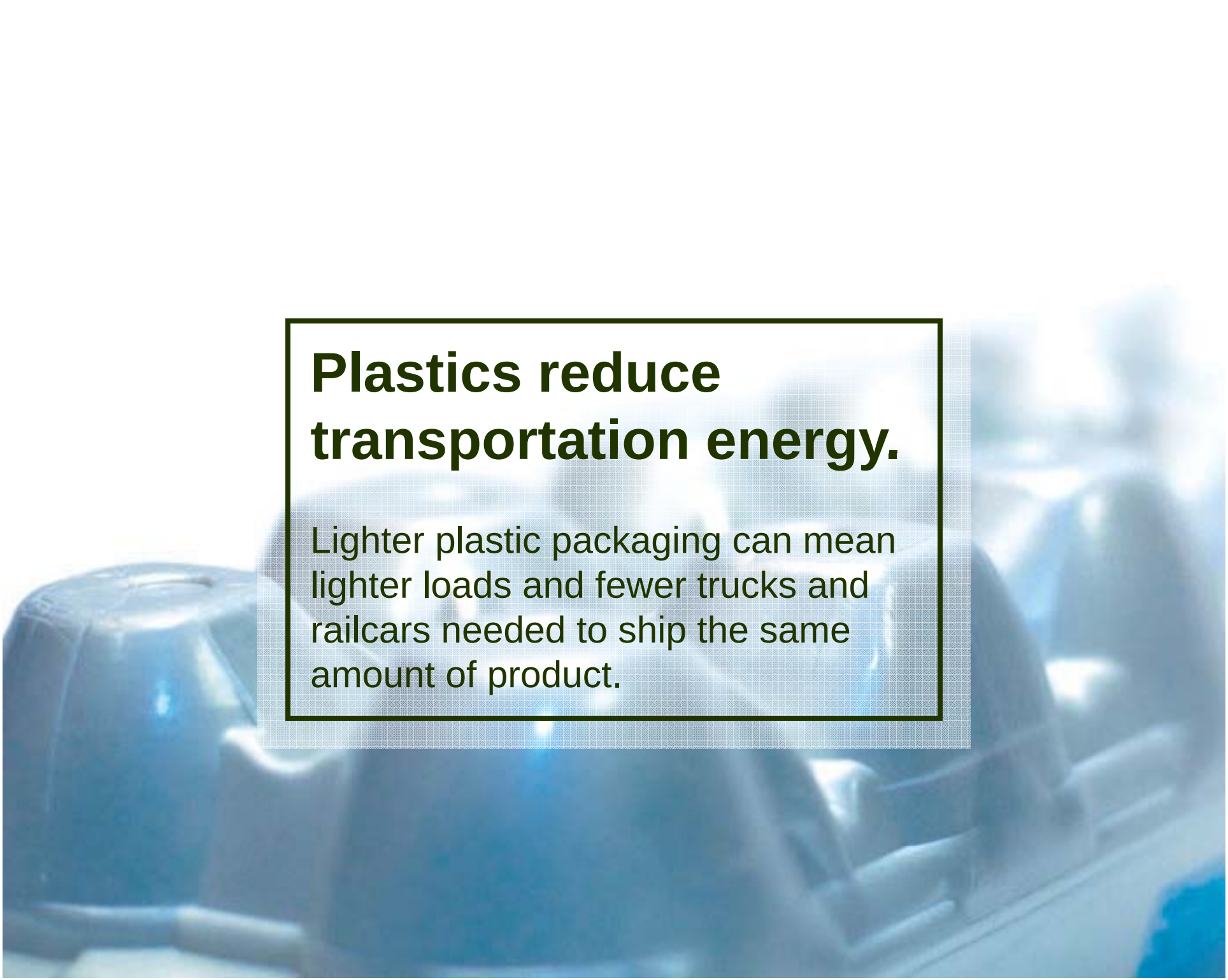
Kraft® recently switched its classic Miracle Whip® jar from glass to plastic

- Decreasing fuel consumption by 87,000 gallons annually
- The switch to plastic means fewer trucks on the road since six more pallets of product fit on each truckload

Plastic innovations

Pepsi® announced in March new “Eco-fina” water bottle

- 50 percent less material
- Innovation reduces 75 million pounds annually



Plastics reduce transportation energy.

Lighter plastic packaging can mean lighter loads and fewer trucks and railcars needed to ship the same amount of product.


Reusable

Some plastic packaging applications, such as storage bins, sealable food containers, refillable sports bottles and dispensers are designed to be reusable.

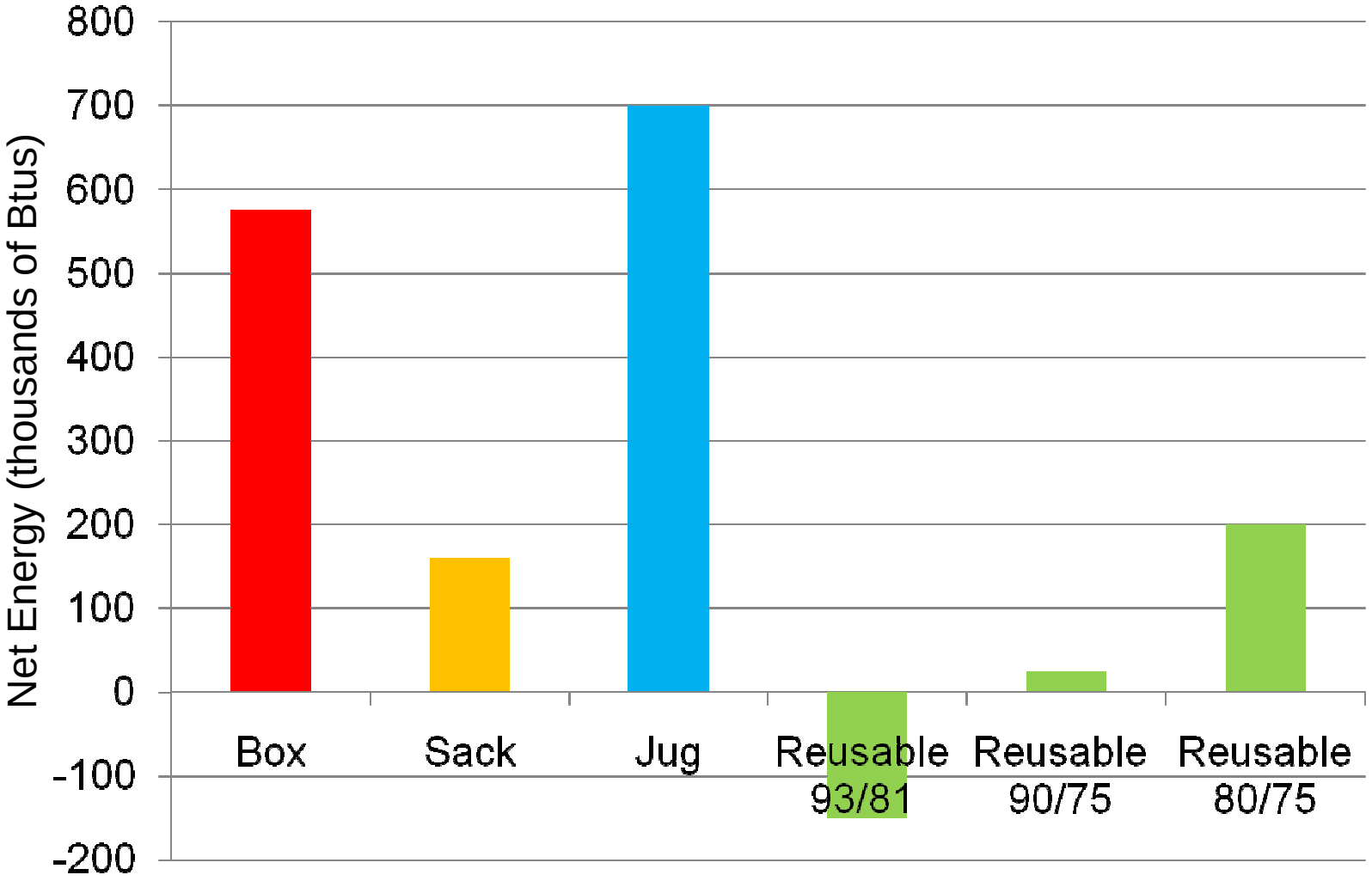
The durability of plastic makes it a preferred material for reusable items.

Plastic crates and pallets are used repeatedly, prized for their durability and their ability to resist moisture and insect infestation.

- 92 percent of consumers reuse plastic shopping bags

- 50 percent of polystyrene loose-fill is reused

Reuseable Plastic Pail Can Save Energy



Source: Franklin Associates and Ropak, Nov 2007, replacing 1.82 pound pail


RECYCLABLE

Since the early days of plastics recycling in the 1970s, the nation's recycling infrastructure has grown dramatically.

Recycling Success

Today, over 80% of U.S. households have access to plastic recycling programs.

According to US EPA data over 4 billion pounds of plastic were recycled in 2007.

In 2007 more than 2.3 billion pounds of plastic bottles were collected for recycling.[3]

[3] "2007 National Post-Consumer Plastics Bottle Recycling Report," published 2009.

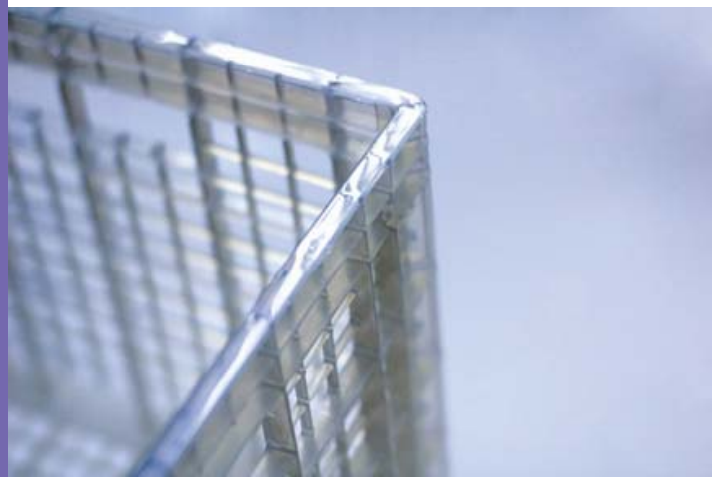
Non-Bottle Rigids—New and Growing

ACC is working to expand collection of non bottle rigid containers.

About 1/3rd of 100 largest communities collect non-bottle rigids

Nearly 50% of California communities ask for all plastic containers

Over 325 million pounds of non bottle rigids collected in 2007[6]



6 ACC 2007 United States National Post Consumer Report on Non-Bottle Rigid Plastics Recycling, Published 2009

Bags and Film Recycling New But Growing Fast

In the US Over 830 million pounds of bags and film were recycled in 2007—up 27 percent in two years.[6]

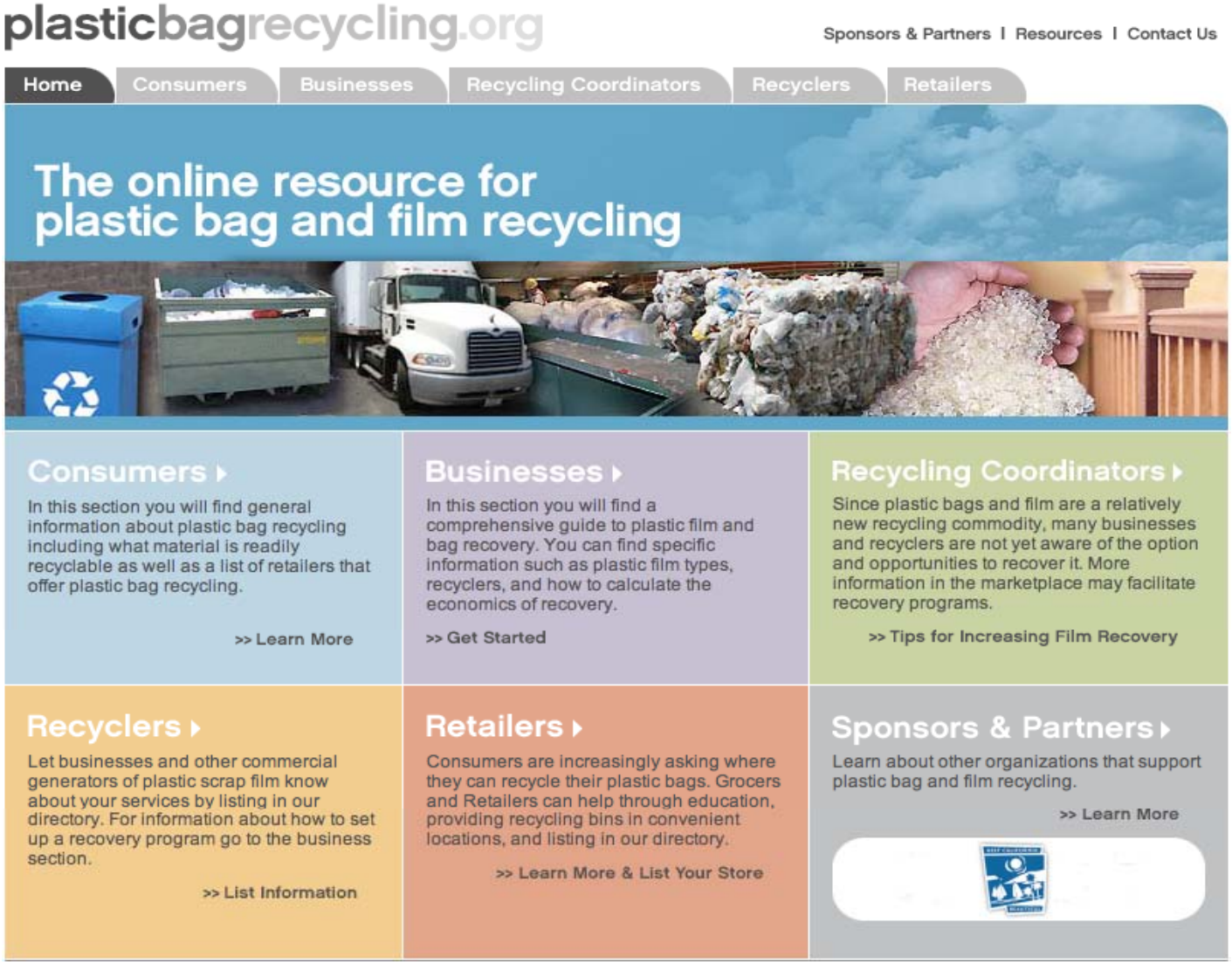
Polyethylene Bag and Film recycling rate now 12 percent according to EPA[5]

In store collection Infrastructure is critical for wraps

6 ACC 2007 United States National Post Consumer Report on Non-Bottle Rigid Plastics Recycling, Published 2009

5 US EPA Municipal Solid Waste in the US Facts and Figures, 2007

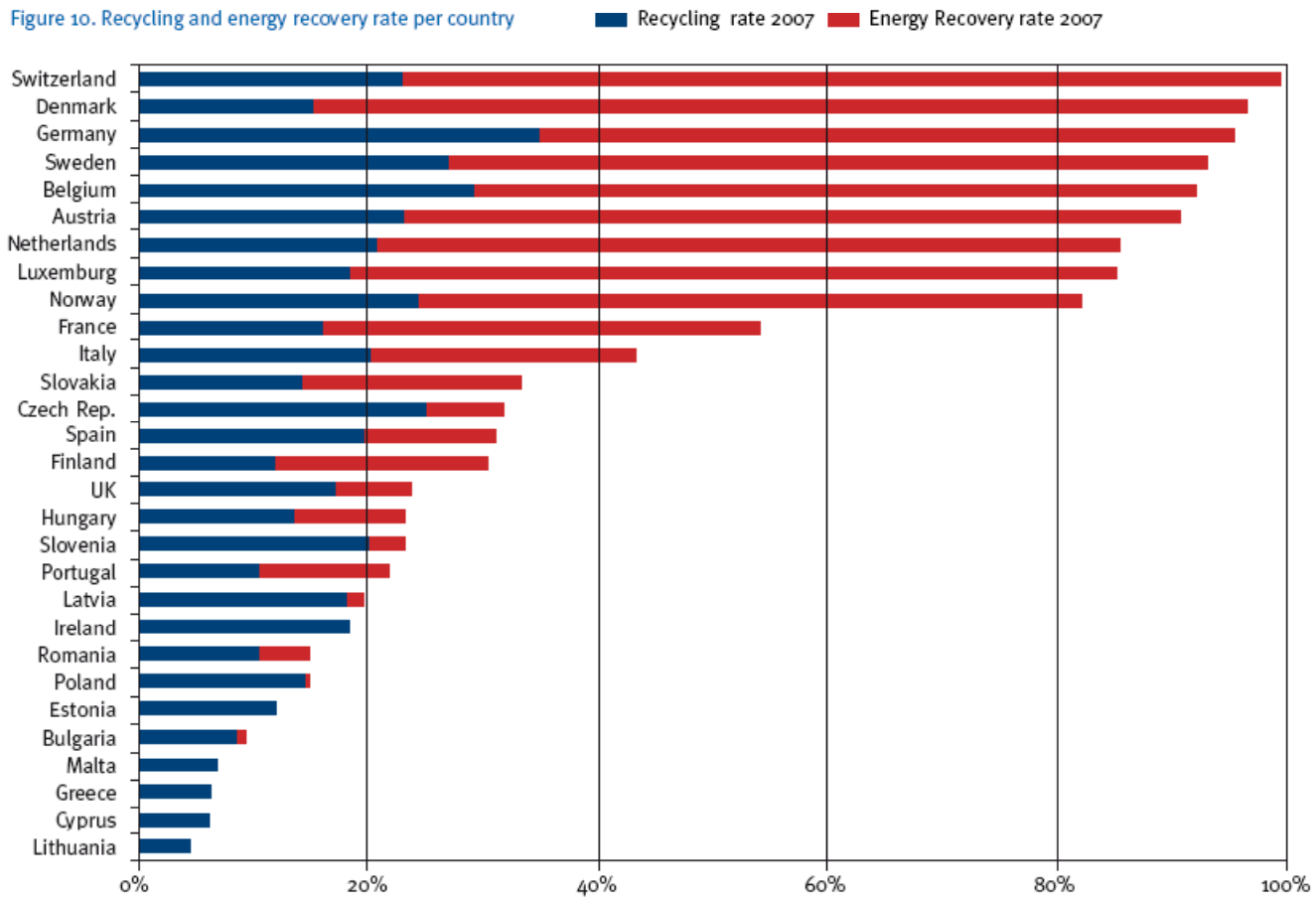
Bag & Wrap Recycling Resource



New Bins in San Diego & LA

Higher Recovery is Possible

- Increased mechanical recycling
- Organics recycling through composting
- Energy recovery from waste



Source: Plastics Europe

SUSTAINABILITY CASE STUDIES

Life Cycle Inventory
Tuna in Can/Flexible Pouch

Table 1

TOTAL ENERGY, TOTAL SOLID WASTE, AND GREENHOUSE GASES
FOR 100,000 OUNCES OF TUNA CONSUMED

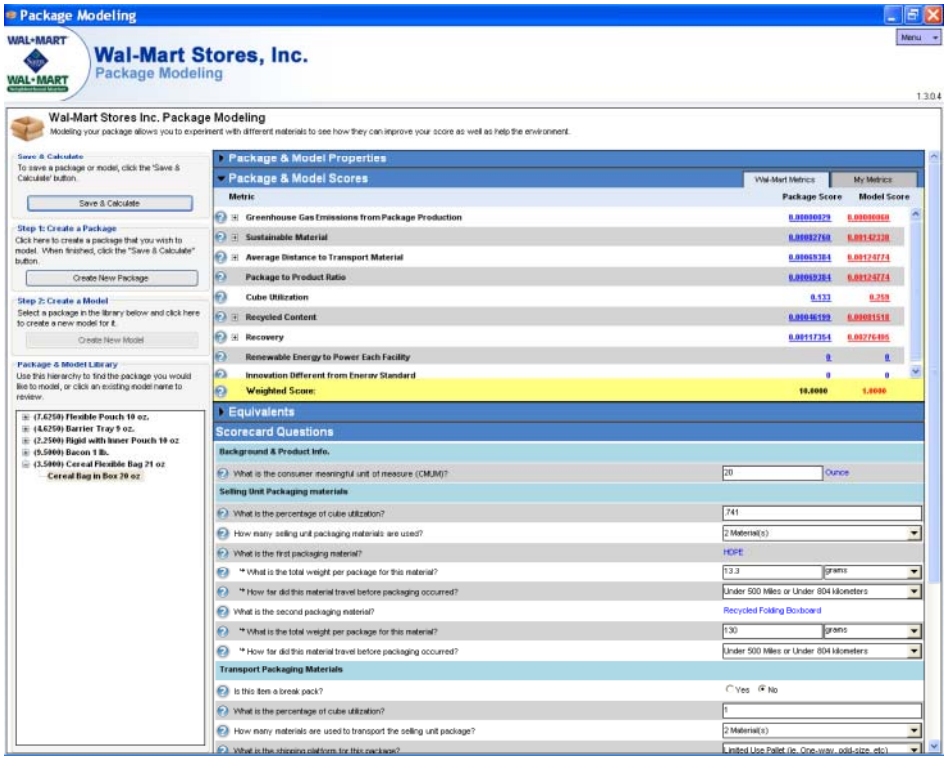
	Total Energy	Total Solid Waste		Greenhouse Gases
	(MM Btu)	(lb)	(cu ft)	(lb of CO2 equivalents)
Tuna Packaging Systems				
12-oz. Steel Can (1)	22.7	1,333	44.0	4,292
12-oz. Pouch	9.3	346	10.5	977
6-oz. Steel Can (1)	24.1	1,413	46.6	4,551
3-oz. Pouch	25.2	936	28.4	2,647
3-3-oz. Steel Cans in Paperboard Sleeve (1)	43.2	2,562	83.6	7,518
2-2.8-oz. Plastic Cups in Paperboard Sleeve	28.2	1,106	37.8	1,702

(1) End-of-life for the steel cans are modeled as 62% being recycled and 38% going to a landfill. The paper labels are assumed to be incinerated during steel recycling. Ash from the incineration of the labels is included in solid waste.
NOTE: The end-of-life for all other material is modeled as 80% going to a landfill and 20% combusted with energy recovery.

Source: Franklin Associates, a Division of ERG calculations using the Franklin Associates database and the U.S. LCI Database.

Wal-Mart Scorecard
Tuna in Can/Flexible Pouch

- 12 oz. plastic pouch best overall
  - improved 7 of 9 metrics
  - 20% better than 3 oz pouch
  - 80% better than 3-3oz steel can
- 3 oz. pouch second
- 2-2.8 oz plastic cup third



Life Cycle Inventory
Milk Bottles

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TOTAL ENERGY, POSTCONSUMER SOLID WASTE, AND GREENHOUSE GASES FOR THE USE OF 10,000 HALF-GALLON MILK CONTAINERS

	Total Energy	Postconsumer Solid Waste		Greenhouse Gases
	(MM Btu)	(lb)	(cu ft)	(lb of CO2 equivalents)
Half-gallon milk container systems				
PLA Bottle (1)	67.2	1,061	80.7	5,968
Gable Top Carton (1)	42.8	1,248	46.5	4,411
Refillable Glass Bottle (2)	32.0	3,733	42.2	5,398
HDPE Bottle (3)	40.0	763	58.0	3,336

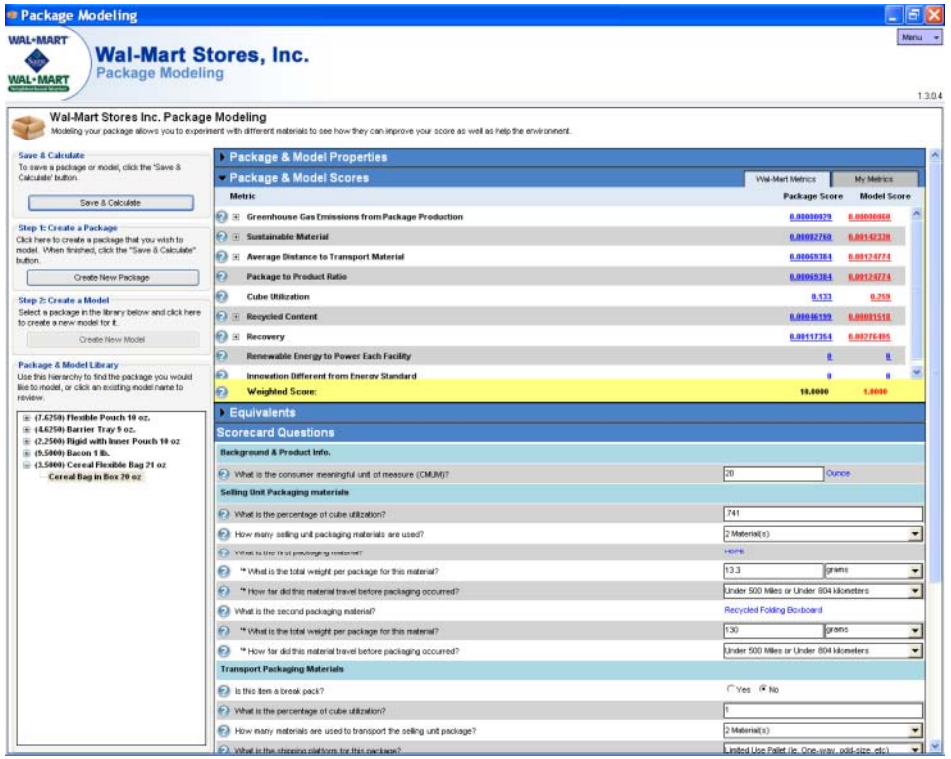
(1) End-of-life for this system is modeled with 80% going to a landfill and 20% combusted at a WTE facility.
(2) End-of-life for this system is modeled with a 90% reuse rate (8 trips) with 15% recovered for recycling, 68% going to a landfill, and 17% combusted at a WTE facility. However, the energy recovery is only available for the cap/seal.
(3) End-of-life for this system is modeled with 29% recovered for recycling, 57% going to a landfill, and 14% combusted at a WTE facility.

Source: Franklin Associates, a Division of ERG calculations using original data from LCI/LCA by NatureWorks, LLC and Franklin Associates.

Wal-Mart Scorecard
Milk Bottles--summary

FreeDigitalPhotos.net

- No good way to estimate reusable glass bottle
  - Unrealistically assuming no transport burden it appears best by 25% over HDPE
- HDPE 27% better score than paper carton
- PLA bottle last-note scorecard data needs to be updated



Life Cycle Inventory
Coffee Packaging

TOTAL ENERGY, TOTAL SOLID WASTE, AND GREENHOUSE GASES FOR 100,000 OUNCES OF GROUND COFFEE

Coffee Packaging Systems	Total Energy (MM Btu)	Total Solid Waste (lb)	Total Solid Waste (cu ft)	Greenhouse Gases (lb of CO2 equivalents)
15-oz. Fiberboard and Steel Canister (1)	23.4	1,376	48.0	2,376
26-oz. Fiberboard and Steel Canister (1)	22.3	1,311	45.5	2,169
11.5-oz. Steel Can (2)	25.8	1,757	67.8	4,377
34.5-oz. Steel Can (2)	18.9	1,379	51.5	3,140
11.5-oz. Plastic Canister (3)	42.6	1,142	70.7	3,310
34.5-oz. Plastic Canister (3)	33.4	896	55.7	2,606
12-oz. Laminate Bag	13.0	504	14.8	1,358
13-oz. Brick Pack	10.2	384	11.1	1051

(1) End-of-life for the fiberboard/steel canisters are modeled as 80% being landfilled and 20% combusted with energy recovery. The steel sections of the canister are collected at the waste-to-energy plants and sent to recycling.

(2) End-of-life for the steel cans are modeled as 62% being recycled and 38% going to a landfill. The plastic labels on these cans are assumed to be incinerated during the steel recycling, but the energy created during this incineration is used internally in the steel recycling.

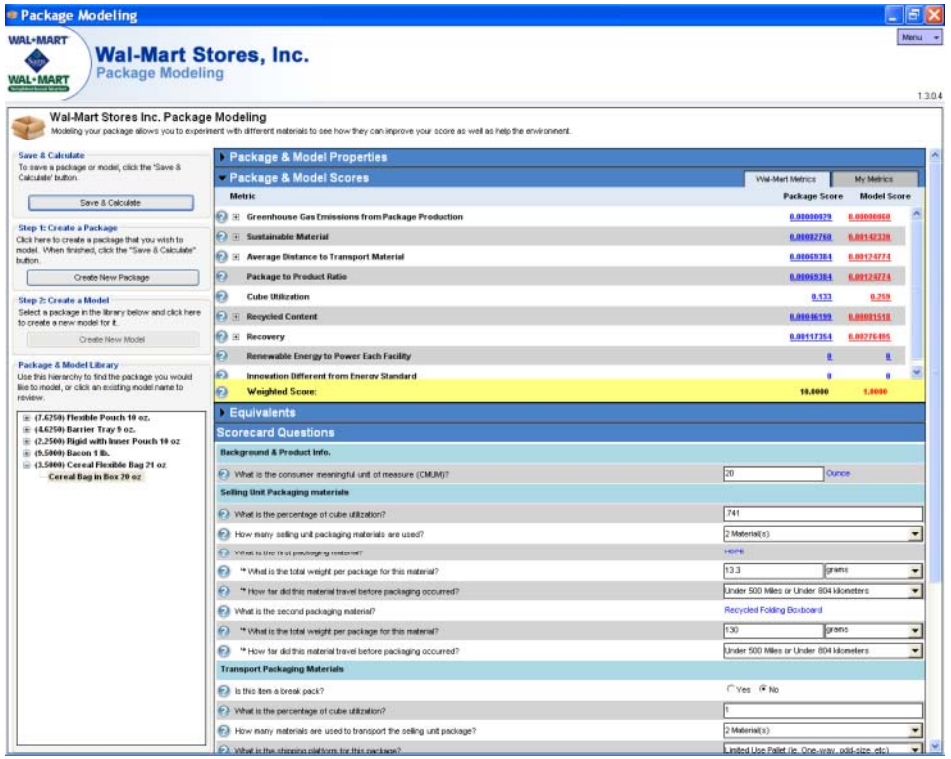
(3) End-of-life for the HDPE canisters are modeled as 15.4% being recycled, 16.9% going to combustion with energy recovery, and 67.7% going to a landfill. The plastic labels are assumed to be recycled with the plastic canister.

Note: The end-of-life for all other packaging is modeled as 80% going to a landfill and 20% combusted with energy recovery.

Source: Franklin Associates, a Division of ERG calculations using the Franklin Associates database and the U.S. LCI Database.

Wal-Mart Scorecard
Coffee-summary

- 13 oz. Plastic composite brick pack
  - improved 7 of 9 metrics
  - 12% better than 12 oz laminate
  - 75% better than 11.5oz steel can
- 12 oz. laminate second
- 34.5 oz plastic canister third



Thus, studies show the use of plastics can help:

- minimize raw material consumption,
- minimize energy use,
- reduce greenhouse gas production,
- And minimize waste to landfill
- Improve scorecard results

Input for this presentation was provided by:

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Read: For More Information

ACC Plastic Resins Life Cycle Inventories Cradle to Gate for major resins

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