Plastic Recovery

Ashley Carlson
Director of Packaging
Plastics Division

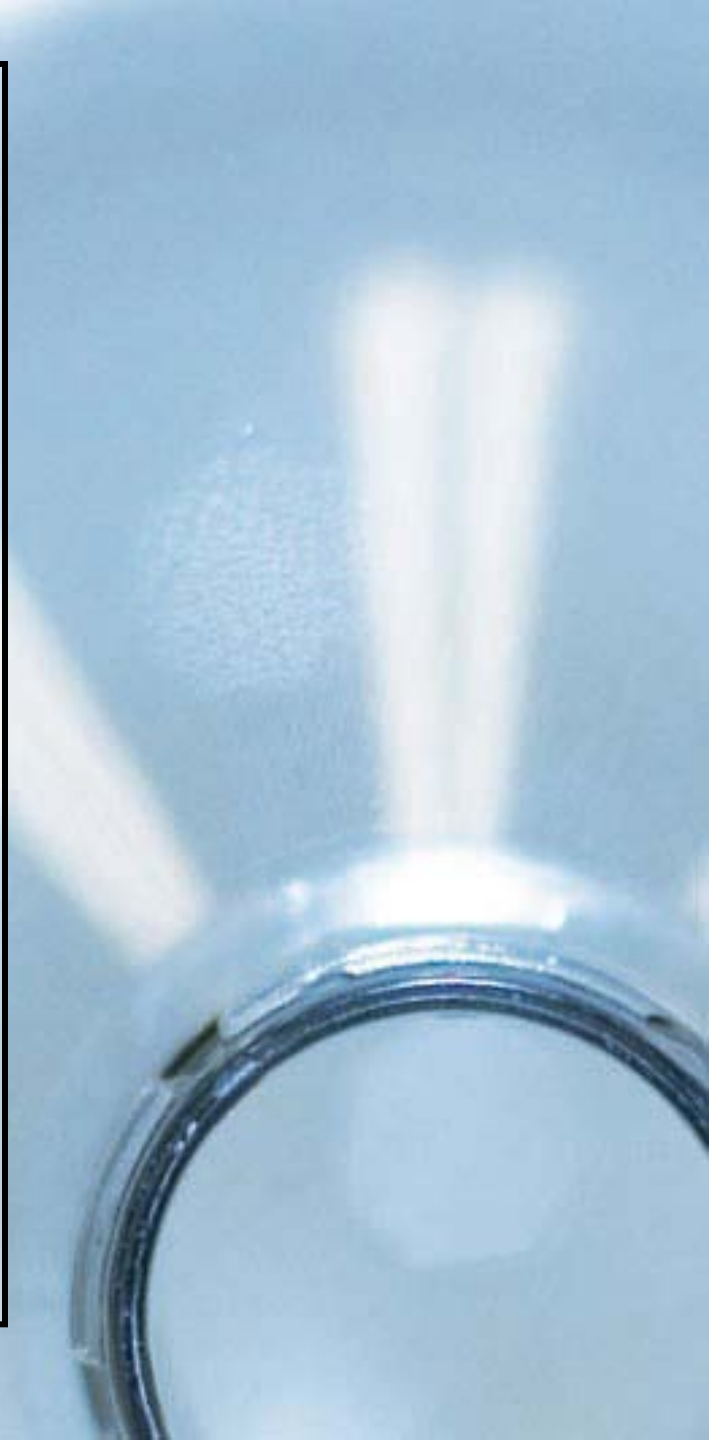
American Chemistry Council

Plastic Recovery

Plastics (polymers): Materials that can be blown, 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 Plastics?

Product manufacturers and consumers choose plastic because:

- Reduced material use
  - 56% less greenhouse gas[1]
  - 26% less energy
- Shatter resistant
- Protects contents and maintains freshness

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

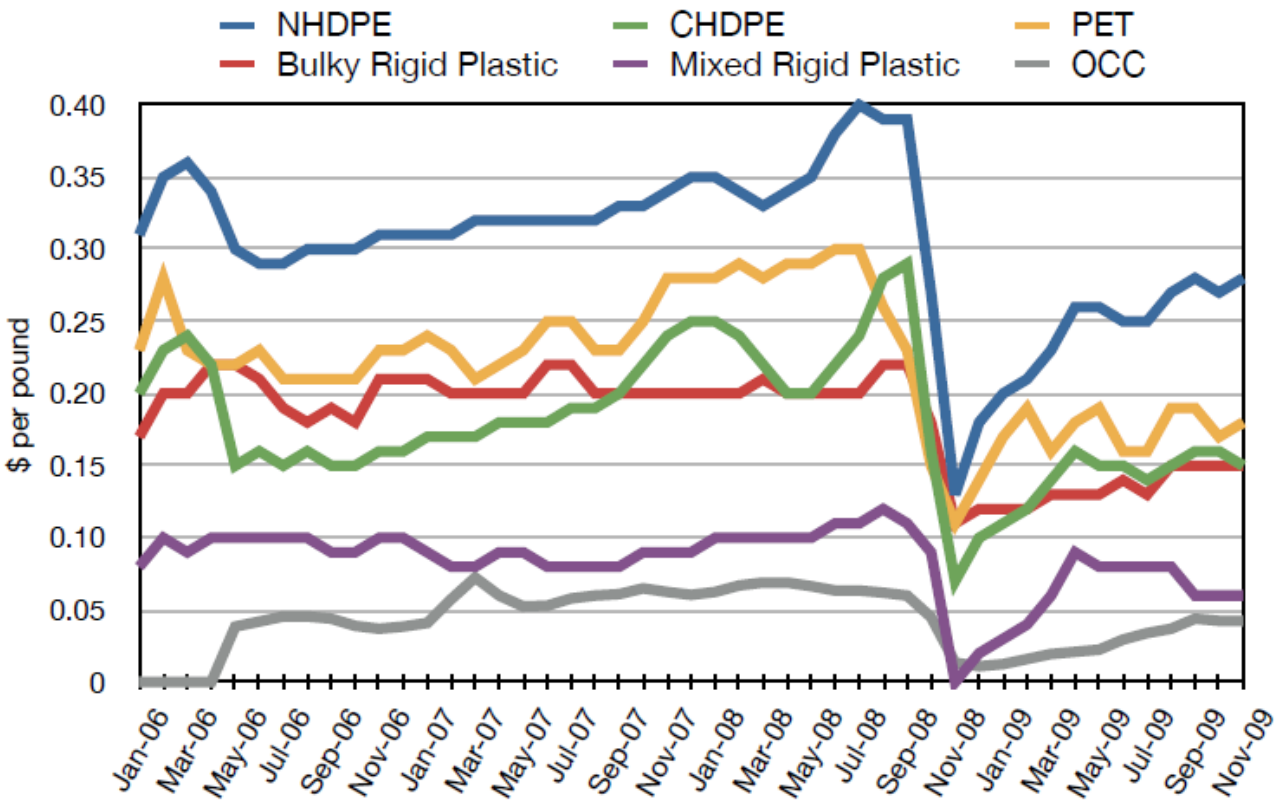
Plastic Packaging Resins: *Any of numerous physically similar polymerized synthetics or chemically modified natural resins including thermoplastic materials such as polyvinyl, polystyrene, and polyethylene and thermosetting materials such as polyesters, epoxies, and silicones that are used with fillers, stabilizers, pigments, and other components to form plastics.*

Plastic	Properties
 Polyethylene terephthalate (PET)	Clear, Excellent barrier to oxygen, water, and carbon dioxide, High impact capability and shatter resistance, Excellent resistance to most solvents, Capability for hot-filling
 High density polyethylene (HDPE)	Excellent resistance to most solvents, Higher tensile strength compared to other forms of polyethylene, Relatively stiff material with useful temperature capabilities
 Polyvinyl Chloride	High impact strength, brilliant clarity, excellent processing performance, Resistance to grease, oil and chemicals
 Low density polyethylene (LDPE)	Excellent resistance to acids, bases and vegetable oils, Toughness, flexibility and relative transparency (good combination of properties for packaging applications requiring heat-sealing)
 Polypropylene (PP)	Excellent optical clarity in biaxially oriented films and stretch blow molded containers, Low moisture vapor transmission, Inertness toward acids, alkalis and most solvents
 Polystyrene (GPPS, HIPS, EPS) General Purpose & High Impact and Expanded Polystyrene	Excellent moisture barrier for short shelf life products, Excellent optical clarity in general purpose form, Significant stiffness in both foamed and rigid forms, Low density and high stiffness in foamed applications, Low thermal conductivity and excellent insulation properties in

Plastic Packaging Resins

Plastic	Applications
 Polyethylene terephthalate (PET)	Plastic bottles for soft drinks, water, etc. Food jars for peanut butter, jelly, jam and pickles. Microwavable food trays.
 High density polyethylene (HDPE)	Bottles for milk, water, juice, cosmetics, shampoo, laundry detergents, etc.. Bags for groceries and retail purchases
 Polyvinyl Chloride	Rigid applications include blister packs and clamshells. Flexible bags for bedding and medical, deli and meat wrap and tamper resistance.
 Low density polyethylene (LDPE)	Bags for dry cleaning, bread, frozen foods, fresh produce, and household garbage. Shrink wrap and stretch film. Coatings for paper milk cartons and hot and cold beverage cups. Lids.
 Polypropylene (PP)	Containers for yogurt, margarine, takeout meals, and deli foods. Medicine bottles. Bottle caps and closures. Bottles for catsup and syrup
 Polystyrene (GPPS, HIPS, EPS) General Purpose & High Impact and Expanded Polystyrene	Food service items–cups, plates, bowls, cutlery, hinged takeout containers (clamshells), meat and poultry trays. Protective foam packaging for furniture, electronics and other delicate items. Packing peanuts, known as “loose fill.” Compact disc cases and aspirin bottles.
 OTHER (Including Polycarbonate Polylactic Acid (PLA))	Dependent on resin or combination of resins

Recovered Plastic: a Valuable Commodity



Source: Moore Recycling Associates, 2010

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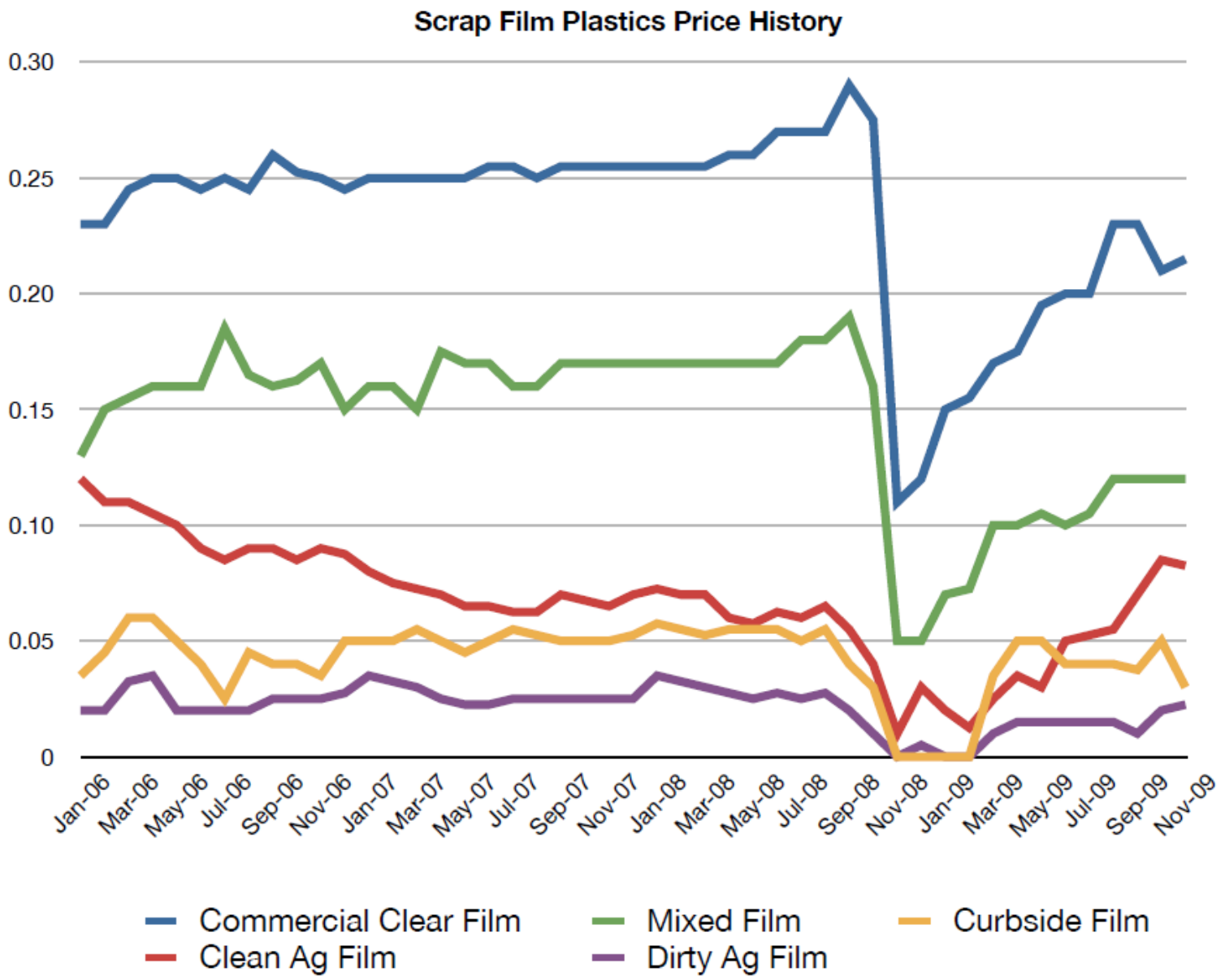


Source: Moore Recycling Associates, 2010

Who is involved in

handling/producing Plastic Products ?

Resin Manufacturer – *ACC Plastics Division*

Processor

Packager

Consumer Product/Brand Owner

Retailer

Consumer

Material Recovery Facilities/Landfill Owners

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 are recycled annually.

In 2008 more than 2.4 billion pounds of plastic bottles were collected for recycling.[3]

More than 62% of Californians have curbside recycling of all plastic containers. [6]

More MRFs are deploying optical sorting technology and moving towards single stream systems.

Cities continue to expand their recycling collection to include non-bottle rigids.

Over 832 million pounds of bags and film were recycled in 2008—up 28 percent since 2005.[6]

[3] "2008 National Post-Consumer Plastics Bottle Recycling Report," published 2009.
6 ACC 2008 United States National Post Consumer Report on Non-Bottle Rigid Plastics Recycling, published 2010

Recycling Success

Existing plastic recycling, particuarly PET and HDPE, results in significant savings in energy and greenhouse gas emissions

- The amount of energy saved by recycling PET and HDPE containers including bottles in 2008 was the equivalent to **the annual energy use of 750,000 U.S. homes**.

- The corresponding savings in greenhouse gas emissions was an amount **comparable to taking 360,000 cars off the road**[4].

[4] **"Final Report—Life Cycle Inventory of 100% Postconsumer HDPE and PET Recycled Resin from Postconsumer Containers and Packaging**," published 2010.

Plastic Bottle Recycling Challenges

- **Need more collection!**
  - Data and experience show that plastic bottle recycling can be increased through sustained local education campaigns
    - All Bottles Campaign
  - Lack of sufficient access to recycling collection opportunities for products used away from home

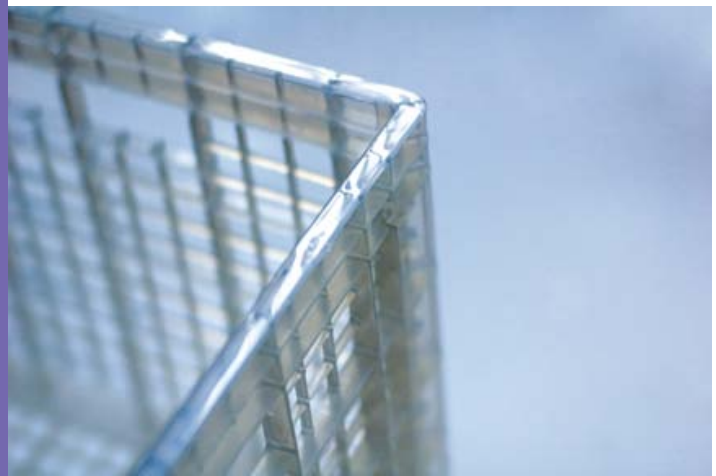
New Bins in San Diego & LA

Non-Bottle Rigids—New and Growing Fast

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

Only about 1/3rd of 100 largest communities collect non-bottle rigid plastics

Over 361 million pounds of non bottle rigid plastics collected in 2008—up 11% from 2007[6]



6 ACC 2008 United States National Post Consumer Report on Non-Bottle Rigid Plastics Recycling, published 2010

Opportunities to Increase Non-Bottle Rigid Plastic Recycling

American Chemistry Council (ACC) Efforts

- Documenting the availability of raw material
- Detailing the types and efficacy of plastic recycling technologies
- Illustrating depth of current and potential demand for products

Association of Post-Consumer Plastics Recyclers (APR) Efforts

- Need for consistent, clear education – APR Rigids definitions project
- Enforceable reclaimer-generated bale specifications
- Working with grocers to learn amount of rigids in their stores and working to create solutions for recycling

Bags and Film Recycling New But Growing Fast

Over 15,000 Drop-off locations Nationwide

Polyethylene Bag and Film recycling rate DOUBLED since 2005--now about 13 percent according to EPA[5]

Recovered plastic bags and wraps can be recycled into many useful products, including durable backyard decking, fencing, railings, shopping carts and, of course, new bags.

In store collection Infrastructure is critical for wraps

6 ACC "2008 National Postconsumer Recycled Plastic Bag and Film Report", Published 2010

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

Bags and Film Recycling New But Growing Fast

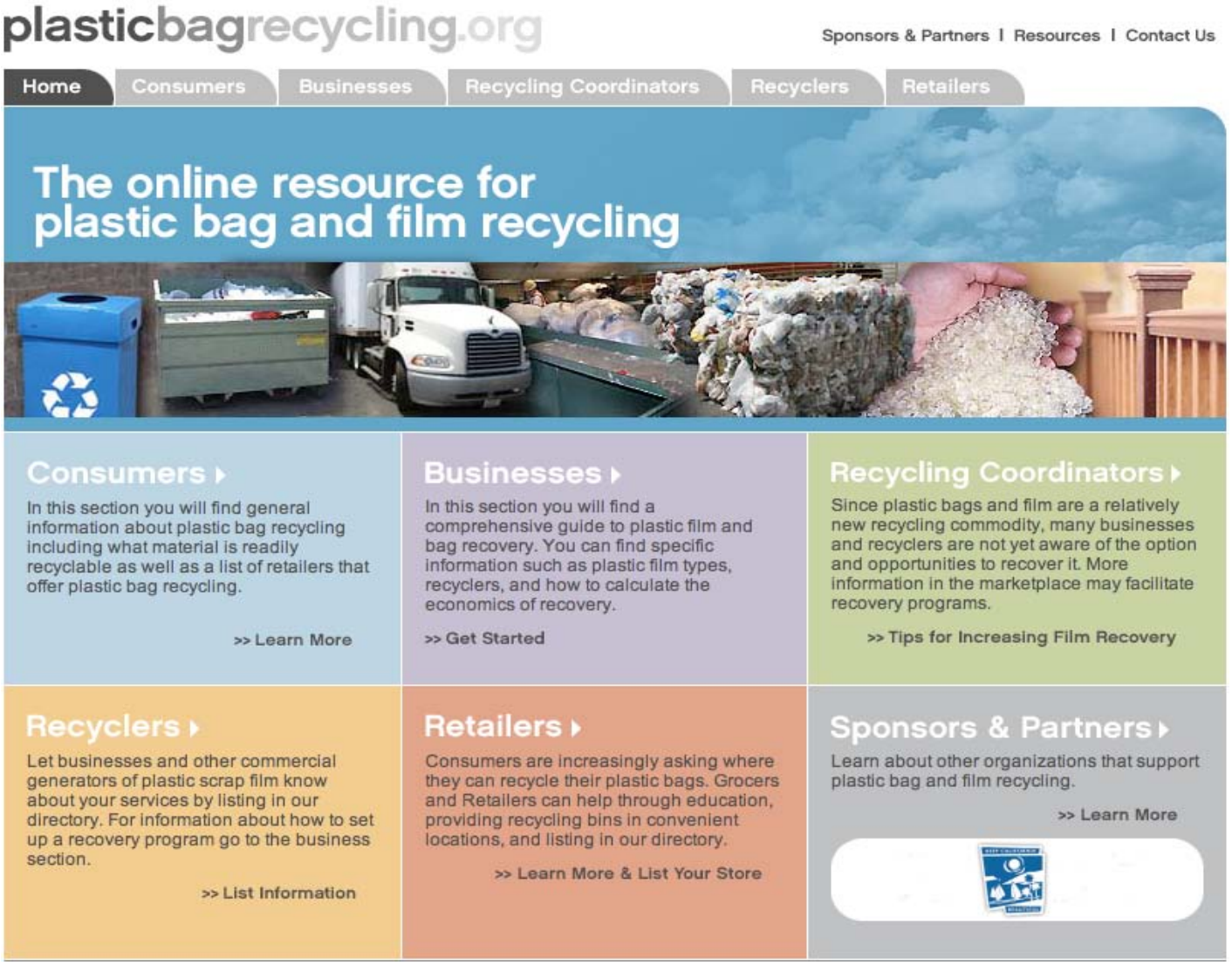
In 2009, the Progressive Bag Affiliates announced a landmark recycling goal of 40 percent recycled content in all plastic bags by 2015.

When fully implemented, the Full Circle Recycling Initiative will reduce greenhouse gas emissions by 463 million pounds, conserve enough energy (mainly natural gas) to heat 200,000 homes, and reduce waste by 300 million pounds every year.

www.plasticbagrecycling.org/

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

Bag & Wrap Recycling Resource



Programs to Enhance Bag Recycling

- **"A Bag's Life"** – is a voluntary public education program to increase plastic bag recycling and reuse in the state of Florida. Partners in the effort include the Florida Department of Environmental Protection, the Florida Recycling Partnership, the Florida Retail Association, PBA/ACC and other major grocery and retailers including Walmart and Publix.

- "**Bag Your Bags. Bring 'Em Back.**" – **King County (WA)** Solid Waste Division is sponsoring this program to enhance plastic bag recycling in partnership with several major grocers in the county's 37 cities (also promoting recycling of paper bags and use of reusable bags).

- **"Bring It Back Philly"** – is a public education campaign to increase awareness of the recyclability of plastic bags and locations for recycling bags and wraps. Spearheaded by a Philadelphia council member, this program is supported by Keep Philadelphia Beautiful, the PA Food Merchants, Penn Jersey Paper, PBA/ACC, Goodwill Industries and Trex.

- "**Got Your Bags**" – Keep **California** Beautiful pilot programs that have been launched in major cities to promote recycling of plastic bags and use of reusable bags. PBA is co-sponsoring this program with local grocers and the state waste authority.

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Programs to Enhance Bag Recycling, cont.

- **Lake County, Illinois** – a voluntary at-store pilot program is underway to increase plastic bag and film recycling. This program is co-sponsored by local retailers, legislators, recyclers and PBA/ACC. It includes a measurement component.

- **"It's In the Bag**" – is **Minnesota's successful** plastic bag and film recycling program sponsored by the state chamber, state recyclers association and local grocers/retailers. It has been expanded to Duluth (employs handicapped adults as service providers).

- **Iowa's "Build with Bags"** – is a bag recycling program to convert plastic shopping bags into recycled products for parks and schools. It is sponsored by the state grocers assn., waste authority, Keep Iowa Beautiful and Dept. of Natural Resources. A unique component of this program is that it provides grants to schools and parks to purchase recycle plastic playground equipment and benches.

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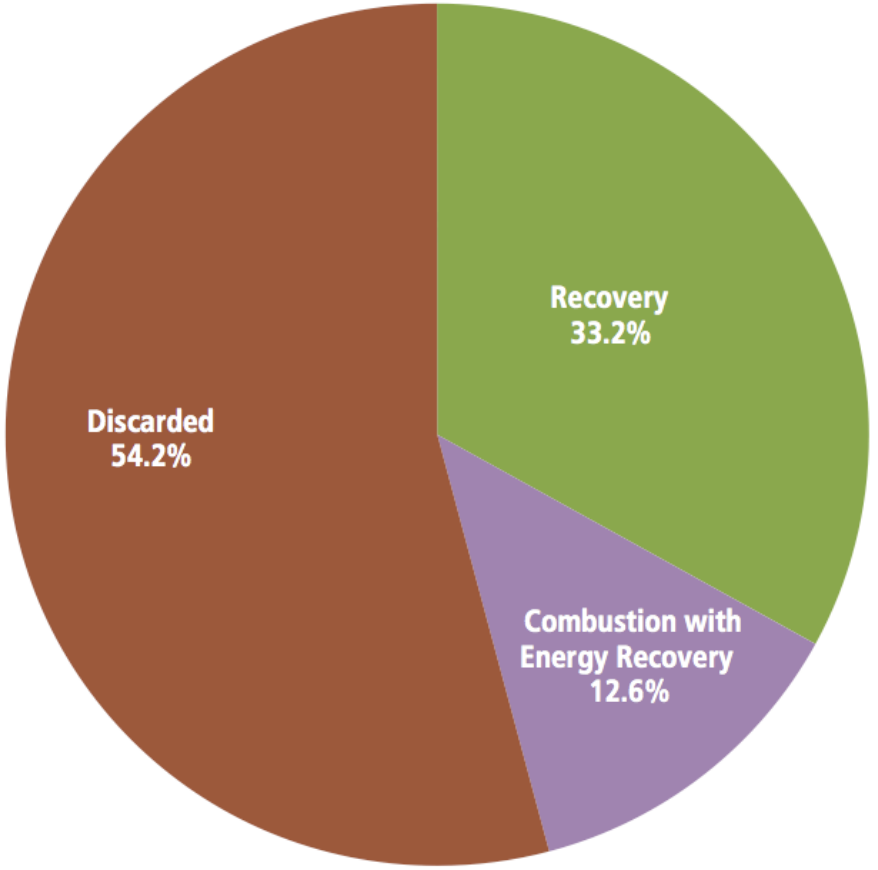
Higher Recovery is Possible

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

Figure 4. Management of MSW in the United States, 2008



Source: US EPA 2008

Studies show the use of plastics can help:

- minimize raw material consumption,
- minimize energy use,
- reduce greenhouse gas production,
- And through higher recovery minimize waste to landfill

Read: For More Information

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

Visit www.americanchemistry.com/plastics

or contact Ashley Carlson at (703) 741- 5125, Ashley_carlson@americanchemistry.com

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