

Plastic Grocery Bags — Challenges and Opportunities

Why Plastic Bag Waste Is Drawing Public Attention

The best-documented environmental issues against plastic bags are visual: they litter the landscape, clog waterways and endanger wildlife. Plastic bags take hundreds of years to decompose, and recycling rates are low.

People are concerned about unsubstantiated reports of high rates of yearly shopping plastic bag use, which suggest up to 1 trillion and more bags are used worldwide and 100 billion in the U.S. These estimates are given without supporting research. The U.S. Environmental Protection Agency (EPA) does not track plastic shopping bag use or waste. EPA experts are not aware of any reliable estimates of use in the U.S.¹

To curb plastic shopping bag use, some countries have imposed taxes and bans. U.S. citizen and anti-litter organizations, largely in coastal regions, are proposing stepped-up recycling, reuse incentives, disposal fees, recycled-content requirements and taxes.

In 2007, San Francisco implemented America's first partial ban of plastic bags, requiring large food retailers and drug stores to provide customers with only paper bags made of 40 percent recycled content, compostable plastic bags or reusable bags.²

Environmentally, 'Paper or Plastic?' Is No Longer the Question

Compared with plastic bags, paper shopping bags make a much larger carbon footprint from production through recycling. For example:³

- A paper bag requires four times more energy to produce than a plastic bag — 2,511 BTUs vs. 594 BTUs.
- In the manufacturing process, paper bags generate 70 percent more air and 50 times more water pollutants than plastic bags.
- Nearly twice as much energy (91 percent) is required to recycle a pound of paper than a pound of plastic.
- Paper bags take up more landfill space and weigh much more. In fact, 2,000 paper bags weigh 280 pounds, compared with 30 pounds for 2,000 plastic bags, increasing the fuel consumed and the air pollution generated to transport them.

¹Many reports cite a *Wall Street Journal* estimate that 100 billion bags are used in the U.S. each year and 500 to 1 trillion worldwide. A search of the newspaper's archive over the past five years uncovered no articles substantiating these figures. Other reports cite an EPA estimate that 81-100 billion plastic shopping bags are used yearly in the U.S. Since the EPA does not track shopping bag use, paper or plastic, this figure lacks any statistical basis. These figures appear to be facts repeated often enough to become facts despite the absence of an original source.

²The law took effect November 1, 2007, and applies only to food retailers and drug stores with annual sales of \$1 million or more.

³EPA, "Questions About Your Community: Shopping Bags — Paper or Plastic or ...?" February 28, 2006.

Food Marketing Institute (FMI) conducts programs in public affairs, food safety, research, education and industry relations on behalf of its 1,500 member companies — food retailers and wholesalers — in the United States and around the world. FMI's U.S. members operate approximately 26,000 retail food stores and 14,000 pharmacies. Their combined annual sales volume of \$680 billion represents three-quarters of all retail food store sales in the United States. FMI's retail membership is composed of large multi-store chains, regional firms and independent supermarkets. Its international membership includes 200 companies from more than 50 countries. FMI's associate members include the supplier partners of its retail and wholesale members.

The fact that paper bags degrade much faster loses significance considering that nothing decomposes substantially in modern landfills — which are lined with clay and plastic and sealed from water, light, oxygen and other elements to prevent materials from breaking down and leaching into the environment. Plastic bags could be a greener alternative to paper ones if recycling rates increase significantly and littering is controlled.

In the broadest environmental sense, the checkout question “Paper or plastic?” no longer has a simple answer. Leading environmental groups and green-minded retailers and shoppers are turning to a third choice: reusable bags.

A Short History of the Plastic Grocery Bag

In 1977, plastic grocery bags were introduced to U.S. supermarkets as an alternative to paper ones. The convenient versions with handles (“T-shirt” bags) followed five years later, and by 1996 four in five grocery bags were plastic — the ratio that exists today.⁴ Made of high-density polyethylene (HDPE) from natural gas, modern plastic grocery bags are lightweight and can carry heavy loads without breaking. These bags can be recycled to help produce building materials and plastic bags.

Plastic bags made from recycled resins offer significant environmental benefits in the production process, compared with bags made from virgin resins, according to United Kingdom reports: two-thirds less energy is consumed, 90 percent less water is used and two-and-one-half times less carbon dioxide is released into the atmosphere.⁵

More recently, manufacturers introduced degradable plastic bags of two general types:

- Biodegradable plastic — made from cornstarch, soy beans and other plant-based materials.
- Degradable plastic — resin-based and manufactured with a chemical additive that speeds degradation.

These types of bags do not degrade significantly in landfills; they do degrade when mishandled as litter and exposed to the elements required for decomposition. Waste management companies are starting to provide special composting facilities, which can process biodegradable bags. Neither type can be recycled.

As a result, companies and communities considering degradable bags should ensure that composting plants are accessible and provide a system for separating degradable bags from recyclable ones.

Government Campaigns to Address Plastic Bag Issues

Mounting concerns over the environmental impact of plastic bags are prompting state and local governments to take action. California became the first state to address this issue with the Plastic Bag Recycling Act of 2006, designed to curb the use of an estimated 19 billion bags per year in the state. The law requires supermarkets and large drug stores to institute plastic bag recycling programs and make reusable bags available. Among other provisions, the statute requires stores to:

- Provide bins to collect used plastic bags.
- Print on each bag the message “Please Return to a Participating Store for Recycling.”
- Maintain records for at least three years documenting recycling activities.

⁴ The Society of the Plastics Industry, Film and Bag Federation, “History of the Plastic Bag,” www.plasticsindustry.org/about/fbf/environment.htm#plasticbaghistory (visited April 4, 2008).

⁵ Waste Online, “Plastics Recycling Information Sheet,” p. 4, www.wasteonline.org.uk/resources/InformationSheets/Plastics.htm (visited April 4, 2008).

Since then, more than 40 states, counties and cities considered legislation to institute mandatory or voluntary plastic bag recycling programs, impose a tax on bags or ban their use. Illinois and Rhode Island enacted mandatory recycling laws, along with the cities of New York and San Juan Capistrano, CA, and Los Angeles County, CA, and Suffolk County, NY.

Many cities in California pursued plastic bag bans in 2007. All of these measures were defeated except the one enacted by San Francisco. Oakland enacted a similar ban, which was overturned by a court ruling that the city must conduct an environmental impact study before moving forward with the law. Opponents argued that a ban could increase use of paper bags, which generate more pollution and consume more energy to produce and recycle than plastic bags.⁶ Efforts to legislate bans were also defeated in the states of Hawaii, Maryland, Washington and Wisconsin.

The movement is continuing in 2008. Measures to ban plastic bag use are pending in Connecticut, New Jersey, Pennsylvania, Rhode Island and West Virginia. Others are weighing taxes on each bag used, including Alaska, Pennsylvania and Vermont. Seattle is pursuing a broader tax, recognizing the adverse environmental impact of plastic and paper bags. The city council enacted an ordinance imposing a 20-cent fee on all disposable shopping bags at grocery, drug and convenience stores. In this approach, retailers would receive 5 cents of each fee to cover administrative costs, and the balance would help fund city programs to promote reusable bags, waste reduction and recycling.⁷ This law is due to take effect on January 1, 2009.

How U.S. Manufacturers and Retailers Are Addressing Plastic Bag Use

Plastic bag manufacturers are following the lead of the Progressive Bag Affiliates (PBA), a division of the American Chemistry Council. PBA's mission is to "initiate programs that help businesses and consumers reduce, reuse, recycle and properly dispose of plastic bags." It is working to prevent plastic bag bans, taxes and other legislative initiatives to curb the use of disposable and recyclable plastic bags.

In part through PBA educational efforts, anti-plastic bag legislative issues emerging in communities are resolved by raising citizen awareness about the benefits of recycling and reusing plastic bags. For example, in 2007 after much collaboration among legislators, bag manufacturers and the PBA, the Suffolk County legislature rejected a proposed ban in favor of a plastic bag recycling law.

Food retailers across America are engaged in multiple efforts to encourage recycling, bag reuse and decreased reliance on plastic shopping bags. For the past 30 years, most U.S. food retailers have offered customers a choice of either plastic or paper bags. Many supermarkets provide recycling receptacles for used plastic bags. They are expanding plastic bag recycling programs, providing plastic and paper bags with recycled content, and offering customers a credit ranging from 1-10 cents for each bag reused.

In fact, more than nine in 10 food retailers (93.5 percent) offer reusable shopping bags for sale, and half of their customers (51 percent) use these bags at least one to three times a month.⁸ Many retailers are training employees to fill bags fuller and minimize double-bagging to reduce the number of bags used.

⁶Huus, Karl, "Plastics Industry Battles Grocery Bag Bans," MSNBC, March 14, 2008.

⁷Chan, Sharon Pian, "Seattle Officials Propose 20-Cent Grocery-Bag Fee," *Seattle Times*, April 3, 2008.

⁸FMI, *U.S. Grocery Shopper Trends 2008*, p. 96; *The Food Retailing Industry Speaks 2008*, p. 62.

One success story demonstrates how government and retailers can together make a difference voluntarily. In November 2007, the city of Phoenix, AZ, encouraged customers to use reusable shopping bags by distributing 30,000 free bags. The city launched this program in a partnership with the Arizona Food Marketing Alliance and Wal-Mart, Inc. Stores built special displays announcing this Bag Central Station program and handed out the reusable bags.⁹

Consumers Growing More Aware of Plastic Bag Issues

Until recently, the lack of consumer awareness has fueled the litter debate and demands to curb plastic bag use. There are indications that consumer sentiment is changing. Retailers across America report that consumer demand for reusable bags is increasing.¹⁰

In 2007, five FMI supermarket companies operating nearly 1,700 stores tracked consumer comments about bag use during various times throughout the year. These were unsolicited comments coming into their consumer affairs or corporate offices. They received 148 requests that their stores provide reusable bags, and 121 suggested that they offer consumer incentives for using these bags. Smaller numbers expressed a preference for paper (83) and degradable plastic bags (24).

The Growing Market for Recycled Plastic

There is a growing market for recycled plastic that did not exist 15 years ago. Recyclers can earn 15-20 cents per each pound of plastic bags recovered. It is less expensive to use recycled plastic resins than virgin resins, increasing the potential for recycling more plastic bags. Recycled plastic bag resins are used to make shopping bags, shopping carts and baskets, decking boards, pallets, patio pavers, laundry baskets, parking lot speed bumps, car stops and many other products.

With recycled plastic bags worth about \$400 per ton, increasing recycling at all levels presents a viable opportunity for food retailers and partnering municipalities. More than 1,800 U.S. businesses recycle post-consumer plastics, and most are food retailers. In 2006, an estimated 812 million pounds of post-consumer film, including plastic bags, were recovered for recycling — a 24 percent increase over the previous year.¹¹ These figures should increase as more states, counties and cities institute plastic bag recycling programs.

Increasing the recycling of plastic bags requires a variety of strategies. The following companies offer examples of current technologies used to produce bags and other products from recycled plastic and other products:

- **AERT** (Advanced Environmental Recycling Technologies, Inc.) has pioneered the use of recycled polyethylene plastic to manufacture composite building materials since 1989. The company is recognized as a leader in resource conservation innovation, receiving the EPA Award for Environmental Excellence in 1999 for its process of converting scrap plastic into composite outdoor decking. AERT converts reclaimed plastic and wood fiber waste into outdoor decking systems, fences and door and window components. It operates manufacturing facilities in Springdale, Lowell, and Tontitown, AR; Junction, TX; and Alexandria, LA. (www.aert.com)

⁹ *EV Living*, Phoenix News, "City Distributes 30,000 Reusable Bags to Promote Reduction in Plastic Shopping Bags," November 29, 2007.

¹⁰ Carr, Coeli, "In the Bag: A Greener Checkout," *Supermarket News*, December 1, 2007, p. 20.

¹¹ Moore Recycling Council Associates, *2006 National Post-Consumer Recycled Plastic Bag and Film Report*, prepared for the Plastics Division of the American Chemistry Council.

- **Trex** has been turning millions of pounds of recycled and reclaimed plastic and waste wood each year into decks, rails, fences and trim since 1996. Most of the raw materials come from recycled plastic bags, other plastic waste and hardwood sawdust. The company recycles 1.5 million plastic bags a year and reports that the volume is increasing as more cities and states promote recycling with education, waste management programs and laws.¹² (www.trex.com)
- **NextLife**, an alliance of recyclers and manufacturers, recycles plastic grocery bags and other materials into bags and other products. Mountain Valley Recycling and NextLife jointly develop closed-loop programs in which plastic is continuously reused to make products. Mountain Valley's technology transforms plastic waste into 100 percent certified post-consumer grade resins and durable plastic products. (www.mvrecycling.com)
- **Hilex Poly Co.** operates a "Bag-2-Bag[®]" recycling center in North Vernon, IN, that recycles used plastic bags into new ones. In the first quarter of 2008, it recovered approximately 3 million pounds of plastic resins from used bags and produced 150 million new bags. The company is partnering with three California cities — Dana Point, San Clemente and San Juan Capistrano — to collect plastic bags in curbside recycling programs for nearly 40,000 households. It provides supermarkets with plastic bag collection bins, along with systems to help them count bags, ensure that bags are fully packed and reduce their use. (www.hilexpoly.com/bag2bag.htm)

International Efforts to Curb Plastic Bag Use

Many countries have undertaken aggressive campaigns to reduce plastic shopping bag use and ban all plastic bags or ultra-thin ones (less than 30 microns thick), which are a major source of litter and cannot be reused or recycled. For example:

Among **African** nations, **South Africa** was the first to act by banning ultra-thin plastic bags and imposing taxes on thicker ones in 2003; **Kenya** and **Uganda** followed suit in 2007. **Eritrea**, **Rwanda** and **Somalia** banned all plastic bags in 2005, as did **Tanzania** (including **Zanzibar**) the following year.¹³

Australia began taking action in 2002. The nation's Environmental Protection and Heritage Council (EPHC) set a goal to phase out single-use bags by the end of 2008. The Australian Retailers Association adopted a Code of Practice for the Management of Plastic Bags in 2003, including a commitment by major supermarkets to a 50 percent reduction in HDPE bags by end of 2005. Industry and government campaigns to promote reusable bags and recycling and dissuade shoppers from using single-use ones produced significant results. Plastic bag consumption declined from 6.9 billion in 2002 to 3.9 billion in 2005.¹⁴ Debate continues over how to achieve further reductions such as through bans, taxes or surcharges. Some jurisdictions have taken independent action, including bans.

¹²Blake, Whitney, "Trex Sees 20 Percent Increase in Plastic Recycling," *The Examiner* (Washington, DC), April 3, 2008, p. 17.

¹³BBC News, "Plastic bag bans around the world," February 28, 2008, http://news.bbc.co.uk/2/hi/in_depth/7268960.stm (visited April 9, 2008).

¹⁴Environmental Protection and Heritage Council, *Consultation: Regulatory Impact Statement — Investigation of Options to Reduce the Environmental Impact of Plastic Bags*, January 2007, pp. 17-18.

In **Canada**, Leaf Rapids, Manitoba, became the country's first city to ban plastic bags, starting in April 2007.¹⁵ Ontario is moving to reduce plastic bag use with incentives, working with the Recycling Council of Ontario and grocer and retail associations. The incentives include store points redeemable for products, airline miles or cash for consumers who use reusable bags. Retailers are training clerks to double-bag less often, fill bags with more items and stop bagging large items.¹⁶

China is prohibiting all supermarkets, department stores and other retailers from providing customers free plastic bags, effective June 1, 2008. Retailers are required to charge customers for any bags they use at a rate equal to the cost. The country banned altogether the use of ultra-thin plastic bags, which have become a major source of litter. Retailers that violate this requirement could face fines of up to 10,000 yuan (\$1,431).¹⁷

In **Europe, Ireland** was the first to take action, imposing what became known as a "plastax" on plastic shopping bags, introduced in 2002 at 0.15 euros per bag and increased in 2007 to 0.22 euros (equaling about 34 cents¹⁸). This tax reduced plastic bag use in the country by nearly 90 percent.¹⁹ Today, plastic bags are also taxed in **Italy** and **Belgium**, and shoppers must pay for them in **Switzerland, Germany** and **Holland. Spain, Norway** and the **U.K.** are considering bans or taxes.²⁰

Plastic Bag Recycling Information and Education Resources

Best Practices Guide for At-Store Collection of Plastic Bags — Prepared by Canada's Environment and Plastics Industry Council, this guide shows retailers how to develop an at-store collection program for plastic bags. It brings together practices already used in many retail outlets throughout North America.

The Environment and Plastics Industry Council, Canadian Plastics Industry Association
905-678-7748, www.plastics.ca/epic

Penn Jersey's Bag Smart Plastic Bag Reduction and Recycling Model Penn Jersey —

This Philadelphia-based retail equipment and supplies company manages "Bag Smart," a plastic bag and recycling initiative in partnership with Goodwill, Trex and participating businesses and retailers. The program features store bagging training tips, bag reuse ideas, plastic bag recycling solutions, consumer education and reusable plastic bag offers.

Penn Jersey Paper Company — 800.992.3430, www.pjponline.com

Progressive Bag Affiliates At-Store Plastic Bag Recycling Collection Toolkit —

This resource provides retailers with a step-by-step process to implement an at-store bag recycling program including instructions on bag language (including language required by laws), setting up collection bins, signage, bag consolidation, sale of material and consumer education materials. www.plasticbagrecycling.org

¹⁵CBC News, "It's Official, Manitoba Town Gives Plastic the Boot, April 2, 2007.

¹⁶CTV, "Ontario Launches Program to Cut Plastic Bag Use, May 9, 2007.

¹⁷Associated Press, "China Bans Free Plastic Shopping Bags," published in the *International Herald Tribune* on January 9, 2008; *China Daily*, "Shops face fines for free plastic shopping bags," April 8, 2008. The conversion of yuan to dollars is based on the exchange rate as of April 22, 2008.

¹⁸Based on the euros-dollars exchange rate in April 2008.

¹⁹"Irish Bag Tax Hailed Success," BBC News, August 20, 2002; RTE News, "One Plastic Bag Now Costs 22c," July 1, 2007.

²⁰Roach, John, "Plastic-Bag Bans Gaining Momentum Around the World," *National Geographic News*, April 4, 2008, <http://news.nationalgeographic.com/news/pf/74875718.html> (visited April 9, 2008).

Additional Sources of Information About Plastic Bag Issues

American Chemistry Council, Plastics Division, Progressive Bag Affiliates —
703.741.5000, www.americanchemistry.com/plastics/

Commonwealth of Australia Department of the Environment and Water Resources
Plastic Shopping Bags in Australia report by the National Plastic Bags Working Group
to the National Packaging Covenant Council —
www.environment.gov.au/settlements/publications/waste/plastic-bags/report-2002.ht

Environmental Advocacy Groups

Environmental Defense Fund — 800.684.3322, www.edf.org

Natural Resources Defense Council — 212.727.2700, www.nrdc.org

Sierra Club — 415.977.5500, www.sierraclub.org,

World Wildlife Fund — 202.293.4800, www.worldwildlife.org

Film and Bag Federation — 202.974.5218, www.plasticbag.com

Plastic Bag Manufacturers, U.S.

Advance Polybag — 800.504.5000, www.apicorp.com

Interplast — 800.896.3222, www.ibsbags.com

Superbag — 888.842.1177, www.superbag.com

Plastic Bag and Film Manufacturers and Recyclers

Hilex Poly Co. — 800.432.1050, www.hilexpoly.com

Mountain Valley Recycling, LLC — 561.274.4928, www.mvrecycling.com

NextLife, Inc. — 877.214.0501, www.nextlifeinc.com

Trex — 800.289.8739, www.trex.com

The Society of Plastics Industry — 202.974.5200, www.plasticsindustry.org

Use Less Stuff — Publisher of the *ULS Report*, www.use-less-stuff.com

U.S. Environmental Protection Agency Websites

www.epa.gov/msw/paper.htm

www.epa.gov/msw/faq.htm

www.epa.gov/epaoswer/non-hw/muncpl/pubs/mswchar05.pdf

“Questions About Your Community: Shopping Bags — Paper or Plastic or ...?”
<http://web.archive.org/web/20060426235724/http://www.epa.gov/region1/communities/shopbags.html>

Glossary

add-on packaging — a term used to describe any carryout bag or extra packaging provided by retailers.

biodegradable plastics — plastics that decompose in the natural environment and can include non-carbon-emitting starch-based plastics or oil-based plastics, which release carbon dioxide.

bioplastic — plastic derived from plant sources such as hemp oil, soy bean oil and corn starch or from a microbial source, rather than traditional plastics, which are derived from petroleum.

closed-loop recycling — reuses recovered plastics to manufacture new 100 percent post-consumer recycled products.

compostable — made from biodegradable substances capable of degrading in a properly managed compost process.

degradable plastic — plastic able to be broken down by mechanisms such as bacterial action, exposure to heat, light or oxygen within a short time frame.

high-density polyethylene — HDPE is a thermoplastic made from natural gas and has stronger tensile strength than low-density polyethylene (LDPE). HDPE plastic bags are recyclable and widely used in supermarkets.

life-cycle assessment — LCA (also known as a life cycle analysis, ecobalance or cradle-to-grave-analysis) is the investigation and valuation of the environmental impacts of a given product or service caused or necessitated by its existence. The goal of an LCA is to compare the full range of environmental damage assignable to products and services, to be able to choose the least burdensome one.

low-density polyethylene — LDPE is a thermoplastic made from natural gas, and its most common use is for plastic bags. LDPE bags are softer to handle and more pliable than HDPE bags.

non-government organization — NGO is a legally constituted organization created by private persons or organizations with no participation or representation of any government entity.

photodegradable or photodegradation — degradation caused by sunlight, and includes the breakup of molecules into smaller pieces by photons. For example, six-pack soda can rings have been photodegradable LDPE plastic since the 1990s. Some plastic bags are manufactured with properties making them photodegradable.

polyethylene terephthalate — PET is a thermoplastic polymer resin of the polyester family and is commonly used in the manufacture of soft drink bottles.

post-consumer recycled-content — a product containing post-consumer recycled material or a percentage of this content derived from curbside or other community recycling programs, if viewed as more beneficial, and helps support recycling as a solution.

recycled-content paper bags — paper grocery bags manufactured with up to 100 percent recycled fibers. Recycled papers may not be as strong as paper made from virgin fibers.

recycled-content plastic bags — primarily LDPE bags manufactured from a combination of recycled plastic resins and virgin resins. Recycled-content can comprise up to 100 percent of the material content of each bag.

renewable resource — a resource that has the ability to regenerate at regular intervals.

reusable bags — manufactured from strong durable materials that extend the life of the bag, eliminating waste from frequent disposal.

single-stream recycling — curbside recycling programs that combine all material types into one collection container, compared with “single-sort” or “source-separated” recycling in which glass, metal, plastic and paper are placed in separate containers.

thinned-walled plastic bags — disposable shopping or carryout bags, usually manufactured from high-density polyethylene (HDPE) or low-density polyethylene (LDPE).

waste-to-energy — WTE or energy-from-waste (EFW) refers to any waste treatment that creates energy in the form of electricity and/or heat from a waste source. In states and communities that have built reliance on waste-to-energy plants as strategic solutions for waste disposal, plastic bags as a source of waste energy may be more attractive to recyclers or processors.