

Paper and Paperboard Products

Paper and paperboard products include items you use every day—newspapers, food packaging, tissues, cardboard boxes, office paper, and paper plates. In fact, paper and paperboard products constitute the largest portion of municipal solid waste (MSW). As the greatest portion of the waste stream, paper also offers the greatest opportunity for recycling. Today, consumers buy recycled paper in newspapers, food packages, and office paper—some containing as much as 100 percent recycled fiber. Other uses of recovered paper include insulation, gypsum wallboard, fertilizer bags, and mulch.

Just the Facts

- At about 35 percent, paper and paperboard products constitute the largest portion of the MSW stream.
- Americans generated about 85 million tons of paper products in the MSW stream in 2006, nearly a three-fold increase from 1960.
- About 52 percent of all paper and paperboard products in MSW were recovered in 2006, about three times the percentage recovered in 1960.
- Recycling rates (2006):
 - Newspapers: 88 percent
 - Corrugated Boxes: 72 percent
 - Office Paper: 66 percent
 - Magazines: 41 percent
 - Telephone Directories: 19 percent



Paper Making and Recycling

To make paper, a paper mill loads debarked and chipped wood into a large tank called a digester. The digester pressure cooks the chipped wood with water and a mixture of chemicals. The chips then stew in a chemical mix under pressure. The resulting pulp is washed, refined, and cleaned. In a separate process, the mill mixes shredded recycled paper with water, then cooks and cleans the mixture to create pulp. The paper mill blends in a certain percentage of pulp from recycled paper, depending on the desired characteristics of the finished product.

Paper reprocessors are very selective about the materials they use to make recycled-content products. High-grade papers like white office paper have long fibers, while low-grade papers like mixed paper have shorter fibers. Processors cannot mix low-grade papers with high-grade papers if they want to manufacture high-grade recycled-content white office paper. In the field of paper and paperboard recycling, the most preferable form of recycling is "first-tier" recycling, such as using recovered newspapers to make new newsprint. Therefore, paper mills commonly seek single-grade recycled paper. Corrugated cardboard, newspapers, and office papers are the most common single-grade waste streams (i.e., no other paper is mixed in, making it easier to "close the loop").



Paper Technologies

As with many recyclable commodities, three challenges facing recovered paper processors and manufacturers are: 1) contamination, 2) sorting, and 3) fiber degradation. Contaminants such as inks, adhesives, food, and broken glass affect the quality of recycled paper. Through literature, Web sites, and other outreach materials, recycling facilities try to educate the public about the importance of sorting papers properly to minimize contamination. Also, papers made from different fibers must be sorted from each other and recycled separately. Office paper cannot be recycled with newspaper and maintain its fiber integrity. Fiber degradation is an ongoing challenge in the paper recycling industry. The size and strength of paper fibers decrease when paper is manufactured and are further degraded with each round of recycling. Paper recyclers are developing new technologies designed to handle, identify, and separate paper grades for recycling. One enhancement technology allows segregation of paper fibers during the recycling process according to fiber length, coarseness, and stiffness through a sequential centrifuging and screening process.

Markets for Recovered Paper

The American Forest and Paper Association (AF&PA), the national trade association representing the forest, paper, and wood products industry, reported that in 1988, about 25 percent of the raw materials used at U.S. paper mills was recovered paper. In 1999, according to AF&PA, that figure rose to 37 percent. As a result, virtually all types of paper products contain recycled paper. According to AF&PA, the brisk rise in paper recovery is attributable to strong demand overseas for U.S. recovered paper and solid gains in domestic consumption. Eighty-one percent of the paper recovered in the United States is recycled by US paper mills; 16 percent is exported to foreign markets; and the rest is used domestically to manufacture products like molded packaging, compost, and kitty litter.

Mills buy recycled paper either loose or in bales. Grades of paper include mixed paper, mixed office paper, sorted white ledger, sorted colored ledger, computer printout, newspaper, corrugated containers, and magazines.

Source Reduction/Lightweighting

Source reduction is the process of reducing the amount or toxicity of waste generated. One form of source reduction is "lightweighting." Lightweighting means reducing the weight and/or volume of a package or container, which saves energy and raw materials.

As early as 1983, companies manufacturing food service disposables began reducing the weight of plates, bowls, containers, trays and other tableware. Manufacturers of paper food service disposables have been able to source reduce by decreasing the paper stock required to manufacture food service containers and coating the containers with a very thin layer of polyethylene or wax. The coating enables the container to maintain its strength and food-protection functions.

Benefits of Paper Recovery

The economic and environmental benefits of paper recycling are many.

Paper recovery:

- Reduces greenhouse gas emissions that could lead to damaging climate change.
- Saves money since recycling fiber is cheaper than harvesting and processing virgin fiber.
- Saves considerable landfill space, since paper products constitute the largest fraction of MSW—accounting for nearly 40 percent of all MSW generated, according to EPA.
- Reduces the volume of waste burned in waste combustors, thus reducing air emissions.

Recycling and source reducing paper products reduces energy consumption, decreases combustion and landfill emissions, and decreases the amount of carbon dioxide in the atmosphere. When you reduce or recycle paper products, trees that would otherwise be harvested are left standing. These living trees absorb carbon dioxide, a greenhouse gas. On the other hand, when trees are harvested for papermaking, carbon is released, generally in the form of carbon dioxide. When the rate of carbon absorption exceeds the rate of release, carbon is said to be "sequestered." This carbon sequestration reduces greenhouse gas concentrations by removing carbon dioxide from the atmosphere.

Source: United States Environmental Protection Agency