

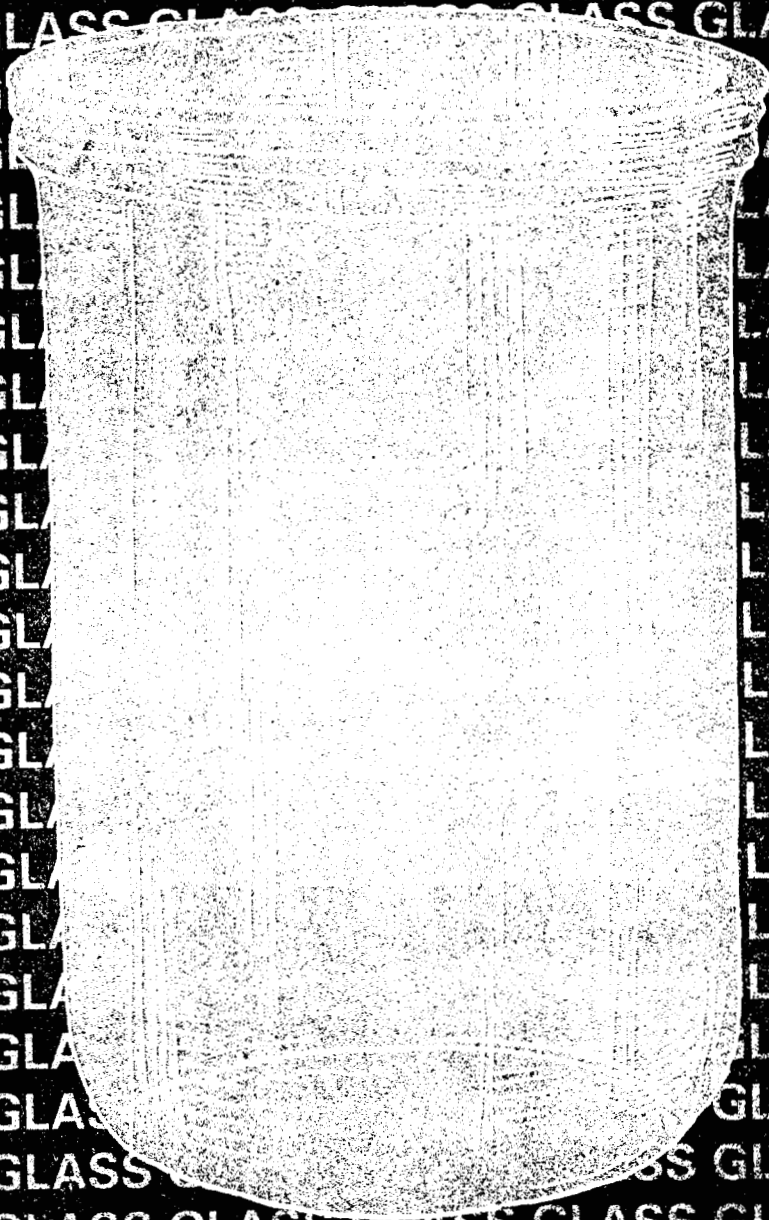
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Solid Waste and Emergency Response (OS-305)



Summary of Markets for Recovered Glass





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The Role of Markets in Recycling

Recycling, along with source reduction, combustion, and disposal in landfills, is a key component of an integrated municipal solid waste management strategy. Recycling may consist of several steps, including collection, separation, processing, remanufacture, and marketing. A material is not considered "recycled" until all of these steps are completed and the "recycling loop" is closed.

Since materials must be converted into products and used by consumers to close the recycling loop, understanding the markets for recyclable materials and for goods manufactured from recyclable materials is key to continued and expanded recycling. Markets for recyclable materials, like all markets, are influenced by the laws of supply and demand. As more and more communities across the nation implement recycling programs and more recyclable materials enter the marketplace, both supply and demand are affected.

The U.S. Environmental Protection Agency (EPA) is supporting market development by promoting the government purchase of goods containing recycled materials; providing assistance to local governments; and researching, developing, and evaluating policy options.

This booklet summarizes EPA's *Markets for Recovered Glass*. It describes factors affecting the current supply and demand for glass, and provides information on future market trends. It also explains how to obtain a copy of the full report.



Scrap Glass Supply

The supply of scrap glass has three components: transition glass, preconsumer cullet, and postconsumer cullet. Cullet is simply crushed scrap glass. *Transition glass* is made up of unmarketable glass products created by glass manufacturers. *Preconsumer cullet* is finished glass that breaks at a bottling or distribution plant. Most transition glass and much preconsumer cullet are remelted by the plant that produced it. More important from the perspective of

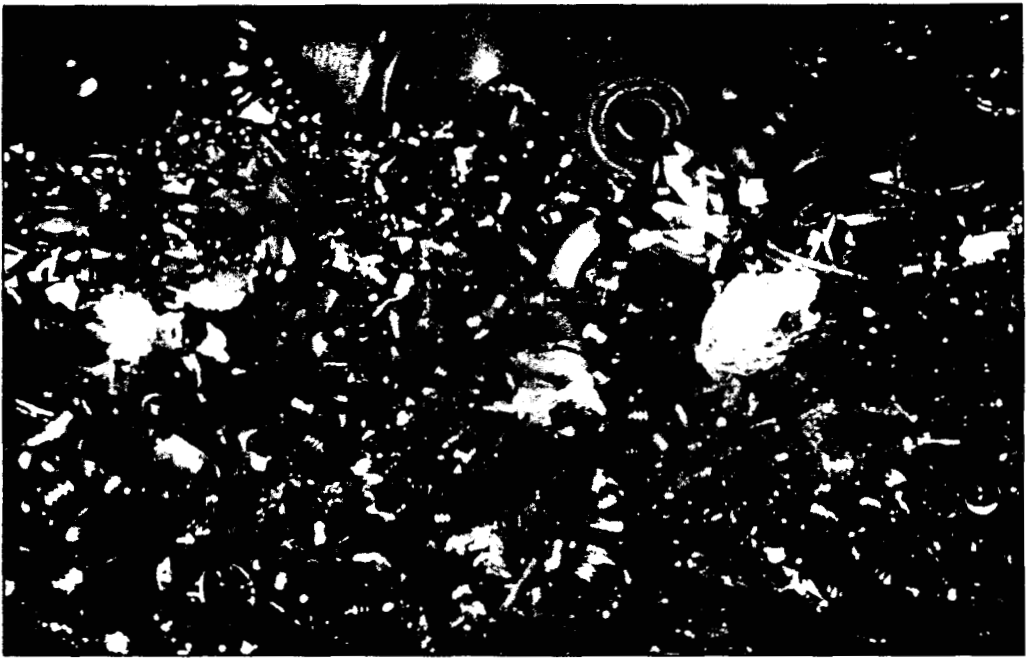
recycling is *postconsumer cullet*. Postconsumer cullet primarily includes discarded glass beverage containers (including juice, beer, and soft drink bottles) and other glass containers (such as food jars and medicine bottles). Cullet is 100 percent recyclable in that it can be used repeatedly to make the same product. Typically, there are three colors of container cullet: flint (clear), amber, and green.

In 1988, recovery of glass totaled 1.5 million tons, or 12 percent of the total glass generated. Glass beverage containers accounted for about one-half of all glass containers manufactured and most of the glass recovered from the solid waste stream. In 1988, 20 percent of all

discarded beer and soft drink containers were recovered.

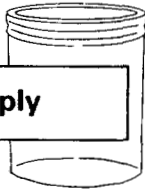
In recent years, municipal glass recycling collection programs have been expanding in terms of the number of areas participating, types of recovery methods employed, and amount of cullet





recovered. From 1980 to 1988, the rate of materials recovery of glass containers from the municipal solid waste stream rose 133 percent. Nevertheless, effective and convenient recycling opportunities do not yet exist in all areas, and many areas do not yet sponsor any type of glass collection program.

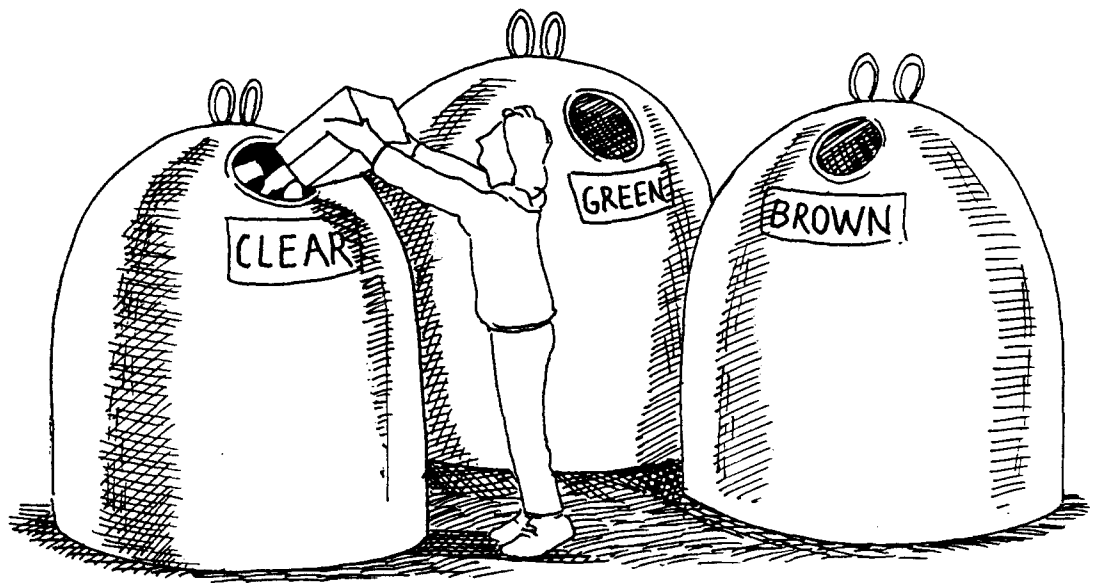
Factors Affecting Supply



The supply of scrap glass is affected by the type and availability of collection methods used, costs, and publicity factors. The type of collection program in place in an area affects the amount of glass recycled and available for reuse. Currently, there are three types of postconsumer collection programs around the country: (1) deposit/refund programs (initiated by bottle bills), (2) drop-off or buy-back centers, and (3) curbside pickup.

Under deposit/refund programs, consumers pay a deposit when buying a bottled soft drink or bottled beer and receive the deposit back when they return the bottle. The bottles are then refilled or recycled. States with deposit laws report much higher recycling rates for glass beverage bottles than states without deposits. To achieve this response, however, these states have had to offer returns on bottles (5 to 10 cents) far above the market scrap value of the bottle. (A glass beverage bottle is worth about a penny.) Although deposit programs do not increase the value of cullet once it leaves the collectors, the effect is to push more cullet into the market than would otherwise be available, given current scrap prices.

The convenience associated with a recycling collection program also affects cullet supplies. The beverage industry sponsors buy-back and drop-off centers in several states, whereby consumers return or sell their containers back to



major glass manufacturers directly. These programs do not generate as much consumer response as deposit/refund programs because consumers typically prefer to return glass to the same location from which it was purchased, and the market price of a glass container is much lower than the typical deposit.

Curbside pickup programs, on the other hand, can be even more effective than drop-off programs at generating cullet because they are more convenient for consumers. In curbside programs, consumers separate recyclables from other trash for collection by the municipality or other organization.

Currently, the recycling of nonbeverage glass containers and non-container glass does not significantly affect cullet supplies. Publicity about recycling often emphasizes beverage containers. Consumers often are unaware that many buy-back and drop-off centers accept nonbeverage glass containers and noncontainer glass in

addition to soft drink and beer bottles. To date, no collection methods have been widely established to handle large or heavy pieces of glass or flat glass (such as window panes), or glass that needs to be separated from other components (such as lightbulbs).

Another factor affecting supply is the low value of cullet and the high cost of transporting it. Transporting cullet to the glass manufacturers is the single largest cost component for cullet suppliers. The market for glass containers, therefore, is regional, and more glass tends to be recycled in areas where manufacturers are located. Exceptions to this trend occur in areas where the high cost of trash disposal makes it economical to recycle glass and other items at a great distance from manufacturers. If municipalities take into account the avoided costs of disposing of this glass in landfills, they may be able to justify high transport costs.



Future Trends in Supply

Industry observers predict that the use of glass food and beverage containers will rise only slightly over the next several years. This modest increase will nonetheless lead to an increase in the supply of cullet because more glass will be available for recycling. Curbside programs, in particular, are likely to boost recycling rates, since this type of program is most convenient for consumers and the number of curbside collection programs is rapidly increasing.

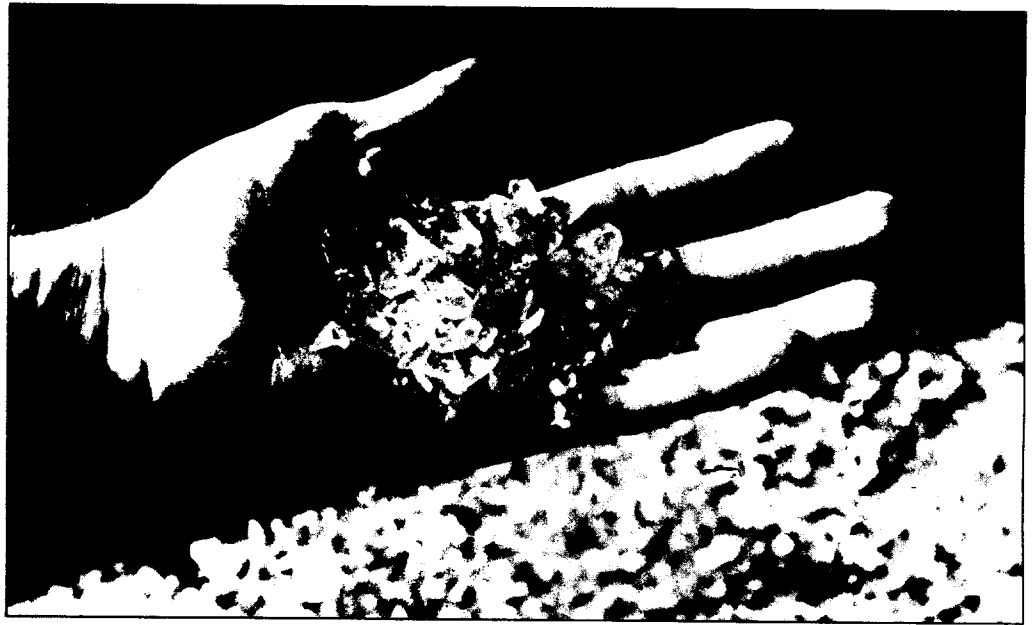
The expansion of the cullet supply partially depends on how well glass fares over aluminum and plastic in the container marketplace. Aluminum has long been a competitor of glass, and, since the introduction of plastic beverage containers in the 1970s, the glass share of the beverage container market has

dropped steadily. Between 1980 and 1989, the number of glass containers declined 12 percent, and the supply of potential cullet decreased. Shipment of glass containers, however, grew slightly in 1989, and that growth is expected to continue for several years.



Demand for Cullet

Glass manufacturers buy cullet directly from recyclers and from *intermediary companies* that purchase cullet from recyclers. Furnace-ready cullet (which is crushed and decontaminated) may be purchased from *independent dealers and processors* (who often obtain cullet from industrial or commercial glass manufacturers that do not use scrap glass). Many glass beverage container manufacturers also own and



operate *beneficiation units* where glass is made furnace-ready.

Glass container manufacturers are the largest consumers of cullet. According to industry representatives, these manufacturers will buy as much cullet as is available because it saves raw materials, energy, and furnace life. In addition, manufacturing recycled glass projects a positive company image.

Noncontainer glass industries currently do not use significant quantities of cullet. The fiberglass insulation industry and companies that make such items as ceramics, industrial compounds, and glasphalt (a road-paving compound made of asphalt and glass) use some

cullet. Although most noncontainer glass manufacturers rarely purchase cullet, they do use small amounts that are self-generated. Pressed and blown glassware producers do not use or purchase cullet and sell their own scrap glass.

Factors Affecting Demand



To meet strict manufacturing specifications, all cullet must be sorted by color, crushed to a size suitable for the furnace, and separated from bits of aluminum and other contaminants.



Color sorting is accomplished either by consumers or after disposal by processing facility operators. Bits of gravel, pieces of ceramic, and some types of noncontainer glass pose special problems for glass manufacturers because they cannot be easily removed from the cullet. Recyclers need to pay special attention to see that these materials do not contaminate their glass.

Strict specifications for most products limit the amount of cullet that manufacturers can use. Although it is possible to manufacture some glass products using 50 percent cullet or more, most glass containers are manufactured using 20 to 30 percent cullet. Higher per-

centages would require significant process modifications. Manufacturers are unlikely to make these process modifications without the assurance of a constant supply of color-sorted, contaminant-free cullet. To respond to the industry's need for a steady supply of cullet, some glass manufacturers subsidize cullet prices and deal with large intermediaries and independent dealers that can provide a large volume of cullet with greater reliability than small individual communities or cullet processors.





Future Trends in Demand

The success of glass against aluminum and plastic in the marketplace will affect the amount of cullet the glass industry will demand. Observers predict that the glass container industry will continue to see modest growth over the next few years. Growth in the container

industry will dictate the overall capacity to use cullet. Consumer demand for recycled containers will also affect use of cullet.

To increase the use of cullet, existing collection and beneficiation units must improve operations to a level that can guarantee cullet quality and quantity. Glass industry observers also speculate that if prices or regulations changed enough to make it more worthwhile to use cullet, more companies would be motivated to do so.

Market Report Availability

A copy of the full report, *Markets for Recovered Glass* (EPA 4530-SW-90-071A), is available from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161, 703-487-4650.