

## CHAPTER B - POTENTIAL BAY AREA MARKETS FOR RECYCLED GOODS

Patricia Weigt

### Abstract

Solid waste has seven reusable components: paper, glass, metal, plastic, rubber, rags and compost. Markets for recycled goods are characteristically unstable. In order for the Association of Bay Area Governments' goal of a 30% reduction in the San Francisco Bay Area solid waste stream by 1982 to be achieved, recycling must increase by almost four-fold in the Bay Area. Stimulation of markets for recycled goods could contribute importantly to bring about a significant reduction in the volume of solid waste.

\* \* \*

An increase in recycling of solid wastes is one partial solution to the solid waste problem facing the San Francisco Bay Area. Besides the familiar paper, bottles and cans, other articles such as plastic, rubber, rags and compost could readily be reclaimed through stepped-up recycling. These seven listed items make up the basic reusable components of residential trash, according to Furlow and Zolinger (1964). They have proposed a system for separating municipal refuse, including sewage sludge, that they claim would cause virtually all mixed municipal refuse to be recycled. Other researchers, such as C.G. Golueke, claim that these seven categories make up only 88.8 percent of solid waste (Golueke, p. 10). This more conservative figure will be used for subsequent discussion.

Recycling centers in the nine Bay Area counties in 1975 recycled 8 percent or 155,000 metric tons (MT) (174,000 tons) of reusable materials from a residential waste stream of 2.1 million tons. This figure also amounts to 3 percent of the mixed municipal waste stream for the same year, but such a low figure is seen as misleading because it does not account for significant contributions from recycled industrial and commercial wastes, in order to meet a California State Solid Waste Management Board (SSWMB) reduction of the mixed municipal waste stream by 1982. This is an almost four-fold increase, assuming that no other method of waste reduction is employed.

C.G. Golueke breaks down his reclaimable 88.8 percent of municipal wastes as follows (Golueke, 1970): plastics 0.7%; rubber 0.6%; rags 0.6%; paper 42.0%; metals 8.0%; compost 30.9%. From this it can be seen that recycling of plastics, rubber, and rags would together cause at most a two percent decrease in total waste tonnage. At the same time, however, recycling less than three-quarters of total paper wastes would meet the 30 percent reduction goal. While every contribution is important, the greatest returns appear to be attainable by concentrating efforts on those categories making the larger

contributions.

Once collected, reusable goods must be traded to individuals or institutions having a need for them. These goods can be classified into three categories (Bengdahl, 1969): 1) products that are recycled to the operation from which the waste material originated (metals, glass, paper); 2) products that serve as raw materials for manufacturing operations (rags, rubber); 3) products that are utilized directly (plastics, rubber, compost). The small number and poor development of these markets is the fundamental problem facing the recycling effort. The markets that do exist are characterized by instability. The future prospects for each of the seven market categories vary widely. A brief discussion of each follows.

Paper - Very little paper is recovered by current solid waste management techniques, even though paper constitutes approximately 42 percent of municipal wastes by weight (Darney, 1969).

Glass - The glass industry regularly uses glass scrap, called cullet, at a rate of up to 10 percent of input tonnage (Darney, p. 65). However, little glass is now recovered from the waste stream. The glass container industry could probably use more than 30 percent cullet (Darney, 1969), so there is potential demand for waste glass.

Metal - Metals derived from municipal wastes are of unknown origin and contain a high percentage of contaminants. For this reason they are generally considered undesirable by industry. While the industry can render reclaimed ferrous metals qualitatively desirable, other sources of scrap are more economically desirable and are of sufficient quantity to satisfy demand (Darney, 1969). A potential market exists for shredded tin cans in the copper industry where they are used to precipitate copper out of copper sulfate (Darney, 1969). Aluminum is the only non-ferrous metal that occurs in adequate amounts in municipal wastes to make its recovery feasible. There is essentially unlimited demand for recycled aluminum. However, because it occurs as a small percentage in municipal wastes, even total recycling would have a negligible impact on the solid waste problem, when considered by weight.

Plastic - Almost no plastics are reused from municipal wastes. There are two basic impediments to the recycling of plastics: the great variety of types of plastics (according to chemical composition), and the lack of technology to upgrade processed plastics to the chemically pure form they had originally. However, there is value in recycling plastics. Their high fuel value (15,770 BTU/lb) is a source of latent energy that can be recovered through incineration (Darney, 1969).

Rubber - Sixty-seven percent of the rubber in municipal wastes is in the form of tires (Darney, 1969). It is less costly to reprocess this type of rubber for reuse than it is to process virgin rubber. There are technical limitations to this process which must be overcome before it can become widespread in practice. Tires are composed of textiles and metal as well as rubber. These materials are technically difficult to separate.

Rags - Textiles can be reused as wiping cloths or as second-hand clothes and other goods. They are also recycled into paper and re-processed wool. Recently, however, there has been a decline in wool re-processing. This can be attributed to contamination by synthetic fibers and to the development of the Woolmark label by world wool suppliers, causing a decline in popular demand for items of re-processed wool. Rags comprise a significant proportion of processed textiles exported from the United States amounting to 13 percent in 1969 (Dorney, 1969). This is a large enough market so that all of the rags in the Bay Area solid waste stream could be diverted without doing more than making a small dent in the market. However, because of the small proportion of textiles in the solid waste stream, efforts spent on diverting textiles would have little effect on waste reduction.

Compost - Compost is not properly a fertilizer. Rather, it is a soil conditioner (see Section IV, Chapter C for a discussion of compost). Existing demands for compost are met by commercial suppliers (Dorney, 1969). Increased supplies of compost made available by recycling could complement the use of inorganic fertilizers in agriculture.

#### BIBLIOGRAPHY

1. Bengdahl, Richard B., 1969, Solid Waste Processing, U.S. Department of Health, Education and Welfare.
2. Dorney, Arsen and William E. Franklin, 1972, Salvage Markets for Materials in Solid Waste, U.S. Environmental Protection Agency.
3. Furlow, H.G., and H.A. Zolinger, May 1964, Reclamation of Refuse: Westinghouse Engineer.
4. Golueke, Clarence G., 1970, Comprehensive Studies of Solid Waste Management, Sanitary Engineering Research Laboratory, Berkeley, University of California Press.