

MUNICIPAL SOLID WASTE RECYCLING

I. BACKGROUND

Recycling includes the collection, sorting, marketing, and processing, of materials removed from the solid waste stream, and the transformation or remanufacture of those materials for use as feedstock for new products and/or other productive uses. Successful recycling includes an examination of the solid waste stream to determine what is recyclable and marketable. Recycling efforts can be implemented in the residential, commercial and industrial sectors.

Municipal solid waste (MSW) is comprised of a number of solid waste streams. The three principal solid waste streams that compose MSW are:

- Residential solid waste – solid waste generated from single-family residences, and multi-family residences. Recyclables prevalent in the residential waste stream include paper, plastics, metals, food scraps, yard trimmings, textiles and personal electronics.
- Commercial solid waste -- solid waste generated from businesses, offices, stores, markets, institutions, government, and other commercial establishments. Recyclables common in the commercial waste stream include paper, plastic, metals, food, yard trimmings, lumber, textiles, and electronic devices.
- Industrial solid waste -- solid waste generated from non-process lines, shipping, plant offices; solid wastes not regulated under the Clean Water Act, Clean Air Act, and Subtitle C of the Resource Conservation and Recovery Act;

Other solid waste streams that may also be a part of MSW include:

- Bio-medical wastes – treated waste, where allowed, generated from hospitals and other acute care facilities, health research institutions and homes that result from the use and administration of medications, surgery or other medical procedures, or medical or health research and development.
- Biosolids – typically waste generated from the de-watering of municipally generated wastewater.
- Construction and demolition debris -- materials resulting from the construction and demolition (C&D) of buildings and other structures, including materials such as metals, wood, gypsum, asphalt shingles, roofing, concrete, rocks, rubble, soil, paper, plastics and glass, but excluding putrescible wastes. C&D components can be a significant portion of the MSW stream with a high potential for recycling. Non-recyclable C&D wastes may be disposed in municipal solid waste landfills or specially designated landfills, or if cleaned of unacceptable debris, used for land reclamation.
- Other -- there are a host of other separately managed solid wastes that may be a part of MSW such as tires, street sweepings, storm catchment wastes, automotive shredding fluff, carpet, white goods, furniture and mattresses.

Recycling material from the waste stream can be encouraged through several approaches, including:

- Ordinances/legislation/mandatory programs
- Voluntary programs at businesses or institutions
- Reward or incentive based programs

Recyclables can be collected through a variety of approaches, including:

- Curbside collection of commingled recyclables (single-stream collection)
- Curbside collection of source separated recyclables
- Curbside collection of mixed MSW
- Drop-off and buy-back programs
- Deposit ordinances and legislation
- Commercial and industrial collections specific to the participating generator

It is not sufficient to just encourage recycling and collect recyclable materials. The efficacy of these programs is dependent on a number of factors, including location, demographics, and availability of processing capacity and markets

II. DISCUSSION OF RECYCLING OPPORTUNITIES

Municipal solid waste is a complex mixture of many materials discarded by every individual, business, government, and industry in North America. This section reviews these material segments from the standpoint of the potential for local government to effectively implement recycling programs.

A. Paper

Paper, which is found in everything from packaging to mail to office supplies, makes up the largest percentage of the municipal solid waste stream. It is also one of the most recovered materials, as recycling opportunities are often readily available. Opportunities to recycle may be reduced if the paper products are contaminated by such constituents as wax and adhesives, but recyclers are increasingly finding ways to overcome these obstacles.

1. *Packaging* - Paper packaging (paperboard), such as cereal and pasta boxes, is often itself made from recycled paper stock
2. *Cardboard* – Corrugated cardboard boxes make up the largest percentage of shipping boxes. When disposed of, this material is called Old Corrugated Cardboard (OCC) and has a long-established niche in the recycled paper market. OCC has a strong recycling market domestically and abroad, and is often compacted in bailers to reduce the volume of shipping.
3. *Newsprint and Magazines* - Newsprint and magazines can be effectively taken out of the municipal solid waste stream through curbside collection or drop-off centers. Old newsprint is recycled by de-inking mills. Markets for recycled magazines and other coated papers can be limited

4. *Office Paper* - High-grade de-inking grades such as office papers are utilized to produce tissue products such as paper towels, toilet paper, and facial tissue. .
5. *Mixed Paper* - Mixed paper is a large portion of the municipal solid waste stream. The potential for recycling this material can be hampered by contaminants such as coated paper stock, pressure sensitive labels, metal foils, and organic materials. Limiting or eliminating the presence of such contaminants could improve the recyclability of these papers. Utilization of this material as a feedstock for composting or as a fuel in a waste-to-energy facility should be considered.

B. Containers

1. *Ferrous Metal* – Food cans are a major source of ferrous metal in the municipal solid waste stream. The market for scrap ferrous is stable, and recovery of ferrous from collected recyclables is relatively simple because of its magnetic characteristics. Scrap metal processors play an integral role in the processing and aggregation of scrap metal.
2. *Aluminum* – Aluminum beverage containers constitute the major portion of aluminum in the municipal solid waste stream. The recovery market is strong. Public education and cooperative efforts, including some statewide bottle/can deposit programs, during the past 20 to 30 years have proven effective at recovering aluminum.
3. *Glass* - Glass containers come in two versions – refillable and non-refillable – and many colors (clear, green, brown, blue), which affects the marketability of recovered product. The dominant share of the market is non-refillable food and beverage containers. Markets for glass containers are well-established but, recovered glass must meet strict industry specifications for quality, including sorting by color. Material recovery facilities (MRFs) can separate and process recovered glass containers, turning it into a glass cullet. Source separating glass by color before it reaches the MRF can also improve the quality and marketability of the cullet. Markets for glass are more limited in rural areas, where transportation costs can render recycling cost prohibitive
4. *Plastic* - Plastic containers continue to gain an increasing share of the consumer packaging market. Most plastic products carry a code indicating what type of plastic resin(s) are used in the product, thus facilitating separation and recycling of single-resin plastic products. However, some plastic containers, (such as squeezable bottles and flexible pouches), may be a mix of several plastic resins, which complicates their recyclability. The plastics industry is working to develop an infrastructure to make recycling of more complex plastic containers a viable option.
5. *Composite Packaging* - Composite packaging, a combination of different types of packing materials, is frequently utilized for beverages and select foodstuffs. This packaging group includes plastic coated paper milk containers and paper/plastic/foil "aseptic" packs for juice and sauces. Composite packaging is difficult to recycle, though processing approaches are under development.

C. Food Scraps

Commercial food scraps along with yard trimmings, represent the most easily separated organic wastes in the municipal solid waste stream. The major sources of commercial food scraps are food service establishments, grocery and super stores and the warehouse/distribution industry.

Many local governments are increasingly seeking ways to implement separate collection systems for these commercial, large-scale food scraps, while also evaluating the addition of household food scraps to curbside organics collection programs. This would allow the capture of these materials for composting or anaerobic digestion.

D. Vegetative Wastes

Vegetative wastes include, yard wastes, street sweeping waste, lawn service wastes, nursery wastes and other similar organics. Soiled paper waste may also be added to this category.

There are several ways to recycle or reuse vegetative wastes including: mulching; on-site composting by generators (e.g. residences, nurseries, or horticulture activities); through organized collection systems with centralized composting or anaerobic digestion operations.

Residential or "backyard" composting can complement large scale composting or anaerobic digestion.

E. Non-food/beverage container glass

Small quantities of glass, such as broken dishes or window panes, and ceramics are present in the solid waste stream, but the chemistry of this glass is not compatible with container glass. This type of mixed glass can be crushed and used in insulation or "glassphalt", (which is road asphalt that includes a percentage of recycled glass). State and federal regulations play a role in the marketability of recovered material for these uses.

F. Household Hazardous Wastes (HHW) /Paints/Pesticides/Unregulated Hazardous Wastes

These wastes are a very small portion (typically less than 1 percent) of the municipal solid waste stream. Removal of these products from the disposed waste stream does not result in measurable reductions in weight or volume, but does result in the reduction of some toxic materials from the residential solid waste stream. HHW is typically considered a universal waste exempt from federal disposal restrictions though the same products disposed by small businesses are banned from landfills. Thus, many communities and agencies nation-wide have developed permanent or recurring HHW and very small quantity generator hazardous waste collection programs. Collected materials require special handling, and if they are hazardous wastes, must be disposed of as such. Some producers (such as agricultural pesticide manufacturers) are developing extended producer responsibility programs to take back products and empty containers.

G. Construction & Demolition Debris

Construction and demolition debris is sometimes disposed of in separate inert or demolition debris landfills rather than MSW landfills because of the different nature of the material and the existence of regulations allowing and/or making alternate disposal facilities cost competitive. Depending on the building activity and age of the building stock in an area, C&D debris can represent a significant portion of the municipal solid waste stream. Much of this waste is recoverable, and can be reclaimed, reused, or recycled. If collected mixed, processing is required to separate the material components and render them suitable for marketing. Materials can also be source separated on site, which reduces the need for processing, and facilitates re-use and recycling.

H. Batteries

Consumers tend to consider all household batteries as hazardous waste. However, batteries contain varying degrees of toxic and corrosive materials that help define the appropriate management system. Some may be more suited for recycling, some for disposal within an MSW landfill, and some for handling as a hazardous waste.

A number of communities have started collection programs for batteries. Options include:

- Deposit programs that encourage their return to dealers.
- Collection at household hazardous waste collection days.
- Separate collection at the source with recyclables or MSW.
- Producer responsibility requirements to collect and process the batteries.

The advantage of collecting batteries as part of household hazardous waste collections is that it sends a clear message to the public that these products are not benign and they require special handling. This may discourage their use except where necessary. Careful consideration of costs and processing capacity for these materials must be used when implementing a program to ensure its long term viability.

I. Other Recyclable Materials

There are many types of waste materials that do not fit neatly into categories. These include tires, used oil and filters, discarded appliances ("white goods"), discarded electronic waste ("e-waste") and similar hard to collect difficult-to-process materials. These materials need specialized collection and processing systems in order to successfully remove them from the waste stream.

Recovered tires, for example, can be burned in some facilities as a fuel to generate electricity, made into new durable products, processed to manufacture new rubber products, or even formed into reefs to provide marine habitats. However, all of these potential uses are subject to processing and market demand limitations and thus are not widely available everywhere in North America.

Used oil and filters can be collected at solid waste facility drop-off sites, automotive garages and household hazardous waste collection centers or events for re-refining or reuse. A very high percentage of auto hulks are recycled by the scrap industry, although disposal of the shredder "fluff" from auto recycling is a consistent concern due to the presence of hazardous contaminants. Shredder fluff has been utilized as alternative daily cover at MSW landfills.

Household appliances (white goods) are already recovered in large percentages. Many states and provinces have passed laws requiring the removal of capacitors and recycling of CFC coolants from appliances. Appliances can be handled by scrap dealers equipped to remove and handle PCBs and the chlorofluorocarbons (CFCs) used as refrigerants.

Electronic waste is a growing portion of the municipal waste stream, including personal devices such as mobile phones, tablet and laptop computers, personal computers, and other personal electronics. Extended producer responsibility laws in some states facilitate the collection and recycling of these devices by requiring the manufacturers to design and implement a program for

collection and processing. Some municipalities operate periodic collection events or have established permanent collection and/or processing facilities for the recovery of these devices.

III. POLICY POSITION

SWANA supports recycling as an important method of municipal solid waste management. Recycling, in concert with other methods of integrated municipal solid waste management (MSWM), including reduction, reuse, composting, energy recovery, and landfilling) provides for the safe handling of municipal solid waste.

SWANA believes that bans on landfill disposal of recyclable materials or zero waste initiatives by state or local municipalities should be implemented only when and where sustainable disposal alternatives exist (See SWANA Policy T-3.6 Solid Waste Disposal Bans). The consideration of such bans and initiatives should be fully vetted in light of practical considerations such as collection, processing, markets and economics before a decision to proceed is incorporated into the municipal solid waste plan..

SWANA supports recycling of municipal solid waste with the following considerations

- Local government recycling programs should be implemented when there is:
 - an established market demand for a particular commodity, or
 - a clearly established societal benefit e.g. toxicity reduction, landfill space savings, resource conservation, or environmental improvement, and
 - an ability to sustain the program on an ongoing basis.
- Mandatory diversion programs should be considered where there are strong federal and state/provincial programs for market development
- The true cost of recycling within the local solid waste management system should be developed and considered as part of any decision to establish such a program, and must be clear to the generator. The manufacturer and generator should pay to support recycling.
- Recycling as a valuable part of integrated solid waste management, must be established in conformance with local conditions and state/provincial law.
- A wide variety of materials can be recycled (e.g. aluminum, glass, ferrous metals, various grades of paper, plastics, and yard trimmings). The feasibility of recycling specific materials should be locally determined based upon collection systems, processing resources, markets, transportation costs and other factors.
- A nation-wide program should be developed to establish a uniform and comprehensive solid waste generation measurement methodology that could be used to determine the effectiveness of recycling programs.
- Subsidies that favor the use of virgin materials should be eliminated.

- Mandatory coding for plastic resins should be adopted, and a corollary public education program initiated to explain the difference between resin identification and product recyclability.
- Recycling cannot be sustained in the absence of reliable markets. Therefore, private, state/provincial and federal initiatives to expand and stabilize recovered materials markets at all levels should be developed.
- To encourage market development through a leadership role, governments (local and state/provincial) should adopt procurement policies that favor products containing recycled materials.
- Recovered materials marketing should stress consistent quality control and recognized grades of materials.
- Economic incentives and disincentives should be established at the state and federal levels to encourage the use of recovered materials over virgin materials, investment in recycling equipment, and investment in facilities for processing recycled materials into new products.
- Extended producer responsibility policies should be considered for used and unused products for recycling or deconstruction.
- Production changes to reduce or eliminate waste generation and increase the reuse of materials or the non-production of materials at the source should be considered.
- Materials should be removed from the municipal solid waste stream for reuse to the extent that such reuse:
 - reduces our dependence on non-renewable resources; or
 - consumes less energy than other solid waste management methods; or
 - reduces the cost of municipal solid waste management systems; and/or
 - does not have greater adverse environmental impact than other waste management methods.

Approved by the International Board
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Richard Allen
International Secretary

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