

Strategy for Sustainable Solid Waste Management

prepared for

**Mid-America Regional Council (MARC)
Solid Waste Management District
Kansas City, Missouri**

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prepared by

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DEFINITIONS OF PROGRAMS AND TERMS USED IN THIS REPORT

Composting: The process of collecting, grinding, mixing, piling, and supplying sufficient moisture and air to organic materials to speed natural decay. The finished product of a composting operations is compost, a soil amendment suitable for incorporating into topsoil and for growing plants. Compost is different than mulch, which is a shredded or chipped organic product placed on top of soil as a protective layer.

Construction and demolition (C&D) waste: Building materials and solid waste from construction, deconstruction, remodeling, repair, cleanup, or demolition operations that are not hazardous. This term includes, but is not limited to: asphalt, concrete, Portland cement, brick, lumber, wallboard, roofing material, ceramic tile, plastic pipe, and associated packaging.

Deconstruction: The process of taking apart a structure with the primary goal of preserving the value of all useful building materials, so that they may be reused or recycled.

Disposal: For diversion purposes, disposal is all waste created by all businesses and residents which is disposed of at properly permitted landfill.

Diversion: For waste measurement purposes, diversion is any combination of waste prevention (source reduction), recycling, reuse and composting activities that reduces waste disposed of at a properly permitted landfill.

E-waste: End-of-life electronic materials.

EPA hierarchy for solid waste management: A ranking established by the U.S. Environmental Protection Agency of solid waste management practices from most preferred to least preferred. The ranking is as follows: source reduction and reuse, recycling/composting, combustion with energy recovery, and landfilling and incineration without energy recovery. The state of Missouri has adopted this hierarchy in its resource recovery policy.

Generation: The total amount of waste produced by a jurisdiction. The basic formula is disposal plus diversion equals generation.

Green waste: Organic wastes derived from plants growing in residential and commercial land use areas. This term includes grass cuttings, leaves, and tree branches and is used synonymously with the term “yard waste.”

Household hazardous waste (HHW): Hazardous waste materials discarded, typically in small quantities, by households (as opposed to large quantities disposed by businesses). Typical household hazardous wastes include used motor oil and oil filters, antifreeze and other vehicle fluids, paints and varnishes, pesticides, and cleaning supplies.

Materials recovery facility: More commonly called a MRF (pronounced "Murf"). An intermediate processing facility designed to remove recyclables and other valuable materials from the waste stream. A "dirty MRF" removes reusable materials from unseparated trash. A "clean MRF" separates materials from commingled recyclables, typically collected from residential curbside or commercial on-site collection programs.

Near zero waste: A solid waste management planning scenario that approaches closed loop utilization of resources, maximizing source reduction, recycling, and composting diversion. Specifically, a planning scenario where existing diversion technologies are used to divert maximum amounts of waste (80 percent) and future emerging technologies (diversion or conversion, with diversion given the priority) are assumed to recover or reuse an additional 10 percent of the waste stream that existing diversion technologies are not able to recover or reuse.

Organics: Materials that are or were recently living, such as leaves, grass, agricultural crop residues, or food scraps.

Policy incentive: A course of action adopted by an organization of authority in the solid waste management system that establishes an advantage (normally economic) for users of the system who comply with specific solid waste management related activities identified by the organization.

Procurement program: Programs that encourage the purchase of recycled-content products by companies, jurisdictions and others. Joint recycled-content product purchasing pools and buy-recycled campaigns are two examples.

Public Education: Creation of understanding and appreciation among the population concerning a particular issue and ways to address that issue.

Recycling: The process of collecting, sorting, cleansing, treating, and reconstituting materials that would otherwise become solid waste and returning them to the economic mainstream in the form of raw material for new, reused, or reconstituted products that meet the quality standards necessary to be used in the marketplace.

Reuse: The recovery or reapplication of a package or product for uses similar or identical to its originally intended application, without manufacturing or preparation processes that significantly alter the original package or product.

Source reduction: Source reduction means any action which causes a net reduction in the generation of solid waste. Source reduction includes, but is not limited to, reducing the use of nonrecyclable materials, replacing disposable materials and products with reusable materials and products, reducing packaging, reducing the amount of yard wastes generated, establishing garbage rate structures with incentives to reduce waste tonnage generated, and increasing the efficiency of the use of paper, cardboard, glass, metal, plastic, and other materials.

Specific waste materials: Solid wastes that are not collected in normal curbside or on-site collection operations but require management in the solid waste system. This term includes, but is not limited to: industrial and municipal sludge, tires, white goods, scrap metal, and rendering waste.

Sustainable solid waste management practices: Activities performed by the solid waste management industry that meet the following “more with less” criteria. Sustainable industry practices will produce “more” value from recovered materials and energy, while also using “less” waste (due to waste reduction efforts to minimize the amounts of waste that require industry management), energy, and space and producing “less” emissions (from Integrated Solid Waste Management – a Life Cycle Inventory, 2nd edition, McDougall, Forbes, et. al., 2001).

White goods: Discarded major appliances of any color. These items are often enamel-coated and include, but are not limited to: washing machines, clothes dryers, hot water heaters, stoves, and refrigerators. This definition does not include electronics.

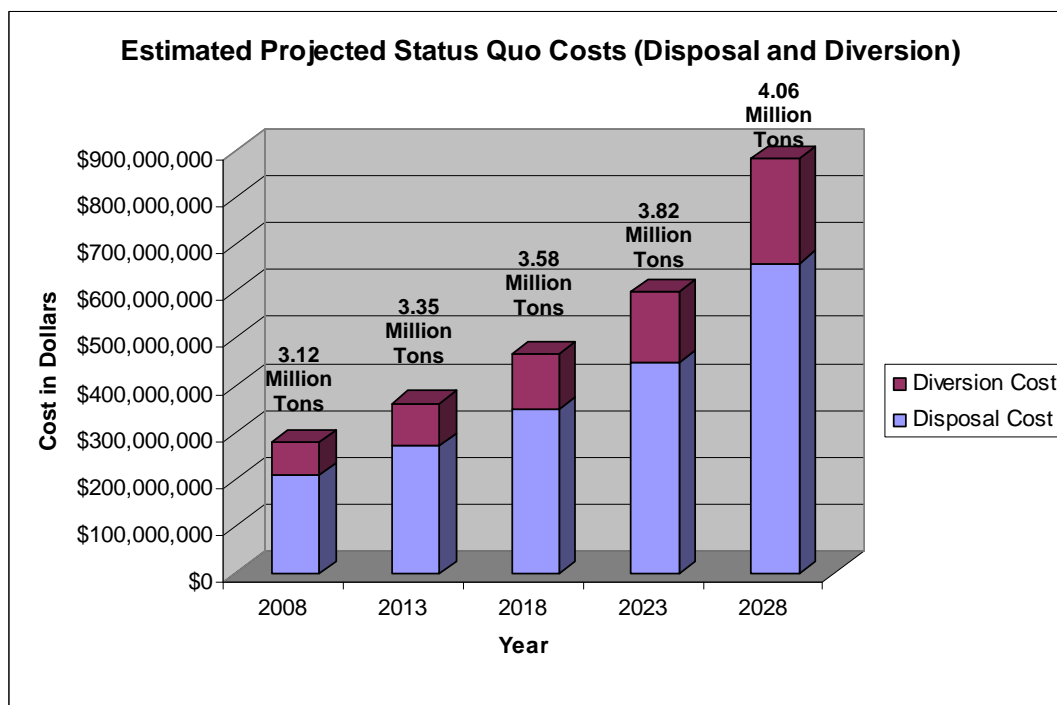
Yard waste: Organic wastes derived from plants growing in residential and commercial land use areas. This term includes grass cuttings, leaves, and tree branches and is used synonymously with the term “green waste.”

Zero waste: A goal that is both pragmatic and visionary, to guide people to emulate sustainable natural cycles, where all discarded materials are resources for others to use. Zero waste means designing and managing products and processes to reduce the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them. Implementing zero waste will eliminate all discharges to land, water or air that may be a threat to planetary, human, animal or plant health (working definition adopted by the Planning Group of the Zero Waste International Alliance on November 29, 2004). The Planning Group of the Zero Waste International Alliance also adopted a set of principles to guide and evaluate current and future zero waste policies and programs. These principles can be viewed at www.zwia.org/standards.html.

EXECUTIVE SUMMARY

This report presents a sustainable, economically viable, and socially responsible solid waste management strategy for the Kansas City metropolitan area throughout the next 20 years. This area is referred to throughout this report as the District. The District includes the five Missouri counties (Cass, Clay, Jackson, Platte, and Ray) which constitute the Mid-America Regional Council Solid Waste Management District (MARC SWMD), a regional solid waste management planning agency recognized by the state of Missouri, and the four Kansas counties (Johnson, Miami, Leavenworth, and Wyandotte) with which the MARC SWMD works cooperatively. The solid waste covered by the report includes municipal solid waste (MSW) and construction and demolition (C&D) waste. MSW includes residential and commercial solid waste but does not include industrial solid waste or special wastes.

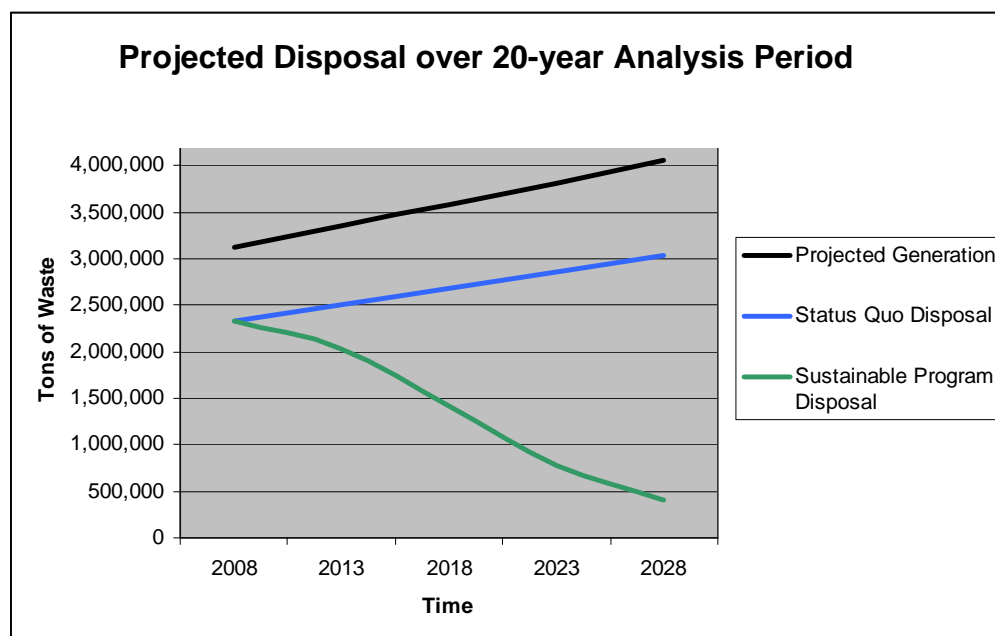
Before adopting a new solid waste management strategy, it is important to understand the current system, defined as the status quo, and projections of status quo operations over the next 20 years. Under the status quo, it is estimated that in 2008 the District diverted about 25 percent of generation. The system's total annual (diversion and disposal) cost was approximately \$278 million. Projecting the status quo system to 2028, the District would be generating 4.06 million tons per year and disposing of 3.04 million tons at a projected total annual system cost of nearly \$882 million. This projection assumes that by 2028 most District MSW will be disposed of using additional transfer stations and transfer of waste to more distant landfills due to local landfill closures.



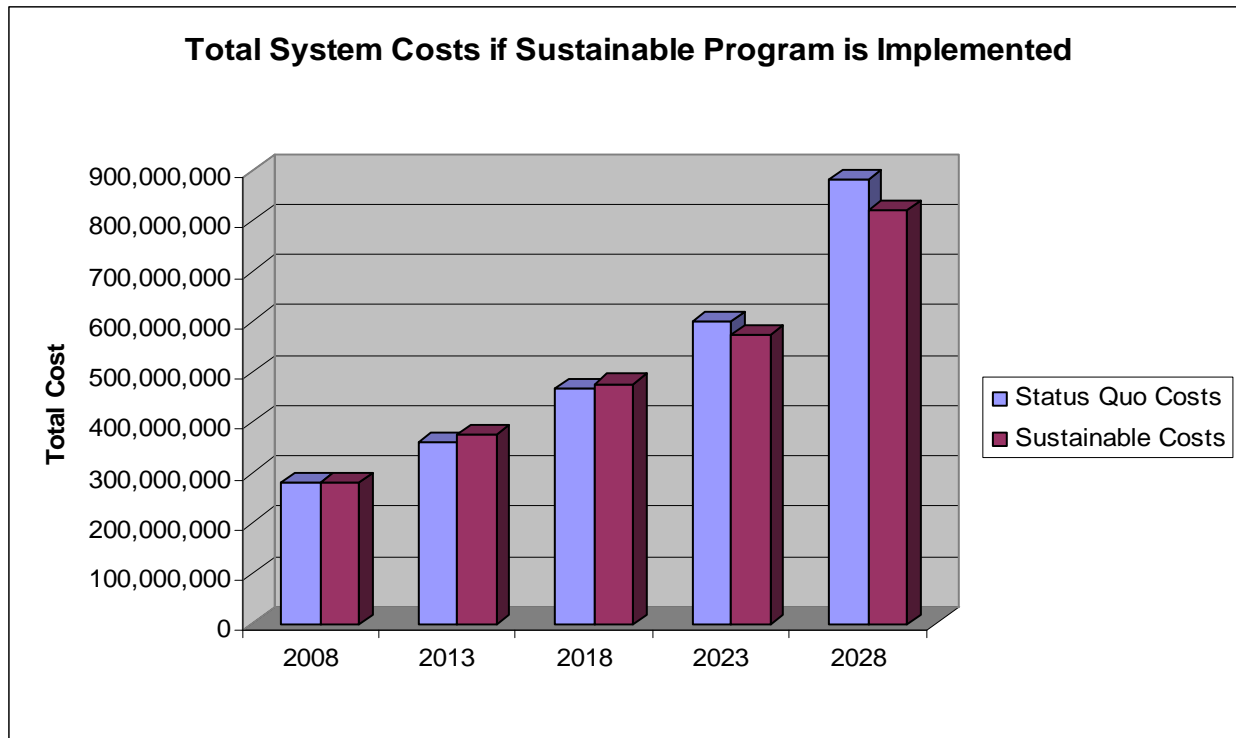
Implementing an alternative sustainable solid waste management strategy offers the District the opportunity to dramatically decrease landfill disposal over the next 20 years (see graph below) at cost competitive rates. The strategy set forth in this study envisions four, 5-year planning horizons designed to reach incremental 40 percent, 60 percent, and 80 percent diversion and near zero waste by 2028. Based on successfully implemented programs in communities in other areas of the United States, a total of 44 practices in the following seven categories of programs were selected for priority ranking by District stakeholders as potential sustainable practices for implementation:

- Source reduction
- Recycling
- Composting
- C&D/specific waste materials
- Public education
- Policy incentives
- Household Hazardous Waste (HHW) and e-waste

During the program ranking discussions, District stakeholders expressed a definite desire for highest and best use of materials in MSW and a near-unanimous approval of the EPA hierarchy for solid waste management. Therefore, the programs included in the scenarios described below give preference to reuse, recycling, and composting strategies over thermal conversion. Based on the results achieved by other example communities, successful implementation of the sustainable practices more highly ranked by District stakeholders is expected to result in the significant reduction of projected waste disposal quantities shown in the following graph.



Successful policy implementation will not only result in lower disposal quantities, it will also result in competitive costs throughout the 20-year program period and lower costs near the end of the 20-year period (see graph below) as more District solid waste needs to be transferred to regional landfills outside the District.



Other benefits of implementing the sustainable strategies include conserving resources, improving overall environmental quality, creating jobs, and minimizing waste transport to more distant landfills.

Therefore, implementation of a series of 5-year planning scenarios, incorporating the sustainable practices highly ranked by District stakeholders, is recommended to approach near zero waste by 2028. To achieve 40 percent diversion in the first 5-year period (by 2013), the primary focus is on the public education of source reduction activities and the implementation of curbside/on-site collection programs for recyclables and green waste from residences and businesses throughout the District. Achievement of the goal to implement these practices is seen as the most important task in the sustainable program implementation. Upon District-wide (or nearly District-wide) availability to curbside and on-site collection of recyclables and green waste, the remaining sustainable program practices are essentially modifications to increase the types and quantities of materials diverted from landfill disposal.

To achieve 60 percent diversion by 2018, the focus during the second 5-year period is to expand participation and types of materials collected in the programs previously put in place throughout the

District for the 40 Percent Diversion Scenario (2013). The major new initiatives to be implemented during this period include adoption of volume-based rates for all residential and commercial waste collection and initial establishment of incentive programs for C&D waste recycling.

To achieve 80 percent diversion by 2023, further expansion of programs implemented during the previous two periods to achieve maximum feasible recovery, as well as the implementation of food waste collection and composting and backyard composting of green waste will be emphasized. Programs implemented during the previous periods continue and, in some cases, recovery rates are assumed to increase as a result of on-going promotion and increased awareness of the importance of recycling.

To get to near zero waste (90 percent diversion) in 2028, the focus is on the implementation of one or more emerging technologies to recover and/or use additional quantities of materials that are not easily recovered through previously demonstrated diversion programs. It is expected that additional diversion and conversion technologies will be available for consideration by the start of this 5-year period, with diversion technologies receiving the priority. Although emerging technology is estimated to be very expensive on a unit price (\$/ton) basis, the high rate of diversion achieved prior to adoption of emerging technology results in a more moderate increase in overall system cost. It is assumed that programs implemented during the previous periods would be continued and that recovery rates would remain relatively constant at the high rates associated with a focused, mature program promoting diversion.

Projections of diversion by type of waste over the 20-year planning period are shown in the following table.

**Projected Diversion by Waste Type
(tons/yr)**

Year (Diversion Goal)	Residential	Commercial	C&D	Emerging Technology	Total
2013 (40%)	569,000	539,000	217,000		1,325,000
2018 (60%)	844,400	795,000	520,600		2,160,000
2023 (80%)	1,109,300	1,104,700	837,400		3,051,400
2028 (Near Zero Waste) (90%)	1,188,200	1,156,800	881,900	420,000	3,646,900

The following near-term activities are recommended to be carried out to maximize the potential for the District to realize the benefits of implementing the sustainable solid waste program:

- MARC SWMD adopts the scenario goals of the sustainable program outlined in the study;
- MARC SWMD prepares a guideline strategy document to define alternative methods for District communities to modify existing solid waste management operations or implement revised operations to provide curbside/on-site collection of recyclables and green waste to all residences and businesses;
- MARC SWMD implements an outreach program using printed media, electronic media, broadcast media, presentations, strategy meetings, etc. promoting the following decisions by all (or nearly all) District cities and towns:
 - Adoption of the scenario goals of the sustainable program by a date to be established and
 - Commitment to implement solid waste management operations that provide curbside/on-site collection of recyclables and green waste to all residences and businesses by 2013; and
- Upon substantial achievement of District commitment to the sustainable practices program, MARC SWMD modifies its outreach program to become a District-wide public education program using the same outreach methods to educate the entire District community of the benefits of the sustainable practices program.

The greater Kansas City area has demonstrated a commitment to sustainability initiatives such as America's Green Region and the Greater Kansas City Chamber of Commerce Climate Protection Partnership. Achieving near zero waste is an attainable goal for the District through the implementation of these sustainable practices and the leadership of the MARC SWMD.

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