

FINAL REPORT (REVISED)

Solid Waste Characterization and Program Analysis

Prepared for
Salt Lake City Corporation

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Executive Summary

The study characterized the municipal solid waste stream of Salt Lake City and identified improvements and new programs to increase the diversion of waste from landfill disposal. The study found opportunities for recovering additional tonnages of materials based on the analysis of samples of waste and presents three sets (portfolios) of programs with the potential of achieving up to 45% diversion for the residential and commercial sectors in the near- and medium-terms.

As one component of the study, a general materials balance was estimated for Salt Lake City's residential and commercial solid waste for 2011; the residential and commercial generated solid waste streams are estimated to be 80,000 and 122,000 tons, as shown in Figure ES-1. The composition of the disposed waste streams is also illustrated in the figure. Substantial percentages of recyclable materials were found in disposed residential and commercial waste streams. The materials included notably recyclable paper grades, and metal, aluminum, glass, and plastic beverage containers. In addition, significant concentrations of organic materials, including substantial concentrations of food waste, were found in the disposed residential and commercial waste streams. The organic materials may be diverted from disposal by one of several methods, including by composting (soil amendment) or anaerobic digestion (biogas). The major categories of materials and their estimated concentrations are summarized in Figures ES-1 and ES-2 for residential and commercial waste streams, respectively.

An estimated overall mass balance for the major waste streams analyzed in the study (including estimates for waste generated in Salt Lake City and self-hauled to the Salt Lake Valley Landfill, household hazardous waste, and construction and demolition debris) indicates that approximately 245,000 tons were generated within Salt Lake City in 2011, and the overall diversion rate for the City as a whole is about 19%, as summarized in Table ES-1.

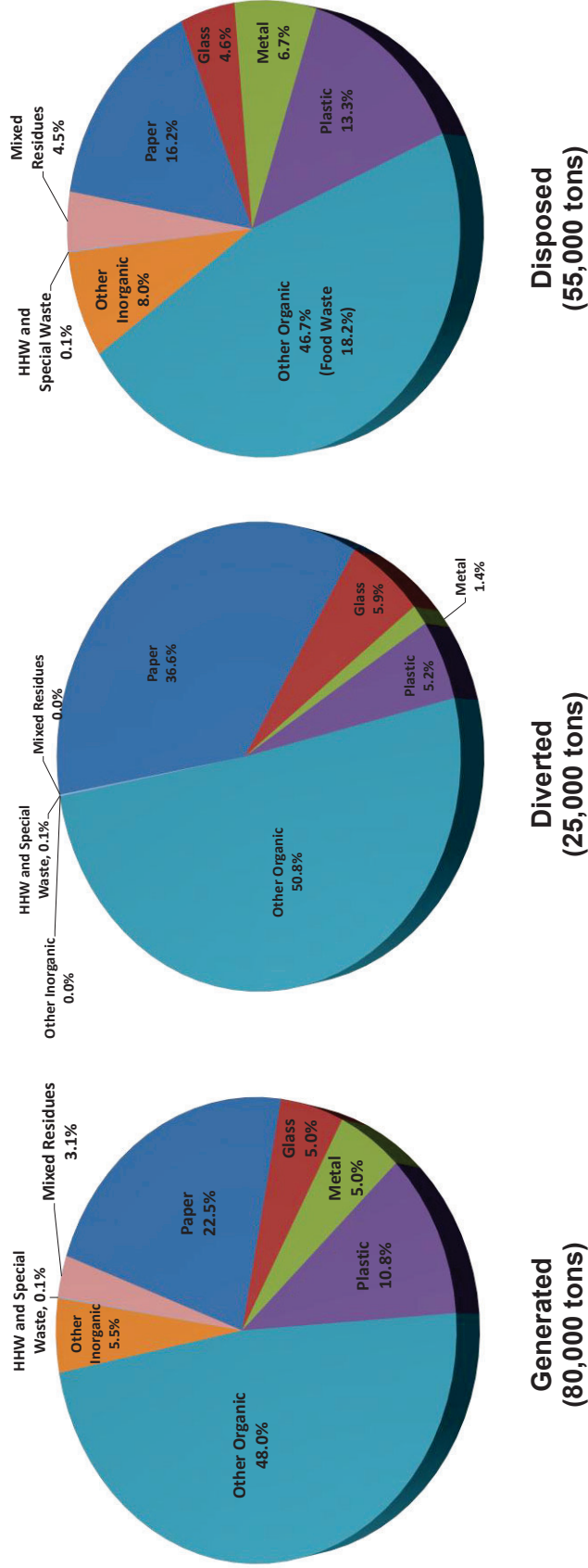


Figure ES-1. Salt Lake City Residential Waste (2011) ^{a)}

^{a)} Includes neighborhood cleanup and residues from processing curbside recyclables and yard waste.

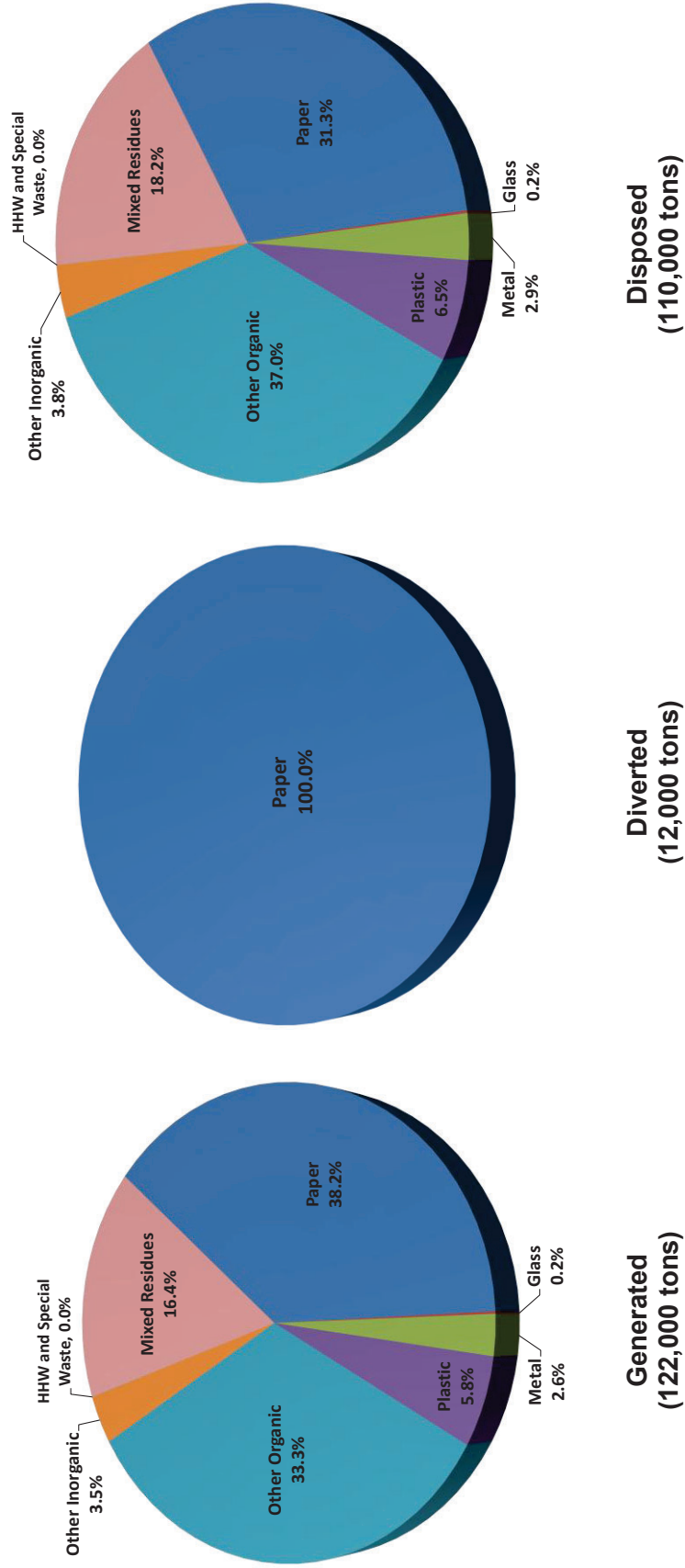


Figure ES-2. Salt Lake City Commercial Waste (2011)

Table ES-1. Estimated Mass Balance for Salt Lake City (2011) (tons/year, rounded)

Sources of SLC	Generated ^{a)}	Diverted	Disposed	Stream/Sector Diversion
Residential single-family ^{b)}	79,600	24,700	54,900	31%
Commercial (including multi-family)	122,200	12,200 ^{c)}	110,000	10%
C&D debris ^{d)}	22,200	2,200 ^{e)}	20,000	10%
Self-haul trash	15,100	400	14,700	3%
Self-haul yard waste	5,700	5,700	0	100%
Household hazardous waste	370	240	130	65%
Total	245,170	45,440	199,730	19%

a) Quantities resulting from waste prevention programs are assumed insignificant.

b) Includes neighborhood cleanup and residues from processing curbside recyclables and yard waste.

c) The only significant diversion of commercially-collected solid waste is assumed to be corrugated (estimated as approximately 10% of generated waste).

d) Construction and demolition debris, with diversion estimated as 10%.

e) Diversion is estimated to be 10% of generated C&D debris.

Program Analyses and Improvements

Based on the analysis of the waste composition studies, the existing programs, the barriers, and the opportunities, a list of programs for input into the SERA Waste Diversion Assessment Model (WDAM) was developed. A total of 25 potential programs were independently modeled, and three “Portfolios” of programs were assembled for the City’s consideration. The portfolios are summarized below:

- Portfolio 1 selects 11 programs from the set of 25 options, and provides a mix of programs addressing residential and commercial programs and materials. The residential programs include enhanced outreach, the addition of (food-soiled) paper to yard collection, addition of a drop-off at the landfill for food, enhanced pay-as-you-throw (PAYT) program, increased enforcement of existing ordinances (paper and container disposal ban), and a phone book program. In the commercial sector, the portfolio adds a food pilot, mandatory recycling of a limited menu of materials, and an audit program.
- Portfolio 2 includes 6 six of the “biggest bang” programs in the mix. On the residential side, there is a focus on outreach, introduction of alternate-week trash collection incorporating food, enhanced PAYT, and bans on paper and containers. On the commercial sector, a PAYT program with recycling embedded in the rates for all is the key program.
- Portfolio 3 includes 6 six programs as well, but focuses on those that are generally “easy to pass.” The residential options are education, adding (food-soiled) paper to yard waste, a food drop-off site at the landfill, the phone book program, and a points-based household incentive program (similar to RecycleBank™). The commercial initiative is an audit/technical assistance program.

The estimated diversion and important financial results for the three portfolios are presented in Table ES-2.

Table ES-2. Summary of the 3 Portfolios

	Estimated Tons per year Diverted	Estimated Resulting Diversion Rate (including current of 19%)	Estimated Unit Cost to Generator	Estimated Annual Staff & Resource Cost to City (including initial year costs spread over 1 st 5 years)	Estimated Annual Net Facility Costs (negative means savings)	Estimated Total Net Annual Costs to City (annual, fixed - spread over 5 years, and net facility costs)
Portfolio 1: Mix	30,600	35%	\$12/ton	\$616K (\$20/ton)	\$-719K (\$-23/ton savings)	\$-103K/yr cost (\$-3/ton)
Portfolio 2: "Big Bang" Programs	51,200	45%	\$15/ton	\$-133K (\$-3/ton)	\$-1,277K (\$-25/ton savings)	\$-1,410K/yr cost (\$-28/ton)
Portfolio 3: Easy/Non- controversial	3,800	21%	\$216/ton	\$112K (\$30/ton)	\$-57K (\$-15/ton savings)	\$56K/yr cost (\$15/ton)

Note: 2012 basis for all cost and tonnage figures; facility costs separate from other City costs.

In summary, the key findings are:

- There are several options that the City can employ to achieve a significant increase in diversion – Portfolio 1 is estimated to increase the diversion rate by more than 80% (from the current 19% level); Portfolio 2 is estimated to increase diversion by about 140%.
- New tonnage diversion can be achieved at relatively low cost per ton – or savings - using any of the three options. However, the “easy” mix of programs is not the lowest cost, and it leads to high costs for generators.
- Portfolio 2 provides the highest diversion for the least cost. The program delivers 2 to 13 times the diversion of the other scenarios at a net savings. It is an economic winner; however, adoption of Portfolio 2 requires a willingness on the City’s part to adopt bans, mandates, and other more politically complicated options.