

Chapter 15

Waste Monitoring and Performance Measurement

This chapter explores what data is needed to measure the effectiveness of the County's waste reduction, recycling and waste diversion programs.

Introduction

Primary reasons to monitor recycling and waste generation data:

- Assistance with planning and decision-making;
- Setting waste reduction, recycling or diversion, objectives and targets;
- Identifying waste generation and recycling trends;
- Determining the viability and capacity of existing solid waste recycling and disposal facilities.

In order to improve programs, data must be accurately measured and used consistently. Targets are intended to measure progress towards the end result. (Objectives). For example, the end results of an effective solid waste reduction program are to reduce the amount of materials generated and landfilled, and to reduce toxicity. Table 15-1 shows the county's targets.

Table 15-1 Clark County Solid Waste Program Targets
Increase the recycling rate to 50 percent and the diversion rate to 65% by:
○ Recovering an additional 50,000 tons of basic recyclables
○ Recovering an additional 10,000 tons of organic wastes
○ Recovering an additional 10,000 tons of construction & demolition materials
○ Recovering an additional 500 tons of hazardous waste materials
○ Reducing per person per day waste generation by 5%
<i>Note: 2005 Baseline. Goal Date = 2011</i>

The following types of data are tracked to measure a program's effectiveness:

- Waste recycling and diversion rates
- Waste generation
- Pounds per household per month collected through residential curbside recycling programs;
- Waste Stream Analysis Data

Assessment of Conditions

Washington State's legislature has a recycling goal of 50 percent. In 2005 recycling by businesses and residents in Washington reached 44 percent according to the Washington Department of Ecology. Coupled with the officially counted recycled items, the statewide rate of materials diverted from landfills remained at 48 percent.

Waste Recycling and Diversion Rates

The recycling rate is the percentage of all waste generated by residents and businesses that is recovered and made into new products. Calculating the recycling rate is complicated. It involves collecting garbage and recycling data from a variety of measurable sources. Only those materials re-manufactured into new products are considered to be recycled, according to new guidelines established by the Environmental Protection Agency (EPA) and adopted by the City of Vancouver and Clark County Solid Waste Programs. The following section shows the calculation of the Clark County waste recycling rate.

Equation For Calculating the Waste Recycling Rate	
MSW Recycling Rate =	Total MSW Recycled / Total MSW Generated
Note: Total MSW Generated = Total tons recycled + Total tons Recovered + Total tons disposed MSW = Municipal Solid Waste (does not include industrial, special and demolition wastes) Some on-site or home diversion practices have not been included in the diversion calculation (i.e. backyard composting, grasscycling, vermicomposting).	

$$\text{Recycling Rate (2007) } 41.4\% = \frac{256,105 \text{ tons}}{256,105 \text{ tons} + 89,300 \text{ tons} + 273,619 \text{ tons}}$$

The diversion rate is the percentage of all waste generated by residents and businesses that is recycled and recovered (not made into new products). Examples of waste recovery include: wood and yard wastes, motor oil and hazardous wastes and tires that are burned for fuel, concrete, asphalt and rubble that are crushed and used as aggregate rock substitute; and rendering.

Equation For Calculating the Waste Diversion Rate	
MSW Diversion Rate =	$\frac{\text{Total MSW Recycled} + \text{Total MSW Recovered}}{\text{Total MSW Generated}}$
Note: Total MSW Generated = Total tons Recycled + Total tons Recovered + Total tons disposed	
MSW = Municipal Solid Waste (does not include industrial, special and some demolition wastes) Some on-site or home diversion practices have not been included in the diversion calculation (i.e. backyard composting, grasscycling, vermicomposting).	

Diversion Rate (2007) 55.8% = $\frac{256,105 \text{ tons} + 89,300 \text{ tons}}{256,105 \text{ tons} + 89,300 \text{ tons} + 273,619 \text{ tons}}$

Year	Recycling Rate	Waste Diversion Rate
2000	30.7%	51.8%
2001	30.0%	43.1%
2002	n/a	n/a
2003	35.6%	48.2%
2004	37.0%	52.4%
2005	38.3%	54.6%
2006	35.9%	55.9%
2007	41.4%	55.8%
Source: Clark County Solid Waste Program		

Tracking non-residential tonnage (one component included in the above calculations) is challenging, and the following issues must be considered when working with the data:

- non-residential programs are not subject to contractual reporting requirements
- non-residential waste diversion and recycling is driven by the competitive free market, and data is considered proprietary information
- commercial tonnages are under-reported; some recyclables are transported out of the county and some recycling merely goes unreported, as in the case of retail/wholesale corrugated shipments that go directly back to distributors and unknown recyclers

The City of Vancouver’s Recycling Ordinance, Chapter 5.62, establishes licensing procedures for all commercial recyclers within the City of Vancouver through which collectors report annual tons collected both in the City and outside the city within Clark County. County solid waste staff works with Vancouver solid waste staff to determine commercial recycling tonnage estimates within the City of Vancouver and Clark County. In accordance with the recommendation of this plan, the County will implement a recycler registration program which will help with data tracking.

Waste Generation

While Washingtonians and Clark County residents are recycling more, we are also generating more waste. We live in a throwaway society but we can, as stated by Washington State’s Beyond Waste Project, “transition to a society that views wastes as inefficient uses of resources and believes that most wastes can be eliminated. Eliminating wastes will contribute to environmental, economic and social vitality.”

The amount of garbage produced by each person in the state has decreased by 1.4 percent in 2007. Washington residents produced an average of 8.17 pounds of waste per person each day in 2007, compared to 7.88 pounds in 2006. Table 15-3 shows Clark County’s pounds of waste per capita generated per day.

**Table 15-3
Waste Generation in Clark County**

Year	Tons Landfilled	Tons Recycled	Tons Recovered	Population	Pounds Per Capita Disposed Per Day	Pounds Per Capita Recycled Per Day	Pounds Per Capita Recovered Per Day	Pounds Per Capita Generated Per Day
2003	235,176	161,295	57,192	379,577	3.39	2.33	0.83	6.55
2004	251,275	195,451	81,049	383,300	3.59	2.79	1.16	7.54
2005	265,691	224,099	95,487	391,500	3.72	3.14	1.34	8.19
2006	277,529	225,930	126,560	403,500	3.76	3.07	1.72	7.88
2007	273,619	256,105	89,300	415,000	3.61	3.38	1.18	8.17

Pounds Per Household Per Month

The County measures residential curbside recycling programs by tracking the number of pounds of recyclables collected per household per month. Table 15-4 shows pounds per household per month of recyclables collected in Clark County and the cities that contract separately with Waste Connections for curbside recycling services.

Table 15-4						
Pounds of SF Materials Recycled Per Household Per Month						
Year	Urban County	Rural County	Vancouver	Camas	Washougal	Ridgefield
1999	67	66	60	43	44	n/a
2000	69	83	59	49	51	n/a
2001	64	74	56	49	50	n/a
2002	61	88	54	49	50	n/a
2003	65	77	56	58	60	n/a
2004	68	73	66	60	60	n/a
2005	65	73	59	55	53	66
2006	59	70	56	54	49	66
2007	56	66	53	55	49	57

Waste Stream Analysis Data

Clark County regularly conducts a waste stream analysis to determine the make-up of the waste that is delivered to the transfer stations. The most recent waste composition study was done during 2007-2008 (Appendix I). Table 15-5 shows that the county's waste stream still contains significant amounts of recyclables including: paper, food waste, construction/demolition waste, plastics and metals.

When considered together, yard debris, food wastes and wood waste represent the largest quantity of potentially divertible material – 27.5 percent – still being disposed in the county's waste stream. At 18.3 percent, recyclable paper is second. The volume of wood and other construction waste is another large component of the waste stream. Due to the proximity to Portland, additional amounts of construction demolition wastes are taken outside of the Clark County Solid Waste System for disposal and/or recovery. This information is difficult to track.

It is important to also note that although the percentage of hazardous/special waste in the overall waste stream is small (.8%), the environmental impact of improper disposal of millions of pounds of this material is great. A detailed

analysis of hazardous waste is presented in Chapter 11 *Moderate Risk Waste Plan*.

One objective of the waste stream analysis is to provide reliable baseline data that will assist the County in evaluating the effectiveness of existing and future waste reduction, recycling and recovery programs. In addition, monitoring helps determine the actual recycling and waste reduction rate in Clark County. Waste stream analyses have been conducted for 1993, 1996, 1999, 2003 and 2008 per Clark County and CRC Contract (amended section 7.6, Resolution 1996-12-6.5).

Table 15-5 Waste Stream Analysis Data (What's Still Being Thrown Away)				
Category	2007	2003	1999	1995
Paper	18.3%	19.2%	21.8%	23.3 %
Newspaper	1.0%	1.6%	2.1%	2.0%
Cardboard	4.7%	4.0%	4.7%	5.3%
Mixed Waste Paper	6.0%	7.0%	6.2%	7.6%
Non-Recyclable Paper	6.5%	6.5%	8.7%	8.4%
Plastic	13.2%	11.5%	12.9%	11.7%
Bottles	1.5%	2.2%	1.0%	1.1%
Plastic Packaging	1.7%	7.7%	7.6%	7.5%
Other Plastic Products	10%	1.7%	4.3%	3.1%
Metal	6.8%	7.1%	7.2%	6.6%
Aluminum	.3%	0.3%	0.5%	0.5%
Mixed Metals/Materials	3.3%	3.3%	2.9%	1.5%
Ferrous Materials	2.8%	3.1%	3.4%	4.3%
Non-Ferrous Metals	.3%	0.2%	0.3%	0.3%
Glass	2.8%	2.2%	3.2%	2.8%
Clear Bottles	1.1%	1.0%	1.5%	1.4%
Brown Bottles	.5%	0.5%	0.7%	0.4%
Green Bottles	.3%	0.3%	0.4%	0.4%
Non-Recyclable Glass	.9%	0.5%	0.5%	0.6%
Organic	17.7%	19.1%	17.8%	16%
Food Wastes	16.3%	15.3%	14.5%	11.9%
Yard Debris	1.5%	3.8%	3.3%	4.1%
Other Materials	18.4%	25.9%	28.4%	30.3%
Recoverable Wood	9.7%	10.4%	8.5%	10.8%
Construction/Demolition	7.9%	7.6%	7.4%	8.9%
Other (diapers, textiles, carpet, etc.)	-	6.7%	10.1%	9.1%
Hazardous / Electronics	.8%	1.2%	2.4%	1.5%
Remaining Waste	22.8%	15.0%	8.8%	9.6%

Recommendations

1. The County will continue to monitor through its environmental management system, waste reduction and recycling diversion program effectiveness on an annual basis to evaluate program successes and determine where extra effort or program changes are needed.
2. The County will continue to work with Columbia Resource Company and Waste Connections Inc. to improve garbage and recycling data management and tracking.
3. The County will continue to conduct waste characterization studies at the transfer stations per CRC contract to monitor the impact of waste reduction and recycling programs and to identify potential changes to the solid waste program, and to gather self-haul data.
4. The County will maintain and regularly update a master electronic Solid Waste data report. (See Appendix J)