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Draft for Sustainability Commission review on March 19, 2013

Council Meeting: April 23, 2013

SUBJECT: Discussion and Possible Action Regarding Zero Waste Strategic Plan

REPORT IN BRIEF

In December 2008, Council approved a Zero Waste Policy (RTC #08-358, Policy 3.2.4) that requires the City to encourage residents, businesses, and agencies to reuse, reduce, and recycle materials. The ultimate goal is to reduce the amount of waste being disposed (i.e. increase diversion).

As directed, staff (with assistance from Cascadia Consulting Group) conducted a waste characterization study that provided an analysis of both incoming materials arriving at the SMaRT Station, and outgoing residual materials. Using this information, staff (with assistance from R3 Consulting Group) developed a draft Zero Waste Strategic Plan for Council consideration. (A copy can be found at *Recycling.inSunnyvale.com* under *Quick Links*.)

The key recommendation from staff is that Council adopt a diversion goal of 75 percent for 2020. The current diversion rate is 66 percent. The actions required to achieve this goal are as follows:

- Improve sorting at the SMaRT Station to remove glass contaminants.
- Implement residential food scrap and commercial/multi-family yard trimmings collection programs.
- Pursue additional source separation possibilities.

In addition, staff is recommending that Council direct and assist staff in marketing SMaRT Station capacity beyond the current tri-city consortium (Sunnyvale, Mountain View, and Palo Alto). Finding additional partners (and their subsequent trash) would alleviate the medium-term financial conundrum caused by the "put or pay" clause in the Kirby Canyon Landfill Contract, which has Sunnyvale paying for unused landfill space. This contract expires in 2021.

Beyond this, staff is recommending that Council adopt a diversion goal of 90 percent by 2030. Additional actions required to meet this goal are as follows: (These actions will be difficult to execute until the existing contracts expire in 2021.)

- Rebuild the SMaRT Station with improved separation technology.
- Develop enhanced franchise provisions.
- Develop enhanced SMaRT operational contract provisions.
- Negotiate new agreements with partner cities.
- Utilize new conversion technology (likely in partnership with others).

BACKGROUND

In December 2008, Council adopted the City's Zero Waste Policy. This policy states that, "The City of Sunnyvale understands that the placement of materials in waste disposal facilities such as landfills causes damage to human health, wastes natural resources, and transfers liabilities to future generations." The stated purposes of this Zero Waste Policy are to, "protect the environment and conserve natural resources; help prevent pollutants from entering the air, land, and water; create a more efficient economy; and preserve the environment for future generations." Specifically, the Zero Waste Policy of states that the City will work to:

1) Reduce the amount of Sunnyvale waste being disposed.
2) Work to encourage or, if necessary, require residents, businesses, and agencies to use, reduce, and recycle materials.
3) Empower consumers to use their buying power to demand non-toxic, easily reused, recycled or composted products.
4) Encourage manufacturers to produce and market less toxic and more durable, repairable, reusable, recycled, and recyclable products.
5) Lobby regional, state, and federal legislators to implement laws, policies, and regulations that promote Zero Waste.
6) Work locally and regionally to assist in Zero Waste planning.
7) Lead by example and implement Zero Waste goals for all City buildings.
8) Put policies in place that favor environmental and economically sustainable practices.
9) Provide periodic reports to community that measure progress toward quantifiable Zero Waste goals.

Staff has conducted, and continues to conduct, efforts in furtherance of these policies, including the following:

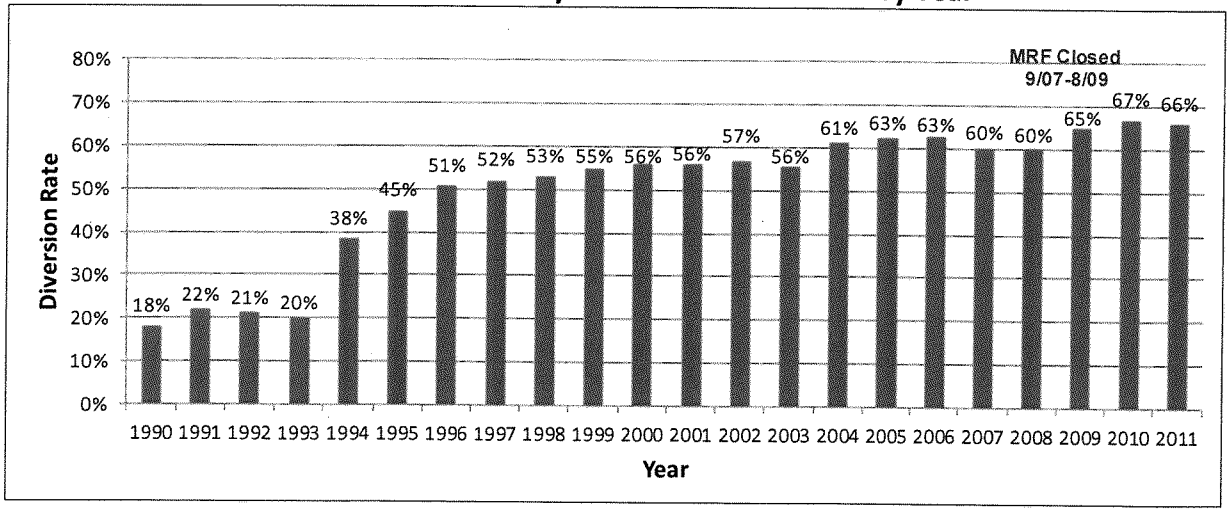
- Providing ongoing education to residents/businesses on waste reduction.
- Developing policies/ordinances that ban products that lead to littering and are difficult to recycle (e.g., single-use plastic bags and expanded polystyrene foam food containers).
- Implementing pilot programs (e.g., commercial food scraps collection).
- Supporting Extended Producer Responsibility legislation that places the responsibility of handling products at end of life on the manufacturers of those products (e.g., product take-back programs for paint, fluorescent bulbs and pharmaceuticals).

- Working cooperatively with other jurisdictions to determine potential partnerships and joint interests on issues such as organics collection, bans on materials, and alternative methods for processing food and other organics (e.g., CEQA coordination for EPS ordinance).

Despite these efforts, the year-over-year increase in Sunnyvale's diversion rate has slowed over time. Sunnyvale's State reported diversion rate for 2011 was 66 percent, essentially equal to the previous year (see Table 1). This is partly due to the fact that, other than the addition of mixed paper in 2008, which increased the amount of paper collected by 12 percent, the City's recycling programs have not expanded to accept additional materials, (except a pilot Commercial Food Scraps Collection Program that has been in place since mid-2011) nor have aggressive outreach methods been employed to increase diversion in the last five years or so. This is both due to a desire to minimize rate impacts to customers during the recession, and because staff was in the process of conducting the Waste Characterization Study and preparing the Zero Waste Strategic Plan in order to gain strategic direction from Council.

Staff has been working on increasing the marketability of the small organic material, called "fines," that is captured in the material recovery facility (MRF) at the SMaRT Station. The organics, which make up 25 percent of the incoming trash entering the SMaRT Station, fall through two-inch holes in two trommels, which separate it from the rest of the material. However, any glass that goes into the trommels breaks up into small pieces and ends up in the fines where it becomes a contaminant. As a result, the compost processor, Z-Best, is accepting only 500 of the 2,700 tons that are generated each month. Staff is in the process of researching different methods and equipment to remove the glass in the fines so more of the organic material can be marketed. If successful, it is possible the diversion rate would increase by 3.5 percent.

Table 1-Sunnyvale's Waste Diversion by Year



EXISTING POLICY

Council Policy 3.2.4 – Zero Waste
Council Policy 7.1.3 – Environmental Procurement
Council Policy 7.3.25 – Expenditure of Public Funds on Bottled Water
Council Policy 3.2.2 – Reusable Diapers
Administrative Policy, Chapter 6, Article 12 – Integrated Pest Management
Land Use and Transportation Element (LUTE)
Climate Action Plan (CAP)
Plastic Bag Ordinance (Ordinance NO. 2965-11)

DISCUSSION

Results of Waste Characterization Study

In late 2009, Cascadia Consulting Group was hired to conduct a detailed waste composition study at the SMaRT Station. The consultant used two methods to characterize the waste: hand sorting of single-family, multi-family, commercial, and residual waste; and visual characterization of construction and demolition waste (C & D). The study focused on two streams:

1.) Incoming waste as it is received at the SMaRT Station
2.) Residuals (what's left after the material has been processed at the SMaRT Station)

1.) Analysis of the Incoming Waste (from Garbage Carts and Bins)

Incoming waste is material that is collected from single-family curbside garbage carts, garbage bins in multi-family complexes with four or more units, and the commercial sector and debris boxes from construction and demolition (C & D) sites. This material was sorted and analyzed prior to being processed through the SMaRT Stations Material Recovery Facility (MRF). The total tons collected each year by sectors are:

SECTOR	TONS	PERCENT
Single-family	24,209	32%
Multi-family	15,349	20%
Commercial	31,164	42%
C & D	4,116	5%

The results of the analysis of incoming waste are shown in Figure 1. Of the incoming material:

- **42 percent** was compostable. Most of this is food waste, with the remainder being mostly yard trimmings and non-recyclable (soiled) paper.
- **39 percent** was recyclable. The largest portion of this is paper, followed by mixed recyclables (glass and plastics), inerts (concrete, rocks and soil), and special wastes (tires and appliances).
- **19 percent** was problem material that would be difficult to recycle or compost, such as treated wood and diapers.

The current diversion rate at the SMaRT Station is 18 percent. This analysis shows that 81 percent of the incoming material can, in theory, be recycled or composted. Additionally, it shows that there is good potential to capture more materials both at the source, and during SMaRT Station processing.

Specifically, residential and commercial food scraps, commercial yard trimmings, and commercial paper would be the best targets for source separation since they make up the largest portion of the incoming material that could be potentially recycled or composted. Enhanced outreach could also increase yard trimmings and paper recycling diversion for curbside collection. Staff is currently in the process of implementing state-mandated multi-family recycling at all complexes in the City over the next year, which should capture some of those materials. In addition, staff implemented a pilot commercial food scraps program in mid-2011 for a handful of businesses and a citywide expansion of the program is being recommended in this report.

2.) Analysis of Residuals

At the SMaRT Station, the contents of recycling bins are sorted and separated in one series of processes (manual and automated recycling separation), and the contents of the garbage received from residents and businesses are sorted and separated in a second series of processes (manual and automated separation through the MRF). C & D materials are sorted manually on the tipping floor to recover recyclable materials in a third process separate from the MRF. Finally, the contents of yard waste bins are processed separately for composting. The materials from the garbage bins that remain after the recyclable materials are pulled out are the "residuals."

Residuals leaving the SMaRT Station are comprised of combined material from Sunnyvale, Mountain View, and Palo Alto since it is mixed together on the tipping floor prior to being processed. Since processing Sunnyvale-only material separately would be costly, and since the composition of materials from the three cities should be very similar, the waste characterization was

performed on the combined materials and pro-rated for Sunnyvale's portion (50 percent of the total).

The consultant team hand-sorted 30 samples of waste that was left over after it had been run through the MRF. The results of the analysis of outgoing waste are shown in Figure 2:

- **57 percent** was compostable[1] (food and paper)
- **27 percent** was recyclable (paper, plastics, and some metals)
- **16 percent** was problem material (diapers, metal, and plastic items made from combined materials; and potentially recyclable materials that do not have markets for recycling such as foam food packaging and food service plastic).

Figure 1.
Overall Incoming Waste Stream

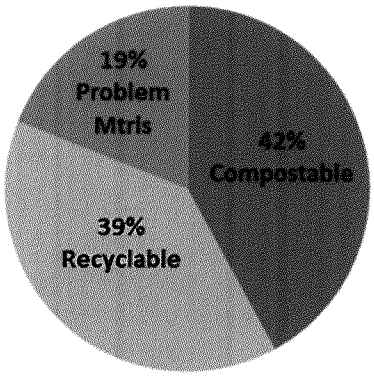
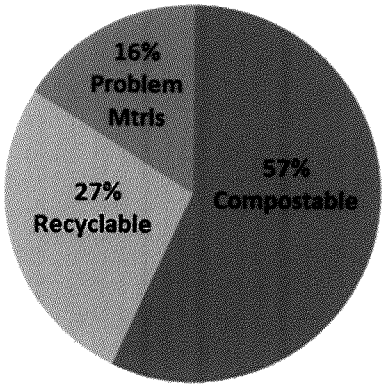


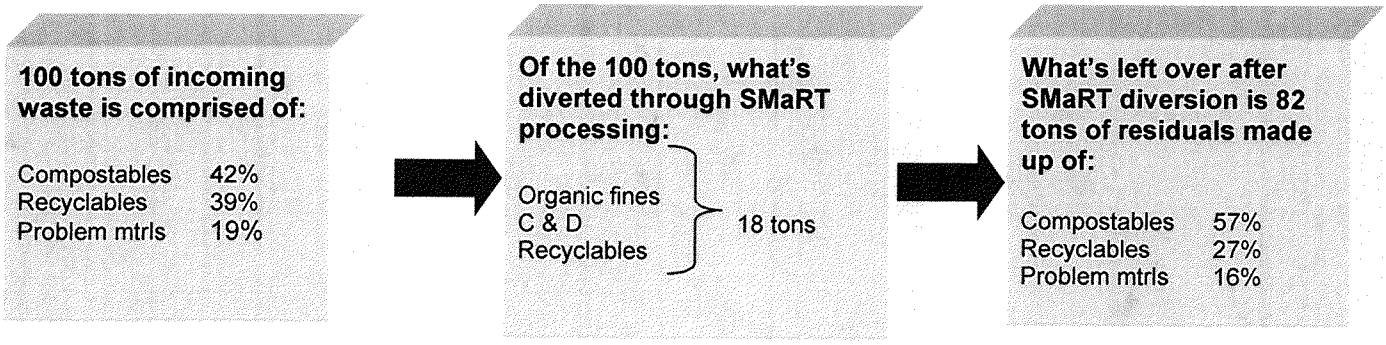
Figure 2.
Outgoing Landfill Bound Residuals



In comparing incoming waste to outbound residuals percentages, it looks like the compostable portion of the material grew substantially (from 42 to 57 percent). It is likely that as the material made its way through the MRF process, the quality changed so it ended up in a different category. For example, what came in the front door as recyclable paper, got dirtier and wetter along the way, and ended up as a compostable residual, not recyclable residual. In addition, of the total outbound waste, 18 percent has been diverted during the MRF process so there is not a straight quantity comparison of the incoming and outgoing waste streams. In other words, 100 tons of waste coming in the front door ends up as 82 tons going out the back. A simplified

[1] Data from the Waste Characterization study on the compostable portion of the residuals do not include the organic fines that are separated after going through the trommels. Once the fines leave the trommels, they are stored separately. 500 tons per month are sent to Z-Best for composting. The remaining 2,200 tons per month go directly to the landfill (as mentioned previously, only 500 tons of the 2,700 generated can be marketed to a compost processor due to glass contamination). Note that approximately 50% of the fines originate in Sunnyvale, with the rest coming out of garbage delivered from Mountain View and Palo Alto.

look at the make-up of 100 tons of material moving through the SMaRT Station is shown below:



No MRF captures all recyclable and compostable materials. There is always a residual to be disposed. However, this analysis shows that there is potential to capture more materials by improving SMaRT Station equipment and operational efficiencies during material sorting. Some examples of efficiencies might be adjusting sorting equipment to capture more material, sending residuals through the sorting line more than once, and increasing the number of sorters. In addition, improving front-end diversion so it does not end up as residuals and researching whether there are alternative methods of processing the material once it becomes residual, such as composting or using the feedstock in an anaerobic digestion process, would be key steps to further reduce the residuals.

Key Findings of Zero Waste Strategic Plan

In 2011, the City hired R3 Consulting Group to develop a Zero Waste Strategic Plan (ZWSP) based on the results of the Waste Characterization Study and to prepare an analysis of the City's current programs and policies. R3 calculated that in 2011, the City disposed of 86,000 tons of waste and diverted 172,000 tons of material from being landfilled, resulting in the 66 percent diversion rate. Achieving 75 percent diversion will require that an additional 21,700 tons of material be diverted per year. Achieving 90 percent diversion will require diverting another 40,000 tons per year beyond that.

In general, diversion can be increased by:

- Adding materials to those being source separated (such as food scraps or additional plastics).
- Increasing the efficiency of source separation (through enhanced outreach and education).
- Increasing the efficiency of sorting at the SMaRT station (by improving the sorting processes).
- Utilizing new methods to use materials that are currently being landfilled (such as by sending the fines to an anaerobic digestion plant).

The ZWSP also determined that none of these actions alone would realistically be enough to achieve 75 percent diversion. Rather, a combination is needed. The objective of the ZWSP is to propose the most acceptable and cost-effective means to increase diversion.

As part of the ZWSP developed by R3, a modeling tool was developed to allow quantitative evaluation of the diversion impacts and costs of various program and facility options required to achieve diversion rates of 75 percent and beyond. Moreover, in conjunction with modeling diversion and cost data, the impact of various program/facility options on greenhouse gas emissions (GHG) was projected using the EPA's Waste Reduction Model (WARM), which calculated the Metric Tons of Carbon Equivalents (MTCE).

R3 developed four scenarios in the ZWSP that include:

- How much additional diversion is expected by enhancing existing programs.
- The types of enhancements needed to achieve 75 percent diversion.
- The additional recovery of mixed waste needed to achieve 75 percent diversion.
- The level of diversion that may be able to be achieved through conversion technology[2], assuming it becomes viable.

Staff used these scenarios to develop the action plan recommended in the Discussion Section.

Expiration of Agreements

Another consideration that will influence decision making in the next nine years is the expiration of the agreements for collection, operations, and landfilling and the possible replacement of the SMaRT Station equipment and building. Managed coordination of these dates can be leveraged to create renewed partnerships that are centered on the SMaRT Station and take advantage of economies of scale, which are significant in waste processing facilities. It is recommended that staff continue to explore with other jurisdictions their interest in committing to a SMaRT Station-based Zero Waste goal as well as transfer and disposal services.

Additionally, in the interim, and prior to the expiration of the Kirby Canyon Landfill agreement in 2021, the City has the opportunity to market the SMaRT Station's excess capacity. This excess capacity is partly a result of less incoming trash from the downturn in the economy and partly due to the quantity of trash the City and Waste Management agreed the City would "put" in the landfill or otherwise "pay" for unused tons. If other jurisdictions show

[2] "Conversion" is the term used by the State of California to refer to thermal treatment technologies such as pyrolysis, gasification, and plasma arc that recover energy and reduce the mass of discarded materials, typically in vessels subjected to high temperature and/or pressure.

interest in bringing trash to the SMaRT Station, staff will ask Council for direction on a new partnership and agreement.

The status of the relevant agreements is as follows:

- The Waste Management disposal agreement at Kirby Canyon expires in 2021.
- Sunnyvale's garbage and recycling collection franchise with Bay Counties Waste Services expires in 2021.
- The Mountain View collection franchise expires in 2021.
- The Palo Alto collection franchise expires in 2017.
- The SMaRT Station operations agreement expires in 2014 (with a possible one-year extension). An extension to 2021 could be negotiated or, as planned, a Request for Proposals process could be used to procure an operator for the 2015-2021 period.
- The SMaRT Station Memorandum of Understanding among Sunnyvale, Mountain View and Palo Alto expires in 2021.
- The Solid Waste Fund financial plan includes a debt-financed $30 million project beginning in FY 2020/21 to replace/rebuild the facility, since the SMaRT Station building and much of its major equipment will have reached the end of its useful life after 30 years.

Recommendations Resulting from Analysis of Information
In light of the City's policies and goals, the information developed in the Waste Characterization Study, the Zero Waste Strategic Plan, and the timing of agreements, staff recommends the following:

70 Percent Diversion by 2015
The three actions recommended for implementation immediately are to:

- Improve sorting at the SMaRT Station to remove glass contaminants from the fines. It is estimated that this could increase (Sunnyvale) diversion by 3.5 percent and send 9,000 tons per year of the cleaned up fines to a composting facility instead of the landfill. Costs to maximize recovery of the organic fines from the MRF have yet to be determined. Both the City and Bay Counties Waste Solutions are in the process of analyzing different approaches to removing glass from the fines in order to market more of the material. Once a solution is found and processing equipment is identified, staff will present a proposal to Council if necessary.

- Conduct pilot programs for collecting residential food scraps and commercial and multi-family yard trimmings to determine costs, communication strategies, routing efficiencies, and participation rates by customers. As an example of the technical issues involved, the simplest way to collect residential food scraps is to have residents place food

scraps into existing yard trimmings carts. However, food scrap composting is governed by more stringent regulations, so this raises the cost for composting all of the collected yard waste as well. Compost that incorporates food scraps is also barred from use on organic farms, one of the main markets for the finished product. Other collection options include asking residents to bag food waste in compostable bags, then hand sorting it from yard trimmings collections for separate transfer to the compost facility. This method will soon be tested in Palo Alto, with the sorting to be done at the SMaRT Station.

- Implement mandatory multi-family recycling at all complexes. This is currently in process and a requirement of AB 341, legislation that was passed in 2011 as part of a state strategy to reduce greenhouse gas emissions. Costs for outreach were included in the City's 2012/13 budget.

75 Percent Diversion by 2020

The additional actions needed to achieve 75 percent diversion by 2020 are to:

- Enhance outreach and education efforts to increase the efficiency of source separation. This would be in coordination with the implementation of new programs listed below to keep costs low. Staff would explore and bring to Council appropriate additional disposal bans and a mandatory recycling ordinance.

- Implement collection programs for multi-family and commercial yard trimmings. Implementing a multi-family/commercial yard trimmings program would require providing new containers and the possible addition of a new route. The composting market for the material is reliable.

- Expand the current pilot commercial food scraps program Citywide and implement collection of residential food scraps. This will result in higher costs due to additional collection costs and the higher tipping fee required at composting facilities for food scraps as compared to the yard trimmings.

- Implement collection of additional materials such as plastics and textiles. The SMaRT processing operations will need to be revised to accommodate the additional materials.

- Expand and implement new programs as opportunities present themselves.

Additional areas of focus during this period would include marketing SMaRT Station capacity, monitoring regional activities in anaerobic digestion and thermal treatment, and working with the partner cities (and possibly other jurisdictions) to leverage and coordinate efforts on new agreements.

90 Percent Diversion by 2030

Significant improvements in diversion can be achieved by virtue of rebuilding the SMaRT Station, installing new equipment, and enhancing the SMaRT operational contract and Sunnyvale franchise provisions. Beyond that, to achieve 90 percent diversion by 2030, use of conversion technologies such as anaerobic digestion or thermal treatment to process landfill-bound waste may be required. There are no viable facilities currently operating in California beyond a pilot scale, but the technology is advancing and facilities are operating in other locations. It is premature to make specific recommendations.

FISCAL IMPACT

Depending on the alternative chosen for implementation, there are potential costs associated with zero waste activities. The estimated rate impacts to achieve 70 percent diversion are estimated at a one-time increase to the rate base of less than one percent. The estimated rate impacts for achieving 75 percent diversion are a one-time rate increase to the rate base ranging from four to seven percent. Staff will bring to Council any proposed action that will have a significant rate impact. The rate impact for achieving 90 percent diversion is unknown at this time.

PUBLIC CONTACT

Public contact was made by posting the Council agenda on the City's official-notice bulletin board outside City Hall, at the Sunnyvale Senior Center, Community Center, and Department of Public Safety; and by making the agenda and report available at the Sunnyvale Public Library, the Office of the City Clerk, and on the City's Web site.

ALTERNATIVES

1. Take no action. This option is not consistent with the Council's Zero Waste Policy.

2. Pursue the actions outlined in this report to achieve 70 percent diversion by 2015, 75 percent diversion by 2020, and 90 percent diversion by 2030. Bring all actions that have significant rate impacts, or other impacts on the residents or businesses of Sunnyvale, to Council for consideration.

3. Return to Council with a Plan that has less ambitious diversion goals

4. Return to Council with a Plan that has more ambitious diversion goals.

RECOMMENDATION

Staff recommends Alternative 2. Pursue the actions outlined in this report to achieve 70 percent diversion by 2015, 75 percent diversion by 2020, and 90 percent diversion by 2030. Bring all actions that have significant rate impacts, or other impacts on the residents or businesses of Sunnyvale, to Council for consideration.

Reviewed by:

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