

Appendix D: Solid Waste

GHG emissions produced from the solid waste sector account for less than 2 percent of Sonoma County’s total GHG emissions.¹ Methane from the decomposing organic portion of solid waste is the largest producer of emissions in this sector. As organic material buried in the landfill decomposes it turns into methane, a greenhouse gas approximately twenty-five times more potent than carbon dioxide. Sonoma County residents and businesses generate a significant amount of solid waste for which they pay a considerable amount for disposal, suggesting that there is ample room for reducing emissions and saving money in this sector.^{2,3}

For many years Sonoma County has worked to curb the amount of solid waste it sends to landfills. This effort has resulted in the diversion of over 60 percent of the county’s solid waste to composting and recycling markets through “blue can” and “green can” source separation.⁴ Although Sonoma County is known for its success in diverting solid waste from the landfill, it can do better, as other communities are demonstrating.

Key Recommendations:

	Recommendation	Communities Employing Recommendation	Sonoma County Status and Applicability
4.1	Work toward a zero waste program by maximizing recycling, composting, and diversion of organic material from the landfill.	Oakland, Portland, San Francisco, San Rafael, Seattle, Vancouver, Massachusetts	The County of Sonoma will soon enter into a long-term agreement with Republic Services, which will help shape the future of solid waste management. ⁵
4.2	Capitalize on emerging opportunities to convert waste into energy	Fairmont, New York, San Jose	Sonoma County’s Solid Waste Advisory Group has considered waste to energy and will continue to do so.

4.1 Work toward zero waste by maximizing recycling, composting, and diversion of organic material from the landfill.

Background

Sonoma County is disposing of about 358,000 tons of solid waste per year, of which 270,000 tons is processed by County facilities at a significant cost. Estimates range from \$75 million to \$150 million per year paid by ratepayers.⁶ The waste disposal system consumes energy and produces GHG pollution. GHG emissions in the solid waste sector are about 70,000 tons of CO₂ equivalent per year⁷, which is less than 2 percent of the total

1 2010 Status Report Card http://climateprotection.org/pdf/Status_Report_Card_May_2010.pdf

2 About 358,000 tons per year, of which 270,000 tons is processed by County facilities.

3 Estimated from Santa Rosa franchise fee, and total tipping fees. January 4, 2010, Press Democrat <http://www.pressdemocrat.com/article/20100104/ARTICLES/100109824?p=2&tc=pg>

4 CalRecycle <http://www.calrecycle.ca.gov/Profiles/County/>

5 <http://www.pressdemocrat.com/article/20130423/articles/130429850>

6 Estimated from Santa Rosa franchise fee, and total tipping fees. January 4, 2010 Press Democrat <http://www.pressdemocrat.com/article/20100104/ARTICLES/100109824?p=2&tc=pg>

7 Dave Erickson, derived from Sonoma County GHG data using the California Air Resources Board's Implementation of IPCC's Mathematically Exact First-Order Decay Model http://www.arb.ca.gov/cc/protocols/localgov/pubs/landfill_emissions_tool_v1_3_2011-11-14.xls

GHG emissions for the county.⁸ This level is approximately equal to the emissions produced by 13,000 cars on the road for a year.⁹ The County's current solid waste policy is aimed at reducing the amount of waste that is disposed in the landfill. This has resulted in successful programs using "blue can" and "green can" source separation that have diverted over 60 percent of waste generated (about 600,000 tons) in the County to either recycling markets or composting.¹⁰ From a policy and implementation standpoint, this has been a successful approach for managing solid waste. However, there is much room for improvement that would yield benefits both for climate protection and for ratepayers.

Strategies to Consider:

- A. *Maximize Methane Capture at the Central Landfill*
 - B. *Institute a Construction and Demolition (C&D) Ordinance for Maximum Recycling and Reuse of C&D Debris Material*
 - C. *Expand Food Composting and Reduce Food Waste in Large Commercial Settings Through a Local Ordinance*
 - D. *Expand Residential and Institutional Food Scrap Collection and Decrease Garbage Service*
 - E. *Institute a Pay-As-You-Throw Program*
 - F. *Use Mandates for Recycling and Composting for Residential and Commercial*
 - G. *Ban Some Types of Waste in Garbage Bins*
 - H. *Set a Date to Achieve Zero Waste*
 - I. *Green the Garbage Truck Fleets*
 - J. *Adopt a More Aggressive Sustainable Purchasing Policy*
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A. *Maximize Methane Capture at the Central Landfill*

Sonoma County already captures some of its methane from the landfill, but there may be room for improvement. Upgrades to the capture system might result in significant GHG savings.¹¹

In the **City of Vancouver**, upgrades to the gas collection infrastructure at the landfill have resulted in a significant increase in gas capture efficiency and greenhouse gas reduction. 354,500 tCO₂e were captured from the landfill in 2012. In 2012, the annual average gas capture rate was 53 percent—well on the way to the target of 75 percent average efficiency by 2016.¹² Methane, a by-product of landfill waste, is a greenhouse gas 21 times more potent than carbon dioxide.

B. *Institute a Construction and Demolition (C&D) Ordinance for Maximum Recycling and Reuse of C&D Debris Material*

The Cities of Sonoma County currently have a patchwork of C&D Ordinances that need to be made consistent if they are to work effectively. Currently, builders can simply drive to a city with more relaxed laws to dump their C&D debris. Sonoma County must use a countywide deposit system in conjunction with certified facilities if the ordinance is to actually deter people from dumping debris that could be recycled.

8 2010 Status Report Card http://climateprotection.org/pdf/Status_Report_Card_May_2010.pdf

9 70,000 tons/year x 2204.62262 pounds/metric ton and then divided by 11,450 lbs/car/year = 13,478 cars. US EPA <http://www.epa.gov/otaq/consumer/f00013.htm>

10 CalRecycle <http://www.calrecycle.ca.gov/Profiles/County/>

11 Henry Mikus, Sonoma County Waste Management Agency

12 Page 14 of Vancouver's CAP update: <http://vancouver.ca/files/cov/greenest-city-2020-action-plan-2012-2013-implementation-update.pdf>

The City and County of San Francisco has a Construction and Demolition Ordinance that requires maximum recycling and reuse of construction and demolition (C&D) debris material.¹³

The City of San Rafael has also adopted a C&D Ordinance requiring 75 percent diversion.¹⁴

C. Expand Food Composting and Reduce Food Waste in Large Commercial Settings Through a Local Ordinance

According to the 2007 Sonoma County Waste Characterization Study, about 27 percent of commercial garbage in Sonoma County is food waste totaling about 39,635 tons per year.¹⁵ Sonoma County currently does not require food composting at large commercial operations. Enacting an ordinance that requires food composting in commercial settings would dramatically reduce the organic waste going into the landfill and the associated methane emissions.

The State of Massachusetts recently put forward a law that will help prevent food waste at large food operations such as supermarkets, colleges, sporting and entertainment venues, hospitals and large restaurants - and then will reduce the environmental impact of waste that can't be avoided. These new regulations, scheduled to take effect July 1, 2014, are an attempt to address the country's \$165 billion, 90 million metric tons of methane-generating food waste problem. The state's Department of Environmental Protection (DEP) recommends producing less waste, starting with a food waste audit. Once there's a baseline to improve upon, entities can modify purchase quantities and timing. The DEP then recommends donating useable food to local charitable organizations such as Lovin' Spoonfuls. They also suggest partnering with farmers to feed excess food to animals, as many will haul food waste away for free. Another option is to deliver unused food to local zoos for use as feed. Finally, the regulations require that venues producing a ton or more of food waste a week divert it from disposal by incineration or at landfills. Massachusetts estimates the 1,700 businesses or so covered by the regulations annually will divert approximately 200,000 tons of waste from landfills, or the equivalent of taking more than 41,000 cars off the road.¹⁶

In October 2011, **the City of Portland** launched a new citywide residential food scrap collection program (www.portlandcomposts.com). Portland residents in single-family houses and buildings with four or fewer units can set out food scraps in their green Portland Composts! roll carts for weekly pickup. By putting all food scraps, including meat, dairy, bones, grains, cooked foods and even pizza delivery boxes, in the green roll carts, Portlanders can divert thousands of pounds of food scraps from landfills each year.

San Francisco's Food Service Waste Reduction Ordinance requires food vendors and restaurants in San Francisco to use compostable or recyclable to-go containers. All San Francisco food vendors, restaurants, delis, fast food establishments, vendors at fairs, food trucks, and all City facilities and contractors that sell prepared food in San Francisco must follow this law. Approved food service ware products include compostable products such as paper or other plant fiber, such as from sugarcane, rice, or bamboo. Polyethylene film coating on paper is currently accepted, but no foam coating. Also accepted are corn, soy, potato, or other plant starch based bioplastics, such as "PLA" clear plastics that are labeled "compostable" and meet compostability standards (ASTM D6400). Bags and food service ware labeled "green", "environmentally friendly", "biodegradable", "degradable", "will decompose", "photodegradable", "made from corn starch", or other unsubstantiated claims are not accepted. Recyclable products include: aluminum foil or trays and plastic containers and lids.¹⁷

13 <http://www.sfenvironment.org/zero-waste/recycling-and-composting/construction-demolition-debris-recovery>

14 Survey

15 http://www.recyclenow.org/compost/comm_food_waste.asp

16 "Massachusetts businesses stay ahead of food waste ban" by Dana Gunders, Greenbiz.com, August 01, 2013:

http://www.greenbiz.com/blog/2013/08/01/massachusetts-businesses-ahead-ban-food-waste?mkt_tok=3RkMMJWWfF9wsRokvazBZKXonjHpfSx56u8tWq6IIMi%2F0ER3fOvrPUfGj4DSMBRl%2BSLDwEYgJlv6SgFSLHEMa5qw7gMXRQ%3D

17 <http://www.sfenvironment.org/article/prevent-waste/food-service-waste-reduction-ordinance>

In April 2010, **the City of Vancouver** started the first phase of a food scraps composting collection program by allowing houses and duplexes to add fruit and vegetable scraps to their Green Bins. In September 2012, the program was expanded to include all food scraps such as meat, baked goods, dairy products, and food-soiled paper. Starting in May 2013, the garbage and organics collection schedules across the city were shifted to weekly Green Bin collection and bi-weekly garbage collection to further increase organic waste diversion. Early indications show that those areas that have been on the program for at least a month have reduced the garbage by 37 percent and increased compostables diverted by 60 percent. About 25,000 tonnes of organic waste is expected to be diverted away from the landfill each year, reducing greenhouse gas emissions by 3,000 tonnes per year.¹⁸

D. Expand Residential and Institutional Food Scrap Collection and Decrease Garbage Service

Food scraps are an enormous source of waste in Sonoma County. In fact, about 35 percent of residential garbage in Sonoma County is food waste, totaling nearly 800 tons a week.¹⁹ Sonoma County now has food scrap collection at virtually all residential locations. However, the program could be expanded to include dairy, meat, and bones.

In **New York City** in September 2012, DSNY began a pilot program in 68 schools to separate organic waste for composting, and are planning to expand this program to all city schools. To date, the program has led to a diversion rate of 34 percent from Manhattan schools and 38 percent from Brooklyn schools participating in the pilot. The weekly collection through this program of more than 20 tons of organic waste will soon be processed into sludge at a Waste Management-operated facility on Varick Street, and co-digested with city wastewater at Newtown Creek wastewater treatment plant. This is part of a pilot anaerobic digestion program, in conjunction with the Newtown Creek wastewater treatment plant (WWTP).²⁰

In October 2011, **the City of Portland** launched a new citywide residential food scrap collection program (www.portlandcomposts.com). Portland residents in single-family houses and buildings with four or fewer units can set out food scraps in their green Portland Composts! roll carts for weekly pickup. By putting all food scraps, including meat, dairy, bones, grains, cooked foods and even pizza delivery boxes, in the green roll carts, Portlanders can divert thousands of pounds of food scraps from landfills each year. As part of the change, garbage service is now collected every other week. The blue Portland Recycles! roll cart and yellow glass recycling bin continue to be collected every week.²¹

The Cities of Mobile,²² Ottawa,²³ Portland,²⁴ and Tacoma,²⁵ have every-other-week garbage collection. **The City of Seattle** has set a 2015 goal of piloting a change to every-other-week garbage collection from single-family homes.²⁶

E. Institute a Pay-As-You-Throw Program

In communities with pay-as-you-throw programs (also known as unit pricing or variable-rate pricing), residents are charged for the collection of municipal solid waste—ordinary household trash—based on the amount they throw away. This creates a direct economic incentive to recycle more and to generate less waste.²⁷ Sonoma County currently does not have a pay-as-you-throw program.

18 Page 25 of Vancouver's CAP update: <http://vancouver.ca/files/cov/greenest-city-2020-action-plan-2012-2013-implementation-update.pdf>

19 <http://www.recyclenow.org/compost/curbside.asp>

20 Page 43, PlanYC Progress Report: http://nytelecom.vo.llnwd.net/o15/agencies/planyc2030/pdf/planyc_progress_report_2013.pdf

21 Page 14 of Portland's CAP update: <http://www.portlandoregon.gov/bps/article/268612>

22 <http://www.cityofmobile.org/trashpickup/>

23 <http://ottawa.ca/en/garbage-collection>

24 <http://www.portlandoregon.gov/bps/article/402952>

25 <http://www.cityoftacoma.org/cms/One.aspx?portalId=169&pageId=16069>

26 Page 12 of Seattle's Climate Action Plan: http://www.seattle.gov/environment/documents/2013_CAP_20130612.pdf

27 <http://www.epa.gov/epawaste/consERVE/tools/payt/index.htm>

PAYT Programs have been adopted by almost 7,100 communities in the United States and have led to the diversion of roughly 6.5 million tons of municipal solid waste (MSW) per year that would otherwise have been landfilled. Based on the computations, the PAYT programs currently operating in the U.S. are leading to annual reductions of:

- 2.1 - 3.8 million metric tons of carbon equivalents
- 7.8 - 13.3 million metric tons of carbon dioxide equivalents
- 61 - 109 million MBTU3
- 4.6 - 8.3 million tons of MSW from landfills

The programs are available to about 25 percent of the U.S. population and about 26 percent of communities in the U.S., including 30 percent of the largest cities in the U.S.²⁸

F. Use Mandates for Recycling and Composting for Residential Solid Waste

A significant portion of waste from Sonoma County's residential sector that could be recycled or composted is instead buried in the landfill. California now has a mandatory recycling law for commercial establishments. In contrast, Sonoma County's residential sector lacks similar laws.

San Francisco's Mandatory Recycling and Composting Ordinance requires residents to separate their recyclables, compostables, and landfill trash.²⁹ San Francisco's recycling and compost collection program is available in restaurants, hotels, office buildings, and anywhere else in the city.³⁰

G. Ban Some Types of Waste in Garbage Bins

Another approach to increasing recycling and composting is to simply ban recyclable and compostable items from garbage bins. This has not yet happened in Sonoma County.

The City of Seattle has set a 2015 goal of banning the following materials from residential and business garbage to increase recycling: asphalt paving, concrete, bricks, asphalt shingles, plastic film, clean wood, residential food, and compostable paper.³¹ The City also has a 2015 goal of a phased-in ban on the following construction and demolition waste from job sites and private transfer stations: recyclable metal, cardboard, plastic film, carpet, clean gypsum, clean wood, and asphalt shingles.³²

H. Set a Date to Achieve Zero Waste

No deadlines for zero waste have been established in Sonoma County. A deadline to achieve this goal will help to spur action.

In **San Francisco**, total emissions from waste have decreased 33.4 percent since 1990 as more materials have been recycled and composted. Their current landfill diversion rate is 80 percent. San Francisco's initial commitment to Zero Waste was made in 2007.³³ San Francisco's goal is zero waste by 2020.³⁴

The City of Vancouver in Canada also has a goal to achieve zero waste.³⁵

28 <http://www.epa.gov/osw/conservation/tools/payt/pdf/sera06.pdf>. List of communities with Pay-As-You-Throw Programs:
<http://www.epa.gov/epawaste/conservation/tools/payt/states/06comm.htm>.

29 <http://www.sfenvironment.org/zero-waste/recycling-and-composting>

30 <http://www.sfenvironment.org/zero-waste/recycling-and-composting>

31 Page 12 of Seattle's Climate Action Plan: http://www.seattle.gov/environment/documents/2013_CAP_20130612.pdf

32 Ibid

33 Email from Calla Ostrander on 11/1/13, SF Environment

34 <http://www.sfenvironment.org/zero-waste>

35 Page 424 of the CAP update: <http://vancouver.ca/files/cov/greenest-city-2020-action-plan-2012-2013-implementation-update.pdf>

The **Oakland** City Council adopted a Zero Waste Goal in 2006, calling for a 90 percent reduction in waste sent to landfill by 2020, with an environmental hierarchy to guide how the diverted material is managed through recycling and composting. The City's Zero Waste Strategic Plan outlines strategies for meeting this goal. These strategies prioritize "systems" solutions to reduce landfilled waste, and expand waste reduction, recycling and composting programs. By pursuing the City's adopted Zero Waste strategies, Oakland can help to create GHG reductions on the same order of magnitude as those related to transportation and building energy use. Oakland released an RFP for zero waste discards management services for the residential, commercial, industrial and government sectors in 2012. Services are scheduled to begin 7/1/2015.³⁶

I. Green the Garbage Truck Fleets

Sonoma County is currently serviced by NorthBay Corporation for garbage trucks. NorthBay has been investigating a cleaner fleet of vehicles, but so far has not taken action. The County could require any garbage truck fleet under contract to use compressed natural gas or another cleaner fuel source.

In **Fairmont City, Illinois** the company Waste Management is building a facility that will create pipeline-ready natural gas from its Milam Landfill in Fairmont City, Illinois. The processed renewable natural gas will be injected into the pipelines of Ameren, Illinois, for withdrawal at other locations, including some Waste Management facilities. Once there, it will be used to fuel truck fleets and other equipment that run on compressed natural gas (CNG). Waste Management is calling the plant the Renewable Natural Gas Facility and expects it to begin delivering gas to the pipelines in late summer 2014.³⁷

The City of Portland requires 19 residential garbage and recycling haulers to use 20 percent biodiesel, often called B20, in their diesel collection trucks, resulting in over 400,000 gallons of biodiesel usage annually.³⁸

J. Adopt a More Aggressive Sustainable Purchasing Policy

The County of Sonoma currently has an environmentally preferable purchasing policy that gives the County the ability to award bids to green vendors or for green products if they are within 5 percent of the lowest bid. To be certified green, the vendor must meet independent third party certification. The County also has a local preference for goods policy that allows local vendors within 5 percent of the lowest bid a chance to match the bid, recognizing that using local vendors often means a reduction in the carbon footprint associated with long distance travel and that local vendors help support the local economy.³⁹ Sonoma County could give greater preference to green vendors by allowing a higher margin than 5 percent.

Multnomah County adopted a Sustainable Purchasing Policy in 2010 to use its purchasing power to reflect the community's values. These values include an open and fair procurement process, best values for taxpayers, reducing negative impacts on the environment or on specific community groups or neighborhoods, and supporting the local economy. Sustainable purchasing (also called environmentally preferable purchasing) is an effort to spend public funds on goods and services that minimize negative environmental impacts, are fair and socially just, and make economic sense now and in the long term.⁴⁰

4.2 Capitalize on emerging opportunities to convert waste into energy

Background

36 Scott Wentworth, City of Oakland (survey response)

37 <http://www.environmentalleader.com/2013/10/21/waste-management-fuels-fleet-with-landfill-gas/>

38 Page 24 of Portland's CAP progress report: www.cap_progress-rept2012_web.pdf

39 <http://green-purchasing.sonoma-county.org/>

40 <http://web.multco.us/sustainability/sustainable-purchasing>

Republic Services has a unique opportunity to partner with the County of Sonoma to realize solid waste diversion goals not only through recycling and composting, but also through waste to energy conversion for those organic materials that may not be compostable.

Strategies to Consider:

- A. Consider Biogas Production From the MSW Using Anaerobic Digestion*
 - B. Encourage Biomass Energy Conversion from Dairy Farms*
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A. Consider Biogas Production From the MSW Using Anaerobic Digestion

Republic Services could operate a Materials Recovery Facility at the Sonoma County Landfill that separates the organic materials out of the MSW stream. Republic would also work with the County haulers to operate a food waste collection program that is included with the organics. This organic waste could be used to feed an anaerobic digester built by Sonoma Clean Power in partnership with (Clean Energy Renewable Fuels) at the landfill site. The digester would produce biogas, which would be refined into pipeline quality biomethane. The clean, carbon-neutral biomethane would then be shipped via natural gas pipeline to Sonoma Clean Power combined heat and power generation systems built and operated in partnership with the local CHP developer. These systems, built onsite, would provide 100 percent carbon-free heat and power to Memorial Hospital, the Santa Rosa Mall, and several other large commercial customers. The heat and power produced by these systems would also be used by thousands of residential customers in the adjacent areas. The landfill gas generation system currently in operation at the landfill would continue to be operated, but would provide heat for the digester to increase its efficiency, as well as to provide power for the MRF and digester. This system would produce carbon emissions reductions by a) diverting organics from the landfill and eliminating the methane that would otherwise be produced with nearly 100 percent efficiency (vs. landfill capture systems that are usually only 75 percent efficient); b) creating 100 percent carbon free electricity that can serve both commercial and residential customers (displacing dirtier grid electricity); c) displacing natural gas used for heating, both hot water and building heat.⁴¹

The **City of San José** has recently started processing all of the City's commercial organic waste using the first commercial scale dry fermentation anaerobic digestion and in-vessel composting facility in the U.S.⁴²

In **Junction City, Oregon** (outside Portland), a \$4 million Green Lane Energy biogas facility was built in 2013. The plant composts organic waste such as food scraps, straw, manure and other materials to generate methane gas that is collected and burned to power a turbine and produce electricity. The system anaerobically ferments organic material to create methane-rich biogas, which is recovered to turn a turbine. Waste is trucked to a receiving building, where it is separated, ground down and processed into a mixture for fermenting. The processing machine removes packaging such as milk or yogurt cartons that might be contaminating the waste. The waste goes into a homogenization tank, where it sits for several days to ferment. It then is channeled into a large 1.2 million gallon digester that is constantly stirred, after which the material goes into a dome-like structure where the methane is extracted. That gas is transferred into a biogas scrubber to remove impurities such as hydrogen sulfide and moisture. Once the gas is scrubbed, it is burned in a 16-cylinder, 2,000-horsepower engine. Much of the technology that's being used in the process is imported from companies in Sweden, Switzerland and Germany, including the digestion tank agitator, the waste intake sorter, and engine, respectively. Some of the equipment, including the intake sorter, has never before been used in the United States.⁴³

41 Email from Dave Erickson, California Public Utility Commission, August 28, 2013

42 <http://www.sanjoseca.gov/index.aspx?NID=1555>

43 <http://www.registerguard.com/rg/news/local/30336803-75/waste-biogas-energy-plant-lane.html.csp>
<http://www.registerguard.com/rg/news/local/30336803-75/waste-biogas-energy-plant-lane.html.csp>

B. Encourage Biomass Energy Conversion from Dairy Farms

Sonoma County is an agricultural county that has many opportunities to produce energy from agricultural waste. The Sonoma County Water Agency (SCWA) has a “Farms to Fuels” project that is doing just this.⁴⁴ However, there are many farms in Sonoma County with the potential to convert waste into energy that have not yet done so.

In **LaSalle, Colorado**, a project will use a complete mix anaerobic digester system to produce up to 4,700 MMBtu of biogas daily, making it one of the largest anaerobic digester facilities in the United States. The anaerobic digestion system converts organic feedstock and dairy cow manure into raw biogas. The raw biogas is then processed into pipeline quality RNG. After being conditioned to pipeline grade, the RNG will be supplied to Sacramento Municipal Utility District (SMUD) through a 20-year Gas Purchase Agreement (GPA).⁴⁵

⁴⁴ <http://www.scwa.ca.gov/farms-to-fuel/>

⁴⁵ <http://www.heraldonline.com/2013/09/05/5179891/edf-renewable-energy-acquires.html>