

ZERO WASTE AT Mt.SAC

BACKGROUND

An estimated 130 billion pounds of food are discarded in the United States, amounting to about \$160 billion in lost monetary value—the equivalent of \$500 per capita.¹¹⁶ This amount includes 22 million pounds from U.S. colleges, according to estimates by the Food Recovery Network.¹¹⁷ According to the EPA, 75 percent of the American waste stream is recyclable; however, on average only 30 percent of total waste is actually recycled. Furthermore, the average college student produces 640 pounds of solid waste each year, including 500 disposable cups and 320 pounds of paper. Even more striking is the statistic which indicates that Americans comprise about 5 percent of the world's population and annually produce 27 percent of the world's garbage.¹¹⁸

From an environmental perspective, food requires substantial amounts of water, energy and land to produce. For example, one pound of beef requires 1,847 gallons of water, 52 pounds of cattle feed, 260 square feet of land to grow the feed, and releases 20 pounds of carbon dioxide equivalents.¹¹⁹ Animal manure, pesticides and herbicides, which are widely used in our agricultural system, endanger the health of farm workers, kill wildlife, contaminate drinking water and result in methane emissions. Unsustainable farming practices contribute to soil erosion, salinization and biodiversity loss. Food waste is also the single largest waste stream entering municipal landfills, where its anaerobic decomposition can release methane, a highly potent greenhouse gas.

¹¹⁶ Jean C. Buzby, Hodan F. Wells, and Jeffrey Hyman, "The Estimated Amount, Value, and Calories of Postharvest Food Losses at the Retail and Consumer Levels in the United States," 2014, https://www.ers.usda.gov/webdocs/publications/43833/43680_eib121.pdf

¹¹⁷ Linda Poon, "When Food Is Too Good To Waste, College Kids Pick Up The Scraps." *The Salt*, NPR, 2015, <http://www.npr.org/sections/thesalt/2015/02/27/389284061/when-food-is-too-good-to-waste-college-kids-pick-up-the-scraps>

¹¹⁸ Sustainability Office, "What You Can Do," Boston College, 2016, <https://www.bc.edu/offices/sustainability/what-you-can-do/know-facts.html>

¹¹⁹ M.M. Mekonnen and A.Y. Hoestra, "The Green, Blue and Grey Water Footprint of Crops and Derived Crop Products," UNESCO-IHE Institute for Water Education, 2010, <http://waterfootprint.org/media/downloads/Report47-WaterFootprintCrops-Vol1.pdf>

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SOLID WASTE PRACTICE AT MT. SAC

American Reclamation is the waste hauling company for Mt. SAC. Solid waste is taken by American Reclamation and then separated into what can be recycled by South Coast Fibers, a third-party recycling agency. The recycled materials are then taken to Covanta Long Beach Renewables and turned into waste energy. These hauling and recycling agencies claim high recycling rates of 70 percent or greater. At Mt. SAC the great majority of waste that is generated is composed of food waste, wrappers, paper, cardboard, aluminum, plastic, and residuals. The total waste collected by the hauling agencies is provided to the College in both monthly and annual reports. These values have been included in the total emissions calculations.

Mt. SAC students are currently working on a recycling program uniquely modified to suit the College's needs. The Clean Campus Initiative is a waste collection strategy that utilizes zero-waste stations, a responsive marketing strategy that informs the student body about living sustainably, and a collection system proposal to compost in the future. This project at Mt. SAC initially began as a student proposal for a PepsiCo grant, and after winning one of the Mt. SAC President's Student Sustainability Awards, became an internship position within Energize Colleges.

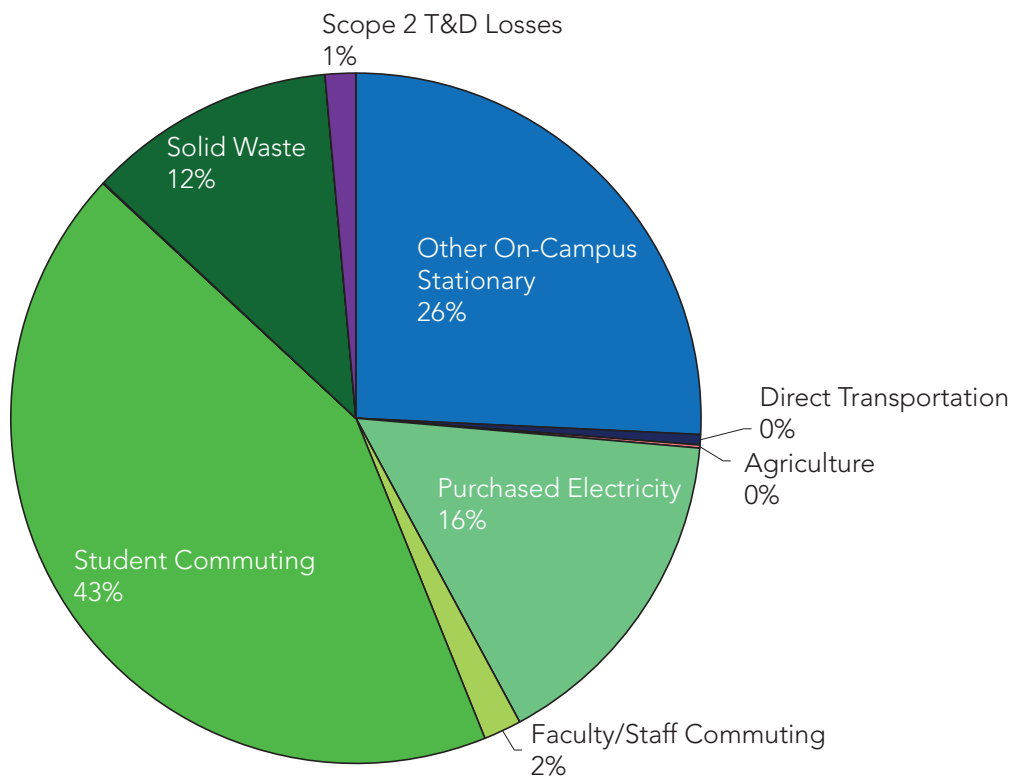
Mt. SAC is also in the process of developing plans for on-campus composting that will sustainably turn green waste from the Wildlife Sanctuary, Horticulture Unit, Farm, and campus landscaping into compost. The Landscape Guidelines, developed as part of the 2018 Educational and Facilities Master Plan, recommend that

Mt. SAC "collect and compost green water (vegetation trimmings)". The Appendix on Farm Planning in the EFMP also describes composting recommendations and potential locations.

GREENHOUSE GAS EMISSIONS, SCOPE 3 SOLID WASTE

The chart below illustrates that in 2016, waste accounted for 13 percent of the total emissions on Mt. SAC's campus, which is equivalent to 8,314 metric tons of annual waste. Per capita, this equates to 0.11 metric tons of solid waste per student, or 242 pounds of solid waste per Mt. SAC student.

2016 SUBCATEGORY PIE CHART



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SOLID WASTE REDUCTION STRATEGIES

Considerable progress can be made to achieve a long-term goal of zero waste at Mt. SAC. Per the EPA, "achieving Net-Zero Waste means reducing, reusing, and recovering waste streams to convert them to valuable resources with zero solid waste sent to landfills over the course of the year."¹²⁰

The following strategies outline a pathway to Net-Zero Waste by the year 2050. Emission reduction strategies are categorized by phases and are associated with corresponding milestone target years.

EMISSION REDUCTION STRATEGY PHASES

Phase 1 strategies, combined for stationary sources, purchased electricity, transportation, and solid waste, aim to result in a cumulative emissions reduction of 20 percent by 2025.

Phase 2 strategies, combined for stationary sources, purchased electricity, transportation, and solid waste, aim to result in a cumulative emissions reduction of 50 percent by 2035.

Phase 3 strategies, combined for stationary sources, purchased electricity, transportation, and solid waste, aim to result in a cumulative emissions reduction of 100 percent by 2050.

¹²⁰ United States Environmental Protection Agency, "Net Zero Concepts and Definitions," 2016, <https://www.epa.gov/water-research/net-zero-concepts-and-definitions>

PHASE 1: 2018–2025

Implement Sustainable Food Purchasing

Thirty to forty percent of landfill waste is composed of food waste, therefore the adoption of sustainable food practices will result in a reduction of total landfill waste. The College currently contracts with Sodexo for food services. The timing is good for Mt. SAC to work with Sodexo on improving environmentally sustainable practices, as the company has recently launched a sustainability initiative of its own. Sodexo implements recycling measures such as recycling of paper products and reduction of styrofoam and plasticware. Food and beverage vending machines are located throughout campus as well. In order to optimize reuse, reduction, and recycling of food items on campus, it is recommended that the College coordinate with on-campus food vendors to establish sustainable policies which include but are not limited to the following.

- Purchase sustainable food from fair trade, sustainably harvested, and local sources
- Discontinue use of styrofoam and plastic serving ware and replace with compostable ware which can be placed into food trash bin
- Provide well marked designated receptacles for recycling (paper, aluminum, and plastic), compost (food waste and compostable ware), and landfill (rubbage that does not fit into either of the two previously mentioned categories). Sodexo operates separately from the campus and does not currently have recycling-waste bins in the Sodexo operated food service areas. This added feature may

incur additional costs and may require a revisit to the contract agreement with Sodexo

- Compost a portion of the food waste and divert the compost to the on-campus Farm and used for amendments to agriculture. It is estimated that \$100,000 would be required to supply an on-site chipper/mulcher to handle this operation, as well as additional staff hours to transfer green waste to the Farm on a daily basis. Any of this waste that is diverted from the landfill will decrease the total emissions
- Provide a variety of healthy food and beverage options that are provided within environmentally friendly packaging to students. Consider incentives for students, staff, and faculty for making these choices
- Purchase a compactor for other non-Sodexo food areas around campus in order to consolidate space. Currently there is only one compactor located in the Sodexo food service areas that compacts food waste and is picked up once a month

Revisit Contract with Existing Hauling Agency and Self-auditing

Currently, the hauling agency American Reclamation picks up waste from one main bin per collection area. The bins contain commingled waste. In order to optimize landfill diversion rates of trash hauled away from campus, it is recommended that the College negotiate its policy with the existing hauling agency, in favor of the practice of picking up landfill, recycling, and compostables from separate bins on a

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SOLID WASTE REDUCTION STRATEGIES (*cont.*)

weekly basis. [The College currently has plans for a request for proposals (RFP) to be issued to all interested hauling agencies, including the current agency]. Revised contracts with hauling agencies will likely result in higher costs, therefore additional funding would be required. In addition, the dispatch of three different hauling agency trucks (landfill, recycling, and compost) will add greenhouse gas emissions as well. The College could work with hauling agencies to determine if clean-fuel trucks are an option, or if it would be possible to offset these additional emissions, such as through renewable energy credits.

Improve Recycling and Waste Receptacles on Campus

Two types of waste containers are currently in use on campus: Green or Blue recycling receptacles for glass, plastic, and paper. Brown waste (landfill) receptacles are placed adjacent to the recycling receptacles.

The following strategies should be considered in order to improve the landfill diversion rates.

- Establish “zero-waste stations” with composting/recycling receptacles in all food service areas
- Provide clear signage that educates the user as to how to dispose of their “waste.” For example, signage should inform the user as to whether or not they can throw away food containers that have food on them

- Develop and implement a waste-on-campus training program for students and the community. This could be developed in partnership with the Facilities Planning and Management Department, hauling agencies, and students. Student clubs could champion the marketing effort
- Provide composting bins in addition to recycling and waste bins around campus
- Explore alternative waste receptacles to make waste collection more efficient for maintenance staff

Install Bottle Filling Stations Throughout Campus

Bottle filling stations already exist on campus. These stations promote the use of personal thermoses and limit plastic being thrown away or recycled. It is estimated that 4,000 bottles per year per filling station are saved as a result.¹²¹ In order to optimize this result, the College would need to install additional stations both indoors and outdoors. Additional funding can be costly to implement at every building; however, a phased approach could be used. The cost to install a drinking fountain is about the same as a bottle filling station, at about \$1,600.¹²² It is recommended that an audit is conducted to determine where these stations could go, and where they would be most useful. In addition, it is recommended that the College supply reusable bottles (metal) to students, faculty, and staff. These reusable thermoses could be distributed during

¹²¹ Bryan Roth, “Campus Water Stations Save 400,00 Plastic Bottles,” Duke Today, 2015, <https://today.duke.edu/2015/10/hydrationstations>

¹²² Elkay, *ELP-6C Commercial Price Guide*, 2017, http://www.elkay.com/wcsstore/lkwscontent/brochure_documents/elkay/price%20books/f-4676_commercial_pricebook_2017_updates.pdf

registration or at club events, and could include a map pointing out the locations of bottle filling stations.

End On-site Use of Styrofoam, Straws, Plastic Place Settings and Plastic Bottles

Aside from the food service areas run by Sodexo on campus, many buildings have break/hospitality/kitchen areas that are stocked with eating ware. It is recommended that a sustainable purchasing program be put into place that replaces styrofoam and plastics with compostable or reusable options.

Make More Processes Paperless

From course work, to administrative functions, efforts to reduce paper use can make a significant difference in reducing the College's overall solid waste. Currently 765,060 pounds of paper are used annually at Mt. SAC. Although this paper is composed of recycled content, it would be ideal to reduce the amount purchased and used. Strategies to reduce paper use include presetting all College printers to two-sided printing, providing electronic syllabuses to students each term, as well as examining current practices to identify any processes that can be moved in part or entirely online.

Participate in RecycleMania

RecycleMania is a friendly competition and benchmarking tool for college and university recycling programs to promote waste reduction activities to their campus communities. Over an 8-week period each spring, colleges across the United States and Canada report the amount of recycling and trash collected each week and are in turn ranked in various categories based on who

recycles the most on a per capita basis, as well as which schools have the best recycling rate as a percentage of total waste and which schools generate the least amount of combined trash and recycling. With each week's updated ranking, participating schools follow their performance against other colleges and use the results to rally their campus to reduce and recycle more. National recognition is provided to the winning school



Image Credit (top): "Rapid Water Bottle Filling Stations." ELKAY. Accessed 11 March 2019. www.elkay.com/bottle-filling-stations.

Image Credit (bottom): RecycleMania. Accessed 11 March 2019. www.recyclemania.org.

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SOLID WASTE REDUCTION STRATEGIES (*cont.*)

in each category on the RecycleMania website and in a national press release. Winning schools receive an award made out of recyclable materials, and win the right to host that category's special traveling trophy for the coming year. This free program is an ideal way to promote awareness, participate in recycling, and even generate income for the campus.

Increase Furniture Reuse

The College has a large stock of furniture that is used throughout campus. Mt. SAC has enacted standards and processes to ensure that all furniture purchased is durable, has a long warranty period, and can withstand relocation and reuse as needs change over time. Once furniture has reached its "end of life," the campus sells old stock to an outside vendor. Additional options for more sustainable reuse of furniture should be explored, including the development of a Reuse Depot, with an online catalog of available items to support on-campus reuse of items that have not reached their "end of life" and the additional staff and equipment needed to operate the facility. The College could contact the current vendor to see how the two entities could better coordinate furniture reuse efforts.

Implement E-Waste and Hazardous Waste Collections

E-waste is a popular term for electronic products nearing the end of their useful life. Computers, printers, televisions, VCRs, stereos, copiers, and fax machines are common electronic products. Electronic discards are one of the fastest growing segments of our nation's waste stream. Under current regulation, these devices require special

handling and can no longer be disposed of in landfills. The City of Walnut is within Los Angeles County and stands to gain from free countywide Household Hazardous Waste and E-Waste collections. It is recommended that Mt. SAC coordinate with the city of Walnut to host a Household Hazardous Waste and E-Waste Day on campus. Parking lots along Temple could provide an easily visible and accessible site for this event. Campus equipment would need to be "wiped" in order to uphold College confidentiality of records. With this process in place, hazardous waste and e-waste from the campus, community, and students could all be collected in one location, reducing the amount of waste in landfills, and strengthening ties with the community.

Examples of Electronic Waste (E-Waste) Items are as follows.

- Alarm Clocks
- Answering Machines
- Camcorders
- CD & DVD Players
- Cell Phones
- Computers
- Copiers
- Digital Cameras
- Digital Thermometers
- Exercise Equipment Displays
- Handheld Electronic Devices
- Medical Monitors
- iPods & MP3 Players
- Pagers & PDAs
- Printers & Fax Machines
- Programmable Kitchen
- Appliances
- Radios (all types)

- Stereos
- Telephones
- Televisions
- VCRs
- Video Game Consoles

Another option would be to engage in the RecycleMania's subdivision, known as the E-cycleMania category. Electronics are not included with the traditional 8-week categories of RecycleMania. Campuses may include electronic waste such as computers, printers, and related equipment; consumer electronics; power cords, chargers, and other ancillary equipment.

PHASE 2: 2025–2035

Install an Anaerobic Biodigester on Campus— Small Scale

A biodigester is a large, fully enclosed tank into which organic waste is collected. Anaerobic is defined as the absence of oxygen. Anaerobic microbial organisms locked in a sealed environment without oxygen, but with abundant food and other organic waste material, produce biogas, a methane-rich gas through their digestive process. In an anaerobic biodigester, this natural process of decomposition is technologically sped up to optimal speed and efficiency. The trapped methane gas is then cleaned and used to generate electricity and steam for heating and cooling via a combined heating and power (CHP) or cogeneration system. The biogas also can be directly used to produce steam in boilers for hot water and heating. Leftover organic solid waste can be used as fertilizer, a soil enhancer, or be further composted. Small scale biodigesters are coming into the market and are worth



Image Credit (top): "Anaerobic Digestion Tech. Suite." BIOFerm Energy Systems. Accessed 11 March 2019. www.biofermenergy.com/anaerobic-digestion.

Image Credit (bottom): "UC Davis biodigester turns campus waste into campus energy." UC Davis College of Engineering. Accessed 11 March 2019. www.engineering.ucdavis.edu/blog/uc-davis-biodigester-turns-campus-waste-campus-energy.

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SOLID WASTE REDUCTION STRATEGIES (*cont.*)

consideration. Working with Mt. SAC's Agricultural Sciences Department, such a biodigester could provide a means of collecting and using food waste in a responsible and educational way. The residual compost could be used on-site for crops at the Farm and for ornamental landscape around campus. One potential location for this equipment may be behind Mountie Café. Case studies from Stanford or UC Davis should be consulted.

Achieve Construction Waste Management Diversion Goals of 100 Percent

Per CALGreen Code, currently 50 percent construction waste diversion is a California mandate; however, 75 percent diversion has become an industry standard.¹²³ Working with local hauling agencies and contractors, a diversion rate of 95 percent is achievable in today's market and by 2035, 100 percent construction waste management will be highly achievable. Recent examples of construction projects on campus provide proof of this trend. By including this as a requirement in campus agreements with contractors and hauling agencies, the College will not only reduce the amount of waste going to landfill from its own projects, but it will be setting a new expectation for the building industry as a whole.

PHASE 3: 2035–2050


Install an Anaerobic Biodigester on Campus—Large Scale

Pending the test fit of the small scale biodigester being proposed during Phase 2, a larger scale biodigester is proposed for Phase 3. This biodigester would be designed to process up to 2,000 tons of manure from the Farm's cattle and horses to create renewable biogas. It would have an electric capacity of 64 kW and a thermal capacity of 101 kW. The average annual electricity production of such a unit would be approximately 512,000 kWh; the estimated energy produced is equivalent to providing electricity to 50 U.S. houses for a year, or heating 61 houses.

¹²³ "Calrecycle Publications Catalog Search | Publications Public," www2.calrecycle.ca.gov, 2018, <https://www2.calrecycle.ca.gov/Publications/Details/1538>

In 2022, Mt.SAC participated in the Campus Race to Zero Waste Competition (Formerly Recyclemania) in an effort to assess landfill waste diversion strategies efficacy on campus. Working with Athens Waste Services, students, faculty, Grounds staff and Custodial staff, the campus was able to achieve a 62% landfill waste diversion rate.





CAMPUS RACE TO ZERO WASTE

[HOME](#)
[MAPS](#)
[REPORTS](#)

Participating Schools

School

Mt. San Antonio College

GENERATE

Mt. San Antonio College

General Information											
Share this Report	https://recyclesearch.com/profile/recyclemania/report/3217/node_id=194209&generate=true										
Custom Results Tool	https://recyclesearch.com/profile/recyclemania/report/3347/node_id=194209&generate=true										
Location:	Pomona, CA										
Athletic Conference:											
Public or Private School:	Public										
Web Site:	https://www.mtsac.edu/sustainability/										
Scope of Participation Information											
Division: What is this?	Yes (Competition Division)										
Reported Mixed Recyclables Data Based On:	Actual Weights										
Measurement Comments:	Athens (the College's hauling agency) will be providing reports that delineate our diversion rates. Our student-run environmental club, E.A.G.L.E. (Environmental Action Group for a Livable Earth), and our custodial staff will work together to optimize recycling efforts on campus.										
Population											
Portion of Campus Participating:	Whole Campus										
Number of FTE Students:	68,512										
Number of FTE Staff and Faculty:	2,094										
Total FTE Campus Population:	70,606										

Weekly Results

		PRESEASON WEEK (NOT CUMULATIVE)		REGULAR SEASON WEEK (CUMULATIVE)							
COMPETITION CATEGORY	YEAR	1	2	1	2	3	4	5	6	7	8
Diversion - weekly recycling rate (%)	2022			55.31%	61.91%	62.92%	63.57%	62.13%	62.73%	61.67%	62.19%
Per Capita Classic - lbs/person	2022			0.21	0.72	1.11	1.40	2.25	2.76	3.32	3.52

Cumulative GHG Reductions

357 Metric Tons of CO2 Equivalent, or
70 cars off the road, or
the energy consumption of 31 households

- Numbers derived from the US EPA's Waste Reduction Model (WARM). [Click Here](#) for details.