

# UC Berkeley Zero Waste Plan



University of California-Berkeley  
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## Acknowledgements

The Plan has been produced by UC Berkeley's Cal Zero Waste in September 2019

### Primary Authors

- Lin King, Cal Zero Waste Manager, Cal Zero Waste, Facilities Services
- Michelle La, Zero Waste Specialist, Cal Zero Waste, Facilities Services
- Izzy Parnell-Wolfe, Zero Waste Specialist, Cal Zero Waste, Facilities Services

### Secondary Authors

- Anna Yip, B.S. Environmental Science, B.S. Environmental Economics and Policy, UC Berkeley, Fall 2017

### Contributors

- Kira Stoll, Director of Sustainability, Office of Sustainability
- UC Berkeley Zero Waste Working Group
- UC Berkeley Zero Waste Research Center

## Executive Summary

The University of California Zero Waste by 2020 goal was initiated in 2004 as part of the adoption of the UC Sustainable Practices Policy and has continued to evolve throughout the years. Per the policy, the “zero waste goal is made up of incremental waste reduction and waste diversion targets”.<sup>1</sup> As 2020 is fast approaching and zero waste programs and education are rapidly expanding, it is apparent that specific strategies and steps need to be taken in order to move the needle closer to zero waste.

The “2013 UC Berkeley Zero Municipal Solid Waste Plan” emphasized, in its conclusion, standardization and consistency of bins & signage, as well as proper sorting of materials on campus. As campus buildings are integrated into the Zero Waste Building Program over the next two years, the standardization of infrastructure and signage will be addressed.

But infrastructure and signage is not the only key component that needs to be addressed as we near 2020. The focus in the coming year will be first to educate and engage users to sort properly and ensure materials are disposed of in the correct bins to maximize our diversion potential. With the longer term solutions in mind, waste reduction and reuse of materials on campus will also be addressed concurrently. Purchasing decisions are difficult to change, but are needed. Multiple forces, public and industry, are coming together to change what products are sold or purchased as well as how products are designed, including the City of Berkeley’s Single Use Foodware Ordinance and Litter Reduction Ordinance in the case of food service ware and the failing recycling market due to the China’s National Sword Policy.

Waste audits indicates that through downstream activities (e.g., waste disposal and handling) a 75-80% diversion rate is likely, but any additional progress will be hindered by hard to recycle or non-compostable materials. Based on the trends in the current recycling market, as well as increased purchasing power and opportunities of consumers, important efforts should and will be spent on developing upstream closed looped or circular economy solutions for single use materials sold and generated on campus.

Upstream and downstream strategies and program implementation will require the active engagement of the campus community, prompting each student, staff, and faculty to play a unique role. Through a multi-faceted education and outreach approach, Cal Zero Waste and many campus partners intend to keep the campus community informed and provide recommendations and outlets on how to strive for zero waste.

The campus is now less than a year away from 2020, and as Cal Zero Waste continues to push the envelope striding forward with innovative zero waste programs on the UC Berkeley campus, a common question will arise among the campus: what if UC Berkeley does not hit the target?

The zero waste by 2020 goal has been a visioning goal to many successful and innovative programs and projects that have significantly reduce campus landfill waste over the last ten years. With no intention of delaying the 2020 goal, UC Berkeley will instead use the goal as a means to measure our progress and evaluate how best to continue to meet the goal quickly. If the target is not hit, then it serves as a past due deadline, where time is passing and the UC Berkeley campus will need to take more active steps to reach zero waste in the near future.

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<sup>1</sup> University of California: Office of the President. Sustainability. <https://ucop.edu/sustainability/>. Accessed August 23, 2019

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## Document overview

This plan is an update to the 2013 “UC Berkeley Zero Municipal Solid Waste to Landfill by 2020” plan. This plan offers a summary of key zero waste efforts currently being implemented on campus. Each program section outlines how the project will be implemented and expanded upon in order for the campus to reach its zero waste by 2020 goal as well as how this work will be carried on beyond 2020.

The programs highlighted in this plan outline a multi-layered strategy focusing on a few key components on campus:

- Installing standardized infrastructure, including signage and bins, in campus facilities.
- Educating the campus community about the proper sorting of materials into campus bins and waste reduction and reuse best practices.
- Reducing the amount and flow of materials.
- Reusing, repairing and re-circulating usable materials.
- Upgrading the procurement process with partners to minimize waste.
- Engaging campus partners and affiliates to adopt zero waste.
- Standardizing and institutionalizing zero waste practices and behaviors.

The contents of this plan are written based off of the current information available at the time of writing and will be updated as the programs and strategies evolve. Program details and progress reporting will be updated on the Cal Zero Waste website.

## Site Overview: Boundaries and Facilities Inclusions

The campus zero waste plans have been created to offer guidance and reference points for campus entities working toward reducing the municipal solid waste produced from all UC Berkeley owned and operated property, buildings and outdoor spaces, in the cities of Berkeley, Albany, and Richmond. This includes the 178--acre core central campus, facilities adjacent to the central campus including the 1,000 acres east of Memorial Stadium (primarily natural open space known as the Hill Campus), campus residence halls and apartments, University Village Family Housing, Richmond Field Station, parking and athletic facilities, and offices and warehouse spaces in the surrounding communities.

This plan does not cover facilities that are leased by the campus and for which the campus does not have operational control.

The UC-system wide working group has formed a sub-committee to discuss the boundaries in which each UC campus will be reporting upon and operating zero waste programs. The sub-committee has been tasked to define the reporting boundaries as well as defining what would constitute an exception. This could modify UC Berkeley's planning details and reporting in the future.

As the focus of this plan is to specifically reduce municipal solid waste, it does not cover waste reduction and disposal strategies relating to hazardous and regulated materials such as chemicals, hazardous wastes, and electronic waste. Lastly, extensive laboratory-related waste reduction is being reviewed for the next plan update.

### Physical Setting and Population

The central UC Berkeley campus is located in downtown Berkeley and is 178 acres in size. Including the campus-owned residential halls, family housing, and offices not located on the central campus (but are included in the scope of our zero waste goal), UC Berkeley is 1,232 acres in size.



In 2017-2018, there were 29,783 undergraduate and 11,172 graduate students enrolled, for a total enrollment of 40,955 people. There is a total of 1,513 regular faculty, 1,296 other faculty, 3,426 academic staff, and 8,447 non-academic staff, bringing total employees at UC Berkeley to be 14,682 employees.

Most waste generated on campus comes from buildings and building occupants. Understanding building characteristics and uses provides insight on waste stream types and volumes and can help guide reduction strategies. As programs detailed in this plan are implemented in the coming two years, understanding the fundamental difference in each building type and occupancy is critical.

Behind central campus buildings, Housing and Dining buildings represent the next largest type of campus building and user. Campus owned housing serves approximately 7,000 undergraduate students in residential hall arrangements; this population is mostly served by campus dining services.<sup>2</sup> The campus also provides family housing located in the City of Albany – this is a 58-acre complex with 974 one, two and three bedroom apartments.

Although most waste on campus is generated from building users, waste is also disposed of and collected on campus in outdoor spaces and venues, such as walkways, parking lots, athletic venues, and plazas. These areas present different challenges and opportunities for waste management and recycling practices.

### *Weighted Campus User*

For each reporting period, two metrics are calculated as stated in the UC Sustainable Practice Policy: annual diversion rate and per capita waste generation.

The per capita waste generation is calculated with total amount of waste divided by the weighted campus user, calculated using the Association for the Advancement of Sustainability in Higher Education's (AASHE) method of calculation, an adjusted count to "accommodate how intensively certain community members use the campus."<sup>3</sup> See below for calculation method from AASHE

$$\text{Weighted campus users (WCU)} = (A+B+C) + 0.75 [ (D-A)+(E-B)-F ]$$

- A = Number of students resident on-site
- B = Number of employees resident on site
- C = Number of other individuals resident on-site and/or staffed hospital beds
- D = Total full-time equivalent student enrollment
- E = Full-time equivalent of employees (staff and faculty)

<sup>2</sup> Berkeley Office of Undergraduate Admissions. Housing. <https://admissions.berkeley.edu/housing>. Accessed 22 July 2019.

<sup>3</sup> AASHE. STARS Technical Manual. <https://www.aashe.org/wp-content/uploads/2017/07/STARS-2.1-Technical-Manual-Administrative-Update-Three.pdf>. Accessed 22 July 2019.

- F = Full-time equivalent of students enrolled exclusively in distance education

With the AASHE method of calculation, the UC Berkeley Campus WCU number for FY 15/16 was 41,834 and the most current FY 18/19 WCU number is 45,519.

Weighted campus user was selected as the population measurement for the per capita waste generation because it was the only population number that was available at the time that was calculated with a recognized methodology. Recognizing that the WCU number is not the best fit in this case, but it is a best available. The same WCU number is also being used by the UC Water Working Group in calculating water use and reductions.



## Waste Reporting Context

### University of California Sustainable Practice Policy

The University of California's Zero Waste by 2020 goal more than a decade ago, with the goal of a 50% diversion rate by 2008, 75% by 2012 and zero waste by 2020 (which is currently defined as a minimum of a 90% diversion rate of municipal solid waste). The University of California Policy on Sustainable Practices was signed in 2004, and has evolved to include the zero waste goal as one of the key elements of University of California's sustainability goals.<sup>4</sup> Since the policy was released, the zero waste policy language has been updated over-time to define and outline the focus of zero waste at the UC level as well as provide a metrics framework to measure success at the campus levels. The most recent policy can be found in the next section under Policy Updates, or [here](https://policy.ucop.edu/doc/3100155/SustainablePractices) (click for external link or use <https://policy.ucop.edu/doc/3100155/SustainablePractices>).

Zero waste planning and efforts at UC Berkeley will be guided by the most current version of the Sustainability Policy. See excerpt below:

- [University of California Sustainability Policy](#) (last update August 2018) guides the planning, development and implementation of programs and projects at each individual campus. The following are excerpts from the August 2018 version of the UC Policy – Zero Waste section. **Policy items that are addressed in this plan are bolded.**

#### **Excerpts - Policy Text:**

##### **F. Zero Waste**

- 1. The University prioritizes waste reduction in the following order: reduce, reuse, and then recycle and compost.**
- 2. The University supports the integration of waste, climate and other sustainability goals, including the reduction of embodied carbon in the supply chain through the promotion of a circular economy and the management of organic waste to promote atmospheric carbon reduction. In support of this goal, waste reporting will include tracking estimated scope 3 greenhouse gas emissions.*
- 3. The University will reduce per capita total municipal solid waste generation at all locations other than health locations as follows:**
  - a. Reduce waste generation per capita to FY2015/16 levels by 2020**
  - b. Reduce waste generation by 25% per capita from FY2015/16 levels by 2025**

<sup>4</sup> University of California: Office of the President. Sustainability. <https://ucop.edu/sustainability/>. Accessed July 22, 2019.

- c. **Reduce waste generation by 50% per capita from FY2015/16 levels by 2030**
- 4. **The University will achieve zero waste by 2020 at all locations other than health locations. Minimum compliance for zero waste is 90% diversion of municipal solid waste from landfill.**
- 5. **By 2020, the University will prohibit the sale, procurement or distribution of Expanded Polystyrene (EPS) other than that utilized for laboratory supply or medical packaging and products.**
  - a. **By 2018, no EPS shall be used in foodservice facilities for takeaway containers. The University seeks to reduce, reuse and find alternatives for EPS and laboratory and medical packaging products.**

**Excerpt - Procedures:**

**F. Zero Waste**

1. *The University will voluntarily comply with Chapter 18.5, the "State Agency Integrated Waste Management Plan," in California Public Resources Code Section 40196.3.*
2. **Waste reduction and recycling shall be prioritized in seeking LEED credits for LEED-BD+C, LEED-ID+C, and LEED-O+M projects.**
3. *By the end of 2018, locations other than health locations will submit new waste management plans including planned waste reduction strategies. Plans will include campus and regional waste management practices and options, evaluate progress towards policy goals and determine the associated costs of achieving policy goals. Waste management plans will be updated and submitted to the Associate Vice President of Energy and Sustainability, Office of the President on a 5 year cycle.*
4. *Exceptions will be considered for entities which represent less than 1% of the overall campus solid waste tonnage.*
5. **Reduction, reuse, recycling and composting are the primary methods to be counted toward the municipal solid waste diversion from landfill goals. The goal is to strive for the highest form of resource recovery methods and the best use of the materials. The hierarchy for resource recovery is as follows:**
  - a. **Source reduction: The reduction of waste is the highest form of resource recovery as it eliminates the products from being manufactured or transported in the first place.**
  - b. **Reuse: Reuse materials in their original form (e.g. use lumber for lumber, mugs instead of single use cups, reuse course readers in subsequent classes. These methods maintain the embodied energy in each material.)**
  - c. **Composting and recycling: Composting is the recycling of organics such as animal waste, bedding, greenwaste and foodwaste into compost and mulch. Recycling refers to the**

- conversion of waste into basic materials so they can be made back into new products.***
- d. The methods of reusing and recycling waste vary and will evolve over time as technologies improve. The Solid Waste and Recycling Working Group – comprising waste and recycling professionals from each location – will continue to evaluate recycling methods and recommend their appropriateness for counting toward diversion goals.***
- 6. Waste Reduction: For the purposes of measuring waste reduction, reporting will be in waste generated per capita per day. Waste generated includes municipal solid waste that goes to landfill and all waste that is diverted through recycling, organics or conversion technologies. Not included in waste reduction calculations are:***
- a. Waste generated as part of major construction and demolition projects; University of California – Policy on Sustainable Practices  
Sustainable Practices 27 of 36***
- b. Organic waste generated due to landscape management; Agricultural and animal related waste.***
- 7. Per capita metrics will be understood in the context of business operations and activities:***
- a. Campuses will use Weighted Campus User.***
- b. LBNL will use Full Time Equivalent  
Other locations should use the per capita metric that best supports their business operations.***
- 8. Where significant data methodology errors are found in benchmark years, an appropriate alternative methodology will be determined by agreement with UCOP and the Solid Waste and Recycling Working Group.***
- 9. Reporting of solid waste and recycling data will follow ULEs Environmental Claim Validation Procedure for Zero Waste to Landfill (UL2799: 2017-03-22 : 3rd Edition) and should be applied in principle to future standards/ editions. Where there discrepancies between UC policy definitions and goals and UL2799 and subsequent editions, the policy language will apply.***

## California Legislation and Regulation Regarding Solid Waste – Policy Driver

In addition to the UC Sustainable Practice Policy outlined above, California and local legislations also play a part in driving and or supporting several zero waste initiatives on the UC Berkeley campus. There are a number of legislative bills that have been passed related to zero waste, some are applicable to UC campus and others are not. More details on each of the related legislative drivers below:

### AB939 –Source Reduction and Recycling Fees (1989)

AB939 established requirements for Cities and Counties to reduce waste by 25% by 1995 and 50% by 2000. *“Also called the California Integrated Waste Management Act of 1989, [it] requires cities and counties to prepare, adopt, and implement source reduction and recycling plans, and requires them to collect fees to cover their costs in doing so.”*<sup>5</sup>

### AB75 – State Agency Recycling: Waste Diversion Community Service Districts

AB 75 *“requires each State agency or large State facility to develop an integrated waste management plan (IWMP) by July 1, 2000, in consultation with the IWMB, and divert at least 25 percent of its solid waste from landfills by January 1, 2002, and 50 percent by January 1, 2004. Additionally the measure requires each community service district that provides solid waste services to report disposal and diversion information to the city, county, or regional agency where the district operates.”*<sup>6</sup>

### SABRC (PCC 12153-12217) – State Agency Buy Recycled Campaign – UC Required

*“Existing law requires each state agency to ensure that at least 50 percent of reportable purchases, which are goods and materials that may be reported or categorized within a specified project category, are recycled products. This bill would require each state agency to ensure that at least 75 percent of reportable purchases are recycled products on or after January 1, 2020, except for paint, antifreeze, and tires, which would remain at the 50 percent requirement.”*<sup>7</sup>

### AB32: California Global Warming Solutions Act of 2006 – UC Required

*“AB 32 requires California to reduce its GHG emissions to 1990 levels by 2020 — a reduction of approximately 15 percent below emissions expected under a ‘business as usual’ scenario. Pursuant to AB 32, ARB must adopt regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions. The full*

<sup>5</sup> “An Audit of Commercial Solid Waste Franchise and AB939 Fee Collection Program”. City of San Jose, Office of the City Auditor. <https://www.sanjoseca.gov/DocumentCenter/View/3266>. Accessed 25 August 2019.

<sup>6</sup> “1999 Summary of State and Federal Legislation”. California Environmental Protection Agency. December 1999. <https://www2.calrecycle.ca.gov/Publications/Download/327>. Accessed 25 August 2019.

<sup>7</sup> CalRecycle. State Agency Buy Recycled Campaign. <https://calrecycle.ca.gov/buyrecycled/stateagency>. Accessed 25 August 2019.

*implementation of AB 32 will help mitigate risks associated with climate change, while improving energy efficiency, expanding the use of renewable energy resources, cleaner transportation, and reducing waste.* <sup>8</sup>

AB341 (Chesbro): Jobs and Recycling (2011) – UC Required

*AB341 "sets forth the requirements of the statewide mandatory commercial recycling program." The purpose of AB341 is "to reduce GHG emissions by diverting commercial solid waste to recycling efforts and to expand the opportunity for additional recycling services and recycling manufacturing facilities in California."*<sup>9</sup>

AB1826 (Chesbro): Organics Recycling (2014) – UC Required

*AB 1826 "[requires] businesses to recycle their organic waste on and after April 1, 2016, depending on the amount of waste they generate per week. This law also requires that on and after January 1, 2016, local jurisdictions across the state implement an organic waste recycling program to divert organic waste generated by businesses, including multifamily residential dwellings that consist of five or more units (please note, however, that multifamily dwellings are not required to have a food waste diversion program). Organic waste (also referred to as organics throughout this resource) means food waste, green waste, landscape and pruning waste, nonhazardous wood waste, and food-soiled paper waste that is mixed in with food waste. This law phases in the mandatory recycling of commercial organics over time, while also offering an exemption process for rural counties. In particular, the minimum threshold of organic waste generation by businesses decreases over time, which means an increasingly greater proportion of the commercial sector will be required to comply."*<sup>10</sup>

SB1383 – Short-Lived Climate Pollutant Reduction: Organic Waste Methane Emissions Reductions (2016) – UC Required

*"SB 1383 [establishes] methane emissions reduction targets in a statewide effort to reduce emissions of short-lived climate pollutants (SLCP)...[it] establishes targets to achieve a 50 percent reduction in the level of statewide disposal of organic waste from the 2014 level by 2020 and a 75 percent reduction by 2025. The law grants CalRecycle the regulatory authority required to achieve the organic waste disposal reduction targets and establishes an additional target that not less than 20 percent of currently disposed edible food is recovered for human consumption by 2025."*<sup>11</sup>

<sup>8</sup> California Air Resources Board. Assembly Bill 32 Overview. <https://ww3.arb.ca.gov/cc/ab32/ab32.htm> Accessed 17 July 2019.

<sup>9</sup> CalRecycle. Mandatory Commercial Recycling. <https://www.calrecycle.ca.gov/recycle/commercial> Accessed 17 July 2019.

<sup>10</sup> CalRecycle. Mandatory Commercial Organics Recycling. <https://www.calrecycle.ca.gov/recycle/commercial/organics> Accessed 17 July 2019.

<sup>11</sup> CalRecycle. Short-Lived Climate Pollutants (SLCP): Organic Waste Methane Emissions Reductions. <https://www.calrecycle.ca.gov/climate/slcp>. Accessed 25 August 2019.

SB1335 – Sustainable Packaging for the State of California Act of 2018 (2018) – UC Required

*"[SB 1335} prohibits foodservice facilities located on a state-owned facility, operating on or acting as a concessionaire on state-owned property, or under contract to provide food service to a state agency from dispensing prepared food using food service packaging unless it is reusable, recycle or compostable."<sup>12</sup>*

## **Local Berkeley Legislation and Regulation Regarding Solid Waste**

City of Berkeley Single Use Foodware Ordinance

*The City of Berkeley Single Use Foodware and Litter Reduction Ordinance is "designed to reduce the use and disposal of single use foodware, including cups, lids, utensils, straws, clamshells, and other disposables that contribute to street litter, marine pollution, harm to wildlife, greenhouse gas emissions, and waste sent to landfills. This ordinance seeks to assist businesses with the shift away from the environmentally harmful single use disposable foodware toward reusable foodware. Reducing the use of disposable foodware is a component of the City's Zero Waste Goal."<sup>13</sup>*

The City of Berkeley Ordinance does not directly apply to the UC Berkeley campus, but the campus is supporting the Ordinance and has already developed an on campus catering and café zero waste guidelines.

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<sup>12</sup> CalRecycle. Sustainable Packaging for the State of California Act of 2018.

<https://www.calrecycle.ca.gov/laws/rulemaking/foodservice>. Accessed 25 August 2019.

<sup>13</sup> City of Berkeley, Department of Public Works. Berkeley Single Use Foodware and Litter Reduction Ordinance.

[https://www.cityofberkeley.info/Public\\_Works/Zero\\_Waste/Berkeley\\_Single\\_Use\\_Foodware\\_and\\_Litter\\_Reduction\\_Ordinance.aspx](https://www.cityofberkeley.info/Public_Works/Zero_Waste/Berkeley_Single_Use_Foodware_and_Litter_Reduction_Ordinance.aspx). Accessed 17 July 2019.

## Current Conditions

### Municipal Solid Waste Material Streams



### Recycling

The campus has a dual-stream recycling system so paper and cardboard is collected separately from cans and bottles. Within cans and bottles, the campus only accepts #1 and #2 plastics, glass and aluminum. #3-7 plastics are not accepted and are sent to landfill on the UC Berkeley campus because there is no reliable market for the recycling of the #3-7 plastics nor is there monetary value in these plastics in the current recycling industry.

With proper education, this provides a cleaner stream of diverted material for vendors and results in higher recycling revenues. Some cases from other campuses or programs have reported higher overall recycling rates with the use of single-stream recycling. However, single-stream recycling has no value and decreases the opportunity to teach the campus about purchasing decisions and what is actually recyclable and reusable. The following is a list of commonly accepted recyclable items on UC Berkeley's campus:

- Mixed Paper - includes all colored and plain white paper, newspapers, magazines, sticky notes, scrap paper, envelopes, catalogs, paperboard, and junkmail.
- Cardboard - includes all corrugated cardboard (e.g., moving boxes).
- Bottles & Cans - plastics #1 and #2, bottles, glass, aluminum (including foil), tin and steel.
- Other - scrap metals, pipette tip boxes from labs, printer cartridges and toners.

UC Berkeley also has a limited recycling program that's operated by the Overstock and Surplus – Property Management department that includes metals, construction and demolition waste, and wood recycling.

## Composting Organics

UC Berkeley collects both pre-consumer and post-consumer organic materials to be composted at a local commercial composting facility. In addition to landfill and recycling collection, compost collection is a provided service to state funded as well as auxiliary buildings and facilities. The accepted compostable materials on campus are:

- Pre-consumer food waste - food scraps, coffee grounds, and other organic materials generated prior to food consumption.
- Post-consumer food waste, food soiled fibers and BPI Certified compostable materials - food, napkins, paper plates and cups, compostable utensils, paper towels, and compostable food containers.
- Green Waste/Wood - leaves, twigs, trimmings, grass, wood (including non-chemical treated pallets), and trees.

## Landfill

This includes anything not accepted in the materials systems listed above (with the exception of hazardous waste materials). Common landfill items include plastics #3-#7, non-recyclable cups/containers/packaging, furniture, plastic coffee lids, film plastics, expanded polystyrene foam (Styrofoam), some laboratory plastics and chip or snack bags.

## **Logistics: Hauling and Disposal and Data**

### *Collecting & Disposing of Municipal Solid Waste Streams*

[Cal Zero Waste](#) is the lead department for municipal solid waste management. Cal Zero Waste, which is housed in Facilities Services, operates collection trucks for landfill waste, recyclables (paper and cardboard), and compost, and manages most vendor contracts for all hauling services like landfill, green waste, concrete, metal roll-offs, bottles and cans pick-ups, and metals. All waste materials are transported off campus to facilities for processing.

[Campus Custodial Service and Residence Hall Custodial Service](#) moves waste materials from the interior of the buildings to the external bins for pick-up. Frequency of recycling, compost, and landfill collection varies building-to-building.

[Grounds Operations](#) provides grounds maintenance services to campus including recycling, compost and landfill collection from outdoor receptacles, as well as green waste and plant debris.

[Overstock and Surplus - Property Management](#) handles sale and disposal of excess campus-purchased material that does not have an immediate use by the campus. Excess material not deemed for donation, trade, or sale is disposed of to landfill or for limited recycling.



Material streams not covered in this updated plan include waste reduction and disposal strategies related to regulated materials such as chemicals, hazardous wastes, and electronic waste, or construction and demolition waste. These material streams are managed by other campus units.

### *Material Streams Disposal Destinations*

<b>Waste Stream</b>	<b>Destination</b>	<b>Location</b>
Mixed Paper	Berkeley Recycling Center/Community Conservation Center	Berkeley, California
Cans & Bottles	Tri-CED (via Civicorp)	Union City, California
Cardboard	Berkeley Recycling Center/Community Conservation Center	Berkeley, California
Compost	West Contra Costa Landfill	Richmond, California
	City of Berkeley Transfer Station	Berkeley, California
Landfill	Keller Canyon Landfill (via Golden Bear Transfer Station in Richmond, California)	Pittsburg, California
	City of Berkeley Transfer Station	Berkeley, California

Source: UC Berkeley Facilities Services, Cal Zero Waste, 2019

## **Campus Municipal Solid Waste Profile and Diversion**

The diversion of municipal solid waste from landfills at UC Berkeley has increased to 52% as of June 30, 2018. The amount of materials sent to the landfill has steadily decreased approximately 20% from 4,622 tons in 2012-2013 to 3,718 tons in 2017-2018.

Compost, landfill and recycling tonnage data is collected for different waste streams as well as reuse and reduction of materials. The data is collected through tipping receipts for a 12-month period and is submitted to UC Office of the President annually. With the data collected, the annual diversion rate is determined, as can be seen in Table 1 below. In recent years, since the per capita waste generation metric was added to the UC Sustainability Policy, the annual reporting process began to include data on waste generation per weighted campus user at each UC campus.

The annual diversion rates that are used to measure success and progress towards the zero waste goal excludes construction and demolition waste materials. Because construction and demolition projects vary from year to year and campus to campus, it is calculated separately from the annual diversion rates.

**Table 1 - Annual Material Stream Tonnage Data – 2012-2018**

<b>UC Berkeley Municipal Solid Waste</b>						
	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Waste to Landfill (tons)	4,622	4,361	4,271	4,096	4,062	3,718
Diverted Waste - Recycling (tons)	2,868	1,115	1,680	1,991	1,857	2,277
Diverted Waste - Composting (tons)	1,308	1,033	2,039	1,629	1,883	1,722
Diverted Waste - Reuse (tons)	-	-	-	-	26.6	15.8
Landfill Diversion rate (%)	47	33	47	47	48	52
Weighted Campus User	39,783	40,236	41,183	41,834	42,293	45,519
Per Capita (lbs/wcu/day)	1.21	0.89	1.06	1.01	1.01	0.97

Source: UC Zero Waste Working Group Annual Reporting

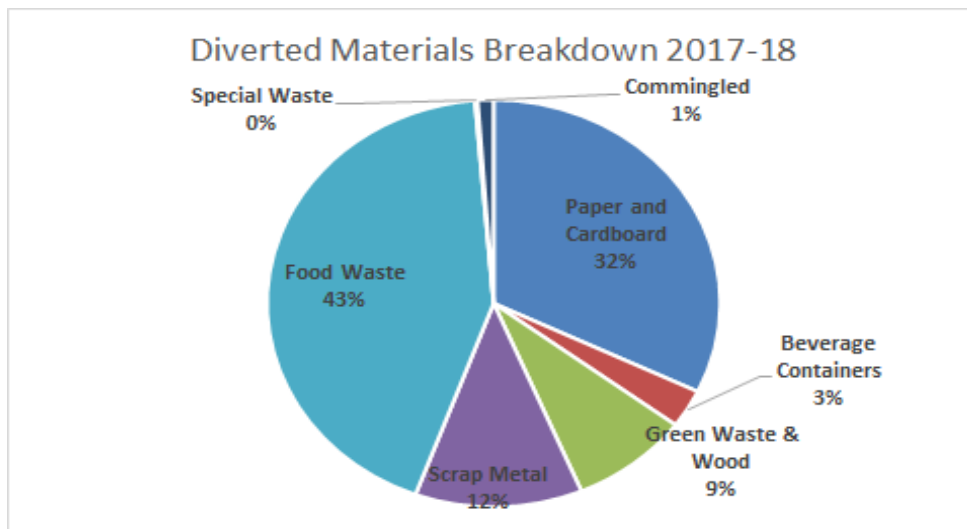
In the most recent reporting year, UC Berkeley diverted a total of 3,998 tons of materials from the landfill. The following table and cart provide a further breakdown of the material streams that were diverted.

**Table 2: UC Berkeley Diversion Breakdown (2017-2018)**

2018-2018	TONNAGE	PERCENTAGE
Paper & Cardboard	1285.0	32.1%
Beverage Containers	121.6	3.0%
Green Waste & Food	339.7	8.5%
Scrap Metal	477.2	11.9%
Food Waste	1721.7	43.1%
Special Waste	7.7	0.2%
Commingled	45.5	1.1%
<b>TOTAL</b>	<b>3998.4</b>	<b>100.0%</b>

Source: UC Berkeley Annual Diversion Data (Cal Zero Waste)

**Chart 1: UC Berkeley Diversion Breakdown (2017-2018)**



Source: UC Berkeley Annual Diversion Data (Cal Zero Waste)

As can be seen in the data above in Table 2 and Chart 1, food organics and green waste, materials that are composted from the UC Berkeley campus, currently account for approximately 52% of the diversion efforts, and 22% of the over waste collected on campus.

UC Berkeley also tracks the greenhouse gas emissions from our landfill waste as part of our sustainability report and carbon metrics. Table 4 below shows the emissions from our landfill waste in the last 10 years.

**Table 4: Greenhouse Gas Emissions from Solid Waste Landfill (Mt CO<sub>2</sub>e)**

<b>Year</b>	<b>Mt CO<sub>2</sub>e (Solid Waste)</b>
2017	571
2016	594
2015	625
2014	652
2013	656
2012	698
2011	721
2010	783
2009	1,066
2008	942
2007	981

Source: UC Berkeley Office of Sustainability

## Waste Diversion and Reduction

### Waste Use Overview

A series of waste audits were conducted in 2012-2013 by Cal Zero Waste through a comprehensive Waste Audit Study. A waste audit team audited landfill materials from a variety of buildings with different functionalities. Materials were sorted into different categories as can be seen below. The project concluded that organics diversion needs to be increased in order to significantly increase the campus's diversion rate, this includes the increase in infrastructure as well as education to the campus community on composting practices. The waste audits revealed the following results in Table 3 below.

**Table 3: Buildings Audited 2012-2013 and Waste Characterization (pounds)**

Waste Category	California Hall	Haas Pavilion	Crossroads	Wurster Hall	Stanley Hall	Total	Percentage
Cardboard	4	53	10	26	38	131	3%
Metal and Glass	7	21	23	64	36	151	4%
Mixed Paper	2	11	76	133	31	253	7%
Landfill	13	72	21	150	231	487	13%
All Plastic	38.5	55	132	341	660.5	1227	32%
Compost	64	156	217	789	339	1565	41%
<b>Total</b>	128.5	368	479	1503	1335.5	3814	100%

Source: TGIF Final Report – Getting to Zero Waste: Waste Audits

Although campus has not conducted similar comprehensive waste audit studies since 2013, the results from individual audits during several instances have provided the same outcome.

## Targeted Zero Waste Programs

### Implementation Strategies Updates

The following section details projects and programs currently underway or in a planning phase. The projects and programs outlined create a roadmap for the UC Berkeley campus to move towards its zero waste by 2020 goal and beyond.

A number of the projects and programs listed in this section will be updates to projects and programs listed in the “2013 UC Berkeley Zero Municipal Solid Waste to Landfill by 2020” Plan. Many of those listed in the 2013 Plan have since been institutionalized.

The strategies outlined for each project and program are divided into upstream, downstream, education and outreach, renovations and construction and demolition. Upstream strategies are focused on behavioral changes as well as driving the industry to innovate and develop circular economy solutions for materials that are not currently diverted on campus, for example the campus Plastic Research Facility currently underway is in the campus Zero Waste Research Center, a student co-curricular program. Downstream strategies, perhaps one of the most visible to the campus community, provides standard and consistent infrastructure for the campus to properly sort recycling, composting and landfill waste responsibly and correctly. Both upstream and downstream strategies involve educating and engaging the campus community about what the zero waste goal means and how each individual is able to play a part.

Construction, renovation and demolition projects are addressed separately. Although the waste generated on construction, renovation and demolition site projects are not included in our annual diversion metrics, it is pertinent to work with these projects to responsibly manage the generated waste as waste material volume can be very significant. UC Policy states that all construction projects must achieve LEED Silver and strive to achieve LEED Gold Certification.<sup>14</sup> As a prerequisite for LEED certification, construction projects must have a waste management plan defining material types, along with disposal or diversion methods. In addition, there are additional credit opportunities for projects that are able to divert construction waste from the landfill.

Similar to the conclusion of the 2013 Plan, the programs and projects detailed here utilize existing resources, while bringing in additional stakeholders to increase the value of the many zero waste initiatives in place on the UC Berkeley campus.

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<sup>14</sup> *University of California – Policy on Sustainable Practices*. Sustainable Practices. <https://policy.ucop.edu/doc/3100155/SustainablePractices>. Accessed 22 July 2019.

## Zero Waste Partnerships

The number of campus departments, student organizations and other groups working towards the UC Zero Waste goal has been steadily growing since the goal's introduction.

Below is a list of key participating entities that are working towards Berkeley's zero waste by 2020 goal. Each entity has a unique contribution to the goal on different zero waste initiatives occurring on campus.

- ASUC Zero Waste Coalition:** The Zero Waste Coalition (ZWC) aims to bring together waste-related organizations at UC Berkeley to improve communications between them, collaborate on initiatives, be a resources for zero waste on campus, and foster a zero waste community. The ZWC is not a new organization; it's a coalition used to better organize existing groups on campus that work on waste.
- Cafes:** Cafes and restaurants are key partners in implementing zero waste best practices on campus. A high volume of disposables originate from cafes and restaurants. Cal Zero Waste is working with cafes and restaurants on campus to implement the zero waste café and restaurant guidelines that have been recently updated and inserted into their lease language.
- Caterers:** Caterers on campus are key to reducing food related waste and also promote zero waste at events on campus. Cal Zero Waste is actively working with caterers doing business on campus to ensure they cater zero waste at any events. Caterers who sign Cal Zero Waste's Zero Waste Caterer Guidelines listing zero waste requirements are listed on Cal Zero Waste's website as an approved zero waste caterer.
- Cal Athletics:** Cal Athletics is a key partner in zero waste and greening efforts at Athletic events and venues, especially during the PAC-12 Zero Waste Bowl and PAC-12 Road to Zero Waste competition during football and basketball season respectively.
- Cal Move Out:** is coordinated through campus Government and Community Relations brings together the resources Cal and the City of Berkeley in an effort to decrease the environmental and social impacts of illegal dumping in near-campus neighborhoods at the end of the academic semester. The program itself combines outreach to students and property owners about responsible disposal and reuse strategies as well as the deployment of large debris bins in the student-dense neighborhoods near campus.
- Cal Zero Waste:** A Facilities Services department that manages campus' municipal solid waste. Cal Zero Waste oversees waste collection and hauling, zero waste program implementation and education and outreach to campus about the zero waste by 2020 goal.
- Campus Overstock and Surplus:** Campus department that conducts resale of items that are no longer needed to campus departments or the general public through auctions. Moving Services, a key partner in department relocations, department clean-outs, and

also construction and demolition projects, is also housed within Overstock and Surplus. Moving services also transports reusable items from departments for reuse and repurposing.

- **Chancellor’s Advisory Committee on Sustainability (CACs):** promotes environmental management and sustainable development on campus. The Committee is charged with advising the Chancellor on matters pertaining to the environment and sustainability including zero waste. Cal Zero Waste affiliates hold member and ex-officio positions on the committee.
- **Facilities Services:**<sup>15</sup>
  - **Custodial Services:** Facilities Services Unit that provides housekeeping services to public space, offices, labs and classrooms. The unit provides a range of cleaning maintenance and event support across the UC Berkeley campus.
  - **Landscape Services:** Facilities Services Unit that provides grounds maintenance services including irrigation, hillside fire mitigation, landscape maintenance, street sweeping, contract management, and consultation.
- **Green Labs:** A program within Environment, Health and Safety Department tasked with integrating sustainable practices within campus laboratories.
- **Haas Green Team and Chou Hall Zero Waste Team:** A collection of staff and students (undergraduate and graduate) who are from the Haas Business School and work towards making it more sustainable. Chou Hall, UC Berkeley’s first US Green Building Council TRUE Platinum certified zero waste building, is a Haas building and the Haas Green Team was pivotal in its zero waste implementations and achievements.
- **Housing:** Housing is a key component of zero waste efforts on campus with the high population and waste volume generation. Housing includes on campus residence halls, apartment buildings, as well as third-party campus housing projects, including Bowles, International House, and Blackwell.
- **Housing and Dining Sustainability Advocates (HADSA):** A program in RSSP which provides sustainability services to dining halls and cafes operated by Cal Dining in addition to campus-owned residential halls as well as Athletics concessions on Cal Catering. HADSA provides training and education of proper waste sorting to the staff members in the dining and housing spaces.

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<sup>15</sup> <sup>15</sup> UC Berkeley Facilities Services. Campus Operations. <https://facilities.berkeley.edu/operating-units/campus-operations>. Accessed August 23, 2019.



- **Office of Sustainability:** Provides the campus leadership for sustainability goals and initiatives.
- **Residential and Students Services Program (RSSP):** RSSP is key partner in developing and building a zero waste community and culture within the residential living spaces and dining halls provided to students on campus through programmatic and operational pieces. RSSP maintains a number of housing regions on the UC Berkeley campus.
- **ReUSE Club:** The ReUSE Club manages the ReUSE Store located within the ASUC Student Union Building to repurpose clothing, office supplies, textbooks and many other items.
- **Strategic Sourcing:** Cal Zero Waste is actively working with Strategic Sourcing (procurement and purchasing) to increase sustainable procurement for zero waste products as well as make the products available to campus departments. Strategic Sourcing play a key role in developing relationships with companies and vendors, including caterers able to provide environmentally preferred products and services to campus.
- **The Green Initiative Fund (TGIF):** TGIF provides funding, via grants from student referendum fees, for projects that improve and support UC Berkeley's campus sustainability efforts. Of its 161 grants given to date, 37 have been categorized under 'Waste Diversion and Reduction', making it the most frequently funded category.
- **Zero Waste Research Center (ZWRC):** Housed underneath the Student Affairs, Student Environmental Resource Center. ZWRC is designing in-house composting and recycling centers, and conducts research related to upstream and circular economy solutions.
- **Zero Waste Working Group:** Representatives from zero waste partners and different campus areas and departments (students, faculty, staff), including representatives from buildings that have implemented the zero waste building program. This group meets twice yearly to share and review campus zero waste efforts and needs.

## Strategies & Approaches

In order to meet the Zero Waste by 2020 goal, a variety of different strategies and approaches must be implemented. These can be categorized into four main categories:

- Downstream Approaches
- Upstream Approaches
- Education & Engagement-Based Approaches
- New Construction, Demolition and Renovation Approaches

While each approach offers its unique value, a combination of all approaches is essential in order to meet the Zero Waste by 2020 goals.

The following section outlines the main zero waste programs and projects that are either currently implemented on campus or are in the development stage. Each program and project is categorized under which approach they most closely follow, but it is important to note that most projects and programs utilize some type of combination of two or more of the approaches listed above.

### *Downstream Approaches*

Downstream approaches focus on managing materials after they have already entered into the waste stream in order to ensure that they are properly sorted and/or utilized in a way that minimizes the amount of the materials bound for the landfill. Within the context of the “4R hierarchy” of “reduce, reuse, recycle, and rot” (also known as “compost”), downstream approaches address the latter 3-R’s.

In 2011, the Chancellor’s Advisory Committee on Sustainability (CACS) commissioned a study to review current waste disposal practices and identify the challenges and opportunities available to the campus to meet these targets. This research found that the campus can likely reach a 75%-80% diversion rate by expanding downstream activities.

The following programs are examples of downstream strategies that are either currently active on campus or are in the process of being developed:

## Zero Waste Buildings Program

The CACS study found that one of the most effective downstream activities would be to expand the food, food container, and paper towel compost program to most campus buildings as well as enhance education efforts and programs to ensure better recycling compliance.



The Zero Waste Buildings Program, initiated by Cal Zero Waste, systematically transitions campus buildings and facilities to a zero waste infrastructure system where centralized recycling, composting, and landfill bins are available at major thoroughways and entrance/exits and standardized throughout the building. In addition, each desk or office space will have desk-side mixed paper recycling bins with landfill side saddles. In addition, this program also focuses on promoting reduction, reuse and refill practices within the building such as encouraging the use of reusable dishware in kitchens and the procurement of recycled office supplies. Lastly, this program includes an educational component where departments are invited to a Cal Zero Waste-led training where building occupants can learn about how to effectively utilize the new zero waste system and become ambassadors for zero waste in their department or building.

With a little over 50% of state-funded campus building having gone through the Zero Waste Building Program, full time Zero Waste Specialists staff are tasked to transition two buildings a month up to 2020 so that all state-funded campus buildings will have transitioned into zero waste buildings. Cal Zero Waste is also simultaneously conducting assessments and evaluations of past buildings that have participated in this program to ensure that the correct waste system is still in place and that building occupants are educated about the program.

Auxiliary facilities will also be evaluated and transitioned into zero waste facilities simultaneously with the state-funded buildings mentioned above. Housing and Dining (RSSP), one of the largest auxiliaries have already implemented the Zero Waste Building Program throughout their facilities. Full time Zero Waste Specialists staff work with each auxiliary to develop programs and infrastructure that will allow the facilities to achieve zero waste.

## Exterior Bin System: Big Belly Solar Compactors

With the majority of existing stations rolled-out in mid-2018, Solar Big Bellies are now the standard receptacle for outdoor locations at UC Berkeley. Prior to the installation of Solar Big Bellies, recycling and composting were not easily accessible options in outdoor areas. With a current total of 76 Solar Big Belly stations located in strategically placed, high-trafficked areas on campus, more recyclable and compostable materials are now effectively captured in outdoor spaces.

The strategic installation and placement of the Big Belly stations have eliminated stand-alone landfill containers and moving forward, all outdoor bins will be placed in sets with three material streams.

Each Solar Big Belly station comprises of 3 separate but connecting units: bottles & cans recycling, compost, and landfill that are compacting units. The stations are Wi-Fi enabled and linked to a wireless network dashboard that informs servicing staff when a unit is full and ready for collection. The dashboard is also used to track data on collection efficiency and diversion rate, which can be used to determine labor savings and changes in waste diversion over time.

Moving forward, this data will be evaluated to determine optimal placement of the stations on campus for highest and best use as well as to determine the level of labor and cost savings produced with the wide spread implementation of stations on the core campus.



The next phase for installations will be discussed for auxiliary locations on campus as well as off campus (e.g., Lawrence Hall of Science, Botanical Gardens, Athletics and Parking & Transportation), as these locations were not part of the initial phase of Solar Big Belly installations.

### Vermicomposting

With a significant portion of the University's waste stream being organic materials, it is essential that these are properly captured and diverted from the landfill. While interior collection programs for compostable materials currently exist and are expanding (through the Zero Waste Buildings Program), the majority of these materials leave campus and are sent to nearby commercial composting facilities.

The vermicomposting project at UC Berkeley is housed within the Zero Waste Research Center (ZWRC) and focuses on developing a local solution to divert organics that emphasizes the circular economy model and a closed-loop system. Organic waste produced on campus can be composted and used onsite to grow fruits and vegetables. This project places a large worm bin located at the Clark Kerr Campus (CKC) where it can then process up to 150 pounds of compostable waste from CKC's dining kitchen. This compostable waste will then be converted into finished compost to be used in CKC's residential garden to produce food for the dining common or the Campus's grounds department.

As of March 2019, the worm bin has arrived and will begin soon to start collecting 20 pounds of organic waste a week until the population of worms grow and can process larger amounts of material. The goal is to have this system running at full-scale capacity by 2020 and will be

managed on an ongoing basis by the students within the Student Environmental Resource Center (SERC).

## ReUSE

ReUSE focuses on reducing waste and preventing reusable items such as stationary, binders, books and clothes from entering into the landfill waste stream and instead, recirculating them throughout the campus. The practice of repair is also a key component to the practice of reuse as it focuses on fixing items to make them usable again.



The UC Berkeley campus has several ongoing programs and projects focused on reuse and repair. Cal Zero Waste currently manages a reuse station in Barrows Hall that is restocked on a weekly basis with office supplies collected from office/departmental cleanouts and move outs on campus. With the collaborative help of ReUSE store volunteers as well as the structure and building access provided by the Zero Waste Buildings Program, the goal is to implement more ReUSE stations throughout all areas of campus.

The campus also has a ReUSE Store located in the Associated Students of the University of California (ASUC) Student Union, Martin Luther King Jr. Building. This store is run by the ReUSE Club and student volunteers and is a not-for-profit thrift store that offers a variety of donated items (textbooks, readers, office supplies, and clothes) at little to no cost, making it accessible and affordable to the majority of people on campus.

The Green Initiative Fund (TGIF) recently funded the creation of the Repair Clinic, which is housed within the ReUSE Store. Through this clinic, the campus community can drop off clothing that needs light mending and have it fixed at no cost. Looking forward, the Repair Clinic can expand its focus from clothing to other types of items that need fixing, for example electronics.



### Upstream Approaches

Upstream approaches focus on waste reduction, the top “R” of the “4R hierarchy.” This type of approach embraces innovation and creativity, as it requires one to think differently and to challenge existing systems in order to decrease or eliminate waste from being generated. UC Berkeley is currently working on the following upstream approaches.

### Zero Waste Research Center

The Zero Waste Research Center (ZWRC) researches and implements upstream strategies for reducing campus waste, with a focus on purchasing, redesigning products, creating behavior change incentives, and instituting closed-loop circular economy waste systems.

One of the center’s key projects, the Integrated Plastic Recovery and Recycling Research Project focuses on solving the issue of recycling hard-to-recycle plastics. The campus currently only accepts #1 and #2 rigid plastics as recyclable. The Research Project seeks to develop a local circular economy solution for these plastics, as well as PLA compostable plastics, focusing on creating a system that would provide the campus with a cost effective and operationally feasible solution.

The overarching immediate goal of the project is to secure funding for the equipment and machinery necessary to be able to effectively recycle plastics onsite. The end products of this process will be used for either campus purposes (e.g. plastic filament for 3D printers) or will be sold to local businesses that are interested in using recycled plastic feedstock in their products.

Still in the development and funding stages, this project will be housed at Richmond Field Station and offers a promising local solution for plastics generated on campus.

While efforts to reduce the number of #3-#7 plastics on campus are also underway, it will be difficult to completely eliminate these plastics, especially in the laboratory and research setting.



### Environmentally Preferred Products

Environmentally Preferred Products (EPP) include refill products that produce less waste, are made from recycled content, promote reuse over disposal, or are part of an existing take back program. Some examples include: refillable whiteboard pens, refillable office pens, and centralized printers that help control the amount of paper used by a department at the source. In the specific case of the

centralized printers, the source reduction printer program embodies the notion of circular

economy and provides take back options at the printers' end of life. The program also manages and reduces the number of printers at individual desks.

Since 2013, Cal Zero Waste in partnership with Strategic Sourcing has hosted EPP roadshow events to showcase and promote environmentally preferred alternatives. The roadshow began as a means to highlight alternatives for lab products and has evolved to include office supplies as well.

Products are carefully vetted to ensure that it aligns with UC Berkeley's zero waste product standards. During the event, samples of the products are distributed and building occupants are educated on why the selected products are environmentally preferred. The EPP roadshow is also meant to educate the campus on how to identify products that embrace zero waste principles.

The importance of purchasing environmentally preferred products is emphasized throughout the transition of a facility to a zero waste building. Attendees are introduced to the concept of EPP and are taught how to identify these items on the campus purchasing system, BearBuy.

Moving forward, the goal is to create a section in the campus bookstores that highlights and promotes environmentally preferred products so that students, staff and faculty can more easily access them, as well as continue to work with the campus procurement team to develop an easy process in BearBuy for campus staff and faculty to purchase, by default, environmentally preferred products.

### Refreshing Refills

The Refreshing Refills campaign promotes waste reduction and reuse and is in many ways related to EPP. The focus of this campaign is increasing the use and purchasing of refillable and reusable items while reducing the overall volume of single-use disposables on campus. Single-use disposables pose a challenge to the campus' Zero Waste by 2020 goal, as the majority are landfill bound materials. Attention needs to be given to the reduction and ultimately, the elimination, of single-use disposables on campus as 2020 approaches.



The Refreshing Refills team recently partnered with Cal Dining and is currently helping them with the strategic distribution of thousands of reusable "Chews to Reuse" coffee mugs into the hands of customers at the Cal Dining operated retail locations on campus. The goal of this joint partnership is to encourage the use of reusable mugs on campus, to discourage the use of single-use disposable coffee cups, and to promote the incentives that many campus cafes offer to customers who bring their own reusable cups.

While this campaign is currently primarily focusing on the promotion of reusable water bottles and coffee mugs, it has the potential to expand to other focuses. As the campus moves into 2020 and beyond, the Refreshing Refills program will expand to other refillable products such as

refillable water pitchers, refillable office pens, refillable whiteboard markers and pipette tip refills. This will be done in partnership with Strategic Sourcing and the EPP program, ultimately reaching for reduction in waste by refills and reuse of all products beyond mugs and water bottles.

### Reuse This

In order to help promote the use of reusable items on campus, Cal Dining recently launched a pilot program called "Reuse This." As part of this program, Cal Dining has begun to sell "Reuse This" zero waste kits at select locations on campus. These kits are comprised of a variety of reusable items: a lunch box, a cup and straw, a utensils set, a handkerchief, a snack bag and a collapsible food container. They are available for sale to all patrons of the retail location and can also be purchased by students using their flex dollars (a form of campus currency provided through their meal plans).



Moving forward, this program will be re-evaluated and assessed in order to determine its effectiveness as well as to identify areas on campus that it could potentially be expanded to.

### Zero Waste Cafes & Restaurants

On campus and in the surrounding Berkeley community, cafes and restaurants have been identified as key areas where durable reusables could replace wasteful single-use disposables. This recently resulted in the passing of the City of Berkeley's Single Use Foodware and Litter Reduction Ordinance, an ordinance that requires sit down restaurants to provide reusables for their customers, to have all to-go materials and packaging be compostable, and ultimately, to charge customers for their use of disposable coffee cups.

UC Berkeley intends to support the ordinance, as the reduction of single-use disposable items is a key strategy in reaching the campus' Zero Waste by 2020 goal. Cal Zero Waste is currently reviewing the existing waste-related language in campus lease agreements and will be submitting revisions to include additional language requiring cafes and restaurants use reusables over disposables.

Cal Zero Waste had previously developed zero waste café & restaurant guidelines that outlined zero waste best practices that campus cafes and restaurants were encouraged to adopt. These [Zero Waste Café & Restaurant Guidelines](#) have recently been updated with language requiring the prioritization of using reusables over disposables. These guidelines are also now being presented to campus cafes and restaurants as requirements, rather than recommendations. These guidelines are currently being distributed to campus cafes and restaurants during site visits.



A project underway between the Ecology Center and a partnering company called Vessel launching a reusable cup checkout service in the Berkeley community and on the UC Berkeley campus. This project is in alignment with the City of Berkeley's Single Use Disposable Foodware and Litter Reduction Ordinance. The launch date of this pilot project is set to be September 18, 2019.<sup>16</sup>

Moving forward, Cal Zero Waste will focus both on aiding existing campus cafes and restaurants in switching to durables while also working with newly leased cafes and restaurants before they open on campus so that they can incorporate the zero waste best practices outlined in the guidelines into their design and planning stages.

### Zero Waste Events

Cal Zero Waste works with event planners and caterers, in a similar way with the cafes and restaurants, to ensure that events on campus are zero waste. For materials used at events, reusables must be prioritized and recyclable and compostable materials are an alternative.

In addition to catering, support and advising is also provided to event planners on zero waste bins and signage needed at events. Major campus events, such as Cal Day, Summerfest and Caltopia, currently are planned to be zero waste events.

### *Education and Engagement-Based Approach*

In conjunction with upstream and downstream approaches, education and engagement-based approaches can extend the reach of these programs by involving the entire campus community. The education and outreach programs provide foundational support and context for the campus community to the efforts detailed thus far.

### Outreach & Education

While operations-based programs are key elements to UC Berkeley's zero waste strategy, education-based programs are an integral part as well. These programs focus on communicating to and educating the general campus population about: the campus' zero waste goal and initiatives, the importance of reducing, reusing, recycling and composting, and how to turn these concepts into tangible actions.

There are currently several different education & outreach based programs on campus, with others in the process of being developed.



<sup>16</sup> *Daily Californian*. Ecology Center, Vessel announce partnership to kickstart use of reusable cups in Berkeley. <https://www.dailycal.org/2019/07/19/ecology-center-vessel-announce-partnership-to-kickstart-use-of-reusable-cups-in-berkeley/>. Accessed August 23, 2019.

## Campus Orientation

A key educational strategy in the last year has been to work with on-campus orientations, so as to gain direct access to teaching new students and new employees about the campus' zero waste goals and practices. The two primary orientations that Cal Zero Waste has worked with so far have been the New Employee Reception and Orientation (NERO), for new employees, and the Golden Bears Orientation (GBO), for incoming students.

### *New Employee Reception and Orientation (NERO)*



At NERO, which occurs once a month, Cal Zero Waste is allocated a 10-minute time slot to present on the campus' zero waste by 2020 goal, the campus standard for waste signage and bins, as well as how to properly sort materials while on campus. This presentation also includes information about how to practice reducing and reusing materials. In order to give new employees on campus a starting point to put some of these ideas into practice, Cal Zero Waste distributes reusable mugs to each NERO participant at every session. This action is directly tied to the Refreshing Refills campaign.

Moving forward, Cal Zero Waste will continue to present at each monthly NERO and will work with NERO staff to develop a plan for how to continue to prompt zero waste actions after attendees have gone through the orientation.

### *GBO - Golden Bear Orientation*

In the fall of 2016, CalSO (UC Berkeley's New Student Orientation) transitioned into Golden Bear Orientation (GBO), a strategically planned 7-day orientation designed and executed to allow incoming students to learn the most about UC Berkeley the week before the semester begins. In the 2018 GBO, Cal Zero Waste began attending and working with Golden Bear Orientation organizers to move the orientation towards being a zero waste event and provide zero waste training and resources to GBO Orientation Leaders during their Orientation Leader training sessions.

The training included information about the UC Zero Waste goal and basic information on how incoming students can contribute to bringing the campus closer to that goal as a resident and also as a student. The goal was to have Orientation Leaders integrate the zero waste messaging into their conversations with incoming students during Golden Bear Orientation as well as into the activities that are planned.

Moving forward, Cal Zero Waste will be working in conjunction with the Housing and Dining Sustainability Advocates, Cal Dining, Office of Sustainability, Student Environmental Resource Center and other campus partners to cohesively bring more zero waste engagement and program pieces into the GBO Programming, as well as work the GBO team to develop content and educational pieces to fit into the schedule organized for incoming students.

## Residence Hall Education Program

In the spring of 2018, Cal Zero Waste received a grant from The Green Initiative Fund to execute a project targeting residence hall zero waste education specifically. The grant has been used to provide zero waste education and outreach to residents in the residence halls of UC Berkeley.

So far, the project has included working with Resident Directors and Resident Advisors to create and partner on activities and events for residents as well as doing tabling to promote zero waste. Additionally, this team within Cal Zero Waste has partnered with Housing and Dining Sustainability Advocates to audit each RSSP building for proper infrastructure, bins, signage as well as placement.

The grant is projected to go through the end of the fall of 2019 and there are many more activities planned for fall, including freecycling events and also a zero waste competition.

Moving forward, the results of this grant will be passed onto the Housing and Dining Sustainability Advocates to continue to integrate zero waste into the residential life of students during their first year on campus. The Residence Hall Education Program will be further integrated with GBO through HADSA to provide continuity to GBO participants as they move from orientation into their new homes for the school year.



## Zero Waste October



In October of 2018, Cal Zero Waste conducted its inaugural Zero Waste October Month celebration. With the support of Vice Chancellor of Administration Marc Fisher, Cal Zero Waste put out a call on the campus community through CalMessages to celebrate and highlight the campus' zero waste by 2020 goal by hosting and/or promoting zero waste themed events throughout the month. Cal Zero Waste promoted Zero Waste October month to the entire campus community and invited other groups to collaborate and participate.

These events included but were not limited to: educational tabling events at key areas on campus, including the residence halls, reuse days at the Tolman Hall demolition site, the Pac-12 Zero Waste Bowl football competition game, and the Fall EPP Roadshow.

The celebratory month provided an opportunity for Cal Zero Waste to interact, engage and share information with departments, offices and organizations on campus. It also provided an opportunity for campus entities and individuals to learn about what zero waste is at UC Berkeley

and reach out to Cal Zero Waste for feedback or more information, as well as how to participate in the campus' zero waste goal.

The first Zero Waste October was an overall success and Cal Zero Waste plans to make this an annual event. Archived information on the inaugural Zero Waste October event is on Cal Zero Waste website: [zerowaste.berkeley.edu](http://zerowaste.berkeley.edu).

### Cal Athletics Zero Waste Initiatives

Cal Athletics events provide an opportunity to engage with thousands of Cal students, staff, faculty, alumni and community members all at once while also working on making athletic venues zero waste. Cal Zero Waste first partnered with Cal Athletics to pilot zero waste basketball events in the spring of 2012 and zero waste football games in the fall 2013 as part of the Game Day Challenge and Recyclemania Competitions. Since then, Cal also participates in the annual [Pac-12 Team Green](#) Zero Waste competition for both football and basketball season. As part of these competitions, each PAC-12 campus is required to select a single game during the football and basketball season to be their [Pac-12 Zero Waste Bowl and Pac-12 Road to Zero Waste Competition](#) game. Campuses are then judged by an independent panel on different criteria: the overall diversion rate achieved at the game, athlete, student, staff and fan engagement and partnerships, as well as innovation and creativity. These games create excellent opportunities for Cal Zero Waste, Cal Athletics, and other on- and off-campus organizations and to partner and collaborate together, as well as friendly competition between other Pac-12 campuses.



Moving forward, Cal Zero Waste will continue to work with Cal Athletics to transition athletic facilities to zero waste. This will include but is not limited to: the installation of Solar Big Belly bins on the plaza of the football stadium, switching from disposable to reusable utensils at the University Club Level in the football stadium, as well as exploring the idea of using bulk bins at events instead of individually packaged snacks that are landfill products. These efforts will expand to include working with the soccer, baseball, and track venues as well.

Cal Zero Waste will continue to participate in the Pac-12 competitions and will use this as an opportunity to both educate and engage Cal Athletic fans on our zero waste goals as well as how to properly sort their materials.

## *New Construction, Demolition and Renovation Approach*

### TRUE (Total Resource Use and Efficiency) Zero Waste Certification

In 2016, UC Berkeley began working on obtaining a zero waste certification, TRUE Zero Waste Certification, for one of the newest buildings at the UC Berkeley Haas Business School: Connie & Kevin Chou Hall through the third party verification. [TRUE Certification](#) is managed by the [US Green Building Council](#). Similar to LEED, TRUE Certification is a credit rating system that systematically assesses a facility in zero waste practices and engagement. The certification covers 15 categories that contribute to a successful zero waste facility.<sup>17</sup>

Over two years ago, Haas School of Business, partnering with Cal Zero Waste, began the process to certify Connie & Kevin Chou Hall. After a year of zero waste education and promotion, operations and data collection, Chou Hall obtained TRUE certification at the highest platinum level in December 2018. Chou Hall is the first academic facility in the nation and first facility on the UC Berkeley campus to be TRUE certified. Facilities Services will maintain the certification moving forward, including any documentation, operations and recertification.



Cal Zero Waste will continue to evaluate buildings for TRUE Certification, striving to achieve zero waste certification at more campus buildings. Chou Hall began the certification during the construction phase and TRUE was added on with LEED Certification. Moving forward, new building construction planning should look into building facilities with the goal of achieving TRUE certification in mind, similar to how LEED Green Building certification is currently structured.

With Facilities Services responsible for maintaining the TRUE certification of Chou Hall, the plan is to develop a standardized operational and communication plan that can be applicable to all future TRUE certified facilities on campus. The plan will include roles & responsibilities, operational maintenance plans (if any are specifically related to zero waste), and documentation and reporting.

<sup>17</sup> TRUE. TRUE Zero Waste Certification program. <https://true.gbci.org/true-zero-waste-certification-program>. Accessed 7 January 2019.

## Campus Design Standards

The UC Berkeley Real Estate Campus Design Standards began its most recent update in late 2018. Updates were submitted for the following Design Standards:

- Interior standard recycling, compost and landfill bins.
- Exterior standard recycling, compost, and landfill bins.
- Facility enclosure guidelines.

The most updated version of the UC Berkeley Real Estate Campus Design Standard can be found [here](#) (click for external link or <https://facilities.berkeley.edu/design>).

New construction and renovation projects on campus will follow the specifications outlined in the Campus Design Standards.

## Recovery of Materials prior to Demolition

During the fall semester of 2018, within Zero Waste October, Cal Zero Waste worked with a Project Manager from UC Berkeley Capital Projects and partnered with Overstock and Surplus to pilot a project where landfill bound materials, including office supplies and furniture, in Tolman Hall were recirculated back to the campus community for reuse.

Tolman Hall was recently demolished, but at the time occupants vacated the facility, usable furniture and supplies were left behind. Through several free reuse days (that were open to the campus population), Cal Zero Waste was able to divert a total of 10,300 pounds of office supplies, furniture, and even fire hoses from the landfill. This best practice was also applied to old Campbell Hall before it was demolished in 2012.

As we move towards 2020 and beyond, this practice should be integrated into the demolition process as a method of recovery for materials that are still in usable conditions prior to demolition beginning.



## Best Practice Benchmarks

Zero Waste Building Program described earlier in this plan is a benchmark target standard for all state funded facilities as the UC Berkeley campus moves towards the 2020 goal. The purpose of the program is to standardize infrastructure in buildings throughout campus as well as provide education on reduction and reuse to eliminate waste generated from the building. Cal Zero Waste Zero Waste Specialists Staff are completing building transitions as we approach 2020 to ensure all state funded buildings and as many auxiliary managed facilities are supplied with proper bin infrastructure.

With the certification of Connie and Kevin Chou Hall as TRUE Zero Waste Platinum in December 2018, the project serves as a beacon example and target for facilities on campus. Buildings that have been transitioned to the UC Berkeley Zero Waste Building Program will be considered for TRUE Certification to become zero waste certified by the US Green Building Council.

## Waste Costs and Project Funding

### Hauling Costs



UC Berkeley is a self-hauling campus, with the exception of outdoor bottles and cans services, which is contracted out with Civicorp, which is the local conservation corp. Cal Zero Waste operates and maintains municipal solid waste collection vehicles that collect materials from campus and from there, hauls the material to a transfer station or recycling station.

Landfill, paper, cardboard, bottle & can, and compost collection services for the majority of buildings on the main campus are state funded and in small part by funds generated from recyclables when the recycling market allows for revenues. Some additional recycling services such as those for metal and wood are also centrally funded.

Auxiliaries are entities that are not funded by the state, but rather are self-funded. Major auxiliaries on campus include Cal Athletics, the Associated Students of the University of California (ASUC), Housing (Residential Student Services and Programs) and Dining (Cal Dining). Auxiliaries fund all of their own landfill, recycling and compost services.

Education, outreach and reuse programs are primarily provided and led by Cal Zero Waste through a robust student staffed program.





## Project Funding and Resources

The resources that have provided support to the UC Berkeley zero waste program and operations include resources for full time personnel, equipment as well as part time student staffing. The Cal Zero Waste Department currently has the following staff resources:

- Zero Waste Manager
- Operations Supervisor
- Operations Lead
- Operations Coordinator
- Zero Waste Specialists
- Zero Waste Custodians
- Zero Waste Techs
- Drivers
- Part time student staff

Two full time Zero Waste Specialists were added to the Cal Zero Waste program in 2018 and provide infrastructural improvements and programmatic changes, like the Zero Waste Building program to increase zero waste awareness and operations on campus. These two positions support the Cal Zero Waste Manager as well as Facilities Services to institutionalize zero waste within the department and the campus community.

Equipment and infrastructure is a required resource in order for campuses to reach zero waste. Cal Zero Waste is, first and foremost, a service provider to the campus including the self-hauling program. Cal Zero Waste is implementing campus-wide standard indoor building infrastructure to achieve waste diversion goals and provide extensive zero waste education and programming to make the bin systems effective. For example, composting education would not make sense without the presence of a compost bin in the facility. For outdoor locations, the UC Berkeley campus has implemented Solar Big Belly units, as mentioned previously, and is continuing to evaluate any additions or changes that may need to be made to the infrastructures.

Cal Zero Waste also has team of students that are funded to support education and outreach efforts throughout campus. This includes, but is not limited to, educational presentations, event outreach and promotion, zero waste training for student, staff and faculty and zero waste topic campaigns, e.g., Refreshing Refills.

## Moving Towards 2020 and Beyond

As the campus gets closer to 2020, the question becomes, what happens after the zero waste by 2020 goal? Cal Zero Waste will be rebranding our effort to achieving zero waste 2020 and beyond. 2020 is still the original year set for the goal, and UC Berkeley will continue to strive for that goal moving forward.

### ZERO WASTE 2020 & BEYOND

*reduce · reuse · recycle · compost*

Cal Zero Waste intends to expand and grow the current portfolio of programs to incorporate beyond what is included now as we move into and beyond 2020. For example, the Refreshing Refills Program will include refillable items beyond coffee mugs and water bottles; Zero Waste October will include more interactive and engagement elements; Cal Zero Waste will facilitate more conversations with Capital Projects to increase the number of TRUE Zero Waste Certification projects. Cal Zero Waste will also facilitate more conversations between procurement and also Green Labs to work on zero waste in laboratories and research spaces on campus. The program expansions will continue UC Berkeley's efforts towards the zero waste by 2020 goal and beyond.

### Implementation

Although Cal Zero Waste manages and leads a majority of the zero waste efforts detailed in this plan, many projects do require comprehensive partnership between various stakeholders. The implementation of the programs and projects detailed in this plan will be carried forward towards and beyond the zero waste by 2020 goal and continue to be supported by Cal Zero Waste.

### Funding

The largest recommendation pointed out in the previous plan, which was to add a compost service to all campus buildings, has since been institutionalized into Facilities Services' regular services provided to campus departments. The pilot program initially organized and operated by the Compost Alliance, a TGIF funded student organization, has been institutionalized into what is now called the Zero Waste Building Program.

Looking at the projects and programs detailed in this plan, campus stakeholders will need to consider internal investments, but the details of this plan will provide the foundation for UC Berkeley to apply for competitive grants within the UC community as well as outside sources to advance and research alternative solutions to issues with landfill items.

Several outside funding opportunities are available for UC Berkeley, including but not limited to CalRecycle, StopWaste, Pepsi Impact Fund, Pac 12 Team Green/Unifi, and others. Cal Zero Waste will continue to research funding opportunities, and when able to and applicable, submit applications for additional funding.

## Metrics & Continual Improvement

UC Office of the President collects annual data from each individual campus on waste diversion reduction and reuse. The data is used to track progress towards the diversion and per capita waste diversion goals listed in the UC Sustainability Practices Policy as well document improvements year-to-year.

Each year, the Office of Sustainability reports comprehensive metrics that highlights and monitors climate impact of waste that is sent to the landfill through greenhouse gas emissions reporting. UC Berkeley has also participated in the annual STARS reporting, Sustainability Tracking, Assessment & Rating System, in which waste diversion is one of the scoring criterion.

In addition, through the Pac-12 Zero Waste Competitions, Cal Zero Waste also tracks qualitative and quantitative data from athletic events and seasons. For each PAC-12 competition game, a detailed scorecard is generated and includes information on campus and community engagement, diversion numbers and partnerships and collaborations. The scorecard serves as a means to measure progress and improvement during each athletic season.

Similarly, the campus participates in the annual [RecycleMania](#) competition as well as Game Day Challenge through RecycleMania. The competition ranks waste diversion, recycling and composting efforts at universities and colleges across the country.

Additional data and metrics is beginning to become available as the Zero Waste Building Program moves forward as well. The following items are currently in development & research stage and will be included in the next update of this the UC Berkeley Zero Waste Plan or as the information becomes available.

- Progress to date within individual units on campus
- Target goals within individual units on campus
- Summary of waste activity within individual units on campus

## Responsibilities & Accountability

Facilities Services, first and foremost, provides an operational service to the campus that includes infrastructure and collections that maintain the campus grounds. As we move into 2020 and beyond, the priority for Facilities Services will be to provide adequate infrastructure and services to campus buildings and ensure that recycling, compost and landfill receptacles are present and consistent. When infrastructural foundations are implemented, education and outreach will become an additional component that will provide information for the campus community to reduce, reuse, recycle, rot and rebuy.

In the next two years, a key component will be working to integrate, on a larger scale, through the campus communication channels or other campus departments, messages about zero waste and the campus' commitment to achieving the goal. The presentation opportunity in 2018 for

the Chancellor's Cabinet was a great opportunity driven by Director of the Office of Sustainability, Kira Stoll to provide the information for the senior leadership team on campus for buy-in and support. Additionally, more detailed and targeted education on proper sorting and disposal at the bins, will be a focus to increase the campus diversion of materials away from landfill.

Although Facilities Services & Housing operational units, including Cal Zero Waste, Grounds Operations and Custodial Services, play a large role in coordinating operations and implementing some points highlighted in this plan, stakeholders outside of Facilities Services will need to be involved and play a role. A growing number of participants and involvement of the UC Berkeley Zero Waste Working Group indicates that campus participation is increasing. The Working Group provides a platform to update and keep campus engaged and informed about zero waste progress.

There is a growing number of departments and organizations becoming more active in the implementation and strategic planning of zero waste initiatives on campus. These departments, as well as operational and communication teams, are essential in making zero waste part of the UC Berkeley campus culture moving forward.