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Let's Get Sorted: The Path to Zero Waste at Pomona College

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ABSTRACT

This senior thesis in environmental analysis explores the Zero Waste ideal and its practical application to a college campus. Given the growing global trash crisis and its grave environmental, social and economic consequences, the Zero Waste movement argues for a holistic shift from 'end of pipe' disposal practices to those that promote the cyclical use of materials, with little-to-no matter ending up in the landfill or incinerator. Cities and colleges around the world have adopted these Zero Waste goals in an effort to function as more sustainable, efficient and moral entities. With a case study of Pomona College, I assess the current status of waste production and diversion and identify opportunities to move the College towards its 2030 Zero Waste goal and to continue its growth as a resource-wise campus. Though the College has made substantial strides towards sustainability, significant room for improvement remains, particularly in regard to waste. Various infrastructural, political, educational, data driven and cultural changes are recommended to reduce waste at Pomona College and to evolve students into conscientious resource-users on campus and beyond.

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CHAPTER 1: INTRODUCTION

Misshapen skyscrapers loom through the orange haze. Windmills sit dejectedly atop small mountains, their arms turning halfheartedly in feeble surrender. Colors have given way to sepia tones. But this desolate world is not a remembrance of the past; rather, it is a foretelling of the future. These are mountains of cans, plastics and electronics, and skyscrapers constructed from these once shining objects of consumerist fantasies.

The opening scene of Pixar's Wall-E depicts the dystopian future of a society much like our own, one propelled by rampant consumerism and plagued by superfluous waste. In this world, humans have deserted Earth's wasteland to live in lethargy on a fully automated spaceship, where they spend their days immersed in the virtual realities of what once was. Though it seems far-fetched, the film playfully explores the serious and very real implications of human wastage.

The world is already in the midst of a trash crisis. Every year, humans generate over 1.3 billion tons of waste and send eight million metric tons of plastic to the world's oceans (World Bank, 2012). Over 254 million tons of that is produced by the United States, where only 34 percent is composted or recycled (US EPA, 2016). Growing volumes of waste and complexity of waste streams have far-reaching consequences in an increasingly populated and resource-constrained world. Waste pollutes groundwater, discharges harmful toxins and gases into the atmosphere, kills millions of aquatic organism each year, puts pressure on land and uses substantial quantities of energy and water (Song et al., 2015). Solid waste also has substantial implications for climate change. Objects made from virgin materials typically use more energy in production than those from recycled materials, which translates to increased greenhouse gas (GHG) emissions (Hillman et al., 2015). Landfills become GHG sources as discarded materials decompose and release methane, a GHG with a warming potential 30 times that of carbon dioxide over 100 years (US EPA, n.d.). These consequences conflagrate in a collective environmental crisis, the origin of which becomes irrelevant in the dissemination of its impacts. Equally problematic are the public health hazards of waste, which largely manifest as unjust burdens upon disadvantaged and marginalized communities (Bullard, 1990). Waste management and transportation also accrue significant economic costs, unnecessarily burdening businesses, cities and nations (World Bank, 2012; Song et al., 2015).

Unfortunately, waste, like so many of our current environmental challenges, is typically conceptualized as "somebody else's problem." This perceptual distancing is apparent in our ignorance of the origins of products and services, and what happens to them after they no longer serve us. Food, clothes, electronics – "stuff"– appears as if magically in the aisles of supermarkets, pharmacies and department stores, and is just as magically disposed of once we no longer desire it. The miles traveled, by-products of production and transportation, and lasting impacts of disposal are largely "out of sight, out of mind" (Princen 2002, 2010; Lehmann & Crocker, 2013). Though individual actions may seem insignificant, they accumulate: consumers are responsible for more than 60 percent of the globe's GHG emissions and up to 80 percent of the world's water use. Four-fifths of consumer impacts are not direct impacts like GHG emissions from the cars we drive, but are rather secondary impacts from the environmental effects of producing the goods and products we consume (Ivanova et al., 2015). Particularly problematic is the 'externalization' of environmental costs, in which environmental debts accumulate and are passed on. In the end, human communities and the environment feel these consequences without regard to who or what are the polluting entities. The 'great Pacific garbage patch' provides a notable example of accumulated and externalized environmental consequences. Trash, notably plastics, make up a floating garbage gyre in the northern Pacific Ocean so large that it can be seen from space, posing a serious hazard to wildlife and shipping lanes (Coulter, 2009-2010). But the vast majority of trash in our oceans is invisible to us. Even more troublesome than the images of dissected, plastic-choked sea turtles that so tug on our heartstrings, are microplastics. These invisible and insidious tiny plastics account for 92 percent of all marine plastics, creating a "toxic smog" that absorbs oily chemicals like flame retardants and endocrine disruptors (Mato et al., 2001; Emmelhiez, 2015). These chemicals, which scientists have correlated under laboratory settings with infertility, feminization of male fetuses, obesity, diabetes, reduced brain development, cancer, and neurological disorders, transfer to animals' bodies when consumed, creating the potential for serious health risks (Grün & Blumberg, 2009; Halden, 2010; Colabuono, 2010; Bergman et al., 2013). But ocean plastic lies beyond the ownership of any nation, government, industry or ship owner; with no one to blame, no one takes responsibility, and the trash patch continues to grow.

The quantity of our wastage is not simply explained by our growing population, but by the rampant and irrevocable manifestation of convenience and consumerism in the cultures of

developed nations. Capitalist economic models have instilled insatiable consumer desire into those with the privilege of means in excess; the desire for more money, more power, and more convenience, with little to no attention to the consequences and costs of these acquisitions. This cause is often misaddressed by environmental movements that promote "green consumerism" rather than "green citizenship[1]," which is typified by resource frugality and resource-sharing rather than consumption of "green" or "sustainable" products (Harbo, 2017). By promoting "consumer responsibility" and giving agency to individuals only as consumers, change is narrowly directed along a pathway that largely ignores the root causes of the waste crisis and the capacities of the larger population to address them. To redefine what determine human well-being, it will be necessary to deconstruct the consumption culture (Harbo, 2017). Our motivations to consume are described by Lehmann and Crocker (2013) as four-fold: 1) the desire to improve ourselves and enhance our knowledge through education, travel and services; 2) the desire for more precise control over our environment via technology and convenience; 3) the emotive and aesthetic grounds for attraction to products and services; and 4) the social pressure to buy and update our 'stuff.' Spurred on by incessant advertising — recognizable and not— our gluttonous consumption habits are normalized and marked by a perpetually growing waste stream.

Unfortunately, the ways in which we consume are not always within our control. While in the 1950s we may have carried our plastic-free groceries home in a reusable hessian bag, even the most conscious shopper today would be hard pressed to leave the supermarket without gross quantities of plastic. Beginning with the introduction of plastic bags in the 1970s, it has become the expectation that products as small as individual fruits and vegetables will be separately packaged. Bought in this way, each trip to the supermarket can produce between thirty and fifty separate plastic bags, all of which are destined for the waste stream (Clapp & Swanston, 2009). Roughly 40 percent of the 448 million tons of plastic produced each year is disposable, much of it used as packaging intended to be discarded within minutes after purchase (Parker, 2018) Thus, shifting the quantity of our consumption rather than just the method is critical.

[1] This term is used to reference the idea of promoting resource frugality and resource-sharing in society rather than green consumption; however, I acknowledge that the term "citizenship" is imperfect. I use it not to promote any sense of nationalism or to exclude those that are not US citizens, but rather to reflect the sense of active social duty and internalization of values that it carries.

As developing nations industrialize and urbanize, they are poised to adopt these consumption-centered, plastic-plagued lifestyles that western-style nations have become accustomed and entitled to. As economic growth fuels larger disposable incomes, waste production will inevitably grow (Medina, 2002). These material lifestyles will be buttressed by and intertwined with fossil fuel extraction, manufacturing processes, transportation, purchasing, and disposal, all of which contribute their own environmental damages (Lehmann & Crocker, 2013).

Recycling, which involves collecting and processing materials such that they are transformed into new products, is one of the most basic, globally employed methods for reducing landfill waste. And it is not a novel idea; as early as 1031, Japan began recycling and re-pulping waste paper into new paper and selling it in local shops across the country. In the U.S., paper recycling began in 1690 with the establishment of the Rittenhouse Mill near Philadelphia, which made paper from fiber derived from recycled cotton and linen rags (Bradbury, 2017). Into the 19th century, traveling peddlers in the U.S. purchased recyclable materials from the households they visited, and resources like rags and leftover beef bones were recycled into paper and fertilizer (Strasser, 1999). England began collecting, sorting and recycling unwanted goods via the Salvation Army in London in 1865, and employed the unskilled poor to recover discarded materials. This organization and its program made its way to the U.S. in the 1890s. Recycling advocates and reuse programs subsequently embraced the phrase "Waste as Wealth" to describe the revenue to be earned from sorting and reselling items found in household trash, and the first American aluminum can recycling plants opened in 1904. During the Second World War, U.S. recycling skyrocketed as tin and rubber supplies dwindled; as part of their patriotic duty, households were encouraged to conserve and salvage supplies critical for the Allied war effort. Up until this point, recycling had been a means simply to generate revenue, create practical solutions to material shortages, and bolster war efforts.

It was not until the 1960s, in response to the growing consumer, "Throw-Away" culture, that recycling began to embody an environmental agenda. The classic Mobius Loop was introduced in 1965 as the symbol for Reduce, Reuse, Recycle to raise environmental awareness, and the first Earth day in 1970 brought national attention to the increasing waste crisis and the importance of recycling (Bradbury, 2017). To ease the process of sorting recyclables, the Society of the Plastic Industry Inc. introduced the Resin Identification Code in 1988, which labels

plastics 1-7 to identify the resin out of which the product is made. This enables grouping of like-materials in order to better preserve the value of the recycled product (International Standards Worldwide, 2008). In the age of today's consumerism, recycling manifests itself across the world in various degrees of intensity and formality; in developing cities like Delhi, over 120,000 informal waste collectors gather and sell recyclables, processing 59 percent of Delhi's waste. In developed cities like San Francisco, more formal, top-down approaches to recycling have been implemented that have achieved reported diversion rates as high as 80 percent (Lehman, 2011).

However, the U.S. recycling industry now faces a crisis: a waning market for recyclables. Prior to 2018, the U.S. exported about one-third of its recycling. Nearly half of that went to China, which has used recyclables from around the world to bolster its manufacturing boom. But in January of 2018 China adopted a foreign waste ban, declaring that foreign recycling was too contaminated and hazardous for them to accept; as part of this new policy, the country announced a 0.5% maximum on recycling contamination (NPR, 2017). This has left recycling centers in the U.S. scrambling to find buyers for recycling, ultimately forcing them to send large quantities of recycling to the landfill (Vanek Smith, 2018; B. McGill, personal communication, 10 Nov 2018). Brandon McGill, supervisor at the Azusa Transfer and Materials Recovery Facility (MRF) in California[2], describes "turmoil in the recycling industry" exacerbated by the stringent restrictions in the U.S. for opening recycling mills. In light of China's waste ban, one municipality in Los Angeles, Azusa, has started shipping recyclables to India and Indonesia, but ultimately is forced to send plastics with little demand, number 3-7s, to the landfill about half of the time.[3] The deteriorating profitability of recycling left Waste Management in debt earlier this year, and it is only recently that the company has started to break even. And as the waste stream grows, Azusa is struggling to keep up. The MRF receives between 500 and 700 tons of material a day; with more material they run conveyor belts faster, scarifying accurate sorting for speed, and further diminishing the marketability of their recyclables (B. Mcgill, personal communication, 9 Nov 2018).

Though the waste crisis is rooted in a deeply ingrained cultural and economic system of consumption and an expectation of convenience, an exacerbating problem is insufficient separation at the source, which is a product of poor waste-separation education, lack of

[2] The Azusa MRF is one of Waste Management's largest facilities
[3] #3-7 plastics include water bottles, yogurt containers, condiment bottles, pill capsules and plastic plates

convenient and standardized infrastructure, and apathy on the part of the consumer (Ölander & Thøgersen, 2006; Park & Ha, 2012). Though the widespread shift to single-stream recycling has streamlined the sorting process, as a system it is more susceptible to contamination. Particularly problematic are wet contaminants, which saturate paper and cardboard materials and render them unusable. Most contamination occurs when people try to recycle things that they should not. "People just don't know what's recyclable," laments McGill, describing everything from food and soccer balls to plastic wrappers and clothing in the recycling their facility has received. Larger objects like furniture and shopping carts can break the conveyor belts, stalling the sorting process and causing Waste Management to lose as much as $600 per minute[4] (B. McGill, personal communication, 9 Nov 2018). Waste Management handles 10 million tons of recycling per year and reports an average contamination rate of 25 percent, meaning that 1 in 4 things that people throw in the recycling does not belong. This directly increases processing fees and reduces the marketability of recyclables (Albeck-Ripka, 2018; B McGill, personal communication, 9 Nov 2018). Contamination of compost waste streams is similarly problematic, especially contamination by heavy metals that can pollute compostable material with toxins (Paradelo, Moldes, & Barral, 2009). McGill also describes the large quantity of recyclable material that is mistakenly thrown into trash bins; with no available screening process for the trash waste stream, all of this "good material" ends up in a landfill. Better sorted waste-streams is essential; it not only helps to reduce the cost and efficiency of processing recyclables, but it also increases profits for MRFs and allows manufacturers to have access to high-quality recycled commodities, thereby preventing the depletion of finite natural resources.

The enormity and complexity of the system from which waste emerges makes for a "wicked problem," the likes of which are characterized by significant, continuous change, contradictions and disputed values, evolving needs, and often require high-stakes decisions (Funtowicz et al., 1999). The solutions to such problems must be similarly multi-faceted and nuanced. Presently, there are three broad solutions to this "wicked problem" that governments and organizations have adopted and endorsed, though any one of them is hard-pressed to succeed satisfactorily on its own. Briefly, these strategies are to 1) promote improved international cooperation and governance and more targeted legislation; 2) reduce material flows through the redesign of resource-intensive and high waste-producing goods and services; and 3) target the

[4] Every minute that the facility is not functioning, approximately $600 per minute are lost.

individual and promote consumer responsibility (Lehmann & Crocker, 2011). None of these strategies are perfect; while the first two require significant cooperation across sectors and borders and are impeded by bureaucracy and political barriers, the third perhaps overstates the consequences of the individual's actions. However, governments can target individuals collectively such that individual behaviors can be shifted on an effective scale. This requires more holistic, 'socialized' campaigns that provide incentives for collective change. Small rewards and punishments, described by the 'carrots and sticks' paradigm[5] and illustrated by policies like 'Pay as You Throw'[6] can nudge consumer behavior collectively in the desired direction and ultimately normalize more sustainable practices (Lehmann & Crocker, 2011). Combined with higher-level policy implementation and product redesign, socialization campaigns can help communities, cities and nations continue to reconceptualize waste and waste management in pursuit of the Zero Waste ideal.

The Zero Waste Movement

With the consequences of waste confronting us in every sphere of society, the concept of the Zero Waste lifecycle has emerged as a novel way to approach resource use. The term 'Zero Waste' is believed to have been first used by Dr. Paul Palmer in 1979 in the context of recovering resources from chemicals (Palmer, 2004). It has since evolved to describe the holistic shift from 'end of pipe' disposal practices to those that promote the cyclical use of materials, with little-to-no matter ending up in the landfill or incinerator (Lehmann, 2011). This requires us to fundamentally reconsider our relationship to resources and the things we consume; it forces us to think not of purchase and throwaway, but of sharing, reuse, and the value inherent in the post-life of one product as it becomes the building blocks for another. For measurement and goal-setting purposes, the Zero Waste International Alliance defines "Zero Waste" as a 90 percent diversion rate from landfills, incinerators, and the environment, meaning that 90 percent of total waste materials are composted, recycled or reused in some way (Zero Waste International Alliance (n.d.). However, this precise definition is not the goal of every Zero Waste movement.

[5] The idea of using small rewards (carrots) and sticks (punishments) to shift behavior. This theory is derived from the old story of a donkey, in which the best way to move him is to put a carrot in front of him and jab him with a stick from behind. The carrot is a reward for moving while the stick is the punishment for not moving and hence making him move forcefully

[6] The policy by which households pay more for producing greater quantities of waste

While cities like Austin are aiming for this 90 percent diversion goal, others like San Francisco are more ambitious, aiming to achieve "zero discards to the landfill or high-temperature destruction" by 2020[7]. Others merely describe a goal to "re-design resource lifecycles so that materials are reused and waste is minimal" (US EPA, 2016). Nevertheless, cities with Zero Waste commitments all aim to operate primarily at the upper tiers of the Waste Hierarchy, which ranks management tactics in order of preferability from "reduce" down to "dispose" (Figure 1). Building on the classic Mobias circle, the waste hierarchy ranks "reduce, reuse and recycle" in order of preference and acknowledges the potential for energy recovery from waste as an alternative to landfill disposal.[8] Research done by entities including Los Angeles County and the Office of Energy Efficiency and Renewable Energy of the U.S. Department of Energy has shown that waste conversion produces fewer greenhouse gas emissions than landfill waste does, but that diverting waste remains preferable to converting waste to energy (County of Los Angeles Department of Public Works, 2016; Lee et al., 2017). Generally, the underpinning philosophy of Zero Waste is to promote the highest and best use of materials in order to eliminate waste and pollution, with an emphasis on a closed-loop system of production and consumption.

Internationally, small cities and villages that have internalized the Zero Waste philosophy have succeeded enormously. In Capannori, Italy, a grassroots movement created a door-to-door waste collection campaign and eventually a Pay as You Throw tariff that, over 10 years, decreased waste by 40 percent and increased waste diversion rates to 82 percent. Some localities have achieved a diversion rate as high as 90 percent (Van Vliet, 2018). The small village of Kamikatsu in Japan embarked on a rigorous Zero Waste program in 2003. Residents now separate their waste into 45 categories such that 80 percent of the town's garbage is recycled, reused or composted, and several stores are run entirely on the premise of reuse and upcycling. The process saves the village a third of its former costs from waste incineration (Hickman,

[7] It is also important to consider the transportation paths of recyclables; this is not transparently discussed in Zero Waste considerations of cities like San Francisco; since approximately half of recyclables in the U.S have historically been sent abroad, this is a concern for GHG emission contributions

[8] While waste incineration ranks near the bottom of the waste hierarchy, it is a rather controversial strategy and is not universally considered unsustainable. Sweden hails incineration to energy technology as a green solution, citing near-Zero Waste achievements with incineration rates as high as 50percent (Zaman and Lehmann, 2011). Though Sweden's incineration processes are relatively emissions-free, in the U.S. incineration is largely considered to disincentivize the upstream reduction of waste, and it remains less energy efficient than reducing, reusing, or recycling materials.

2018). Larger cities like San Francisco have also made substantial step towards Zero Waste. To achieve nearly 80 percent diversion, San Francisco has taken a three pronged approach: enacting strong waste reduction legislation, partnering with a like-minded waste management company to innovate new programs, and working to create a culture of recycling and composting through incentives and outreach (Song et al., 2015).

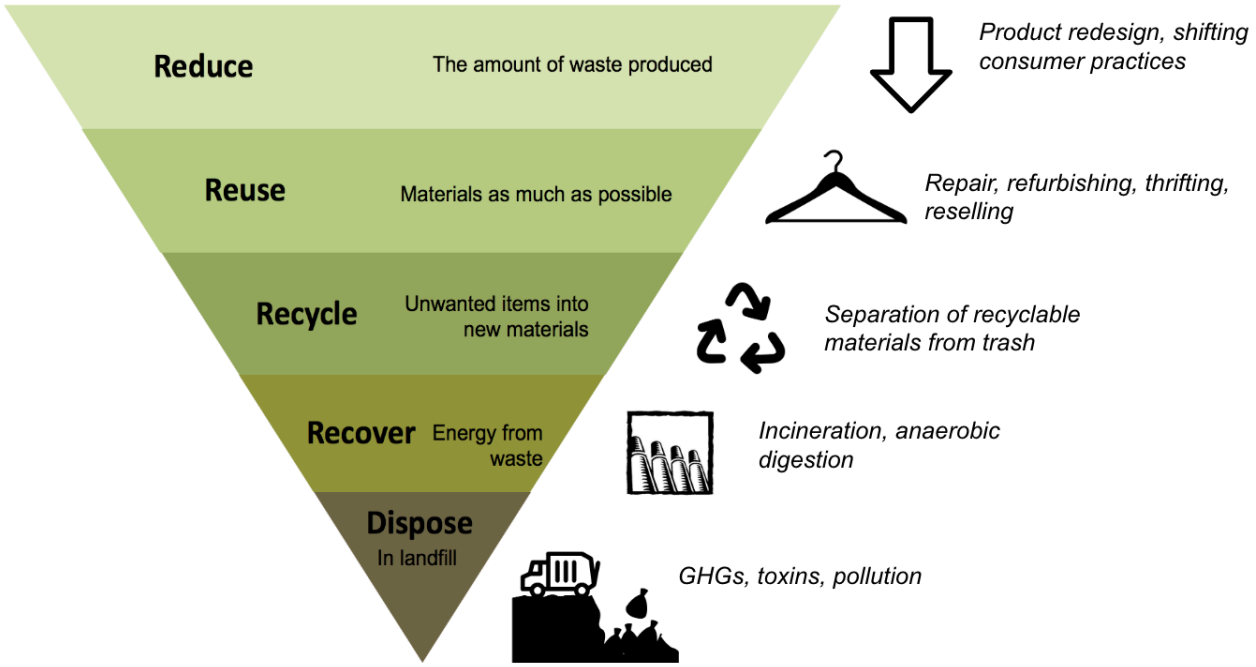


Figure 1. The Zero Waste Hierarchy. Graphic made by author with information from All About the Zero Waste Hierarchy by *The Sustainability Project*, 2017, from https://thesustainabilityproject.life/all-about-the-zero-waste-hierarchy/

The philosophy of Zero Waste can be applied at any scale of society, from the community to the city to the national. Lehmann and Crocker (2013) highlight four interrelated ideas critical to the Zero Waste movement: sustainability and behavioral change, consumption and technologies, sustainable design of our built environment, and governance and material flows. Though these ideas generally refer in their context to city and country scales, they are applicable on college campuses, which in many ways act as microcosms of cities. This thesis will utilize the college campus as its focal scale in an effort to explore and understand practical applications and challenges of the Zero Waste ideal. Though I acknowledge the insufficiency of "green consumer" and post-consumer solutions, for the sake of practicality this thesis will

primarily address college purchasing practices, campus waste infrastructure, environmental policies, waste streams, and campus education, with limited attention to deeper behavioral and psychological transformations. Chapter 2 will consider how college campuses across the nation have implemented these various tactics in pursuit of the Zero Waste ideal. Chapter 3 will focus on Pomona College in Claremont, California, analyzing the College's current waste management practices, infrastructure, and waste-stream, and evaluating the status of current waste goals. Chapter 4 will provide specific recommendations to move Pomona College towards its 2030 Zero Waste goal and to create a campus culture of more responsible and conscientious resource use.

CHAPTER 2: ZERO WASTE ON COLLEGE CAMPUSES

Across the world, institutions of higher education are gaining awareness of their environmental impacts and their role in promoting sustainable development. Building upon this environmental awareness, universities are incorporating sustainability principles into their daily activities and campus governance. As Lukman and Glavic (2007) suggest, higher education has both a direct and indirect impact on local, regional and national environments, and notably on graduates and their future decisions as members of and leaders in society. Environmental education in particular is crucial for the formation of an aware society, and universities have a leadership role to play in the identification of coherent and sustainable solutions to environmental challenges (Cortese, 2005; Lukman & Glavic, 2007; Brandli et al., 2011). Disterhef et al. (2012) suggest that universities can contribute to sustainable development by implementing well-conceived and planned models of sustainability; significant attention to developing sustainable campus operations is a usual starting place. Eventually by exhibiting long-term commitments towards sustainable development, universities serve as examples to other organizations and emerge as educators beyond the classroom.

One question these institutions now face is how sustainable development rhetoric can be translated into practice to act not only as an educational tool, but as a mode of societal transformation (Harbo, 2017). Considering the dynamic complexity of universities, environmental sustainability must be skillfully implemented such that it operates in an interdisciplinary and participatory fashion. The challenges of implementing interdisciplinary approaches to research, policy and operations at Universities are widely recognized (Holley, 2009; Richter & Paretti 2009; Wade & Stone, 2012). According to Sharp (2002), a critical component of an environmental agenda is that it requires universities to address several complex challenges and to acknowledge that system-wide change requires the involvement of multiple stakeholders (students, alumni, administration, faculty) in exerting pressures for change. This mission is encumbered by a number of obstacles including lack of resources to support interdisciplinary working, lack of supportive academic reward systems, contrasting discipline cultures, departmental policies and procedures, and decentralized budget strategies (Filho et al., 2015).

Comprising one facet of the sustainability challenge on campuses is waste; following the emerging international Zero Waste narrative, colleges and universities across the world have developed Zero-Waste strategies to take action against the adverse environmental impacts and costs of waste disposal. Most colleges with a Zero Waste goal operate with the 90 percent diversion definition offered by the Zero Waste International Alliance. Realistically, until there is a sustainable alternative for virtually every product open to the public, large, complex organizations like universities will not be able to reach absolute Zero Waste (Oberlin College, 2015; Smoot, 2018). However, much like cities utilize differing definitions of Zero Waste, even colleges with 90 percent diversion goals may define diversion differently. For example, the University of California in Los Angeles (UCLA) includes waste to energy (incineration) as an allowable zero waste practice, which does not fully embody the spirit of sustainable practices (Smoot, 2018).

Particularly in California, several universities have made significant progress towards their Zero Waste goals. California State legislation in 1999 set diversion mandates in California of 25 percent by 1995 and 50 percent by 2000 for local cities and counties.[9] In 2011, AB 341 expanded this initiative and established a statewide policy goal of diverting 75 percent of waste from landfills by 2020. California colleges have followed suit, establishing diversion goals of various ambition. The University of California collective has a 2020 Zero Waste Goal; within the greater "University," UC Irvine has the highest waste diversion rate at 81 percent[10], and the other UC schools are not far behind (Table 1).

Table 1. *Diversion rates at a top-performing UC schools*

School	Diversion Rate
UC Irvine	81 percent
UC Riverside	78 percent
UC San Francisco	74 percent
UC Davis	72 percent
UC Santa Barbara	68 percent

[9] AB 939: The Integrated Waste Management Act
[10] Not including construction and demolition waste

Though waste-to-energy is permissible, UC Irvine only converts 1.27 percent of its waste to energy (University of California, Irvine, n.d.). The UC sustainability policy, which extends to all UC campuses, asserts that "The University of California ("University") is committed to responsible stewardship of resources and to demonstrating leadership in sustainable business practices. The University's locations should be living laboratories for sustainability, contributing to the research and educational mission of the University, consistent with available funding and safe operational practices." (University of California, 2018). The UC campuses, along with other colleges across the country, have made sustainability central to their mission and have implemented a number of replicable initiatives.

At the most basic level, waste-conscious universities have separate source collection bins and conduct waste audits to understand the composition of their waste and to identify opportunities for greater diversion rates. However, simply having recycling infrastructure is not sufficient to achieve effective source separation. Standardized bin infrastructure and signage, along with education campaigns, are critical to ensure successful source separation (Aremu & Sule, 2012; O'Connor et al., 2010). Building upon these strategies are green purchasing agreements, re-use stores, vendor agreements, and participation in national recycling competitions. Several colleges in recent years have adopted these various approaches in an effort to fundamentally change their relationships to waste on campus (Brown et al., n.d., Arizona State University, 2014; Oberlin College, 2015; Ebrahimi & North 2017; University of California, 2017). For large goals like the achievement of Zero Waste, it is useful to have a concrete set of steps and behaviors that can guide campus changes in a structured way; Arizona State University (2014) has identified ten steps towards Zero Waste:

1) Setting a date to achieve zero-waste
2) Developing and enforcing purchasing policies; establishing a teamwork model that includes all stakeholders
3) Ongoing training for anybody involved with waste management and recycling operations
4) Developing simple and effective signs
5) Maintaining customer service; post-event sorting
6) Keeping a baseline of program performance data
7) Monitoring the economics of zero-waste projects

8) Celebrating success and rewarding best project performers;
9) Encouraging regional synergies to make projects look similar on campus and off
10) Fostering local capacity development by supporting local companies that make recycling or compost goods.

These are not comprehensive, but they do provide a number of important starting points for the transition to Zero Waste. The following sections will discuss some of these steps like purchasing policies, signage and performance data in greater detail, and highlight their roles in creating more waste-conscious campuses. Additional tactics not explicitly stated in ASU's 10 steps but common to Zero Waste campus movements, like bin infrastructure and educational campaigns, will also be addressed.

Bin Infrastructure and Signage

Although reducing and reusing waste is preferable to recycling, correct sorting is critical to a Zero Waste campus. Accessibility and convenience of waste separation programs and infrastructure are some of the most essential, basic factors that influence sorting behavior (Ölander & Thøgersen, 2006). Generally, individuals with access to convenient infrastructure for recycling and composting are much more likely to accurately separate waste (Aremu & Sule, 2012; O'Connor et al., 2010). However, separate source collection bins are not sufficient to ensure that waste is properly sorted. Recycling, waste, and compost containers are most effective when they are color-coded and standardized across a campus or region; if separation bins are present, but inconvenient or not clearly labeled, then waste separation success will suffer (Aremu & Sule, 2012; O'Connor et al., 2010). Clear and universal signage is especially critical and significantly increases accurate source separation (Craig & Leland, 1983; Sussman et al., 2013).

Regarding bin design there is not one just solution, but it is important that bins are standardized and strategically placed around campuses. A survey of several campus initiatives determined that the availability of bins and ease of understanding bin signage were two very influential factors in the success of campus waste sorting (Ebrahimi & North, 2017). In addition to promoting the use of clear, standardized graphics, CleanRiver Recycling Solutions (n.d.) suggests to collect all waste streams in a single partitioned container to eliminate the chance that bins become separated or removed, as providing paired bins is considered best practice. To cultivate a more unified recycling culture, they also suggest to brand bins with school or

company logos. UC Irvine, which boasts a Platinum environmental rating and reports the highest diversion rate in the Sustainable Tracking, Assessment and Rating System database (81 percent[11]), exemplifies standardized and predictable infrastructure. Anne Krieghoff, the Program Coordinator of Solid Waste & Recycling at UCI, explains that pairing recycling and trash bins on campus is mandatory at UCI. Additionally, every recycling bin is blue or has an obvious blue accentuating feature, and bin liners are blue for recycling, clear for food waste, and gray for landfill. These bin liners help to streamline the final sorting process and minimize improperly sorted bags. Finally, every bin, both in buildings and outside, is fitted with a standardized, school-branded sign that pictures common items the bin accepts (A. Krieghoff, 2018, personal communication, 7 November) (Figure 2)

Using standardized, immovable "smart" bins is another tactic that colleges like the UC schools among other, smaller universities more comparable in size to Pomona, have employed to improve waste-sorting and to reduce the frequency of trash pick-up. Big bellies are smart units that capture both landfill and recycling waste streams and use cloud-based computer tracking systems to notify campus collectors when they are full and ready to be collected (Figure 2). Using solar power, they are able to compact their contents and hold up to eight times as much as conventional rubbish bins ("Brighton Boasts a Big Belly", 2016). However, some cities have found that investing in Big Bellies is more trouble than they are worth, citing common maintenance issues and overflow as their downfalls. But they have had success at college campuses like UC Irvine, where bins placed in high-traffic areas reportedly increased the amount of recyclable materials collected from 20 percent to 45 percent in one year (A. Krieghoff, 2018, personal communication, 7 November).

The success of convenient bin infrastructure and clear signage is illustrated by a high school in Toronto, Ontario. The school transitioned from a basic recycling program consisting of blue and black bins without signage to single bins with separate, color-coded openings for recycling and trash complete with informational school-branded signs. After the transition, there was a reported 72.5 percent decrease in recycling stream contamination and a 20 percent increase in diversion rate (CleanRiver Recycling Solutions). Georgetown University in Washington D.C. also cites bin standardization across campus as a major factor contributing to its 85 percent

[11] 83% including construction and demolition waste

diversion rate.[12] The University also acknowledges the importance of developing an on-campus recycling collection center and participating in the annual national RecycleMania competition (Georgetown University, n.d.)

The importance of standardized signs is recognized by Recycle Across America (RAA), a 501(c)(3) nonprofit that recently launched "Let's Recycle Right!" the largest recycling education campaign in U.S. history. This in direct response to the ongoing collapse of recycling in the U.S. Adoption of RAA standardized labels has documented notable successes. By partnering with RAA and implementing their standardized bin labels, Rhode Island reduced their number of rejected truckloads by more than 18 percent, from 1,380 tons of rejected recycling in 2016 to 1,1288 tons rejected in 2017[13] ("Resource Recovery Wins Prestigious Industry", 2018).The City of Atlanta Sustainability Director reported that that RAAs standardized labels reduced the amount of contamination by 90 percent, and they nearly doubled recycling rates at the University of Denver (Recycle Across America, n.d.). On their website, RAA claims that to date, there are nearly nine-million standardized labels displayed on bins throughout the U.S. that have proven to "double or triple recycling levels and significantly reduce or eliminate contamination" (Recycle Across America, n.d.).

Education and Competition

Because students and faculty hail from across the country and world with inevitably different sorting and waste-stream management knowledge and experience, educating the population on the College and City of Claremont's practices is essential. This is done through a variety of mechanisms on campuses, though a notable and consistent strategy is participation in RecycleMania. RecycleMania is an annual national competition that serves as a tool to help colleges and universities advance campus recycling and waste reduction efforts. In 2017, 320 U.S. colleges and 4.1 million students and staff participated, together collecting 69.9 million pounds of recyclables and food organics, and reducing GHGs by an estimated 77,791 MT of CO_2 equivalent (CO_2E) (RecycleMania Tournament Report, 2017).

[12] Georgetown does not report it data to the Sustainability Tracking, Assessment & Rating System
[13] Measured March to November

Figure 2. Standardized bins at UC Irvine. Clockwise from left top: paired and color-coordinated outdoor bins; attached indoor office and classroom bins; a Zero Waste station used for events; Big Belly solar compacting bins for high-traffic areas. Reprinted from *How We Recycle at UCI* by the University of California, Irvine, n.d., from http://www.fm.uci.edu/files/units/HowWeRecycleatUCI.pdf

Loyola Marymount in California won the diversion category in 2017 with an 83.89 percent diversion rate. North Lake College in Texas won the waste minimization category, reducing waste by an average 4.14lbs per capita. UC Irvine has consistently ranked in the top 10 schools for highest diversion rate. In post-competition surveys, over 70 percent of school coordinators have reported experiencing a noticeable increase in recycling during their RecycleMania participation. As a testimony to the value of the competition, Loyola Marymount University announced, "RecycleMania has helped LMU Recycling entrench and expand our campus' commitment to create a better tomorrow via recycling. The RecycleMania Tournament has truly captured the imagination of the entire campus." In 2017, the Rhode Island School of Design

(RISD) won the Per Capita Classic category, and cited "clear and concise labeling on recycling and trash bin labels" through the RAA campaign as "critical to their success" (RecycleMania Tournament Report, 2017). Thus, these educational and promotional campaigns, which utilize standardized signage and infrastructure to collectively shift individual behaviors, have documented significant successes on college campus scales.

To both accompany and to function independently from such national campaigns, schools provide campus-specific trainings and resources. UC Irvine has a large collection of educational videos and training materials available on their website and on YouTube, which offer guidance on waste-stream separation and other sustainability initiatives on campus (Sustainability Tracking, Assessment & Rating System, 2018). The Sustainability Team at UCI also provides educational material to office-users like videos and flyers that help individuals become more sorting-savvy (UCI Facilities and Management Team, 2017). Georgetown University has a section of their website devoted entirely to recycling infrastructure; it provides pictures of their various standardized bins (for indoor use, outdoor use, clothes and plastic bags) and explicitly lists what can go into each bin. The University also lists the locations and types of recycling bins at main buildings on campus (Georgetown University, n.d.). UCLA distributes and provides the online link to "Green Guides" to new students at the beginning of each year, which offer comprehensive but easily digestible information on food, transportation, waste, water, electronics and appliances, purchasing and green action involvement at the University (UCLA, 2014).

Environmentally Preferable Purchasing Programs

Colleges with Zero Waste strategic plans almost always make some form of commitment to Environmentally Preferable or Green Purchasing programs (Oberlin College, 2015; Wesleyan University, 2016; Ebrahimi & North, 2017, University of California, 2018). Appalachian State University identifies an Environmentally Preferable Purchasing Program in the second phase of its Zero Waste implementation, which commits ASU to purchasing products that have a reduced negative effect on human health and the environment when compared with competing products (Ebrahimi & North, 2017). Similarly, Oberlin College recognizes that it has the "opportunity and responsibility to handle purchasing, reuse and disposal in a way that advances the College's achievement of environmental sustainability," and that the "purchase and disposal of materials are inseparable: purchasing something entails a commitment to disposing of or reusing it in a

responsible way" (Oberlin College, n.d.). One way that Oberlin achieves this in practice is through centralized purchasing. A Procurement Office purchases all of the materials and services in bulk needed by college departments and offices; when procuring highly technical or specialized equipment, they rely heavily on the expertise of the ordering department, but all orders must ultimately be placed through the Procurement Office (Oberlin College, n.d.). Centralized purchasing is monitored by a Socially Responsible Purchasing Committee and a Sustainable Purchasing Intern. Intern responsibilities include reviewing departmental and college purchasing, researching products, seeking and offering sustainable alternatives, educating purchasers, and updating the Green Purchasing Policy accordingly. Some of the College's steps for reducing the environmental impacts of purchases are to:

1) Examine all purchases as to whether the purchase is absolutely necessary; can similar items be reused from elsewhere on campus, or can the task be achieved some other way?
2) When purchases are necessary, employ total product "life-cycle analysis" and "full cost accounting" to evaluate products. Life-cycle analysis is accomplished by considering the origin and fate of a material or service. Full-cost accounting reveals the environmental costs of its extraction, manufacture, transportation and disposal that may not be fully reflected in its market price.
3) Based on life cycle analysis and full cost accounting, select materials that minimize environmental costs and maximize environmental benefits on campus and beyond. This means favoring materials that have minimal packaging, are recycled or reusable, sustainably harvested, non-toxic and biodegradable, and/or energy-efficient.
4) Favor local products, when possible, to gain a variety of environmental and economic benefits. For example, favoring locally grown foods minimizes fossil fuel use for transportation and at the same time helps sustain farmland and the economy.
5) Minimize products containing known toxins where viable substitutes are available.

The University of California school system also has an environmentally preferable purchasing policy that requires all of its schools to "maximize the procurement of environmentally preferable products and services" (University of California, 2018). Following are selected commitments from the policy:

1. The University will use its purchasing power to target environmentally preferable products and services for volume-discounted pricing to make them cost-competitive with conventional products and services.
2. The University will integrate sustainability requirements into its practices for competitive bidding in material and services procurement, allowing for suppliers that meet these requirements to earn additional evaluation points.[14]
3. The University shall seek products that have take-back programs, as appropriate.
4. When requested, suppliers citing environmentally preferable purchasing claim shall provide proper certification or detailed information on environmental claims, including benefits, durability, and take-back, reuse and recyclable properties.

These policies aim to standardize and unify sustainable purchasing efforts across departments and to align vendors with the college's sustainability goals. Importantly, they do not merely suggest that sustainable purchases should be made where cost-effective; rather, they commit the institution to proactively evaluating current practices and making changes, finding avenues to make environmental purchases cost-effective, and concretely taking vendor sustainability into service procurement decisions. Accompanying these overarching policies are specific guidelines for purchasing that detail preferred certifications, vendors, brands and other relevant information. Arizona State University does this with a comprehensive document of purchasing guidelines for Zero Waste and other environmental considerations like energy and carbon, water, toxins and pollutants, bio-based products and renewable fuels, forest conservation, buildings and landscaping, transportation, food and garments and linens (Arizona State University, 2018). The use of centralized purchasing is important, as sustainable changes are significantly more difficult to achieve without coordinated departmental action. To truly create a Zero Waste campus, environmental policies must extend to all stakeholders that play a role in waste creation on campus, and active purchasing policies that are well communicated to and received by departments, businesses and vendors are an effective way to do so.

[14] Evaluation points are a system that the University uses to evaluate bidders and to ultimately select a vendor.

Events

Campus events are huge waste-generators. Especially at large universities where football games and alumni events are attended by thousands, it is important to structure events such that products with minimal disposable contents are provided and waste-sorting is as easy as possible for event attendees. Many colleges, Arizona State University among them, have developed procedures for ensuring that events are Zero Waste (Brown et al., n.d.). These events require substantial planning, from the purchasing of compostable and recyclable substitutes for disposal materials, to the education and cooperation of facilities staff, to the coordination of labels and the physical setup of the event. To pull off these kinds of Zero Waste events, cooperation and coordination on the part of all parties involved is critical to minimize waste-generating opportunities. To broaden the opportunity for and feasibility of Zero Waste events, schools like UCLA have created Zero Waste or Green Event guides that event-planners can easily download and utilize (UCLA, n.d.).

CHAPTER 3: INTRODUCING SUSTAINABILITY AND WASTE MANAGEMENT AT POMONA COLLEGE

Pomona College is a small, liberal arts college of 1663 students located in Claremont, California.[15] It is the founding member of the Claremont Consortium, which contains five undergraduate colleges and two graduate institutions. The 140 acre campus has 15 residence halls, three dining halls and two cafes. Ten of the buildings are LEED certified (one silver, six gold and three platinum).

Pomona's firm commitment to sustainability began in 2003, when the College adopted its first Environmental Policy and Sustainable Buildings Guidelines. In 2006, former President David Oxtoby established the President's Advisory Committee on Sustainability (PACS) to oversee campus sustainability efforts, and PACS produced its first sustainability report in 2007. I the same year, President Oxtoby signed the American Colleges University Presidents Climate Commitment (ACUPCC), which requires these institutions, among other obligations, to identify the sources of their greenhouse emissions, develop and implement a plan by which to reduce them, integrate sustainability into the curriculum, and make accessible all reports related to their efforts (Miller & Close, 2011). Fueled by this agreement, Pomona joined the Association for the Advancement of Sustainability in Higher Education (AASHE)[16] and hired its first full-time Sustainability Coordinator, which subsequently led to the creation of the Sustainability Office in 2007.[17]

Each year, the Sustainability Office (SO) utilizes student interns and employees to audit and report on the College's greenhouse gas emissions, food sustainability, waste generation, energy flows, purchasing, water consumption and education initiatives (Pomona College, 2018). Since the founding of the Sustainability Office, the presence of sustainable campus initiatives has grown enormously. In 2008, Pomona's Food Rescue program was launched and the first ReCoopsale netted $9,125.[18] The Sustainability Office launched the Green Office program in 2010, and the dining hall introduced trayless dining and reusable to-go containers in the same

[15] As of the 2018-2019 school year.
[16] Pomona no longer actively reports its sustainability data to this organization due to the administrative work involved – instead, it creates its own annual sustainability reports.
[17] Formerly the Sustainability Integration Office.
[18] A project that collects unwanted student dorm supplies, furniture etc. at the end of the school year and re-sells it at the beginning of the next.

year.[19] Pomona was one of only seven colleges in the nation to receive an "A" in the Sustainable Endowments Institute's *2011 Green Report Card.* In 2013 Pomona joined Sustainable Claremont as an institutional member, and in 2014 committed to reaching carbon neutrality by 2030.[20] In 2016, the Coop Store and Coop Fountain – two campus food suppliers that are not run by the dining halls – stopped purchasing bottled water (Pomona College, 2016). In 2017, I along with the Eco-Reps[21] established a Free Room on campus that collects student donations and offers them for free during open hours throughout the year. Also in 2017, Pomona became the first college in the nation to provide free menstrual cups to students, which eliminate substantial waste from otherwise used tampons and pads (Pomona College, n.d.-c). As of the 2018 school year, all post-production and some pre-production food scraps are composted through the City of Claremont, and pre-preproduction vegan food scraps are composted at Pomona's Organic Farm.

Since the 2013-2014 baseline year, the College's sustainability efforts have reduced carbon emissions by 13 percent, energy usage by 23 percent, and water usage by 20 percent. However, the same cannot be said for waste generation and waste diversion, which have worsened slightly since the baseline year (Pomona College, 2018) (Figure 3). In the following section, the aforementioned waste-related programs and initiatives will be described in greater detail to explore the successes of the College thus far on waste management, and to set the stage for subsequent discussion of Pomona's shortfalls and how its practices, infrastructure and sustainability culture can be necessarily improved to achieve its Zero Waste goal and to function as a more sustainable institution.

[19] Assesses office practices and offers solutions to make them greener, giving certifications to offices that participate and meet a certain standard.
[20] Sustainable Claremont is on-profit organization that provide educational resources, engages in advocacy, and takes actions to create more sustainable communities in and beyond Claremont.
[21] A student group that works for the Sustainability Office and runs various sustainable initiatives, programs, events etc.

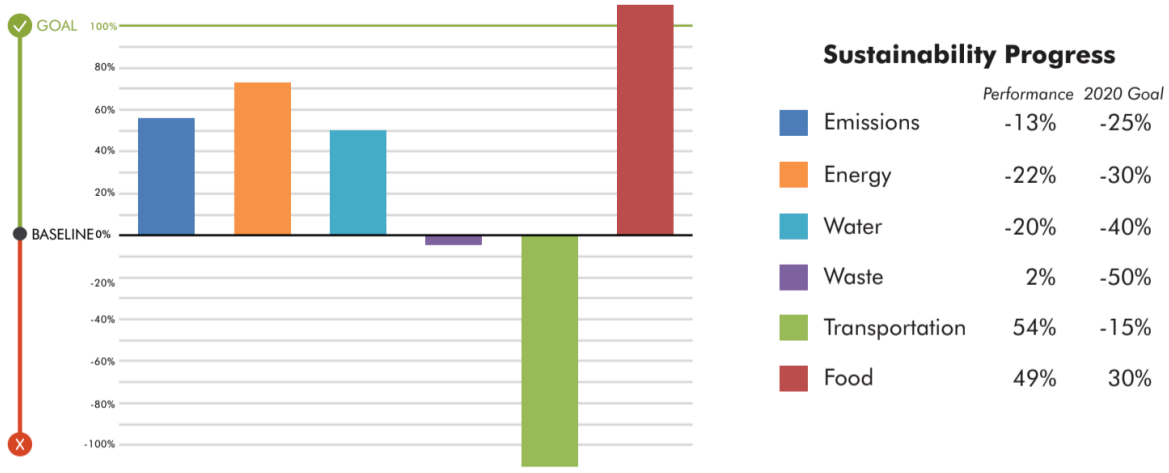


Figure 3. Overview of Pomona's sustainability progress compared to the baseline (2013-2014). Reprinted from the "Pomona College SAVE Annual Report" by Pomona College, 2018.

Pomona College Environmental and Procurement Policies

Pomona wrote its first Statement of Environmental Policy in 2003, and subsequently updated it in 2009. It asserts that Pomona is "Committed to the further development of an ethos of resource sustainability among faculty, staff and students and to the incorporation of environmentally sound practices in its operations" (Pomona College, 2009). It goes on to highlight its sustainability values and to discuss policy implementation in the following areas:

1) **Campus planning, maintenance, and construction**: Suggests that projects and project decisions will be assessed using life cycle cost-benefit analysis and that new construction and renovation projects will abide by the College's Green Building Standards.
2) **Financial and Budgetary Planning:** Asserts that the College will fund the administrative and program needs of the Sustainability Office and provide separate funding within Campus Planning and Maintenance for sustainable projects and programs.
3) **Educational and Research Support:** Recognizes that education is the cornerstone to achieving sustainability goals and promotes the ongoing development and recognition of efforts to expand curricular, research and extra-curricular opportunities for sustainability-related education.
4) **Ongoing Assessment and Review:** Promises annual reporting on progress toward sustainability goals

Without an update since 2009, the policy is woefully outdated and fails to represent the practices of the College or to include all that a holistic campus environmental policy should. For example, Assistant Director of Sustainability Alexis Reyes has indicated that life cycle cost-benefit analyses largely do not occur for purchases and campus projects (A. Reyes, personal communication, 20 Oct 2018). Additionally, the policy makes no mention of environmentally preferable purchasing or of generally cultivating a culture of environmental awareness. Recommendations for improving and supplementing this policy can be found in this thesis on page 58.

The Procurement Policy at Pomona College provides guidelines that departments are responsible for following when making purchasing decisions. This highlights a key barrier to sustainable decision-making: the lack of a centralized purchasing operation tasks departments, and specifically unit managers, with the time-consuming responsibility of making smarter purchasing decisions without adequate information or resources. The policy affirms departments as the ultimate decision-makers, though asserts that decisions ought to be made with the utmost consideration of "what is in the best interest of the College," which means purchasing in the "most efficient and cost effective manner." The College's stated goal is to "obtain the best value possible" with each purchase, which is determined by evaluating many factors like "price, delivery capabilities, quality, past performance, training, financial stability, service capabilities, ease of ordering, payment, etc." The policy briefly addresses environmental considerations in a section titled Environmental Awareness; it states, "environmental impact should be considered in purchasing decisions, when appropriate," and departments are "encouraged to consider the use of products and services that impact the environment less than competing products, when it is a good best value decision to do so." Best value is to be determined through a "total cost ownership analysis" that considers the initial cost of the item as well as factors like: energy efficiency, shipping materials, recycled content, and other indicators like the "environmental performance of the supplier, waste prevention, waste reduction, pollution prevention, clean air and water programs, re-use of materials, and minimization of scrap metal" (Pomona College, n.d.-b). The language of the policy enforces rather a weak environmental agenda, and it is not clear how thoroughly these "total cost ownership analyses" take place and how influential they are in guiding purchasing decisions. Along with the Environmental Policy, this Procurement Policy will be discussed further on page 59 in the recommendations section.

Composting and Recycling

The City of Claremont collects compost, recycling, and landfill waste from Pomona College. All paper, cardboard, plastic, metal and glass are collected by the City's recycling program and sent to the Azusa Materials Recovery Facility (MRF) where they are sorted, compacted and sold. For ease of use, all materials can be "co-mingled" – thrown into the same bin – for recycling (Figure 5). Though this in theory simplifies recycling, it also increases the stakes of recycling contamination; a single food or liquid item thrown into a recycling bin could irreversibly contaminate paper and cardboard materials.

Housekeeping collects recycling bins in residential and academic buildings and Facilities collects external bins and brings them to a central collection site. Facilities sorts trash and recycling according to the color of the trash bag inside the bin. White bags are recycled and clear bags are trashed, though this policy is not publicized to students or staff, and often bags are seen in their wrong respective bins (Figure 4). It is not clear whether these bags are always properly distinguished, and anecdotal evidence points to instances in which both clear and white bags were simply trashed (A. Reyes, personal communication, 17 Oct 2018). An industrial trash compactor is available at the collection site and landfill trash weight is recorded accurately, though recycling weight is not. The school's recycling is collected along a route that includes the other Claremont Colleges and some small businesses nearby, so estimates of annual recycling tonnage or recycling contamination rates are made by the Azusa MRF and are not specific to Pomona (Figure 6). Further, estimates of the College's produced recycling tonnage are pre-sorting estimates, and do not reflect the amount that is truly recycled after accounting for contamination (I. Quintero, personal communication 15 Oct 2018). This makes accurate estimation of diversion and recycling contamination difficult, emphasizing the importance of campus waste audits to collect campus-specific recycling data and to gauge recycling contamination rates.

The City of Claremont established a composting program in response to AB 1826, state legislation passed in 2015 that requires mandatory commercial organic recycling throughout California. While the city must report business compliance to the state every year, there are no current penalties for those who do not comply (Bramlet, 2012). As of the 2018 school year, all post-production and some pre-production food scraps from the Pomona dining halls are composted through Burrtec Waste Industries, Inc. Preproduction vegan food scraps and the

contents of compost tumblers around campus are picked up by and composted at Pomona's Organic Farm. The Farm cannot accept compostable non-food items, and while the City will accept compostable utensils, napkins and plates for occasional large events, it cannot accept them on a regular basis. These products create lower quality compost and the facility is not equipped to handle them. Although the dining halls on campus are required to compost, on-campus businesses like the Coop Fountain and Sagehen Café are not, and as of October 2018 are not doing so. They previously composted, but after compost was infrequently collected they were deterred (C Yarck, personal communication, 2 Nov 2018).

Figure 4. Ambiguous bins at the Smith Campus Center. White recycling bags are in unlabeled bins that are presumably trash. October 31, 2018.

Dining Halls

Pomona has three dining halls on campus. They have a contract with Sodexo, but all dining services employees are employees of Pomona. The dining halls have taken several steps to reduce both food waste and material waste in the pre and post food production stages. Bulk purchasing eliminates unnecessary packaging, and moving napkin dispensers from tables to a centralized location in the dining hall has been estimated to reduce napkin usage by 40 percent, which is significant because napkins cannot be composted or recycled in Claremont (J. Martinez, personal communication, 5 Oct 2018). To provide a take-away option while remaining conscious

of waste, each student at Pomona receives a credit for a green clamshell container and reusable cup that can be used to eat meals outside of the dining halls and take beverages to go.

Dining halls also have an obligation to minimize food waste and to discourage wasteful behavior on the part of the students. Since 2009, the dining halls have been trayless, which reduces food waste because students are inclined to take less food, and reduces water use because the dish machines do not have to operate for as long. The Sustainability Office estimates trayless dining reduces food waste by at least 10 percent. The Food Recovery network, launched in 2008, picks up leftovers at the end of each meal and delivers it to a homeless shelter. This program donates approximately 400 meals per week and significantly reduces the College's food waste (Pomona College, n.d.-c). Reducing portion sizes – for example of pancakes and pastries, and making sliders instead of entire burgers – has been another way the dining halls have implemented waste-minimization practices.

The Pomona website advertises that the dining halls use certified compostable disposables in all operations including catering. However, the benefits of this "environmental initiative" are somewhat questionable. Certified compostable materials are not always environmentally preferable to plastic or paper disposables, especially in Claremont because of Burrtec's limited composting capacity. In the event that Burrtec does agree to specially compost these materials as it has for large Zero Waste events, using compostable materials is beneficial as long as they are properly sorted. But sending "compostable" material to the landfill is just as problematic as sending non-compostable materials. Food and other certified compostable materials are meant to be composted in specific environments requiring microorganisms, carbon, water, oxygen, nitrogen and very high heat. In the dark, anaerobic environment of a landfill, even food waste decomposes at an extraordinarily slow rate, releasing significant quantities of methane in the process (Rathje et al., 1992). Rathje et al., (1992) excavated over 21 landfills and uncovered preserved perishables like heads of lettuce, hot dogs, corncobs, and readable newspapers. An order of guacamole they unearthed in 1992 was discovered "almost as good as new, [sitting next to] a newspaper apparently thrown out the same day. The date was 1967" (Grimes, 1992). Thus, compostable material is not inherently low impact in its post-use life, emphasizing the importance of using reusable dishware in catered events.

Figure 5. City of Claremont recycling guidelines. Reprinted from Residential Refuse and Recycling Regulations by the *City of Claremont, California* n.d., Retrieved from https://www.ci.claremont.ca.us/government/departments-divisions/community-services/trash-and-recycling/residential-refuse-and-recycling-regulations

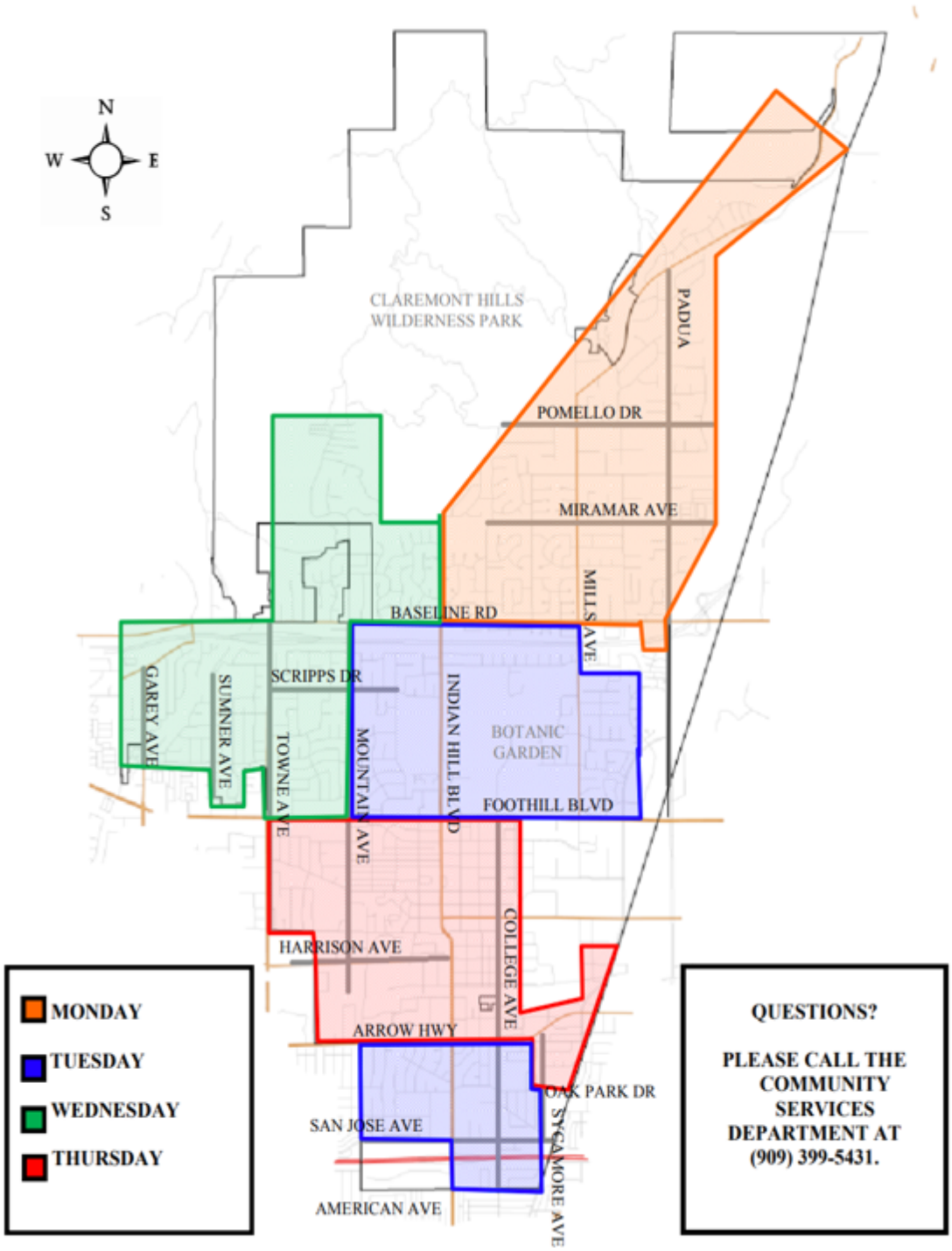


Figure 6. City of Claremont refuse/recycling collection schedule. Reprinted from Trash and Recycling by the *City of Claremont, California* n.d., Retrieved from https://www.ci.claremont.ca.us/home/showdocument?id=982

The President's Advisory Committee on Sustainability (PACS)

This committee of faculty, staff, and students meets biweekly during the school year and is responsible for reviewing and monitoring campus operations that directly affect the College's use of resources, creating campus sustainability reports to assess progress, developing strategies, outreach, and programs for increasing campus sustainability and administering the President's Sustainability Fund. The sustainability reports provide valuable information to keep the campus community informed about ongoing sustainability efforts. Additionally, the President's Sustainability Fund provides funding for sustainability-related infrastructural or operational changes proposed by students or staff. Since 2007, the fund has administered over $40,000 for projects including water bottle refill stations, beverage dispensers to reduce plastic water bottle use at Class Day, and reusable bags at the Coop Store (Pomona College, n.d.-a)

Sustainability Office

The Sustainability Office at Pomona develops, coordinates and assesses sustainability efforts on campus. It runs a number of waste-related campus initiatives including the Greenware reusable dishes events kit, ReCoop and ReCoop office, the Free Room, and E-waste handling. The Greenware events kit provides reusable plates, bowls, cups, and cutlery to students, staff, and faculty for campus events. In 2017-2018, 691 pounds of reusable utensils and plates were checked out free-of-charge from the Sustainability Office for club events or dinners.

ReCoop is a student-run program that promotes reuse and responsibility for items on campus by collecting items donated and left behind during move-out weekend re-selling them in a reuse sale in the fall. Typically, the program diverts over 20 tons each year. As an extension of the ReCoop program, ReCoop office enables departments and offices on campus to easily exchange unwanted office supplies and furniture. Because ReCoop only operates at the end of the year and usually does not collect items like clothes, small accessories, art supplies or other miscellaneous objects, The Free Room on campus targets this neglected waste stream. It collects all of these items through student donations and holds weekly hours where students can donate and take items for free throughout the year.

The College's electronic waste is handled by a certified and approved E-waste handler with verified appropriate practices. The Smith Campus Center and Sustainability Office function as e-waste collection sites through which batteries, light bulbs, and other hazardous wastes are

disposed of with an approved handler. Seven tons of hazardous waste and 7.7 tons of computer waste were diverted in 2017-2018 (Pomona College, 2018). All of these endeavors succeed in reducing waste on campus; however, the issue of waste mis-sorting on the part of students and faculty is largely neglected.

Events

Large campus event are massive waste generators. Prior to 2018, it is estimated that 20 tons of landfill waste were produced from Alumni Weekend and Commencement combined[22] These events use disposable plates, cutlery and cups, and prior to the 2018-2019 year food waste was sent to the landfill. But in 2017, a President's Sustainability Fund grant proposal written by Abby Lewis '19 created a replicable Zero Waste package for major college events; the first was the 2018 Commencement, during which less than two pounds of landfill waste were produced. This required significant planning and collaboration prior to the event in order to ensure that no disposable materials were sourced and that only recycling and compost bins were supplied at the event. The City agreed to accept non-traditional compostable products and catering agreed to make a number of changes to their setup including compostable tea bags, biodegradable coffee stirrers, and the replacement of individual sugar packets with shakers filled with bulk-purchased sugar. During the 2018-2019 school year, this template was used to host a Zero Waste Founders day that produce less than one pound of landfill waste. These efforts have major positive implications for Pomona's waste stream and are certainly necessary if the College is to achieve its Zero Waste goal. Plans to execute additional Zero Waste events throughout the school year are currently underway.

Though targeting events is critical, the bulk of the College's waste is not produced at these large events. In one year, Pomona typically produces over 1000 tons of waste and sends over 500 tons of that to the landfill. In order to address the day-to-day decisions and behaviors that contribute to our waste stream, more sweeping infrastructural and institutional changes are needed.

[22] Estimate used by Pomona '19 student Abby Lewis in her President's Sustainability Fund grant proposal titled "Zero Waste Events Package"

Waste Goals

In its 2017 Sustainability Report, Pomona identifies a 2030 Zero Waste goal. It has some smaller, precursory waste goals but ultimately does not have a comprehensive Zero Waste Action plan that sets clear objectives and courses of action against a timeline (Pomona College, 2018). In the following section, the 2020 waste goals will be presented and assessed, and 2030 goals will be discussed briefly to identify where improvements need to be made (Table 1). All of the following data was obtained from the Pomona College Sustainability Office database.

In the 2017-2018 year, Pomona recorded a 49.49 percent diversion rate[23] diversion rate, which is 25 percent lower than the 2020 75 percent diversion goal (Figure 7). Though the College reduced total waste sent to landfills by 38 tons from the previous year, it increased the amount of landfill waste by 2 percent from the 2013-2014 baseline year, and decreased total comingled recycling by 84 tons (Figure 8). In the 2016-2017 year, the College faced difficulties with compost contamination and was largely forced to cease composting, which resulted in a mere 6 tons of compost in 2017. In the 2017-2018 year, this figure increased to 66 tons by implementing a compost bin checkout program, establishing a pick-up program, installing large compost tumblers, and hosting the first Zero Waste commencement (Pomona, 2018). Given the College's new composting partnership with the City as of the 2018-2019 year, it is expected that a significant amount of food waste will have been diverted from the landfill via the dining halls during this year.

It is not particularly useful to discuss historical diversion rates because of the poor quality of those data, but they will be briefly discussed precisely for the purpose of highlighting the consequences of inaccurate data reporting. Beginning in the 2010-2011 year and ending with the 2017-2018 year, recorded diversion rates are as follows: 60.01 percent, 84.16 percent, 75.92 percent, 84.71 percent, 84.84 percent, 52.13 percent, 48.44 percent, and 50.28 percent (Figure 7). These rates are highly inaccurate; in 2012 the College received a significant overestimate from the City of Claremont for recycling tonnage, and this estimate was simply carried over to diversion calculations in the next years until 2016, when a much lower, more accurate estimate was given. This reveals a concerning lack of good data practices. Additionally, in 2015 scrap metal recycling was calculated incorrectly, drastically overstating how much metal had been recycled. That mistake was corrected in 2016 and revealed a lower, much more accurate

[23] A 50.28 percent diversion rate if construction waste, e-waste and hazardous waste are included

diversion rate than had previously been recorded. Because large construction projects occurred in 2012-2014, this also artificially inflated diversion rates. Excluding construction, e-waste and hazardous waste from calculations reveals diversion rates of 60.01 percent, 56.49 percent, 56.64 percent, 59.09 percent, 60.73 percent, 51.58 percent, 47.44 percent, and 49.49 percent for the same string of years. With accurate recycling estimates, the rates prior to 2016 would have been even lower. The fact that diversion rates were overestimated by over 30 percent for numerous years is problematic, as it not only misrepresents Pomona's sustainable achievements but also may have stalled action on the part of the Sustainability Office. For 2030, the waste-related goals are as follows:

- 75 percent reduction in total waste sent to landfills (based on FY14)
- 90 percent of white copy paper purchased is 100 percent PCW and FSC certified
- 90 percent of non-standard paper purchased is at least 30 percent PCW and FSC certified
- Five major campus events are Zero Waste
- Achieve Zero Waste
- 100 percent proper disposal of hazardous waste and a 90 percent recycle rate for electronic waste
- 90 percent documented diversion rate of construction waste (Pomona, 2018)

Though the paper-related goals do not directly relate to waste that the College produces, they address landfill waste and deforestation on the larger market scale. 100 percent post-consumer waste paper substantially reduces landfill waste and deforestation; instead of chopping down trees and milling the timber into pulp, PCW paper is made by processing newspaper, junk mail, office papers, and similar materials to remove ink, forming the pulp into paper, and selling it to be used again. As of 2018, 25 percent of standard white copy paper at Pomona is 0 percent recycled, 69 percent is 30 percent recycled, 5 percent is 100 percent recycled, and 1 percent is 10 percent recycled (Figure 9). The percentage of non-standard[24] paper that is at least 30 percent PCW increased by 10 percent from 2017. However, the percentage of 100 percent PCW white copy paper purchased decreased by 3 percent (Pomona College, 2018). To meet 2020 purchasing goals, the college will need to expand the current PCW paper purchasing effort.

During 2018, the Duplicating Office ran a pilot program testing TreeZero paper, which is 100 percent carbon neutral and recyclable paper made from recycled sugarcane waste fiber. The pilot

[24] This includes paper that is nonstandard because of size, color, finish etc.

program was very successful, and plans are underway to expand the use of TreeZero paper to the whole campus, though it is unclear when or if this expansion will occur. The College also has yet to meet its goal of establishing a centralized purchasing program, as currently departments make all of their purchases, including paper, independently (A. Reyes, personal communication, 5 Oct 2018)

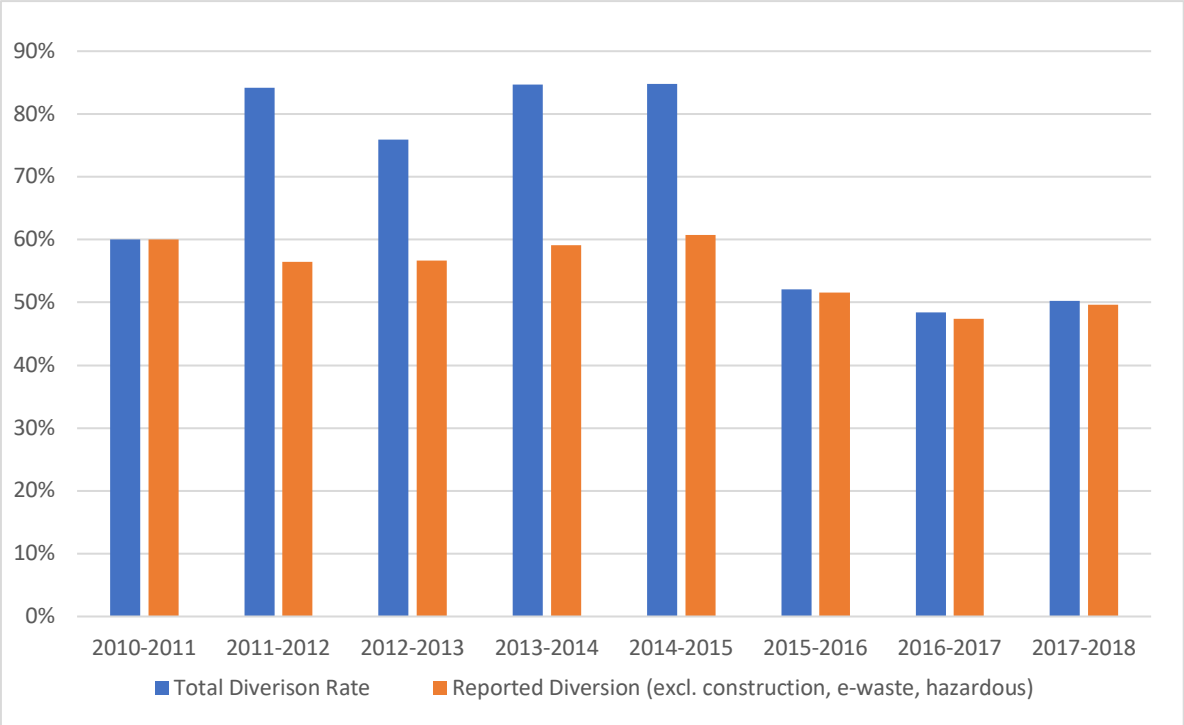


Figure 7. Recorded Total Diversion and Corrected Diversion rates for 2011-2018**.** Rates prior to 2016 are dramatically overstated due to data inaccuracies and the prevalence of construction projects on campus. Orange bars indicate rates excluding construction, e-waste ad hazardous waste.

Table 2. *Progress Towards Pomona's 2020 Waste Goals*

2020 goal	Performance Data	Status
50% reduction in total waste sent to landfills (based on FY14)	**2% increase** in landfill waste since 2014 (521.93 vs. 511)	**Off Track**
25% of white copy paper purchased is **100 percent** PCW[25] and FSC certified	**5%** achieved	**Off Track**
25% of non-standard paper purchased is at least **30 %**PCW and FSC certified	**23%** achieved	**On Track**
Establish centralized purchasing for paper	Not done	**Off Track**
100% of College letterhead purchased is sustainable	Not done	**Off Track**
Two major campus events are Zero Waste	Commencement 2018 & Founders Day 2018	**Completed**
Achieve **75%** waste diversion rate	**50.28%** diversion rate	**Off Track**
Partner with the city of Claremont to participate in an industrial composting program	Not done	**Off Track**
Track and quantify hazardous and electronic waste production and disposal	14.29 tons of hazardous and electronic waste donated/disposed	**Completed**
90% documented diversion rate of demolition waste	Yes	**Completed**
75% documented diversion rate of construction waste	**92.46**% documented diversion rate[26]	**Completed**

All data obtained from the Pomona Sustainability Office database

[25] Post Consumer Waste and Forest Stewardship council

[26] Based on two construction projects: The Pomona College Art Museum 2017-2018 (94.21percent diversion rate) and Millikan hall 2014-2015 (88.24percent diversion rate)

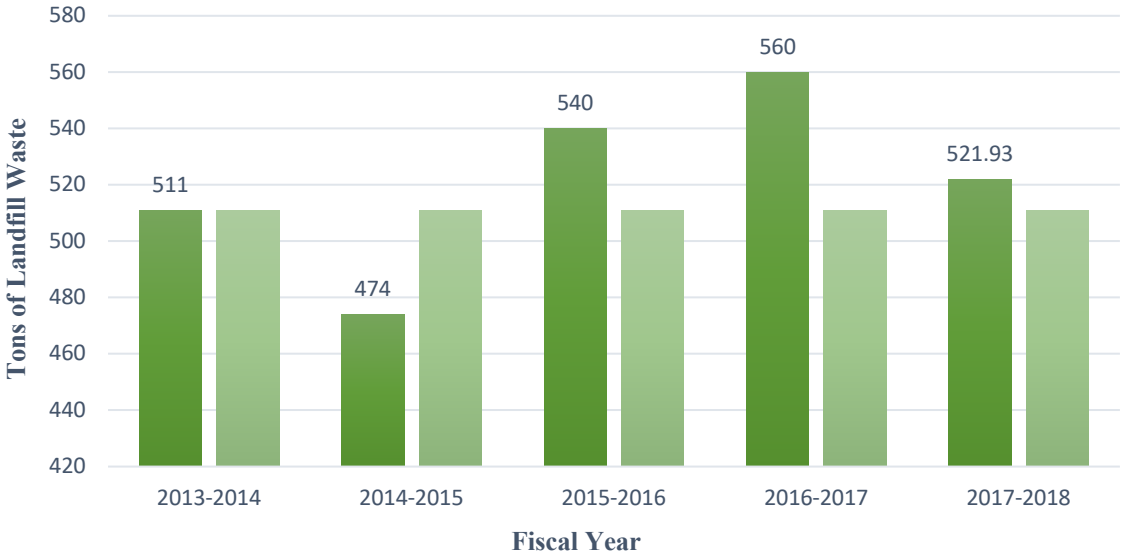


Figure 8. Total tons of waste sent to the landfill compared to the 2013-2014 baseline. The baseline is indicated in light green.

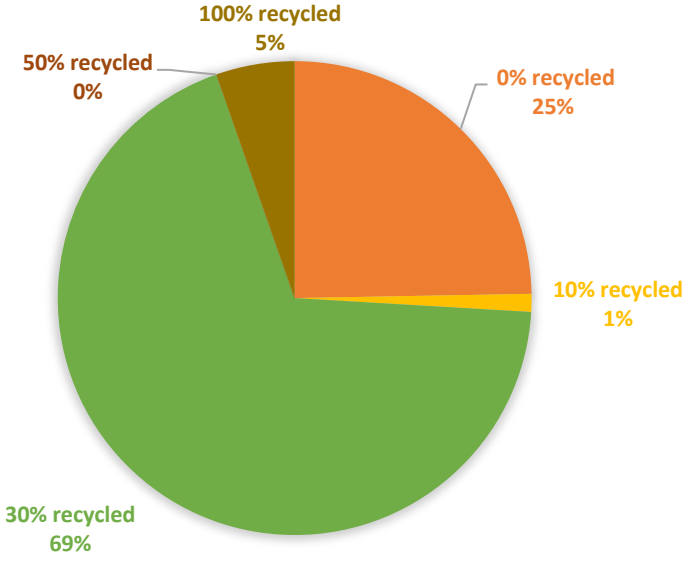


Figure 9. 2017 breakdown of white copy paper purchases.

Waste Audit

Pomona usually completes a yearly waste audit to assess diversion potential and contamination rates in recycling. No waste audit was completed in 2017 because waste-stream data was not being actively utilized, according to the Assistant Director of Sustainability at Pomona. (A. Reyes, personal communication, 15 Oct 2017). This is concerning, as assessing the composition of the waste stream provides critical information that enables an institution to identify what and where materials are being incorrectly sorted, and what the diversion and source reduction potentials are. This year, I organized an audit that increased sample sizes from six bags of recycling and trash from every building category to eight bags of each, and I audited Rains Athletic Facility for the first time. The audit aimed to assess seven building categories: academic, science, administrative[27], residential[28], athletic and the Smith Campus Center. However, no bags were collected by Facilities from the Smith Campus Center. Instead, a larger sample was collected from the dorms. Facilities were also unable to collect a sample from dining. Thus, the audit assessed the remaining five categories. "Academic" bins were collected from Richard C. Seaver, Seaver North, Carnegie, and Pearsons, and the "Science" sample was collected from Millikan. Though some of the audited "academic" bins are in fact from science buildings, this is not thought to affect the overall composition of the waste, but it should be corrected in future audits.

During the audit, first trash and then recycling bins were emptied and sorted into categories. We separated waste into 13 different bins that each corresponded to a category. Past waste audits have not attempted to identify the composition of the landfill waste, but in this audit we divided landfill waste into seven categories in an attempt to identify which materials should be targeted for source reduction. These categories were: paper towels/napkins, soiled boxes/plates, plastic utensils (including straws), Styrofoam, plastic bags/wrappers, clothes/furniture, and "other" landfill trash like coffee cups and materials with nonrecyclable mixes of plastic, metal and/or paper. If the audit were to be done again, it would be preferable to add disposable coffee cups and plastic utensils to the "soiled boxes/plates" category due to the large number of cups and small quantity of plastic utensils. We sorted recycling into plastics #1-7, paper, cardboard, glass and metal. Compost was its own category, and contained only food

[27] Bins were collected from Alexander Hall and Sumner
[28] Bins were collected from Clark 1, 3 and 5

waste to represent the current composting capacity of the City. Any compostable food containers were grouped with soiled boxes/plates. E-waste and hazardous waste were not included because past waste audits have not typically found either of these materials, and the same was true with this audit. We recorded by first weighing empty bins and then weighing bins with material at the end of each building category. We emptied bins only when they became close to full, so where bins were not emptied between building categories we subtracted recorded bin weights from the previous category's weight to find net weight. To determine volume, sorters compressed bin material and then estimated the percent fullness of the bin, which was then used with the bin volume to estimate gallons. Volume is a valuable measure because landfills are filled and closed on the basis of volume, not weight (Rathje, 1992). But because volume was a rough estimate and dependent on the estimation tendencies of different sorters, weight is generally the more reliable metric in this audit.

Results of the audit revealed significant diversion potential and relatively high rates of recycling contamination. Overall, landfill trash, compost and recycling made up 56.1 percent, 24.3 percent and 19.4 percent respectively of trash bin composition by weight, and 66.4 percent, 3 percent and 30.6 percent by volume (Figure 10). Paper towels and napkins were the largest landfill category after "other landfill waste," making up 15.9 percent of total waste by weight and 16 percent by volume. Plastic bags and wrappers were the third largest weight category at 11.1 percent and the largest volume category (18.3 percent), even greater than "other landfill waste" (18 percent). By weight, recyclable plastics (#1-7) were the largest recyclable category in trash bins (8.4 percent), followed by paper (3.9 percent), cardboard (3.2 percent), metal (2.5 percent) and glass (1.4 percent). Compost comprised a substantial portion of trash bins (24.3 percent). Together, these results reveal a diversion potential of 43 percent, and even greater if materials like soiled cardboard and compostable food containers were accepted by Burrtec. The Academic category had the highest diversion potential (51.04 percent), with trash bins containing 42.7 percent recyclable material and 8.33 percent compostable material (Figure 11). Residential areas and Rains Athletic Facility also had high diversion potentials (47.9 percent and 44.9 percent) driven by large quantities of compost (31.1 percent and 31.2 percent) (Figure 11).

Recycling contamination rates were significant. 26.6 percent of recycled material was landfill trash, and 1.9 percent was compost for a total contamination rate of 28.5 percent (Figure 10). Paper towels (11.8 percent) and plastic wrappers/bags (6 percent) were the biggest

contaminants, which may be due to confusion about recyclability rather than due to laziness, as these materials are variations of other recyclable materials like paper and #1-7 plastics. Disposable coffee cups were also commonly found in recycling, the cup part of which is not recyclable due to the plastic film that coats the inside.

The materials recycling facility in Azusa reports a recycling contamination rate of around 25 percent, self-identifying as one of the dirtiest inbound recycling facilities in the country (B. Mcgill, personal communication, 9 Nov 2018). By this estimate and the results of the waste audit, Pomona is contaminating recycling at a rate 3.5 percent above this average. Although recycling is much less contaminated in 2018 than it was in 2016, this may be due to anomalous 2016 data and the fact that dining was not audited for this thesis. In 2016, 49 percent of recycled material was landfill trash, and recycling was 52 percent contaminated with the inclusion of compost. However, broken down by building category, dining was the main source of contamination. 80.9 percent of all recycled material in the dining halls was landfill trash, while other building categories had contamination rates closer to 7 percent (administrative and academic) and 16 percent (residential). The fact that dining was not included in this 2018 audit may mean that the this particular source of recycling contamination was not identified; it could also be that dining's recycling practices in 2016 were anomalous or have since changed, especially given the recent transition in dining hall managers.

If the sample is representative of campus-wide trends, then slightly better sorting rates were observed when compared with previous years. We observed a slightly lower diversion potential in this waste audit than in previous years driven by a higher percentage of landfill waste in trash bins and less compost and recycling (Figure 12). This is true particularly when comparing 2018 with 2014 and 2015, which both had diversion potentials of 69 percent. The 43 percent diversion potential in 2018 is roughly comparable to that of 2016 (49 percent). Examining results of past waste audits further problematizes the pre-2016 diversion rate estimates discussed on page 37, as observed diversion potentials of 69 percent are not compatible with the calculated 84 percent total diversion and reported 60 percent[29] diversion in 2014-2015.

[29] When excluding construction waste, hazardous waste and e-waste

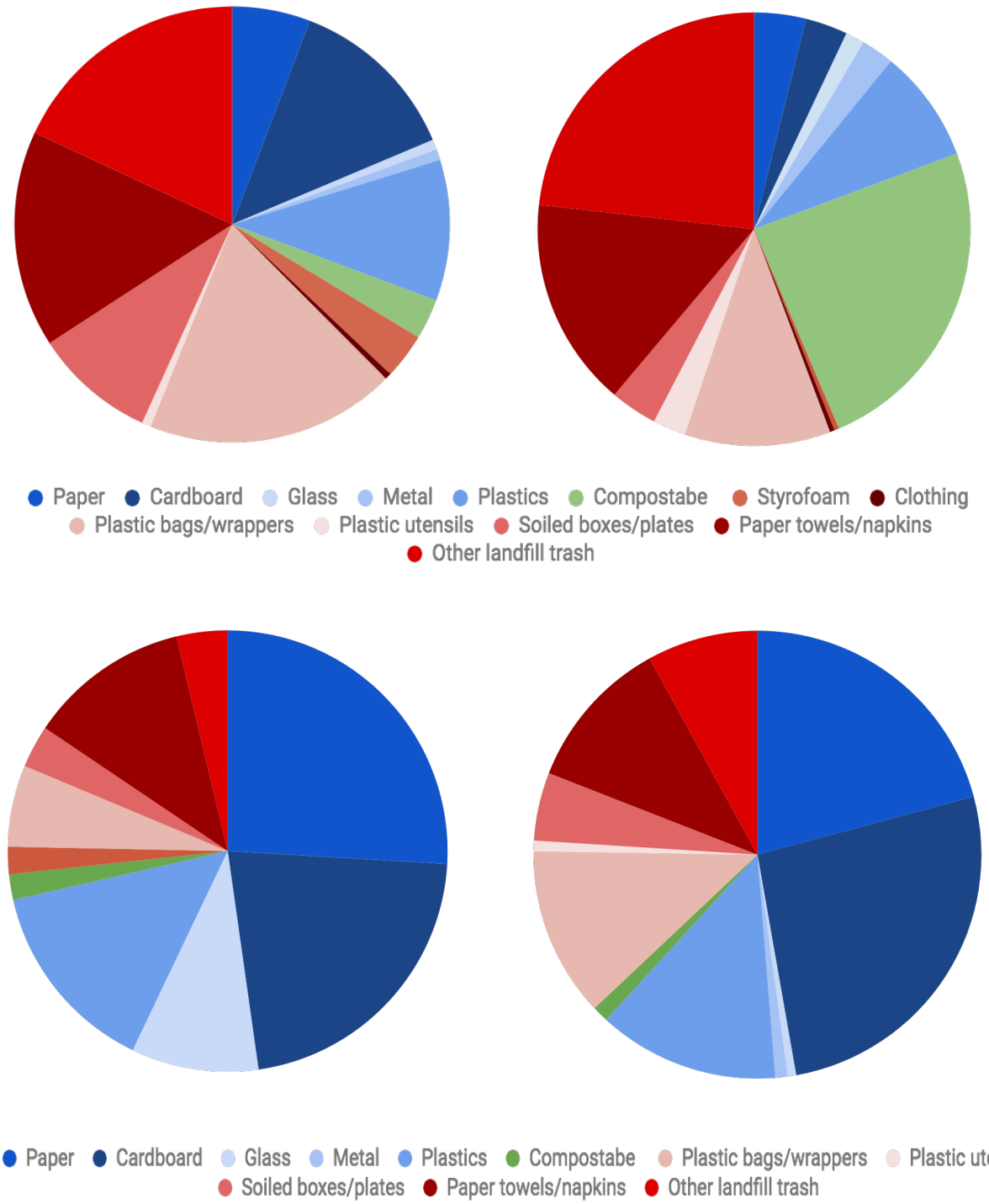


Figure 10. Total trash and recycling bin composition from the 2018 waste audit. Results of trash bin (top) and recycling bin (bottom) composition in terms of: Percent Weight of Total (left) and Percent Volume of Total (right). All trash categories are in variations of red/pink, and all recycling categories are in variations of blue. Compost is indicated with green.

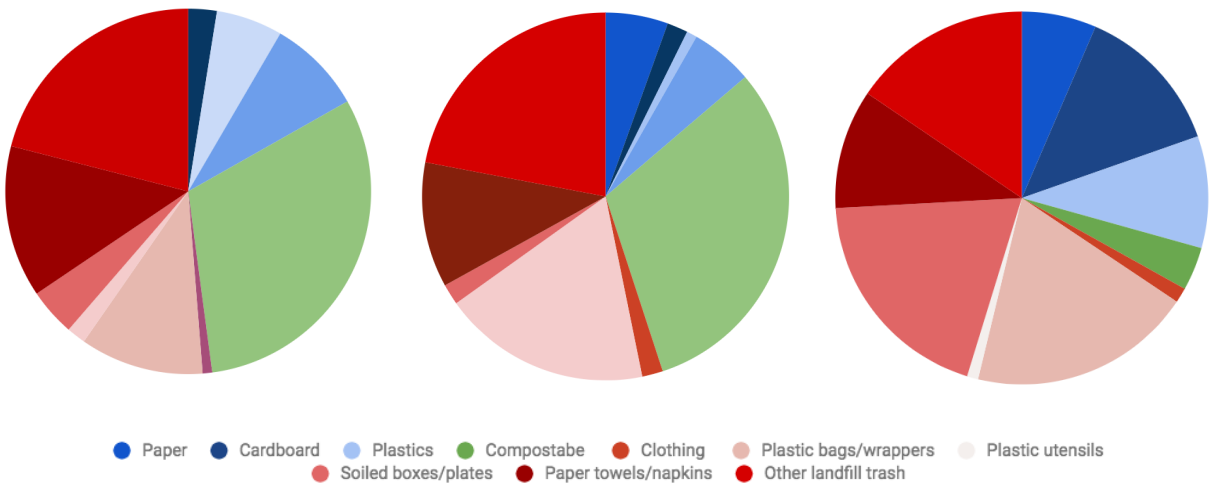


Figure 11. Trash composition by weight in three building categories. Displays the breakdown of percent weight in trash bins from left to right: Residential buildings, Rains Athletic Facility and Academic buildings. The greatest diversion potential is shown in the Academic category (51.04 percent), with 42.71 percent of recyclable material and 8.3 percent compostable material.

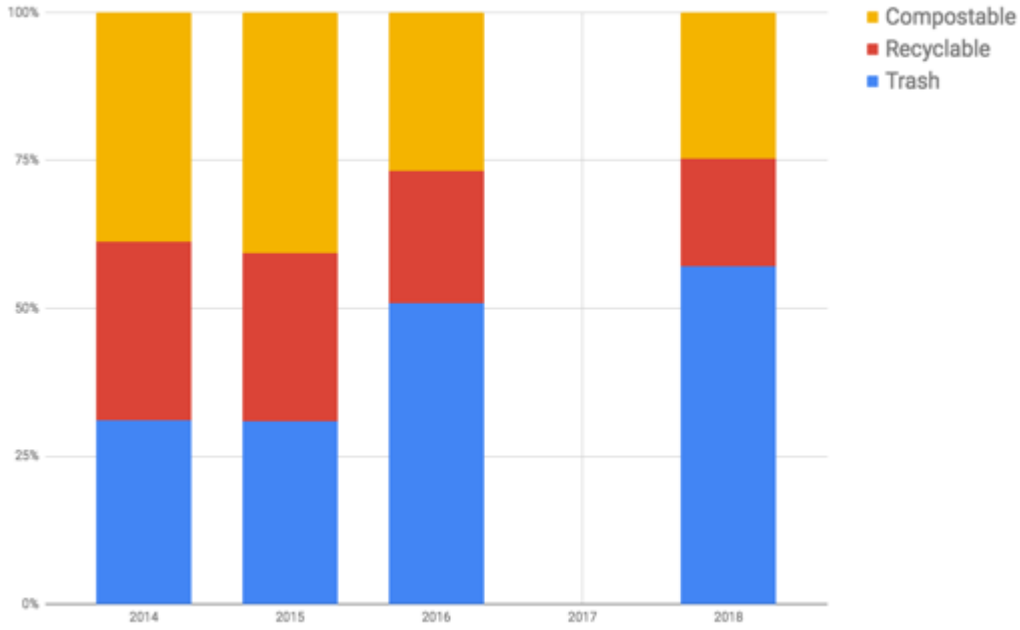


Figure 12. Diversion potential in 2014, 2015, 2016 and 2018. The amount of trash in trash bins has increased, while mis-sorted recyclable and compostable material have declined somewhat compared to 2014 and 2015. No waste audit was completed in 2016.

Bin infrastructure

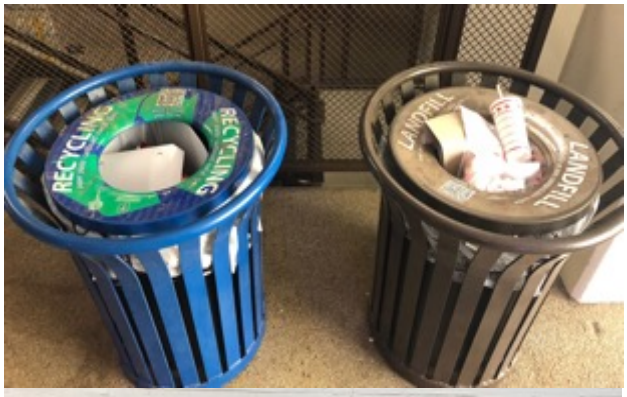
Pomona College's external bin infrastructure is alarmingly unstandardized. Different buildings and campus areas have a variety of bin styles, many of which are unlabeled, unpaired and ambiguous. By completing a thorough walk-through of campus, I identified over a dozen different styles of bins, none of which have informative signs and most of which have no signs at all (Figure 13). In total there are 140 exterior trash cans and only 69 exterior recycling bins on campus, meaning that about half of the trash bins are not accompanied by a recycling bin (R. Neumo, personal communication, 4 Dec 2018). When unlabeled and unpaired, trash bins provide no alternative and passerby are likely to throw recycling or compost into these bins along with their landfill waste. Kevin Quanstrum and Orland Gonzalez of Facilities explain that it has been an uphill battle for them to standardize bins across campus; they have historically been overridden by architects who have selected and installed bins based solely on aesthetic considerations, and other bins have been donated by parents (O. Gonzalez and K. Quanstrum, personal communication, 7 Nov 2018). Many of these bins are not only unlabeled, but send conflicting messages about what type of bin they are. Unlabeled bins that would typically be regarded as trash may have white recycling bags in them, and landfill bins with clear plastic bags may have large blue accents (Figure 14c).

However, Facilities has implemented one set of standardized bins across campus that are a step in the right direction (Figure 14a). These are clearly color-coded—blue for recycling and brown for trash—are paired at each of their locations, and have signs developed by the Sustainability Office and Communications team that provide some indication of what should go into each bin.[30] There are 48 and 47 of these trash and recycling bins respectively. Facilities admits that total standardization of bins across campus is ideal, though expressed substantial surprise at the number of stand-alone and ambiguous bins on campus. Said Mr. Gonzalez of the miscellaneous bins, "some of these bins have just been around forever, so we just leave them there."

[30] They indicate that recycling accepts "paper, plastic, cardboard metal, glass," and landfill accepts "non-recyclable or non-compostable waste"

Figure 13. A sampling of Pomona's exterior bins on campus. The vast majority have no signage and provide no sorting guidelines. Many stand on their own and send conflicting messages with bin and bag color.

a.



b.

c.

d.

Figure 14. A sample of bin pairings at Pomona College. a) shows the most desirable pairing: standardized and color-coded bins that are labeled and have some indication of what should go inside of them; b) bins are labeled, though offer no sorting guidance and are not color-coded; c) bins are unlabeled and the trash bin (judging from the clear plastic bag) is blue like the recycling bin next to it; d) two identical, unlabeled bins sit next to each other, distinguished only by their bag colors.

Student Knowledge Base of Waste Practices

To assess the student knowledge base of sorting and waste at Pomona, I created a survey in conjunction with a waste-awareness week hosted by the Pomona Eco-Reps. The survey assessed students' knowledge of Pomona's Zero Waste goal and of correct waste-sorting by Claremont's standards. Survey respondents were recruited by tabling at Frary dining hall during five dinners. Those that entered the dining hall were asked if they would complete the survey, and they did so if they were willing, A link to the survey was also posted on all class Facebook groups and shared at other waste-related events throughout the week. Because it was a voluntary survey, it likely represents the knowledge of a more environmentally–conscious sample of the student population than is representative, as those who clicked the online link or attended waste-

related events were likely to have an environmental inclination. Nonetheless, results indicated notable confusion regarding proper sorting practices (Table 3). The vast majority did not know that a "compostable" coffee cup could not be composted in Claremont, and many thought that paper towels were recyclable, results that align with the waste audit data. In the free-response recommendations section, several survey respondents indicated that they wished there had been some sort of orientation on campus waste-sorting. One student noted: "when I came to Pomona, nobody really told me what the bins were for," and another affirmed this, noting, "coming from a city that still doesn't have recycling collected, having recycling as part of the freshmen orientation would be helpful. I still don't wholly understand recycling/composting." A significant majority indicated that signs on the bins and other educational resources would help them better sort waste.

Table 3. *Results of Waste-Sorting Survey*

Item	Answered Recycling	Answered Compost	Answered Landfill
Compostable coffee cup	8.7 percent	72 percent	**19.1 percent****
Paper towel*	29 percent	3.5 percent	**67.5 percent**
Cookie	0 percent	**88.6**	11.4 percent
Chip bag	22.6 percent	0.9 percent	**76.5 percent**
Soiled pizza box	11.3 percent	5.2 percent	**83.5 percent**
Cardboard Amazon box	**97.4 percent**	1.7 percent	0.9 percent

*The question on paper towels was initially mistakenly created with options "landfill," "trash," and "compost," but upon identification of the error, "trash" was substituted for a "recycling" option. The proportion of "recycling" answers would likely be higher had the recycling option been available the whole time.
**correct answers are indicated in bold

CHAPER 4: RECOMMENDATIONS

According to Cortese (2005), a university system consists of four dimensions, namely Education, Research, University Operations and External Community, which have often been seen as separate and based on hierarchical and competitive structures. Lozano (2006) adds a fifth category, "Assessment and Reporting," that should be considered in an ongoing manner. Although this thesis primarily addresses University Operations, Assessment and Reporting, and Education to some degree, I acknowledge that a truly sustainable campus requires an understanding of the interdependence among these dimensions and the necessity for collaboration between them. Additionally, though many of these recommendation will discuss infrastructural and post-consumer behavior, I will attempt to address the responsibility of the college to target deeper psychological and behavioral changes to work towards the idea of "green citizenship."

Given the significant diversion, waste-reduction and contamination-reduction potential, the following section will outline suggestions to improve Pomona's diversion rate and general culture of waste-consciousness. I will address physical and infrastructural improvements, educational and assessment tools, opportunities to target waste-stream components, departmental participation and the duty to promote green citizenship. The following broad recommendations will be discussed in detail in this section:

- Improve Campus Bin Infrastructure and Signage
- Implement Educational Campaigns
- Improve Data, Reporting and Transparency
- Revise Pomona's Environmental and Procurement Policies
- Target Waste Streams
- Improve Departmental Coordination
- Promote Green Citizenship

1. Improve Campus Bin Infrastructure and Signage

Standardization of bin infrastructure and signage across campus will provide a critical foundation to support educational efforts and to simplify sustainable decision-making on the part

of the consumer. Given Pomona's current haphazard collection and organization of bins and total lack of signage, it is unsurprising that mis-sorting rates are high.

Recycling and trash bins ought to be paired at every location and clearly distinguished, preferably through color-coordination. Given the large number of "orphan" trash bins, this will require the purchasing of additional recycling bins. Following the example of UC Irvine, recycling bins should always be blue or have an obvious blue accent, and miscellaneous, older bins that we eventually hope to phase out should be used as landfill bins. While taking these steps in the interim, the College must develop a plan to move to full campus bin standardization that involves purchasing new bins. Piloting the implementation of Big Belly bins in high traffic areas could provide an opportunity to reduce waste-pickup frequency and to have real-time reporting on waste data. Currently, it is problematic that there is not one entity in charge of making bin decisions on campus; going forward, Facilities, with support from and consultation with the Sustainability Office, should be given the ultimate decision-making power for bin planning and implementation. To make sorting more intuitive for both students and the Facilities staff, it is recommended to use blue clear bags for recycling and clear bags for trash. Keeping color coordination constant across all stages of the waste-sorting process will streamline the process and better ensure its success. Based on large quantities of compost observed in residential and athletic waste streams and on survey responses that lamented a lack of compost bins, compost needs to be more easily accessible on campus. This would involve installing more compost bins in high-traffic areas and rolling out the dorm kitchen composting program that was scheduled to go into effect this year.

Signage must also be universal. On every bin across campus a sign must clearly label it trash or recycling and depict common items the bin accepts. This could be modeled after UC Irvine's design, but with Pomona's own branding and logo (Figure 15). The College could also use RAA standardized signs, though those are not as well-tailored to Claremont's specific sorting guidelines. Using specific examples is important; people generally know that paper, aluminum and glass are recyclable, but often do not know that plastic bags, plastic utensils or soiled boxes have to go in the landfill. Indoors, connected trash and recycling bins like those at UC Irvine should be installed. These infrastructural changes will serve as the departure point for creating a more waste-conscious campus, and are necessary to ensure the success of the educational campaigns and policy changes.

Finally, encouraging on-campus businesses like the Coop Fountain and Sagehen Café to participate in the City's composting program would offer a concrete avenue for higher rates of diversion. The Sagehen Café previously composted, but stopped because it was infrequently collected. Given our new partnership with the City of Claremont, these business should be encouraged to participate in the City's program, which would regularly pick up compost at no cost. Sagehen Café owner Cheryl Yarck estimated that the two businesses fill one large bin with food waste every day.[31] Installing compost bins would be an easy way to divert food waste from these businesses and from students that are throwing away other food in the vicinity.

Figure 15. UC Irvine's bin signs for recycling, compost and trash. Reprinted from *How We Recycle at UCI* by the University of California, Irvine, n.d., from http://www.fm.uci.edu/files/units/HowWeRecycleatUCI.pdf

2. Implement Educational Campaigns and Provide Educational Resources

Universities have a pedagogical responsibility to not only grow students academically, but to evolve them into more environmentally conscious and responsible citizens through practical and experiential education. Educational campaigns are essential to shift student and faculty behavior regarding waste reduction, reuse and waste sorting. These campaigns are also in demand from the students themselves, who point to a lack of educational resources and trainings

[31] The precise volume of the bin was not specified.

as a cause of sorting confusion. Educational initiatives must start immediately when new students arrive on campus with a formalized orientation event that, in addition to introducing students to the Sustainability Office and the sustainable resources on campus, provides a hands-on and interactive "how to" for waste-sorting at Pomona and for minimizing waste generation. In addition to a waste-sorting introduction, the orientation event should provide tips for reducing waste by: shopping with a reusable bag, bringing a reusable mug to cafes, and limiting purchase of items with disposable packaging. Orientation could provide a "Zero Waste Toolkit" that includes a guide for waste-sorting, a reusable mug/thermos and a canvas bag for shopping. These tool-kits could be funded and piloted through the President's Sustainability Fund. Currently, Eco-Reps present to sponsor groups[32] about the Sustainability Office, but a formal orientation slot would better emphasize the College's commitment to sustainability on campus and broadcast a sense of administrative support. To better create institutional-wide change stemming from participatory approaches, Disterhef (2012) emphasizes the importance of presidential support and affirmation of bottom-up efforts. To create a broadly educated campus, new faculty and staff at the beginning of each semester should also receive a short workshop on sustainability focusing on Pomona's waste goals and the sorting requirements of the City.

Pomona's participation in the ReycleMania campaign, which I am currently in the process of organizing, is recommended as part of the ongoing education process. During RecyleMania, waste demonstrations, tabling at dining halls, educational waste-sorting competitions, competitions to "go zero-waste for a week," and aggressive signage will aid in shifting student and faculty sorting and consuming behavior. This along with weekly diversion-rate and competition standing reporting will mobilize students to improve their waste-sorting and waste-creating behaviors while collecting valuable data for the College.

Additionally, general informational resources that can be consulted throughout the year should be developed and available on Pomona's website. These may include videos that: demonstrate the waste-sorting guidelines at Pomona; describe the College's Zero Waste goal and its importance; provide a virtual tour of the Azusa waste facility emphasizing the magnitude of waste generation and the consequences of waste mis-sorting. Other resources should include a link to the Azusa facility's website and a visual guide to recycling.

[32] Groups of first-years that live in the same hall and are headed by two sophomore "sponsors."

3. Improve Data, Reporting and Transparency

Reliable data collection and reporting are essential to track goals, assess the effectiveness of new programs and infrastructural changes, and celebrate successes. Currently, the College only receives reliable data for landfill waste, which it gets monthly from the City of Claremont. Waste audits are performed annually at most, and data is not well-reported to the campus body. Consistent monitoring and evaluation of goals is important to allow more transparency and enhance credibility, and to in turn support participants' disposition for continuous participation in campus waste efforts (Disterhef, 2012). To more accurately measure and report diversion, the College should invest in a recycling compactor so that recycling output can be precisely measured; at minimum, Facilities should consistently record the estimated volume of recycling and report it to the Sustainability Office on a monthly basis. Along with the data collected during RecycleMania, the Sustainability Office or the EA30 class[33]should perform a waste audit semi-annually. The results of the audit should be advertised with signage around campus, through emails to students, and on Pomona's Sustainability webpage to hold the College accountable for the contents of its waste-stream. Paired with information on how to improve the sorting mistakes that are identified in the audit, this information will aim to tie the issue of waste to the personal, tangible actions of the student and staff and to inspire behavioral change. Additionally, the Sustainability Office should conduct diversion and waste-stream audits after major infrastructural or educational changes to assess the success of the initiative.

To create a greater sense of community ownership over and involvement in the Zero Waste goal, the Pomona Website should have an easily accessible, informative webpage linked to the Sustainability Office that details ongoing Zero Waste efforts and achievements. Currently, Pomona's "Vision for Sustainability" webpage is uninspiring; in discussing the "Vision for Waste," it says only "Reduce, reuse or divert our waste to create a responsible, healthy, Zero Waste campus," but provides no further information on Zero Waste. In a separate section of the website under "What we're doing on campus" three of the waste goals are listed and some achievements are highlighted, namely the Zero Waste commencement, but further information on Zero Waste is again absent. Additionally, only select, positive pieces of data are advertised; without the context of the larger dataset, it is impossible to tell what the actual status of waste diversion and generation on the campus are. Available on an updated webpage should be: a

[33] One of the core class requirements for the Environmental Analysis major at Pomona

comprehensive Zero Waste strategy with the 2020 and 2030 Zero Waste goals and their current statuses; an engaging graphic that reports Pomona's current diversion rate and the composition of its waste-stream; graphic results of the most recent waste audit and; photos and descriptions of recent waste successes. Increased transparency will push the College to take more urgent action to meet its Zero Waste goal. In general, the Sustainability webpage needs to be more visually engaging, more transparent, and more frequently updated[34] in order to function as an accurate source of the College's sustainability-related information.

4. Revise the Pomona College Environmental and Procurement Policies

Policies provide a framework to guide activities and decisions across campus and to hold deciding entities accountable. Given the College's stated commitment to environmental values and its image as a sustainable campus, its policies ought to reflect and enforce these values, particularly as they pertain to the somewhat neglected topic of waste. To more strongly emphasize the importance of environmentally preferable purchasing, it is recommended to revise the Environmental and Procurement Policies and to develop a Guidelines for Business Partners Policy. With the current system of departmental purchasing, each department should be supplied with green purchasing guidelines and a list of approved vendors.

The environmental policy discussed on pages 29-30 is neither accurate nor holistic. Unlike the policies of the schools discussed in Chapter 2, Pomona's policy does not include any concrete commitments to green purchasing and/or vendor agreements, despite the fact that Environmental Awareness is considered, if weakly, in the college's Procurement Policy. It also fails to acknowledge the responsibility of colleges for evolving students into responsible and environmentally-conscious citizens.

Importantly, because each department makes its own individual purchases, it is difficult to coordinate sustainable purchases across campus. A centralized purchasing program like that at Oberlin College and many other larger Universities like the UCs and ASU would allow larger bulk purchases that reduce packaging waste and enable shifts to more sustainable products like 100% PCW paper to occur simultaneously across campus. The Procurement Policy at Pomona would then ideally provide guidelines for all purchases with strong preference given to environmentally favorable products, and not simply to efficiency and cost-effectiveness. In the

[34] It has not been updated since 2016.

interim, the current procurement policy, which gives agency to individual departments to make purchasing choices, must be revised to more aggressively require environmental considerations. Based on policies from University of California, (2018) and Oberlin College, (2015), additions to the Environmental Awareness section of Pomona's Procurement Policy could include the following points. Pomona College will:

1) Employ total product life-cycle analysis and full cost accounting to evaluate current and proposed purchases. Based on these analyses, the College will select materials that minimize environmental costs and maximize environmental benefits on campus and beyond. This means favoring materials that have minimal packaging, are recycled or reusable, sustainably harvested, non-toxic and biodegradable, and/or energy-efficient.
2) Favor local products, when possible, to gain a variety of environmental and economic benefits.
3) Use its purchasing power to target environmentally preferable products and services for volume-discounted pricing to make them cost-competitive with conventional products and services.
4) Integrate sustainability requirements into its practices for competitive bidding in material and services procurement, allowing for suppliers that meet these requirements to gain favor in their evaluations.
5) Procure products with packaging that is designed, produced and managed in an environmentally sustainable manner. The College shall seek products that have take-back programs, as appropriate.
6) Minimize products containing known toxins where viable substitutes are available.
7) Request that suppliers citing environmentally preferable purchasing claim provide proper certification or detailed information on environmental claims, including benefits, durability, and take-back, reuse and recyclable properties.

To identify environmentally undesirable purchases that campus businesses and other departments of the College are making and to ensure that life-cycle analyses and full-costing accounting are carried out, it is recommended to establish a Sustainable Purchasing Committee and/or Sustainable Purchasing Intern. Duties will include reviewing purchasing, researching products, and seeking and offering sustainable alternatives. This would be most feasible as a

compliment to the centralized purchasing program. The intern/committee would employ total product life-cycle analyses and full-cost accounting to reveal the environmental costs of various purchases and suggest preferable alternatives. Using this information, the intern/committee would create a Green Purchasing Guide with regard to Zero Waste and other environmental categories like energy and carbon, water, toxins and pollutants, bio-based products and renewable fuels, forest conservation, buildings and landscaping, transportation, food and garments and linens. For a detailed example of purchasing guidelines for each of these categories, see the Arizona State University (2018) Sustainable Purchasing Guidelines. This policy could be edited to reflect Pomona's location and partnerships and, as our system stands currently, made available online and sent to department heads to guide their purchasing decisions. However, centralized purchasing would better enable the College to monitor and ensure that these guidelines are followed.

It is also important to consider the environmental effects of on-campus businesses and their purchases. Collaboration and communication with the Sagehen Café, Coop Fountain, and Coop Store should be leveraged to encourage agreements with green vendors and to eliminate or find alternatives to products like Styrofoam and straws. Currently at the Coop Fountain, "for here" orders are served in red baskets lined with wax paper or in Styrofoam bowls (Figure 16). It would be preferable to have a "for here" option in which washable and reusable plates, bowls etc. are used. The Sustainability Office could achieve this through collaboration with the Coop Fountain owner and the submission of a President's Sustainability Fund grant for reusable dishware. The Coop Store's purchases should also reviewed to identify opportunities for product swap-outs. The sustainable purchasing intern/committee would ideally work with these business-owners to identify and implement these changes, thereby establishing better and more consistent communication between businesses, purchasing bodies, and the Sustainability Office, and creating a more unified campus sustainability effort.

Sustainable purchasing agreements with on-campus businesses and other vendors should be a policy that the College creates and actively abides by. Although Pomona's Procurement Policy mentions that a vendor's environmental reputation could be considered, the policy should be more holistic and explicit. Based on Oberlin College's Guidelines for Business Partners, the basics of a potential vendor-leveraging policy may appear as follows (Association for the Advancement of Sustainability in Higher Education, 2017):

Pomona College Policies, Guidelines and Agreements with Business Partners:

Because sustainability is important to Pomona College, when selecting vendors, negotiating contracts and conducting business, environmental considerations must be tended to.

The college can increase the likelihood that it will achieve its sustainability goals by proactively working with vendors to promote sustainable practices and products. The College will favor vendors with demonstrated expertise in and commitment to sustainability and resource use efficiency. Specifically, the college will wherever possible:

1. Convey in writing its goals for source reduction and will encourage vendors to help us achieve these goals. This document will emphasize the institution's adherence to 'total product life-cycle analysis' leading to closed-loop scenarios in product development, design, packaging, shipping, and the return of products for recycling, reuse ad remanufacturing.
2. Work with other area institutions to increase its leveraging and buying power. This has the potential to expand across to sustainable products as well as create monetary savings.
3. Instruct vendors to notify buying staff of all of the environmentally sensitive products or services that they provide and plan to provide.
4. Favor "Products of Service" when available. This arrangement allows the consumer to purchase the service of a product while the manufacturer retains material ownership of the product. It creates an economic incentive for the manufacturer to produce durable products that provide valuable services to the customer.
5. Minimize the generation of materials destined for landfills or incineration, and seek relationships with waste vendors that help Pomona achieve this goal by developing cooperation mechanisms to audit, monitor, and reduce waste streams.

Figure 16. Disposable materials at the Coop Store and Coop Fountain. a) Styrofoam bowl at the Coop Fountain b) wax paper and nonrecyclable paper trays at the Coop Fountain; c) Styrofoam at the Coop store; d) eggs packaged in Styrofoam at the Coop Store Nov 1, 2018.

5. Target Waste Streams

With the results of the waste audit, it is possible to identify landfill waste streams that should be targeted for reduction and elimination. Paper towels were a major waste culprit, comprising 15.6 and 16.1 percent of trash bin weight and volume respectively. At Wesleyan University in Connecticut, similar results from a waste audit prompted the University to eliminate paper towels from all residential buildings and replace them with electric hand dryers; this was done with the exception of "guest" restrooms, which retained paper towels.[35] Indeed, 2

[35] The precise meaning "guest" restroom was not clarified

percent of total landfill waste in the US is paper towels (Ream, 2010). In comparing the environmental impact of paper towels to that of electric hand dryers, electric hand dryers are found to be the preferred option, especially when they operate with cold instead of warm air (Budisulistiorini, 2007; Montalbo et al., 2011; Joseph et al., 2015). MIT scientists completed a lifecycle analysis of paper towels and air hand dryers (taking into account manufacturing, transportation, dispensing, materials and disposal) and found that paper towels and warm hand dryers have the highest environmental toll, generating 70 percent more carbon emissions than new, high-speed dryers that use cold air. The study found that the environmental effects of recycled paper towels equaled those of virgin paper towels by a number of environmental measures including CO_2 emissions and water consumption. Both recycled and virgin paper towels were found to generate over three times the carbon emissions of high-speed, cold-air dryers (Montalbo et al., 2011). There are some hygiene concerns with electric hand dryers; some studies have found that hand dryers dispel potentially bacteria-containing water droplets (Kimmitt & Redway, 2016). However, others have found no significant differences between the amount of bacteria left on people's hands after using hand dryers and paper towels (Matthews & Newsom, 1987). Generally, these debates occur in the context of environments that require substantial sterility like hospitals or food preparation environments, and sufficient handwashing should negate hygiene concerns on college campuses. Based on these findings, I recommend that Pomona College eliminate paper towel dispensers from its bathrooms on campus in favor of high speed, cold-air dryers like the Dyson Airblade hand dryers, which have filters installed to capture microbial particles so that hands are cleaned with filtered air (Dyson, n.d.)

Coffee cups and plastic bags were other significant landfill categories. Providing students with reusable mugs and shopping bags could aid in reduction of this waste-stream, but ultimately wrappers and snack bags pose a significant barrier to Zero Waste and will require a systemic change on the manufacturing level. As previously mentioned, large quantities of compost in trash bins should be addressed with more available composting infrastructure.

6. Improve Departmental Coordination

Despite a strong commitment to sustainability and demonstrated environmental victories, the approach to sustainability and waste at Pomona could be substantially better coordinated and institutionalized. Sustainability efforts come mainly either from the top down or from the

grassroots efforts of students, with little action occurring at the departmental level. The presence of administrative support is important; presidential endorsement of initiatives like Zero Waste events has been key to their success. Indeed, the President's Advisory Committee is able to advise at the highest administrative level to create top-down changes. From the bottom up, the Sustainability Office can support student efforts that aim to educate and inform behavioral change. However, true institutional change requires better integration at all levels of college activity, particularly at the departmental level. Departments heads should be educated, informed and mobilized with regard to sustainability initiatives, as should student liaisons. These representatives should meet with the Sustainability Office at the beginning of the year to learn about the resources available to green their operations. Provision of a "Zero Waste Events" guide would enable departments to green their events without having to do time-consuming research.

To work through an example of improved departmental involvement, I will examine Rains Athletic Center, which offers a slightly different opportunity than academic departments but provides transferable suggestions. Thus far, Rains has largely been excluded from sustainability audits or initiatives, and this thesis identified a high diversion potential for the facility. Most teams host several food-serving events throughout the year, and at the beginning of Fall and Spring seasons all of the teams gather for a kick-off barbeque. These events are never equipped with compost bins and use disposable utensils, plates and cups. This year I attended a Pomona-Pitzer football "tailgate" and noted substantial presence of single-use items including plastic water bottles, individually packaged condiments and cookies, and single-use utensils and plates (Figure 17). No compost bins were present to collect food waste. Because team events are typically "catered" by parents and families of players, they are more difficult to control than larger events like Commencement and Founders Day. But there is still work that can be done; to better integrate sustainability into athletic events, I propose that each team in the athletic department have a sustainability ambassador; these athletes will make up a sect of the Student Athletic Committee (SAC) and act as a line of communication between the Sustainability Office and the Athletic Department. Equipped with resources, knowledge and contacts from the Sustainability Office, the committee will be better able to plan events that use Greenware, ensure the presence of compost and recycling bins, and provide parents with purchasing guidelines that minimize the amount of disposable material. For the all-athlete barbeques put on by the department, Athletics can utilize the Zero Waste events package developed for Commencement.

This way, instead of the Sustainability Office imposing unwelcome or misunderstood guidelines, the department will change and mobilize from within, guided by those with access to the right knowledge and resources.

Figure 17. Single-use items at Pomona-Pitzer football tailgate. Nov 10, 2018.

7. Promote "Green Citizenship"

Though my recommendations thus far are important, they largely do not address deeper psychological and behavioral underpinnings of waste-generation. To move beyond interventions that seek to create "green consumers," Pomona has a responsibility to foster and support the development of "green citizens" in order to curb the College's aggregate resource and energy use (Harbo, 2017). Again, I wish the emphasize the imperfect nature of the term "citizenship," which I use not in a nationalistic sense but only to expand this discussion to at once address the internalization of environmental values and a sense of external duty that manifests tangibly in every-day action. Pomona's commitment to green citizenship should be communicated to new students when they arrive on campus. A speech from the College

President or other high-profile speaker should emphasize the importance of minimizing our environmental impact and redefining or "need" for the things that contribute to our waste-stream so damagingly. In order to guide students away from wasteful behaviors, Pomona first needs to convince students that waste reduction and sustainable action are integral values of the College itself. Just as orientation currently emphasizes the importance of being an active preventer of sexual misconduct, a responsible user of alcohol and an open-minded learner, so too should it emphasize being an environmentally responsible consumer and inhabitant of our planet. New students should be made mindful of their environmental impact–and its social implications– by calculating their ecological footprint and learning the sources of Pomona's food, water and energy and the destination of our waste. A trip to the Azusa material recycling facility should be an optional but highly encouraged orientation opportunity that would better connect students with the implication of their consumptive actions. In the face of increasingly urgent environmental crises, it would be appropriate to have a mandatory first year class on sustainability—holistically, with integration of social and economic issues and with critical discussion of the commodification and inaccessibility of the green consumerism movement–that ties individual actions and behaviors to the larger environmental crises. A visit to the Azusa MRF could then be a field trip as part of this class. Empirical research reveals that individuals find the pursuit of competence (e.g., learning new skills), frugality (e.g., pursuing resourcefulness), community participation and opportunities for meaningful action to be intrinsically satisfying and effective motivators of long-term environmental stewardship (De Young 1996; Ryan & Grese, 2005; Ryan, Kaplan, & Grese, 2001). Thus, offering tour or volunteer opportunities at waste facilities, local environmental sites, and environmental justice organizations could inspire behavioral change and students' relationships to resources. In order to maximize participation, these opportunities could all be part of a first year course.

Another way in which green citizenship can be promoted is through the act of sharing resources, skills and services. Pomona does this to some extent with ReCoop, the Free Room and the Green Office program, which all promote the reuse of materials. These resources should be heavily advertised and their use normalized to promote resourcefulness and thriftiness on campus; along with the positive environmental impact of thrifting, this makes pro-environmental behavior more accessible for those with limited financial resources.

Barriers to Zero Waste

In the event that all of these recommendations were implemented, barriers remain to achieving Zero Waste at Pomona and beyond. Though we can control how the college educates its student body, operates its infrastructure and to some extent makes its purchases, limitations manifested at the local City level, and at the larger cultural and economic scale exert often unavoidable influences.

The limitations of the city composting and recycling facilities make the normalization of Zero Waste events difficult; because Burrtec can only accept compostable material on rare occasions, it would require event leaders to make special arrangements with the facility for every event at that they wish to throw, which would likely increase the frequency of events such that the facility would no longer be able or willing to accommodate them. Because the composting program is relatively new, it is likely that an industrial composting program will eventually come to fruition, but for the time being its absence operates as a substantial barrier. However, to prepare the campus for the potential of industrial composting, laying the groundwork by creating templates for campus-wide Zero Waste events and establishing relationships with vendors that use compostable packaging are encouraged as forward-thinking actions. In general, disparate capacities of cities and regional facilities to process waste poses a notable barrier to the standardization of waste education and waste-management initiatives.

The unprofitability of recycling is also of substantial concern. Because the Azusa MRF currently only recycles #3-7 plastics about half of the time, our diversion rate estimates are likely inflated and underestimate how much our campus is sending to the landfill. Finding domestic markets for recyclables and new uses for traditional landfill waste are larger, national and international problems that are out of our control.

Similarly problematic, and largely already addressed, are deeply ingrained cultural and behavioral norms that require a holistic shift in the way that we evaluate our positionality and our relationship to resources. Drawing from Yuval Harari's thoughts on romantic consumerism, we are ultimately motivated to consume by our subscription to the dominant myths of our day; Westerners have been molded by humanist, romantic, nationalist and capitalist myths that have been around for centuries, feeding our supreme sense of self-importance, our desire for knowledge and travel in order to make the most of our human experience, and our greed, indulgence and impulses to buy that stem from the forces of the capitalist-consumerist ideal

(Harari, 2016). These ideas offer the ideological basis for Lehman and Crocker (2013)'s identified motives to consume: our desire to improve ourselves and enhance our knowledge through education and travel, and the social pressure to buy and update our "stuff." The desire for more precise control over our environment via technology and convenience acts as another force driven by technocratic and capitalist ideals, and is tangibly symbolized by single-use items, large quantities of packaging and services like Amazon Prime. Reducing the prevalence of disposable items on campuses and beyond is currently somewhat stymied by a lack of available substitutes on the market, and can be addressed as the production of reusable items and packaging evolves. As discussed in the previous section, situating environmental values at the forefront of school, city and country governance missions will need to provide a template for human behavior moving forward.

Society-wide, the potential for association of the Zero Waste Movement with elitist "eco-movements" has the capacity to alienate populations. As a concept, sustainable living must be decoupled from the commodified and exclusive "eco-lifestyle" movement that promotes green consumerism and undeniably caters to liberal, white, middle-class, elitists that have the means and education to buy into such narratives. This fuels the unfortunate conflation of sustainability as a concept with elitism and the reproduction of white privilege (Harper, 2007). Rather, sustainability and green citizenship must be considered holistically with attention to a multitude of interconnected human issues like racial injustice, gender equality, wealth distribution, integrity, food security, community service, and environmentally conscious living – particularly resource use– as a complement to human wellness.

CHAPTER 5: CONCLUSION

In a world that is increasingly populated and resource-constrained, our current consumption and disposal patterns are unsustainable. Waste pollutes our water and atmosphere, endangers wildlife, contributes to climate change and environmental injustice and is implicated with the depletion of natural resources. The Zero Waste philosophy is one that reexamines our traditional conceptions of waste, attempting to emulate the cyclical nature of resource-use in nature to reduce, and ideally eliminate, the material that we send to the landfill. This philosophy is emerging in governance narratives across the world, as cities and institutions seek solutions to growing and unmanageable quantities of waste.

As a college with an environmental agenda and a Zero Waste goal, Pomona College must build upon and more systemically integrate this agenda to achieve its Zero Waste goal. Recommendations for improving waste management and diversion on campus include: improving campus bin infrastructure an signage, implementing educational campaigns, improving data, reporting and transparency, revising the College's environmental and procurement policies, targeting waste streams, improving departmental participation, and cultivating a culture of green citizenship. Universities and Colleges not only have a responsibility to deliver formal education, but to effectively offer environmental and sustainability learning in a way that evolves students into conscious citizens and effective environmental leaders in society. To do this, colleges themselves must serve as role models for sustainable development, environmental management and social responsibility by implementing interdisciplinary solutions and supporting holistic changes in campus relationships to the environment, and particularly to waste.

As environmental disasters continue to confront us, we may find that applied ideological shifts like Zero Waste, which ask us to change the ways in which we conceptualize and use resources, will need to emerge in a big way. We must challenge cultural myths of consumption, growth and superfluity, critically reassessing the exploitative positionality that we have afforded ourselves on this planet.

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