

CHAPTER 6: PLASTIC WATER BOTTLES

Dina Sabatelli

6.1 Introduction

6.1.1 Overview

One million plastic bottles are purchased around the world every minute and 480 billion were sold in 2016. According to research collected by The Guardian, it is estimated sales of single use plastic bottles will surpass 500 billion bottles sold annually by 2021. For reference, if each bottle cost \$1, with \$500 billion dollars you could give over \$13,000 to each individual in China. The EPA cited that in 2013 recycling and composting prevented 87.2 million tons of waste from going to a landfill, however, only 31.3 percent of PET (clear, lightweight plastic) bottles and jars were recycled in the United States.

6.1.2 Environmental Impact of Plastic Water Bottles

Tap water in the United States is closely regulated by the Environmental Protection Agency (EPA). The Safe Drinking Water Act (SDWA) was passed in 1974 to regulate public drinking water supply in the U.S. and sets standards for publically available water to protect against health risks. Bottled water is regulated by the Food and Drug Administration (FDA) as a packaged good. An estimated 50 percent of bottled water is filtered tap water and a study done by the Natural Resources Defense Council (NRDC) estimated that 22 percent of the bottled waters tested have chemical levels higher than state standards. In the U.S., tap water costs less than a penny per gallon, while bottled water on average costs \$1.22 per gallon, over 300 times more than tap water. The environmental impact of creating and shipping plastic bottles is enormous. In 2006 it took 17 million barrels of oil to produce the plastic for water bottles in the U.S., which is the equivalent of enough petroleum to “fuel more than 1 million American cars and light trucks for a year” and takes 2,000 times more energy to produce than tap water.

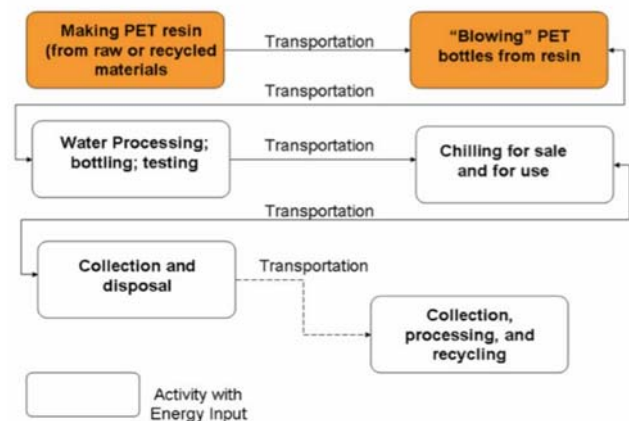


Figure 6.1: Different Stages energy use during the lifecycle of a plastic bottle.

6.2 History of Recycling at Universities

The United States Environmental Protection Agency (EPA) found that 89 million tons of waste was recycled in 2014, for a recycling rate of 34.6 percent. Many people are mindful about the choices they make when it comes to waste and recycling, however, a majority of individuals remain are unaware of how their daily decisions affect the environment. Nationally, universities are taking it upon themselves to prioritize sustainability. Schools such as University of Colorado, Boulder, University of California system, University of Oregon, American University, and other nationally recognized institutions have set goals to transition into zero waste.

Over 80 universities and organizations in the U.S. have joined the Ban the Bottle campaign. Ban the Bottle has been implemented at universities Chapman references as peer and aspirational schools including: Pitzer College, Harvard University, Princeton University, Gonzaga University, Seattle

University, and many others. This campaign seeks to educate university communities about the harmful effects of single-use bottles, with the ultimate goal of ending the sale of plastic water bottles on school campuses.

The College and University Recycling Coalition (CURC) is a non-profit organization that brings universities together to “advance recycling and sustainable materials management”. Participating universities include Vanderbilt University, Pennsylvania State University, and University of San Diego. As of July 2012 it has been mandated that all schools in the state of California recycle, and it encourages K-12 students learn about the environment as a part of their class curriculum.

It is essential for institutions of higher education to stay current with sustainability policies. Increasing sustainability at Chapman not only benefits the university financially, but also increases the overall value of the institution as a whole by reinforcing the Vision and Mission of the University. Ending the sale of plastic water bottles on campus is one way to communicate that Chapman is committed decreasing its carbon footprint.

6.3 Goals of this Chapter

The goals of this chapter are to research plastic water bottle use at Chapman University, assess attitudes towards the use and recycling of plastic water bottles at Chapman, and collecting on-campus data to measure recycling rates. In addition, research of recycling and water bottle policies at other institutions was conducted. This information was used for inspiration and as a reference for effective methods of implementing sustainable practices on a university campus.

6.4 Recycling in Previous Audits

Plastic water bottles are sold at the on campus eateries and given to admission visitors. Typically for catered events Sodexo uses the large water jugs and disposable plastic cups. According to the audit performed in 2013, refillable water bottle stations started on campus in 2010, and the number of units has increased to the point where now almost every building on campus has at least one station. The audit from 2016 contained information about recycling in Argyros Form and found that even after increasing signage, approximately 30% of waste going to the landfill was recyclable and about 30% of the waste in the recycling was not recyclable. In 2013 there were eight refillable water bottle stations on campus and in residence life. By 2016 there were 13 on campus and 2 in residence life. Currently Chapman has 30 refillable water bottle stations on campus.

6.5 Current Status of Plastic Bottles at Chapman

Over twenty million students were expected to attend universities and colleges in the United States. There are currently 8,305 undergraduate and graduate students are currently enrolled at Chapman. On average, less than 26,000 single-use plastic water bottles are purchased each year to sell on campus. This equates to each student purchasing approximately three water bottles on campus in one calendar year. From this data, it can be concluded that plastic water bottles are not frequently purchased by Chapman personnel or campus visitors, which was also confirmed by the trash audit performed on March 14, 2018. Trash and recycling was collected on Tuesday March 13 from 1st floor Argyros Forum, 1st floor of Leatherby Libraries, and Starbucks.



Figures 6.2 & 6.3: All of the plastic water bottles collected from recycling and trash from 1st floor of Leatherby Libraries, 1st floor of Argyros Forum, and Starbucks on campus on March 14, 2018.

Total weight of trash collected from the three locations was 110.31 pounds. Total weight of recycling was 115.36 pounds, for a total weight of 225.67 pounds of trash and recycling. Total number of water bottles collected from the audit was 35. The total weight of water bottles from trash and recycling equaled 1.64 pounds. Plastic bottles made up 0.727% of total weight of trash and recycling collected.

6.6 Survey Data

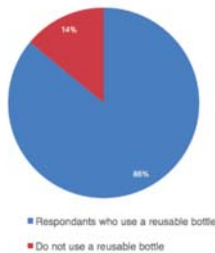


Figure 6.4: Respondents (n = 584) who use a reusable water bottle

An environmental audit survey was open to the Chapman community between March 28 and April 14, 2018 and student, faculty, and staff responses were collected. Of the respondents, 504 (86%) regularly use a reusable water bottle and 80 (14%) do not use a reusable water bottle.

Out of 574 Respondents (**Figure 6.5**), 251 (44%) almost never use a single use water bottle, 149 (26%) use occasionally, and only 48 (9%) use plastic water bottles multiple times a day.

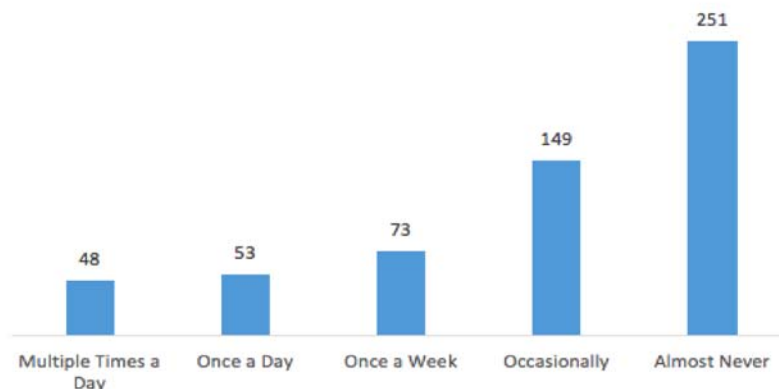


Figure 6.5: how often respondents (n=574) use single-use plastic bottles.

6.7 Ban the Bottle

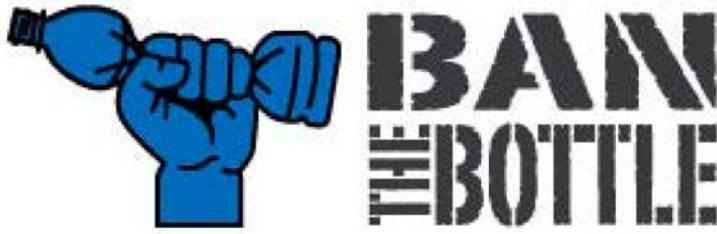


Figure 6.6: Ban the Bottle logo

As stated in the introduction, the Ban the Bottle Campaign is an effort by students around the country to educate university populations about single-use plastic bottles with the ultimate goal of ending the sale of plastic water bottles on campuses. Ban the Bottle is not an

organization that provides schools with step-by step instructions on how to reach the goal, but rather relies on the grassroots efforts of students to implement the movement in the most effective way for their own campus.

University of Portland was one of the first institutions in the country to ban plastic water bottles in 2010, and as of April of 2018, University of Portland also banned plastic straws. Steve Kolmes PhD., Director of the Environmental Studies Program at University of Portland gave insight to how the University was successful in these efforts. The most important thing for banning bottles was providing students with an alternative for single-use bottles through adding refill stations on campus as well as providing students with free reusable water bottles. Additionally, University of Portland took not only an environmental standpoint, but also a human rights standpoint, stating that water is a universal human right and the University shouldn't support the privatization of bottled water by large corporations.

Information collected from the trash audit as well as the survey data convey the message that the Chapman community does not consume many single-use water bottles. The many refill stations around campus make it easy for individuals at Chapman to carry their own reusable water bottles and not have to rely on single-use bottles. For this reason, I believe that banning plastic bottles at Chapman would be a feasible task. After reaching out to the Student Government Association, the president of SGA has voiced his interest in this project and banning water bottles on campus. Chapman's Angora Gift Shop in Argyros Forum and the bookstore in Bhathal Student Services sell reusable water bottles ranging in prices from \$7.95 - \$26.00. Websites such as waterbottles.com have a variety of options for buying reusable bottles in bulk starting at \$0.58 per unit. If the University was interested in providing students with free reusable bottles during orientation (approximately 2,000 students a year), it would cost \$1,160 if reusable bottles were purchased at \$0.58 a unit.

6.8 Sustainability and Strategic Plans at Chapman

Chapman is a liberal arts university that focuses on providing each student with a well-rounded education that will be valuable as a post-graduate. The Vision Statement of Chapman University: Chapman University will be a student-centered institution recognized nationally and internationally as a center of academic and personal excellence that prepares our students to contribute to a global society. The Mission of Chapman University: The mission of Chapman University is to provide a personalized education of distinction that leads to inquiring, ethical, and productive lives as global citizens.



Figure 6.7: Strategic Plan 2019

Every five years since 1993 Chapman has released a 5-year Strategic Plan. The University has been extremely successful in implementing these plans. The Plan for 2013-2018 was “Moving into the Health Sciences.” As the document states, Chapman is continuing to grow and become a more competitive institution with an increasing endowment and an increasing number of students applying to the university. This application cycle Chapman saw a record number of over 14,000 applicants for the fall of 2018.

The newest strategic plan for 2019-2023 is focused on “Engineering the Future of Chapman University”. One of the central commitments for this plan is to “encourage the linkage between a life of learning, and service and vital interaction of the University with our wider communities”. As Chapman continues to grow in terms of enrollment and a nationally and internationally recognized institution, it is essential to be aware of how this growth affects the environment.

Financial Statements for 2017 state that the University’s endowment as of May 2017 was \$352,616,000 and over \$1.25 Billion of total assets, and the University hopes to expand these numbers as a part of the 2019-2023 Strategic Plan, as well as reaching an endowment of \$1 billion dollars in order to be considered a nationally-ranked university by the Carnegie Foundation for the Advancement of Teaching.

Being environmentally sustainable is just as important as being financially sustainable. Taking steps to decrease the University’s environmental impact is a way of reinforcing that the University is forward thinking and expects to be around for a long time. Planning for the future as a campus that focuses on all aspects of sustainability is more attractive to donors because it shows that their investment is more likely to be successful.

Prioritizing sustainability adds intrinsic value to the University. Potential students and donors want to be a part of a university that is conscious of its environmental impact and takes steps in order to decrease its impact.

6.9 Recommendations about Plastic Water Bottles on Campus

6.9.1 Low Cost and/or Effort

- Creating signage around campus with information regarding the impact of plastic water bottles.
- Collaborate with University Program Board, Documentary Club, and Mission Environment to host a screening of the movie *Tapped*, and other documentaries that provide information about plastic water bottles.

6.9.2 Medium Cost and/or Effort

- Provide all new students with a reusable water bottle during orientation.

6.9.3 High Cost and/or Effort

- Work with Student Government Association to start a Ban the Bottle Campaign on campus.
- Give vouchers for Hydroflask and Swell water bottles to students who complete a sustainability training.
- Ban the sale of plastic straws.

6.9.4 Future Areas of Research

- Banning other bottled beverages such as sodas.
- Auditing plastic water bottles in residence life.



Figure 6.8: Mock-up of potential signage <https://www.banthebottle.net/articles/think-before-you-drink-infographic/>

6.10 Contacts

Mackenzie Crigger: Sustainability Manager, Chapman University (crigger@chapman.edu)

Dr. Jason Keller: Associate Professor, Chapman University (jkeller@chapman.edu)

Dr. Chris Kim: Associate Dean of Academic Programs, Chapman University (cskim@chapman.edu)

Dr. Andrew Lyon: Dean of Schmid College of Science and Technology (lyon@chapman.edu)

Eric Cameron: General Manager, Sodexo (eric.cameron@sodexo.com)