The University of Texas at San Antonio Department of Environmental Health, Safety, and Risk Management
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MEMO

Date:	3 August 2018
To:	Tammy Anthony, Assistant Vice President for Budget and Financial Planning at the University of Texas at San Antonio
From:	Madison Schick, Environmental Waste and Recycling Safety Coordinator at the University of Texas at San Antonio
Subject:	Recommendation report for the elimination of plastic bottles from vending machines on campus

The University of Texas at San Antonio provides its staff, faculty, students, and visitors with a multitude of conveniently located vending machines that dispense the large majority of plastic beverage bottles. National and regional studies consistently report that plastic (PET) beverage bottles are the least recycled material, leading these numbers to prove that aluminum cans are recycled significantly more and thus far more profitable. The university undoubtedly contributes to these statistics with the lack of available recycling bins. Research and supporting tasks have been conducted and are further explicated in the attached document: "Implementation of Plastic-Free Vending Machines and Environmentally-Conscious Conduct at the University of Texas at San Antonio: A Recommendation Report".

With the help of my department, various modes of research were utilized in the construction of the proposed recommendation to cease the sale of plastic beverage bottles from all vending machines on campus, eliminate single-stream recycling, and provide and assist in environmental outreach to encourage students and faculty to participate in recycling at the University of Texas at San Antonio.

The solutions listed above have been extensively researched through the success of several tasks, as explained in the recommendation report, including the two tasks: calculate national recycle rates of recyclable materials and compare plastic (PET) beverage containers to aluminum cans, and determine the cost and environmental impacts of single-stream recycling operations versus split-cart recycling. Our third task, marking the completion of all tasks on July 27, 2018 was achieved and is listed as: establish progressive and practical tactics to encourage the University of Texas at San Antonio's students, staff, and faculty of the moral, environmental, and monetary significance of recycling and the ban of plastic beverage bottles.

We recommend the implementation of plastic-free vending machines at the University of Texas at San Antonio. If you have any questions or comments please contact myself, Madison Schick by phone at (903)-390-2019 or by email, at madison.schick@gmail.com.

Implementation of Plastic-Free Vending Machines and Environmentally-Conscious Conduct at the University of Texas at San Antonio: A Recommendation Report

Prepared for:	Tammy Anthony, Assistant Vice President for Budget and Financial Planning at the University of Texas at San Antonio
Prepared by:	Madison Schick, Environmental Waste and Recycling Safety Coordinator at the University of Texas at San Antonio

August 6, 2018

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Abstract

"Implementation of Plastic-Free Vending Machines and Environmentally-Conscious Conduct at the University of Texas at San Antonio: A Recommendation Report"

Prepared by: Madison Schick, Environmental Waste and Recycling Safety Coordinator at the University of Texas at San Antonio

The purpose of our proposal is to urge direct contacts of the University of Texas at San Antonio to cease the sale of all plastic beverage bottles from vending machines with the hope of the complete elimination of all plastic bottles from campus. The university provides its staff, students, and visitors with a multitude of vending machines that dispense plastic beverage bottles. These vending machines remain close to outnumbering the amount of trash receptacles, and even fewer are the number of recycling bins, which are specifically funded and placed on campus for the discard of used plastic. The plastic bottles that are not disposed of in garbage or recycling bins are haphazardly left on benches, campus grounds, dining, and lecture halls. The disproportion in the locations and quantities of trash receptacles to recycling bins admittedly supports nationally funded and conducted studies that report that plastic (PET) beverage containers are the least recycled beverage containing material and are far less profitable in comparison to aluminum cans. In contrast to the negligence some consumers have towards the recycling of plastic, the recycle rates of aluminum cans continue to increase.

The environmental and economic advantages of aluminum cans in comparison to plastic beverage bottles led to our use of several modes of research to investigate the university's concerns including waste, environmental impact, including the effects of plastic use on the San Antonio river, student morale, and attempts at progressive sustainability. The approval granted to the department of Environmental Health, Safety, and Risk Management to research the potential benefits of the eradication of plastic beverage bottles from campus allowed to the discovery of a profound budget opportunity and investigation of establishing split, or dual-cart recycle operations versus the current single-stream recycling operations. Supporting tasks included in the recommendation report also discuss the establishment of progressive and practical tactics to encourage the University of Texas at San Antonio's students, staff, and faculty of the moral, environmental, and monetary significance of recycling, in the attempt to complement the university's decision to eradicate the sale of plastic beverage bottles from all campus vending machines.

The information garnered from extensive research through online databases and universities such as UC Berkeley provide effective substance in the argument for the elimination of plastic bottles from the university. The University of Texas at San Antonio should concur with the fiscal feasibility and environmental recompenses of this recommendation in order to remain competitive to other universities and establish the university's unwavering devotion to its past, current, and future Roadrunners.

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Introduction

The target goal of this recommendation report, and the actions and processes that will take place upon approval, is to implement plastic-free vending machines on campus and pursue environmentally-conscious conduct at the University of Texas at San Antonio. The basis of our research, focused on the possible consequences of eliminating plastic beverage bottles, roots itself in the foundation of ethics, morality, budget opportunity, and fiscal feasibility. The University of Texas at San Antonio faces many challenges trying to keep campus grounds clean. In addition to small debris, plastic bottles may regularly be seen strewn all over campus. Considering that plastic bottles are the least recycled beverage containers, the University of Texas at San Antonio's environmental and morally compromising situation is not alleviated by the lack of recycling bins on campus. In addition, the trash cans that greatly outnumber the recycling bins are largely compromised of unrecycled plastic bottles, which creates even more environmental turmoil. The act of eliminating plastic bottles and instead promoting the purchase and use of aluminum beverage cans provides proper grounds and reason for an increase in educating students and faculty about the fundamental and imperative advantages of recycling.

The research supporting our recommendation of plastic-free vending machines is expected to be completed within a year. The following year, the University of Texas at San Antonio will potentially lead the position as a top institution in the state of Texas for environmental advancements and innovative sustainability. The university's issues of waste, recycling, and plastic bottle use and disposal on campus will remain until the profound advantages of replacing these plastic bottles with aluminum cans are investigated. In order to make effective and responsible decisions on this issue, we must reconsider our choice of utilizing single-stream recycling and weigh the fiscal and environmental costs of continuing this process. Evidence provided in this research report has clearly shown the lack of plastic that makes it to the recycling bin, compared to the energy and cost efficient recycling of aluminum cans. An increase in locations of recycling bins and advocacy for recycling is imperative to the reinforcement of our sole purpose: to eliminate plastic beverage bottles from vending machines on campus with the hopes of decreasing waste and increasing recycling output.

Given the significance of the issues listed above, upon approval the University of Texas at San Antonio's department of Environmental Health, Safety, and Risk Management will accomplish these three tasks:

- Calculate national recycle rates of recyclable materials and compare plastic (PET) beverage containers to aluminum cans
- Determine the cost and environmental impacts of single-stream recycling operations versus split-cart recycling.
- Establish progressive and practical tactics to encourage the University of Texas at San Antonio's students, staff, and faculty of the moral, environmental, and monetary significance of recycling and ban of plastic beverage bottles.

The following sections provide investigative details and supporting research concerning the proposed tasks, credentials, and our intention to serve and improve the university.

Research Methods

The completion of the following tasks listed will allow for the discovery of significant results and beneficial conclusions. The dedicated time allotted to these individual tasks cohesively build towards a collective goal of decreasing plastic beverage bottle waste at the University of Texas at San Antonio.

Task 1. Calculate national recycle rates of recyclable materials and compare plastic (PET) beverage containers to aluminum cans.

The department of Environmental Health, Safety, and Risk Management will utilize online databases to collect national recycle rates of recyclable materials and specifically compare and contrast the rates and overall sustainability of plastic (PET) beverage containers to aluminum cans. The finding of the pros and cons of plastic bottles versus aluminum cans will help determine if the subsequent use of aluminum cans in the replacement of plastic bottles beneficial. Data will be compared to several other peer-reviewed sources to garner factual statistics.

Task 2. Determine the cost and environmental impacts of single-stream recycling operations versus split-cart recycling.

The university currently employs single-stream recycling operations. The research conducted will achieve this task by investigating the efficiency and effectiveness, or lack thereof, of single-stream recycling operations. Comparisons of single-stream recycling versus split-cart recycling data will be gathered from UC Berkeley. UC Berkeley negated its single-stream recycling operations and now utilizes split, or dual-cart recycling. Our team will use this data in support of choosing the most fiscal and environmentally feasible recycling program.

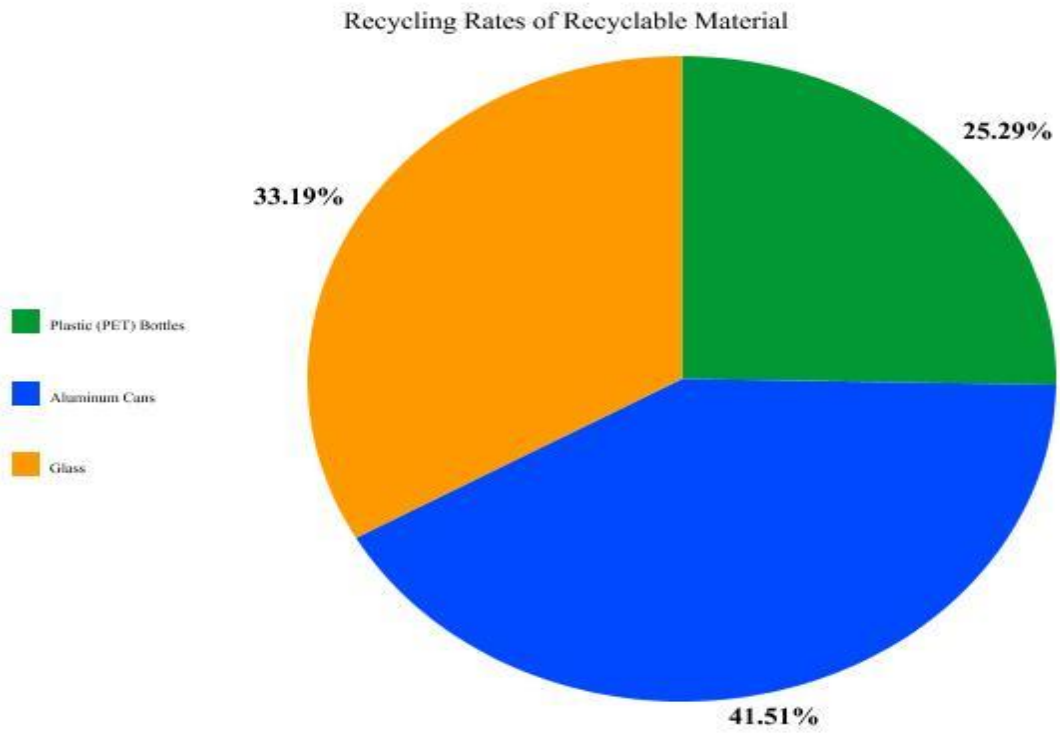
Task 3. Establish progressive and practical tactics to encourage the University of Texas at San Antonio's students, staff, and faculty of the moral, environmental, and monetary significance of recycling and ban of plastic beverage bottles.

Our third task is important to incorporate and research in the hopes of gathering student and faculty support for a plastic-free campus. With the implementation of progressive and practical tactics to encourage students, staff, and faculty to recycle, it is our intention to fulfill this task in order to involve the university's student body and employees in the ongoing efforts toward a more sustainable and forward-thinking campus. We will utilize surveys conducted at other universities in the U.S. in order to create our own survey that UTSA students will complete. From there, we will compare the completed surveys to previously directed surveys. The survey consists of questions such as: "What obstacles, if any, keep you from recycling on campus? Which of the following would encourage you to recycle on campus?" In addition, we will also discuss the potential fiscal benefits the university will acquire as a result of the banning of plastic beverage bottles, as examined from figures and data retrieved from the University of Washington.

Results

Task 1. Calculate national recycle rates of recyclable materials and compare plastic (PET) beverage containers to aluminum cans.

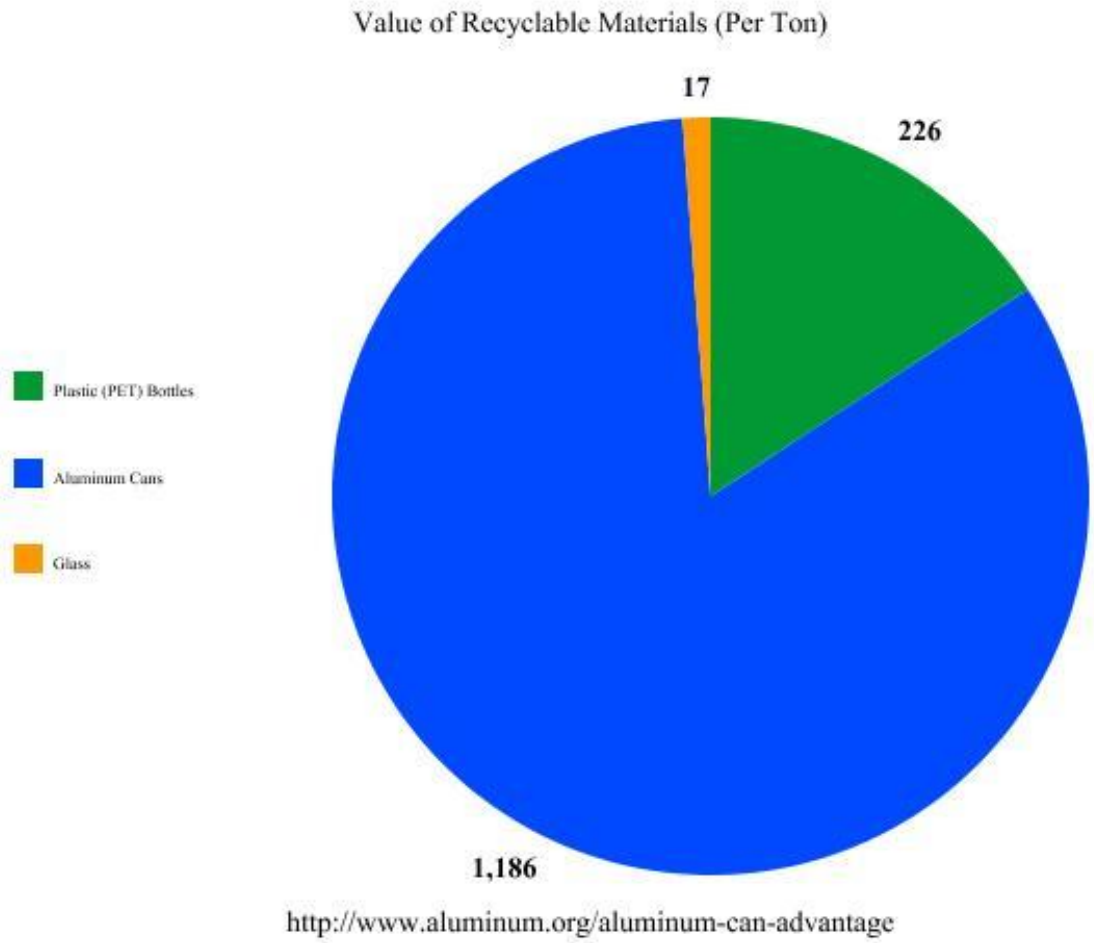
Figure 1.



http://www.aluminum.org/aluminum-can-advantage

The recycling rates of recyclable materials demonstrated in this pie-chart further prove that aluminum cans are recycled more than plastic bottles or glass. The information presented in this graph was gathered from The Aluminum Association and will be referenced to encourage the university to replace all plastic bottle vending machines with aluminum can vending machines with the hope to add more recycling bins for more efficient and greater volumes of recycling.

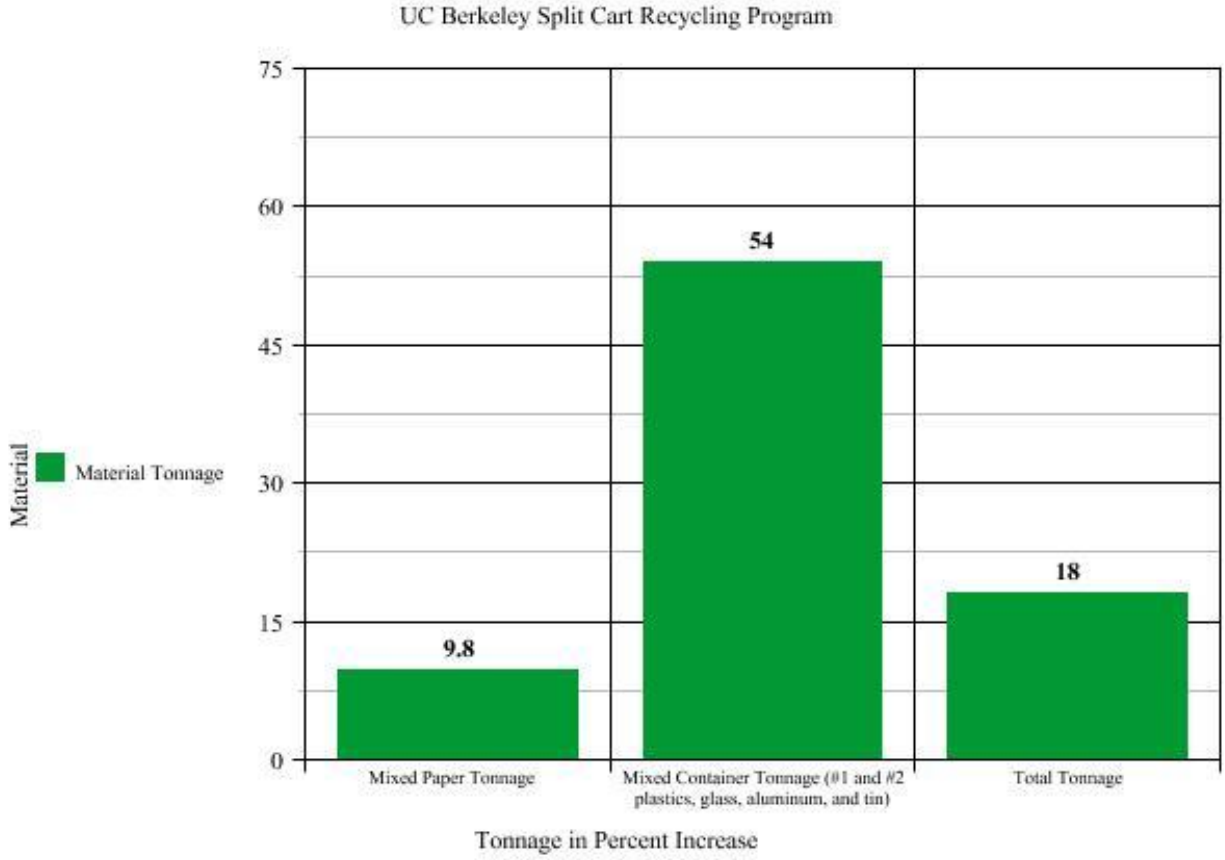
Figure 2.



This pie-chart represents in dollars per ton the value of aluminum cans compared to plastic and glass. Given the previous graph illustrated above, the information presented here reveals the fiscal, economical, and environmental benefit aluminum cans possess over plastic bottles. This information was gathered from The Aluminum Association and will be utilized in the recommendation to acquire support for the cost efficient benefits of selling aluminum can beverage containers versus plastic bottles.

Task 2. Determine the cost and environmental impacts of single-stream recycling operations versus split-cart recycling.

Figure 3.

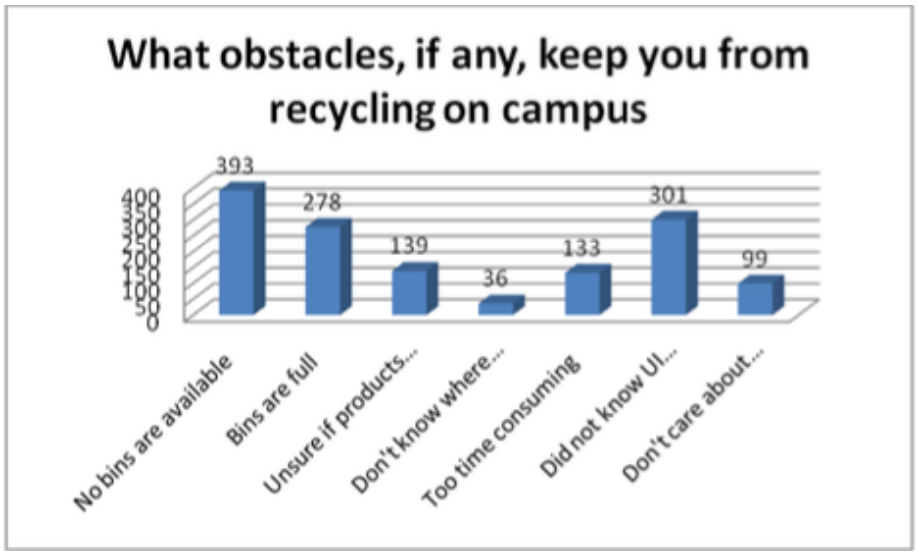


https://ecologycenter.org/blog/early-results-of-berkeleys-split-cart-recycling-show-big-gains/

The data shown in this bar graph represents the increase in recyclable tonnage for UC Berkeley after the university made the switch from single stream recycling to split cart recycling. The data gathered from the Ecology Center of UC Berkeley will be referenced in the recommendation to provide substantial evidence for the negation of single stream recycling. The information presented in this graph shows the significant increase in recycling the university has witnessed due to their transition from single stream recycling programs to the split cart recycling program.

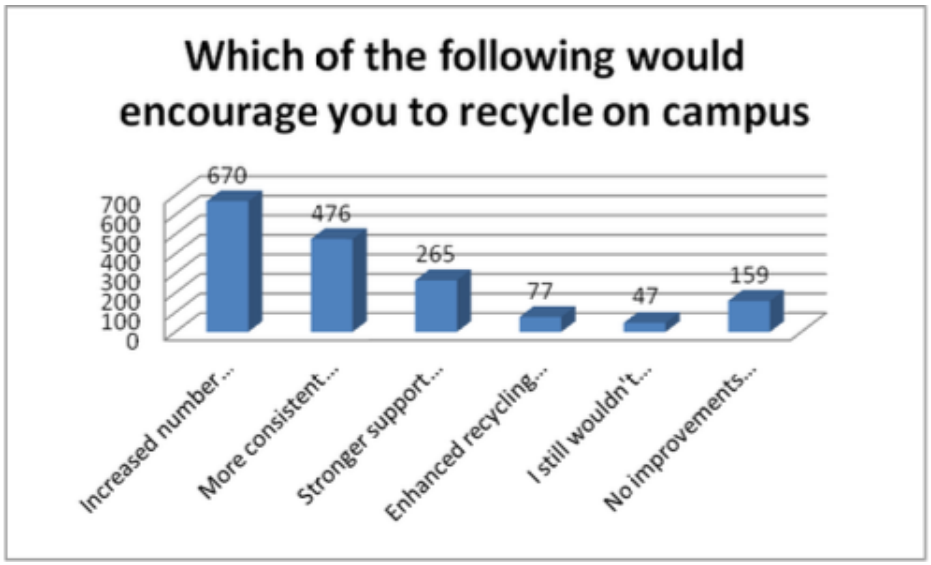
Task 3. Establish progressive and practical tactics to encourage the University of Texas at San Antonio's students, staff, and faculty of the moral, environmental, and monetary significance of recycling and ban of plastic beverage bottles.

Figure 4.



https://www.uidaho.edu/-/media/UIdaho-Responsive/Files/current-students/sustainability/Surveys/SponsorReport_RecyclingSurvey_Sp11_final.ashx?la=en&hash=72E2DF04CA96E51E255E488671A8BFF06E0E6D70

Figure 5.



https://www.uidaho.edu/-/media/UIdaho-Responsive/Files/current-students/sustainability/Surveys/SponsorReport_RecyclingSurvey_Sp11_final.ashx?la=en&hash=72E2DF04CA96E51E255E488671A8BFF06E0E6D70

Figure 4 exploits the various issues that students from the University of Idaho feel are obstacles to recycling on campus. The bar graph represents a significant increase in the amount of students

that feel their biggest obstacle to recycling on campus is that there are not any bins available. The second highest listed reason students selected as an obstacle was not knowing that their own university recycled. Coincidently enough, figure 5 shows a substantially higher number of students that expressed an increased number and visibility of recycling bins would encourage them to recycle on campus. Another important figure obtained from the graph is the students' desires for more consistent signs and labeling for recycling resources.

Figure 6.

Aggregated Costs and Benefits

The following table summarizes the upfront costs, yearly costs, and yearly benefits of implementing the ban:

	Upfront Costs	Yearly Costs	Yearly Benefits
	Water fountain retro-fits:$122,500	Increased water usage: $38,610	Decreased recycling costs: $37,270
	Publicity bottles $3,680	Loss in sales revenue: $233,760	Saved student ex-penses: $593,940
	Administrative costs: $12,800	Administrative costs: $2,950	Environmental ben-efits: < $0.01
		Maintenance costs: $6,790	
		Health costs: < $0.01	
Subtotals	$138,980	$282,110	$631,210
Total Yearly Net Benefits		**$349,100**	
Annualized Net Benefits Per Year		**337,030**	

https://depts.washington.edu/esreview/wordpress/wp-content/uploads/2014/07/2014-Ban-the-Bottle.pdf

Figure 6 was obtained from the University of Washington and represents a cost-benefit analysis of the potential "Ban the Bottle" movement, the banning of plastic water bottles, from the University of Washington. Our recommendation report, focused on the ban of all plastic beverage bottles is further motivated by the $337,030 annualized net benefits per year the University of Washington is set to collect from the eradication of only plastic water bottles. Further research of possible renegotiations with the Coca-Cola company is set to take place upon ratification of the originally presented research.

Conclusions

Aluminum cans are recycled more frequently than plastic (PET) beverage bottles.

Sufficient evidence has provided reason to conclude that aluminum cans are recycled more frequently than plastic (PET) beverage bottles. Aluminum cans contain far more value per ton than plastic bottles and would effectively contribute to split-cart recycling operations.

Students' recycling efforts suffer from the lack of available recycling bins and lack of recycling awareness, information, and monetary benefit.

Surveys conducted at the University of Idaho have resulted in various responses from students communicating some of the obstacles they face when trying to recycle on campus. Some of the responses included full bins, ignorance of any recycling programs, and the most selected reason of the lack of availability and locations of bins. In addition to the challenges students face with recycling at universities, students also clarified that an increased number and visibility of recycling bins would encourage them to recycle on campus. The second most selected reason students would feel encouraged to recycle is more consistent signs and labeling for recycling resources. It stands to reason that the University of Texas at San Antonio is not maximizing the cost or benefits of its recycling operations and thus hurting students and employees without the addition of more, better located recycling bins, properly displayed information explaining how to recycle, and negatively presumed lack of interest in sustainability. By addressing the fiscal benefits of recycling, students may be encouraged to recycle once lower fees for the student are recognized as a result of the plastic bottle ban.

Recommendation

The department of Environmental Health, Safety, and Risk Management recommend the University of Texas at San Antonio cease the sale of all plastic beverage bottles from vending machines and promote the sale and use of aluminum cans. Research, surveys, and data collectively support the negation of single-stream recycling in favor of split-cart recycling operations. The definitive recommendation of the elimination of plastic beverage bottles and supplementary efforts, such as more locations and awareness of recycling bins, will improve the university's fiscal and environmental health. The replacing of all plastic beverage bottles with aluminum cans will ensure the university with every potential to become a large and notorious proponent of the eradication of plastic bottles and the overall positive outcome of decreasing waste and increasing funds in both the public, economic, and education sector.

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