

UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

Reducing Single-Use Plastic Cup Waste at Events Held in the Engineering Student Centre (ESC)

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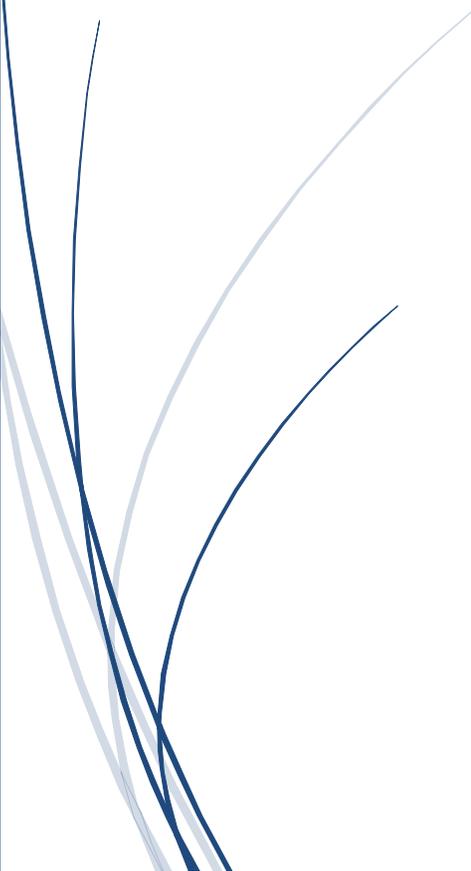
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April 5, 2019

UBC SEEDS Final Report

Reducing Single-Use Plastic Cup
Waste at Events Held in the
Engineering Student Centre (ESC)



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UBC SCHOOL OF PUBLIC POLICY AND GLOBAL AFFAIRS

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1 EXECUTIVE SUMMARY

The UBC SEEDS Program introduced students to the client, the Engineering Undergraduate Society (“EUS”), on January 3, 2019. From the list of sustainability concerns highlighted, it was determined the team would be addressing the principle client concern of single use plastic cup waste.

[Client Concern] Events hosted at the EUS student building are resulting in the disposal of a significant volume of single-use plastic cups. The EUS is seeking policy solutions to reduce the number of single-use plastic cups disposed across all event-types.

[Actions taken] The student team undertook preliminary research to assess the status of the single-use plastics disposal problem. This included: conducting stakeholder interviews, reviewing current EUS contracts and related policy regulation, and attending two EUS events of varying size and duration to observe event participant behavior and construct a sample baseline of cup use.

[Deliverable Content] As a part of the final report, the student team has produced recommendations for immediate action by EUS as well as a detailed pilot project design for use by the EUS Sustainability Council to evaluate longer-term, more intensive solutions.

Policy Recommendation

The student team recommends that the EUS implements a \$200 sustainability deductible on the event organizer’s damage deposit (referred throughout the report as ‘Alternative #2’). In the long-term, reusable cups and bar washer, “Alternative 3,” is recommended as the most sustainable option for the EUS.

2 CLIENT OVERVIEW

2.1 Initial Assessment: Client Interview

On January 15, 2019, the student team met with the EUS VP Administration (“client”). The client provided the team with several areas of interest for the EUS, from which single-use plastic waste reduction was selected.

The client identified waste reduction and consumer/event organizer convenience as the two primary criteria for policy evaluation.

As forced compliance by external event organizers is not feasible, the client clarified their desire for a solution that is convenient for organizers to implement. Through the student team contact representative, Chris Stoicheff, a site visit was arranged and completed January 18, 2019. Subsequent meetings with the client, the EUS Sustainability Group and the UBC Student Sustainability Council were arranged by each group’s representative contacts, as well as Chris Stoicheff and Denby McDonnell from the student team.

Initial discussions with the client identified reusable cup options as a potential solution of interest.

Price manipulation (e.g. reduction of product cost if attendee brings own cup) was removed as a policy option due to a combination of BC liquor license regulation, inability to mandate external groups to comply to price differentials, and client preference for alternative solutions.

Our preliminary research identified restrictions on the reusability of containers at liquor events. Under BC liquor regulation, bartenders are prohibited from pouring alcohol directly into a

‘dirty’/used container for consumption. As such, any reusable container-based solutions must include a consideration of the washing requirement for repeat container use.

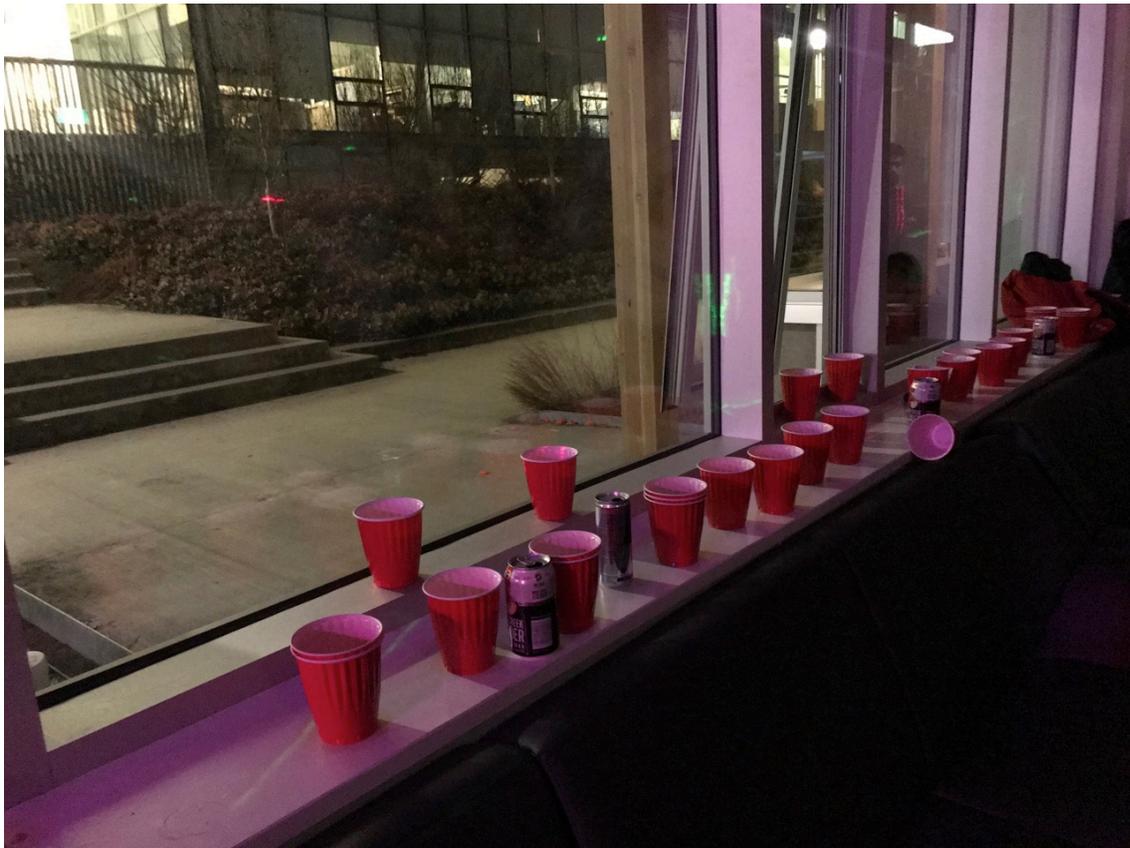


Figure 1. Plastic cups around the ESC during an event.

To align with UBC’s Zero-Waste Strategy, the solution should aim to reduce all forms of waste as well as improve waste diversion to compost more effectively (UBC Sustainability, 2019a). The UBC composting system is unable to compost biodegradable plastics, which is a significant constraint on the proposed solution (UBC Sustainability, 2019b).

2.2 Initial Assessment: External Consultation

UBC Student Sustainability Council

On March 4, 2018, Denby McDonnell presented an overview of the client concern to the Student Sustainability Council. Engagement with student sustainability leaders provided feedback on potential

solutions for the problem. The council raised the issue of implementing a cup fee, the impact of washing reusable cups, and some issues surrounding corn-material disposable cups. Pitchers and bamboo compostable cups were offered as opportunities or immediate waste reduction.

EUS Sustainability Director.

On March 7, 2018, Chris Stoicheff and Rasmus Dilling-Hansen met with EUS Sustainability Council Director, who provided the team with the EUS Waste Audit report from the previous year. While the report does not include data regarding cup usage/waste, it reinforced the requirement for our team to collect baseline cup use data in order to ascertain the scope of the problem. To this end, the Director agreed with the student team's strategy to attend and count cup waste at EUS events.

GPP 504 Teaching Assistant

On March 5, 2018 the student team met with the GPP 504 Teaching Assistant to overview the work progress and discuss alternative solution options. Concerns were raised regarding the feasibility of behavioral change-based solutions as there are few clear incentives for external event organizers to adopt any changes.

Koerner's Staff

Previous research had indicated that Koerner's Bar had previously used durable reusable solo cups for large events. Current staff and management were unfamiliar with this procedure and the bar has since discontinued this practice.

3 PROBLEM OVERVIEW

3.1 Problem Definition

Events at the ESC generate a large amount of single use plastic cup waste. A more sustainable and convenient long-term solution to reduce single use plastic cup waste is needed.

3.2 Evidence of Problem Scope

Review of the Engineering Sustainability Council Waste Audit Report (2018) provided the student team with an overview of the scope of the *total waste* problem currently faced by the EUS, through the examination of the volume of waste produced at a single event. While non-reusable cup waste was not separately measured, data from the report- reviewed in context with observations collected during the student team’s attendance at two EUS events supports the inference that a large proportion of disposed cups are being mis-categorized as ‘garbage’ instead of ‘recyclables’.



Figure 2: Distribution of waste in kilograms by type.

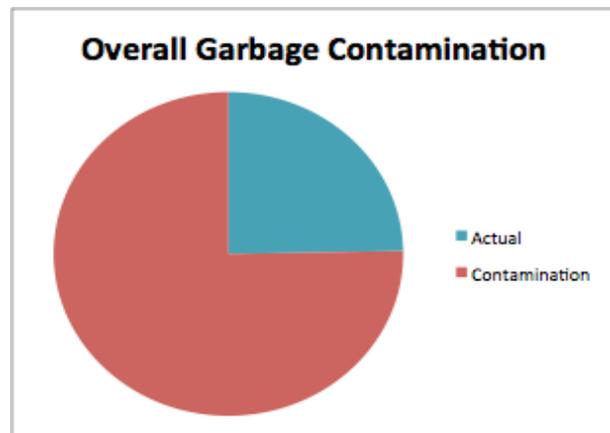


Figure 3: Overall Distribution of Garbage, separated by if the disposed product is ‘actual’ garbage or contaminated collections of products from one of the other waste categories that is then disposed of as garbage.

In the overall distribution of waste by product type, ‘garbage’ waste accounts for a significantly larger proportion of total waste produced than ‘recyclables’ (Figure 1). However, Figure 2 reveals that a substantial portion of the waste classified as ‘garbage’ is in fact waste from the other categories (organics, recyclables, paper) that has been contaminated by being mixed with other waste-types.

Consequently, plastic cup waste from events may be being disposed as general garbage due to contamination from other waste produced during the event. This possibility is supported by observational evidence collected during the student team’s event attendance, during which the

mixing of waste-types was observed to occur more often than not. As such, policy alternatives should be designed to minimize the potential for waste contamination to ensure proper disposal.

4 PROJECT DESIGN

4.1 Policy Project: Approach Rational

Due to the absence of data establishing the number of cups disposed of on average at an ESC-hosted event, the immediate goal of our team became to produce this baseline data. As no other policy proposal can be evaluated without a baseline to reference, our team sought to collect raw data on the number of cups disposed. Our team attended two events at ESC - one where alcohol was served and one without - and manually counted the number of cups discarded over the course of the event. Data collection was limited to two events due to the time constraints imposed on the student team for delivery of the final report. Further discussion of the data collected will be expanded upon in Section 5.1 of this report.

4.2 Risk Evaluation and Project Constraint Assessment

In evaluating the scope of the policy problem, the following general risk factors were evaluated. They have been grouped into three primary risk-types: social, economic, and environmental risk.

Social

- Event organizers and attendees may not voluntarily choose to adopt practices associated with proposed alternatives, due to perceived lack of convenience;
- Loss of purchased product due to theft may demand more vigilance from security staff at events, in addition to adding to economic cost considerations in replacing lost product;
- Installed materials associated with alternatives may be perceived as inhibiting event activities (ie. beer pong, dancing, room behind the bar for bartenders).

Economic

- The cost of purchasing and putting into practice and maintaining a proposed alternative (ie. materials, equipment, increased event staff);
- Cost of purchases/deposits for event organizers utilizing the ESC event space.

Environmental

- Potential for unsustainable waste generation to be transferred from single use plastic cup waste to increased usage of other resources (ie. water and electricity for running equipment);
- Possibility that a recommended alternative would not lead to a substantial increase in recyclability or reuse of cups due to inefficient waste disposal options and/or lack of uptake by event organizers.

In estimating the feasibility constraints to the potential solutions developed through this project, the following constraints were assessed. They have been grouped into political and organizational constraints.

Political

- UBC waste disposal protocol for dealing with single use plastic, biodegradable, and reusable cups at the end of their lifespan could negatively impact effectiveness of sustainability initiative if they are not sorted into the correct waste types; as noted, UBC and Metro Vancouver is unable to compost biodegradable cups, which will cause them to be disposed in the landfill (Metro Vancouver, 2019; UBC Sustainability, 2019b).
- Due to restrictions on cup re-use established by the BC Liquor Act, the adoption of a policy that requires the re-use of cups must be accompanied with a process to sanitize the cups between use.

Organizational

- Policy alternatives produced should be adaptable to fit within the capacities and current initiatives of the EUS Sustainability Council;

- Inducing a voluntary behavioral change (ie. switch to use of alternative cups) by event organizers without requiring a contractual obligation to using the new product.

An alternative solution-specific evaluation of risk and constraints will be expanded upon in Section 5.3 of this report.

4.3 Criteria Analysis

CRITERIA	ALTERNATIVES			Level of Importance of Criteria (%)
	Alternative #1 (biodegradable cups)	Alternative #2 (Option 1 + damage deposit incentive)	Alternative #3 (Reusable cups + bar wash)	
Convenience	5%	15%	20%	40%
Waste Reduction	5%	7.5%	22.5%	35%
Cost Efficiency	5%	10%	0%	15%
Continuity	2.5%	2.5%	5%	10%
Total	17.5%	35%	47.5%	100%

Criteria

The following are ranked by their percentage level of importance to the EUS:

- Convenience (40%):
The following criteria refers to the convenience of the proposed alternatives to the event organizers renting the space at the ESC. This is ranked as the most important criteria as the EUS made it clear that proposed alternatives must be attractive enough on their own for event organizers to want to use them without forced regulation. Therefore, any proposed solution must be just as or more convenient than the current system of wasteful plastic cups in place.

- Waste Reduction (35%):

Due to the nature of the problem statement, any proposed solution must reduce waste. However, as mentioned above, any implemented alternative will not be able to efficiently reduce waste if it is not convenient. Therefore, Waste Reduction has been attributed a weight score of 35% in second place after Convenience.

- Cost Efficiency (15%):

This criterion is weighed at 15% because no single alternative can be implemented if it is not within event organizers' and the EUS' budget. Alternatives that are the most cost efficient will have the highest percentage attributed to them. Although this criterion applies to all stakeholders, event organizers are primarily considered in this analysis as the final decision behind implementation of proposed solutions is dependent on them. It is important to note that this analysis does not consider long-term efficiency but only short-term.

- Continuity (10%):

The proposed alternatives must be feasible in the short-term, as well as the long-term. The proposed solutions must therefore be implementable at various event scales, as well as in a long-term capacity through changes in leadership at the EUS.

Alternatives

Alternative #1 - Biodegradable cups:

This option would be for the EUS to replace their stock reserves of plastic cups with biodegradable cups. Currently, the EUS holds 744 plastic cups in storage that they also offer to sell to event organizers if they run out during an event. This alternative is an immediate one that would enable the EUS to set a sustainable example to peers as well as be a first step in the right direction. This option however does very little to meet the first criteria as event organizers rarely purchase cups

from the EUS and mostly bring their own. On the other hand, it is an option that enables the EUS to start trying towards reducing its plastic footprint. However, biodegradable cups cannot be composted at this time at UBC or Metro Vancouver composting facilities (Metro Vancouver, 2019; UBC Sustainability, 2019b)

Alternative #2 - Biodegradable cups + damage deposit incentive:

The second proposed solution is for the EUS to implement Alternative #1 as well as include a damage deposit incentive in the rental event contract. The incentive would state that event organizers would only receive \$800 of their \$1000 damage deposit back in the circumstance that they bring non-biodegradable plastic cups to the ESC the day of the scheduled event. This alternative is highly convenient for event organizers but also is the most cost effective in the short-term as it costs the EUS nothing and organizers are incentivized to co-operate in order to receive their full deposit back. Although this alternative requires some sort of regulation it is observed to be the most simplistic, efficient and low-cost in the short-term.

Alternative #3 - Reusable cups + bar washer:

The final alternative is for the EUS to fully stock their bar with re-usable cups as well as a commercial bar washer for events. This option would be very costly for the EUS in the short-term but potentially extremely financially lucrative in the long-term. Furthermore, it bears a high convenience score as event organizers would no longer have to bring their own cups to events. This is also the option that reduces the most waste, this is why it is measured to be the most attractive alternative - however, it is important to note that this alternative bears a high upfront cost and is potentially very complex in implementation.

5 IMPLEMENTATION AND POLICY EVALUATION

In order to make an informed recommendation on an alternative for implementation, observation and data collection at two EUS Events was conducted. The proceeding analysis and implementation assessment is premised on the following overview of observations and data collected, which will be drawn upon to inform the recommended alternative in this report.

5.1 Observation and Data Collection from EUS Event Attendance

Event 1: *LUXE 2.0*

Date: March 15, 2019

Event Description: LUXE 2.0 was a non-alcoholic event. Organizers brought with them a supply of 547 primarily compostable cups, however the EUS also provided an additional supply of 744 single-use plastic cups for purchase should the organizers run short on cups during the event. In total, security recorded 462 attendees. The event run time was from 9:00pm-1:00am, and the total number of cups used was 547. Event organizers noted that approximately 15 cups were re-washed, and water cups were frequently refilled multiple times.

Observations:

[Event Venue] To accommodate the largest number of guests, the tables and other furniture on the main floor were removed. Patio access was unavailable throughout the evening and waste disposal required attendees to walk into the bar space to use the garbage can options located there. A water cooler was set up next to the bar and upstairs by the beer pong tables with a stack of cups available for self-service by attendees throughout the event. A significant back-up of waste cups occurred near the cooler due to participants leaving empty cups on the bar top rather than dispose of them.

[Participants] Most observed attendees would consume their drink shortly after ordering at the bar and dispose of their cup prior to returning to the dance space. No cups were observed in the hands of attendees who were dancing during the 45-minute observation period. There were at times up to 11 people behind the bar (much higher than the event average of 4-6 bartenders at a time) which raised concerns about space availability and efficiency for drink output and waste disposal. While most cups that were acquired from the bartenders were disposed of directly by the consumer, the empty space next to the water cooler had a significant back-up of half-drunk water cups and a few partially consumed mixed drinks as well.

[Areas of Opportunity] To avoid purchasing additionally cups from the EUS stock, the event organizers opted to wash 15 cups for re-use. This indicates some potential willingness to adopt a reusable option if there is a cost benefit to the event organizer. Finally, additional waste disposal options (e.g. recycle bins or compostable bins) should be provided for attendees to dispose of waste more easily.

Event 2: *Fire and Ice*

Date: March 22, 2019

Event Description: Fire and Ice was divided into two components: a barbeque from 6:00pm to 8:00pm (non-alcoholic), and a party from 8:00pm until 1:00am where alcohol is served.

Organizers brought with them a supply of 2, 251 single use plastic cups and the total used was 1, 675. In total, over the course of the two segments, security recorded 633 attendees.

Observations:

[Event Venue] During the party segment of the evening, attendees were distributed throughout the venue, utilizing both the first and second floor indoor and outdoor space. Waste disposal bins were visibly available at five separate locations within the indoor space,

and one in each outdoor venue. Unfortunately, a majority of table and seating space was used over the course of the evening to discard used cups. Furthermore, while water coolers were set up on both the first and second floor the used and unused cups became intermixed throughout the evening and thus a portion of unused cups were discarded as waste.

[Participants] Unlike the previously attended event, attendees of the party segment of the debate freely carried cups into the dance area. Cups travelled from the bar throughout the venue, likely aided by the multiple disposal locations. To cope with volume and overproduction of beer foam, bartenders resorted to pre-pouring a significant number of beers that sat on the back-bar counter awaiting an order. The excessive number did not appear to reflect the actual demand on the bartenders. This may be a practice that has been passed down through bar staff from previous events. At the end of the evening, event organizers were patrolling the venue with large garbage bags to collect the cup waste.

[Areas of Opportunity] Prior to the event starting, bins for quick disposal were identified under the bar. This could lead to mixing of compostable trash (eg. Lime wedges) and recyclables that may compromise the recycling of plastic waste. A differentiation of garbage sources for bartenders should be implemented to reduce the volume of waste improperly sorted. Additionally, should any re-usable cup policy be implemented in future events, it is likely that 1-2 of the bar staff will be required to retrieve cups from throughout the venue.

	No Alcohol Available	Alcohol Available
Number of Participants	462	633
Number of Cups	547	1675
Cups per person	1.2	2.6

5.2 Cost-Benefit Analysis of Alternatives

Alternative 1: Biodegradable Cups

Background: The EUS currently supplies 12oz single-use plastic disposable cups for their events.

These cups are extremely cheap (\$4.46 per 50 or \$89.2 per 1000) and are recyclable. However, studies show that 90% of these plastic cups end up in the landfill (The Weather Network, 2018).

Therefore, at a typical EUS licensed event where approximately 1,675 plastic cups are used, around 1507 are not recycled per event. Considering that the EUS holds 15 licensed events per year and 60 total events per year, the EUS licensed events alone would produce 22,613 cups annually.

Biodegradable Cup Options: Prices vary considerably between suppliers. We have offered a range of price options to consider. There appears to be no substantive quality difference between the options.

All prices are in Canadian dollars and are presented in order of ascending price from each supplier:

Supplier Name	Price (\$CAD)/1000 cups
GreenMunch	\$158.00
Eco-Products	\$209.60
Regreene	\$419.00

Alternative #1: Biodegradable Cups

Supplier A was chosen because it is the lowest cost option.

Benefit: Reduction of 1507 cups to landfill per event.

Cost: \$316 for 2,000 biodegradable cups (1,675 used per licensed event) + (-\$178.4) cost of plastic cups per event).

Total: Will cost EUS/event holders an additional \$137.6 (per event) to save 1507 cups from the landfill (per event) by switching to biodegradable cups from plastic cups.

*Assuming 2000 cups per event

Alternative 2: Biodegradable Cups + Damage Deposit Incentive (\$200)

Our second option for the EUS is that they select one of the biodegradable cup options listed above for stock/inventory purposes, and then offer event holders a damage deposit incentive for bringing their own compostable/biodegradable cups. The advantage of this option is that it incentivizes event

holders to choose biodegradable cups by implementing a potential penalty. In this option, the EUS provides an incentive of a \$200 sustainability deductible from the damage deposit for the event booking if the event holder does not use biodegradable cups.

Alternative #2: Biodegradable Cups + Damage Deposit Incentive

Supplier A is chosen because it is the lowest compostable cup option

Benefit: Event holders are deducted \$200 upon the return of their damage deposit if they do NOT use biodegradable cups. 1507 cups are saved from the landfill (per licensed event).

Cost: \$316 per 2,000 compostable cups (\$137.6 more than plastic) OR 178.4 price of 2000 regular plastic cups + \$200 damage deposit=\$378.4.

Total: Event holder will accrue cost of \$378.4 for use of plastic cups per event and EUS will earn an additional \$200. Alternatively, event holders will accrue cost of \$316 for switching to biodegradable cups and will receive their full damage deposit. The financial incentive is then \$62.4 to switch from plastic to biodegradable cups.

*Withholding \$200 from damage deposit is the bare minimum that the EUS can deduct from event holders. If it is determined that the financial incentive is not producing results, it can be increased to further incentivize the use of compostable cups.

*Based on 2000 compostable cup purchases per event.

Alternative 3: Reusable Cups + Bar Washer

Background: Recent study in the UK claims at 3+ uses, the benefits of a reusable cups outweigh the costs of recyclable cups (RAW, 2019). Their finding was that even when they are recycled, single-use cups have a significantly higher environmental impact than reusable cups due to the cumulative impact of manufacturing and transportation. The results strongly favor reusable cups as the best environmental solution, but it must be acknowledged that the benefit of a reusable cup initiative is dependent upon the number of cups reused across the entire stock of cups at any given event or held by a supplier.

For reusable cups, nearly all of the environmental impact is caused by the raw materials, water, energy and long-distance transportation that is required for usage. Additional impacts are distributed

across include local transport, washing and what actually happens to the cup after it is disposed of. For these reasons, it is by far the most environmentally friendly option to use reusable cups, especially if they will be used more than 2.5-3 times- which is guaranteed across the 60 events held per year.

Reusable Cup Options: Prices vary considerably between suppliers. We have offered a range of price options to consider. There appears to be no substantive quality difference between the options. All prices are in Canadian dollars and are presented in order of ascending price from each supplier:

Reusable Cup Supplier	Price (\$CAD) for 18oz cups
Red Cup Living	\$4,005 for 500 cups (\$8.01 each)
“What Is It?”	\$5,530.80 for 480 cups (\$11.50 each)
EcoCup	\$403 for 400 cups (\$1.03 each)*

*This is a low-quality option that may not be bar washer friendly or may yield a high attrition rate.

Remains a viable option for later proposed Pilot Project further in the report. Client preference is red cups.

Bar Washer Supplier	Price (\$CAD)
Cook Store	\$2,699.99 (30 cups per 2 min cycle)
Vortex Restaurant Equipment	\$7,390.00 (1000 cups per hour)*

*Trial/rental/lease rate are available on the website through hyperlink.

Alternative #3: Reusable Cups + Bar Washer

Supplier A was chosen because of client preferences

Benefit: 90% reduction in environmental impact. Saves nearly 23,000 plastic cups from the landfill every year. Event organizers no longer have to pay \$178.4 per event for plastic cups.

Cost: \$8,010 for 1000 Reusable Cups (\$133.5 per event, for first year) + \$2,699.99 for Bar Washer (\$44.99 per event, for first year) + 10% attrition rate of \$801 per year (\$13.35 per event, for first year). Overall cost of \$191.84 per event, for first year to switch to reusable cups from plastic cups. Up-front investment of \$10,709.99 (Reusable cups + Bar Washer). \$10,709.99 + \$801=\$11,510.99 including the attrition rate of 10% per year. Therefore, it will cost the EUS \$191.85 per event for the first year after initial investment OR it will take 66 plastic cup events (\$178.40) to repay the initial investment of \$10,709.99.

Total: \$11,510.99-10,704=\$806.99 (or \$13.44 per event) to switch from plastic cups to reusable cups at EUS events. Event organizers will no longer have to pay for plastic cups, (178.4 x 60) the total first year cost of implementation will be \$806.99.

*Assumes 60 events per year

5.3 Strengths and Weaknesses of Alternatives

For all three of the policy alternatives, the strengths and weaknesses of each proposal were considered. Below are summary tables of these findings for each alternative respectively:

Alternative 1: Biodegradable Cups

Strengths	Weaknesses
<ul style="list-style-type: none"> ▪ Reduce recycled plastic waste from single-use plastic cups ▪ Low cost short term ▪ Does not require restructuring of how events are run 	<ul style="list-style-type: none"> ▪ Event organizers may opt to still bring single-use plastic cups of their own instead of purchasing biodegradable option from ESC ▪ Biodegradable material of cup may have perceived negative social impact on event activities (ie. beer pong) ▪ UBC currently filters out biodegradable plastics and disposes of them at the landfill ▪ Physical appearance of biodegradable cup option may look like plastic and be accidentally recycled, contaminating recycling and leading to increased landfill waste

Alternative 2: Biodegradable Cups + Damage Deposit Incentive (\$200)

Strengths	Weaknesses
<ul style="list-style-type: none"> ▪ Reduce recycled plastic waste from single-use plastic cups ▪ Incentivizes the event organizers, resulting in higher rates of adoption 	<ul style="list-style-type: none"> ▪ Biodegradable material of cup may have perceived negative social impact on event activities (ie. beer pong) ▪ UBC currently filters out biodegradable plastics and disposes of them at the landfill ▪ Social desirability of “red solo cups” as a party cup may lead to negative perceptions of alternative by event organizers and event attendees

Alternative 3: Reusable Cups + Bar Washer

Strengths	Weaknesses
<ul style="list-style-type: none"> ▪ No immediate cup waste generation ▪ Most sustainable long-term solution ▪ Retain social desirability of “red solo cups” (for some models) ▪ Lowest cost input for event organizers 	<ul style="list-style-type: none"> ▪ Will require space behind the bar for the bar washer and reusable cup storage ▪ High cost of purchasing industrial bar washer and stock of reusable cups ▪ Cannot be implemented immediately ▪ Requires bartenders to be responsible for running cups through industrial bar washer and collecting them around the ESC throughout event ▪ Potential loss of cups ▪ Increased water and electricity consumption with implementation of industrial bar washer

6 POLICY RECOMMENDATIONS AND FUTURE RESEARCH

6.1 Thinking Ahead

While Alternative #1 can be implemented relatively easily and quickly, the other two alternative proposals require a more intensive consideration of costs and impact to the event organizers. If the EUS chooses to explore the feasibility of implementing Alternative #2, it is our recommendation that an opinion survey is to be sent to previous, current and future event organizers. This survey would be designed to gauge the organizer's willingness to pay an increased cost for biodegradable cups to avoid a \$200 safety deposit deductible. A potential survey question could be drafted as follows:

Acknowledging that biodegradable cups are a more expensive option, how willing would you be to switch your event cups to a biodegradable alternative in exchange for avoiding a \$200 damage deposit fee? Please rate on a scale of 1 to 4, with one being 'not willing at all' and four being 'completely willing'.

Lastly, if the EUS decides to explore the feasibility behind Alternative #3, a pilot project (outlined below) must be run and compared to the baseline study in this report in order to gage several factors such as costs, behavior and logistics. Furthermore, a building assessment must be completed in order to identify whether the ESC has the space and appropriate plumbing to support an industrial bar washer in their facility.

6.2 Pilot Project

In order to effectively measure the feasibility of implementing a fully stocked bar at the ESC, a pilot project that is scaled towards a large group drinking event must be performed. The EUS will have to consider several aspects in order to determine whether such an option is worth the upfront investment. These include:

Event Factors:

- Event Design:
 - Large Attendance (450+ people) to stress the pilot model appropriately;
 - Must be serving alcohol as these events require significantly larger volumes of cup usage
- Initial purchase of 500-piece reusable cup stock
- Bartenders must be prepared to wash cups by hand during event as a bar washer will not be considered for implementation until the waste reduction of the reusable cup adoption can be confirmed.

Measured Variables:

- Behavioral
 - Bartenders' capacity to handle demand and washing of cups
 - Bartenders' strategy to compensate for traditional method of 'pre-pouring' large volumes of beers
 - Students' behavior in cup usage, disposal and demand
- Attrition rate of cups over the course of the event
 - The attrition rate of the upfront investment of 500 reusable cups must be calculated by counting leftover cups at the end of the event.

6.3 Policy Recommendation

- We recommend the EUS adopts Alternative #2 in the short-term and further investigates Alternative #3 for long-term implementation.
- Further research through a survey questionnaire and the Pilot Project would support implementation of Alternative #3.
- Our student team suggests that the EUS opts for Alternative #2 because is low cost, simplistic, durable, and provides strong financial incentive for event organizers provided it can meet organizational constraints and be approved by the board of directors.
- However, given the political constraints that UBC and Metro Vancouver cannot compost biodegradable cups, Alternative #3 must be seriously considered as a viable long-term solution due to its alignment with UBC's Zero Waste Food Ware Strategy and its significant potential in long-term cost effectiveness and convenience for event organizers.

7 REFERENCES

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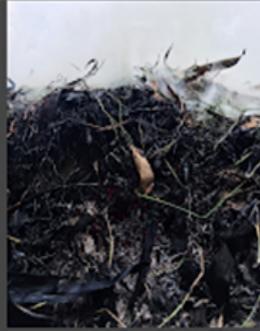
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Appendix A: Infographic Knowledge Dissemination

The infographic features a red header with a white water bottle icon. Below the title, the website www.ubcengineers.ca is listed. The main content is divided into three horizontal sections, each with a statistic, an image, and a white arrow-shaped graphic pointing to the right.

- Section 1:** A photograph of orcas swimming in the ocean. Text: "700 marine species are threatened because of plastic waste [1]"
- Section 2:** A photograph of a large pile of plastic waste, including bags and bottles. Text: "300 million tonnes of plastic is disposed globally each year [2]"
- Section 3:** A photograph of a person's feet wearing shoes made of plastic bottles. Text: "90% of plastics in Canada end up in the landfill [3]"

UBC food bins are often too contaminated by plastic that they cannot be composted ^[4]



Events held at the Engineering Student Centre typically use 1,675 plastic cups, or 2.6 cups per person

The EUS aims to reduce their plastic cup use.

For more info about our reusable cup program, visit the "Events" page on our website!
www.ubcengineers.ca



SOURCE

[1] <https://wrcanada.com/en/get-involved/resources/plastics-themed-resources/plastic-facts>

[2] <https://ourworldindata.org/plastic-pollution>

[3] <https://environmentaldefence.ca/plasticsdeclaration/>

[4] <https://planning.ubc.ca/vancouver/news-events/newsletter/2018-04-16/dlg-2018-waste-audit>

www.ubcengineers.ca

Appendix B: Poster Campaign



**Sea otters love
cuddling each other,
not red solo cups.**

Help reduce single use plastic cups in their home by partying
with compostable cups in ours!

For info on using compostable cups at your next
event at the ESC visit the "Events" page on our
website!

www.ubcengineers.ca 



**Partying your pod can
feel good about...
even the next morning
with a killer headache.**

**The future of sustainable partying at the ESC
is now!**

For info on using our reusable cup program at your
next event at the ESC visit the "Events" page on our
website!

www.ubcengineers.ca 

Appendix C: Blog Post

Blog: <https://www.pubpoli.com/projects/2019/4/3/solo-cups>

Too many solo cups: solving our event plastic waste problem at UBC

Canadians are addicted to plastic. But in Canada, [90% of recyclable plastics end up in the landfill](#) or are incinerated. The Engineering Undergraduate Society (EUS) recognized the scale of this issue, and approached our policy team to come up with solutions to reduce their plastic cup use at events held in the Engineering Student Centre, a LEED certified building among the most sustainable on UBC campus. We looked at this problem in two ways: what are some short-term and long-term sustainable solutions that reduce single use plastic cup waste?

The Engineering Undergraduate Society recognized that plastic and waste issues are primarily a problem of convenience. Any proposed solution, for both the short-term and long-term, must be convenient for the event organizers and event attendees. We also considered the proposed options ability to reduce waste, minimize cost, and ensure continuity of the waste reduction proposal.

Our policy team attended two events held at the Engineering Student Centre. One event did not have any alcohol, whereas the other event had alcohol available for purchase. The event that had alcohol had **more than 2 times the number of cups used per person**.

	No Alcohol Available	Alcohol Available
Number Participants	462	633
Number Cups	547	1675
Cups per person	1.2	2.6

After our study and policy analysis, we investigated three proposed options for the Engineering Undergraduate Society: purchase biodegradable cups, include a biodegradable cup requirement in the event organizer damage deposit, or purchase reusable cups and a bar washer.

Based on our research and engagement with the UBC Student Sustainability Council, we learned that biodegradable [plastic cups cannot be composted in Metro Vancouver](#) facilities. While biodegradable cups are a simple solution to effectively reduce plastic pollution in the short-term, they still contribute to long-term landfill waste. Although biodegradable cups are a good short-term solution to immediately reduce plastic waste, reusable cups are the best long-term option for sustainability and waste-reduction.

Switching to biodegradable cups would eliminate 1507 plastic cups from the landfill per event, based on the proportion of recyclable cups that are disposed in the garbage. The use of reusable cups by the EUS will save nearly 23,000 plastic cups from the landfill every year. While upfront costs associated with the purchase of a commercial bar washer and reusable cups are surprisingly high, the long-term cost reductions allow the EUS to recoup their costs of switching to reusable cups in less than two years.

Moving forward with UBC and Vancouver’s strategic vision for sustainability and circular economy, we have found that biodegradable plastic cups cannot be substituted for long-term solutions. There are significant consumer information gaps and a lack of clarity about what is defined as ‘compostable’ in Vancouver. Our analysis suggests that there is a need for improved sustainability communication, particularly on plastic waste.

Appendix D: Ethics Certificates



Certificate of Completion

This document certifies that

Alexandra Martin

*has completed the Tri-Council Policy Statement:
Ethical Conduct for Research Involving Humans
Course on Research Ethics (TCPS 2: CORE)*

Date of Issue: **30 March, 2019**

Certificate of Completion

This document certifies that

Christopher Stoicheff

*has completed the Tri-Council Policy Statement:
Ethical Conduct for Research Involving Humans
Course on Research Ethics (TCPS 2: CORE)*

Date of Issue: **2 April, 2019**

Certificate of Completion

This document certifies that

Rasmus Dilling-Hansen

*has completed the Tri-Council Policy Statement:
Ethical Conduct for Research Involving Humans
Course on Research Ethics (TCPS 2: CORE)*

Date of Issue: **5 April, 2019**