

# UC San Diego

## Capstone Projects

### Title

Connect the Disconnect: Reducing Single-Use Plastics on the SIO Campus.

### Permalink

<https://escholarship.org/uc/item/6pp4m0pb>

### Author

Mendez, Lori Renee

### Publication Date

2018-07-18

### Supplemental Material

<https://escholarship.org/uc/item/6pp4m0pb#supplemental>

### Copyright Information

This work is made available under the terms of a Creative Commons Attribution-NonCommercial License, available at <https://creativecommons.org/licenses/by-nc/4.0/>

# Connect the Disconnect! Reducing Single-Use Plastics on the SIO Campus.

A Capstone Project by

Lori R. Mendez, Esq.,

MAS-MBC Candidate

June 14, 2018

Capstone Chair: Richard Norris, Ph.D.

Signatures of Capstone Committee Members:

Dr. Richard Norris: \_\_\_\_\_

Dr. Dale Squires: \_\_\_\_\_

Kenneth Hall: \_\_\_\_\_

Allyson Long: \_\_\_\_\_

Connect the Disconnect! Reducing Single Use Plastics on the SIO Campus.

A Capstone Project by Lori R. Mendez, Esq., MAS-MBC Candidate

June 14, 2018

Capstone Chair: Richard Norris, Ph.D.

**ABSTRACT:**

This paper summarizes current best practices for using the Scripps Institution of Oceanography (“SIO”) campus as a living laboratory to test current and predicted best practices toward the effective long-term reduction of single-use plastic dishware, beverage ware and service ware. These are the plastic things we use every day to contain food and drinks one time before disposing of them. Some examples are “to-go” clamshell shaped boxes, dressing/sauce/ketchup containers (“ramekins”) and lids, water and juice bottles, coffee and tea plastic-lined paper cups and clear plastic cups and lids; and also the instruments we use to put food and drinks into our mouths, like cutlery and straws.

This project also considers an outright ban on the following: 1. Expanded polystyrene (sometimes known as Styrofoam®); 2. Single use plastic (“SUP”) beverage bottles of water, tea and juices with plastic caps; and 3. Plastic straws. All three of these items are currently being sold and distributed on the SIO campus.<sup>1</sup> Acknowledging classical economic theory and faith in the market to correct itself based upon the will of the people, we should allow the market work itself out over time. However, the market has failed to do so, and the science of plastic pollution dictates that we are out of time.<sup>2</sup> Accordingly, given the ever-worsening ocean plastic pollution problem and the tremendous damage that it is doing to the ocean, seabirds, ocean wildlife and humans, there is an urgent need for an immediate outright ban of these SUP materials on campus. Such a ban will align with the will of SIO constituents and administration.<sup>3</sup> Cities and countries around the world, and most recently, the European Union, are recognizing that it is too costly and dangerous to continue along the business-as-usual path, and they

---

<sup>1</sup> Food served on Expanded Polystyrene (“EPS”) was sold, but as of May 25, is no longer provided by Belinda’s Food Truck that comes to campus on Fridays. SUP bottled beverages, including water, are sold from the Belinda’s Food Truck, at Cups and at Caroline’s, while plastic straws are distributed by all three, Belinda’s, Cups and Caroline’s. Without a firm policy banning EPS, every time there is a new vendor that comes to the SIO campus, we will just have to take a “wait-and-see” defensive approach versus proactively developing a consistent policy for a uniform stance regarding single-use plastics, including EPS. (See photos on page 4 below).

<sup>2</sup> Jenna Jambeck, et al. (2015)

<sup>3</sup> See Appendices 1 and 2: Petition and Summary of Petition signatories and comments for Petition sent to all-SIO via e-mail on May 8, 2018 re: banning EPS, beverages in SUP bottles and plastic straws.

are taking measures to ban these single-use wasteful and polluting products to meet zero-waste goals, and to save public funds for rubbish clean-up efforts on city streets and in the environment.<sup>4</sup>

This paper also summarizes best practices for a “Mindful Mugshare” program at the soon to be renovated Eckart vendor site that will have access to a dishwasher inside the building. SIO staff, faculty and students have expressed their desire for a zero waste campus to compliment the amazing work they do at this first-rate oceanography institution.<sup>5</sup>

Acknowledgments: Any progress in the reduction of SUPs on the SIO campus, present or future, was the result of a collaborative effort, as well as the helpful guidance and commitment of Facilities Operations and Planning Director Ken Hall, Safety and Sustainability Director Allyson Long, and SIO PhD. candidate Laura Lilly, my capstone committee chair and members, SIO Director Margaret Leinen, and a whole host of zero waste warriors and ocean protectors.

#### **EXECUTIVE SUMMARY:**

1. Observations
2. Waste Audit
3. SUP Ban
4. Best Practices at Caroline’s, Belinda’s, the new Eckart Vendor, and Catered Events
5. “Mindful” Mugshare Program at Eckart Vendor site-Fall 2018
6. The Economics of Desired Behavior Change
7. Education/Information/Transparency via signage and a sustainability webpage

---

<sup>4</sup> See City of Berkeley’s “Disposable-Free Dining” Plastics Ban: <https://www.eastbyexpress.com/WhatTheFork/archives/2018/04/27/what-berkeleys-disposable-free-dining-plastics-ban-would-mean-for-restaurants>. See also Great Britain’s Parliament study recognizing the less than 1% recycle rate, that taxpayers footing the bill for 90% of the coffee packaging waste clean-up associated costs, and that producers and big coffee chains have been unable to come up with a solution for mostly non-recyclable plastic lined paper coffee cup ensembles, should they not be able to recycle ALL single use coffee cups by 2023, the study recommended the UK should will ban them. House of Commons Environmental Audit Committee-Disposable Packaging: Coffee Cups: Second Report of Session 2017-19 (p. 29-30). (<https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/657/657.pdf>)

<sup>5</sup> See Survey sent to “all-SIO” on May 8, 2018, and results of survey, including number of participants, and comments by survey participants in Appendices 1 and 2, respectively.

8. A short film: "Walking the Talk," SIO's commitment and call to action for zero waste
9. Conclusion

**OBSERVATIONS:**



Photos source: Lori Mendez

These photos were taken at a January 18, 2018 SIO noon-time talk. They are intended to demonstrate two things: 1) Multiple layers of unnecessary single-use plastics and plastic packaging that were provided to attendees by Cups; and 2) Inadequate and ineffective recycling collection for the event that likely resulted in recyclable materials being mismanaged, and inappropriately sent to the landfill. In fact, I have counted 10 different pieces of plastic waste just for one person's meal packaging that was left behind post-consumption.<sup>6</sup>

---

<sup>6</sup> 1.Cellophane/plastic sandwich wrapping; 2.Plastic sandwich wrap label; 3.Water bottle; 4.Lid; 5.Plastic cutlery wrapper; 6.Plastic knife; 7.Empty potato chip bag; 8.Plastic mayonnaise sachet; 9.#6 polystyrene clamshell container; and 10.Plastic adhesive label on the container.

Additionally, during my one-year tenure here on the SIO campus, I have observed the following single-use plastics for sale, and in and around trash bins and storm drains:<sup>7</sup>

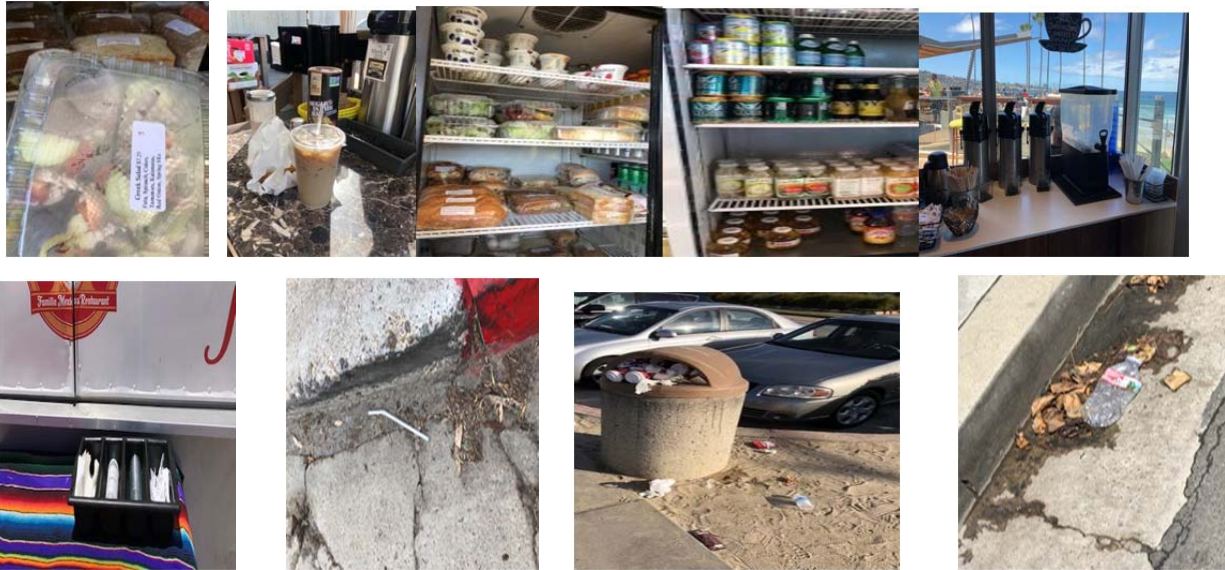


Photo source: Lori Mendez

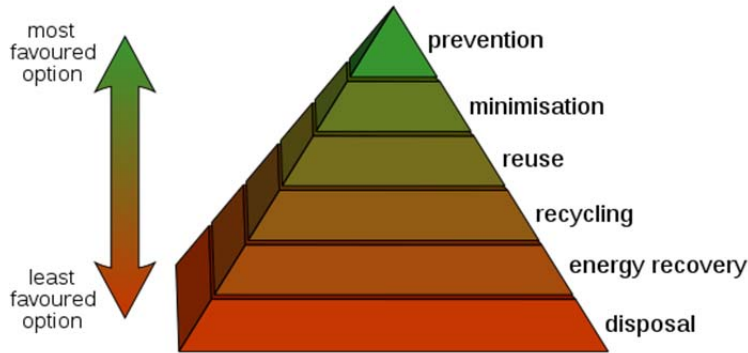
I recognized there was a disconnect at SIO between the amazing human beings who have dedicated their lives to pioneering science, discovery and improvement of the environment and society, and that which was being served up by SIO campus vendors and caterers.

There is still much work to be done in terms of convenience and offering the proper economic incentives to both vendors and consumers. Some improvements can be made in terms of banning SUPs, offering incentives to switch away from single-use plastics and reducing single-use plastics through the implementation of consistently enforced rules that apply uniformly across campus at every eatery, café and food truck, and at all events that take place on the SIO campus.

---

<sup>7</sup>Photos from Left to Right: Cups' Salad, Cups' Iced Coffee, Cups' Sandwiches; Caroline's plastic bottled beverages, Caroline's plastic straws and coffee cup lids, Belinda's plastic cutlery, salsa cups and lids (not pictured-plastic straws for horchata drinks)

I reviewed the online literature and interviewed cafe and restaurant vendors, managers and sustainability directors leading to several suggestions for best practices that can be imported and implemented on the SIO campus. All are based upon the solid waste hierarchy:



Credit: <https://www.newsecuritybeat.org/2018/04/default-post-3/>

One easy step would be to provide better signage with shadow boxes, and actual examples for all campus trash and recycle bins (and composting when we get a biodigester-coming soon to UCSD). Additionally, I think that wrap around signs on the Big Belly bins would be effective. It would also be useful to have actual human trash-talkers at lunch-time for major public events during the academic year, to assist head-scratching, but well-meaning new students, and event visitors, for whom sustainability may not yet be second nature.<sup>8</sup>



Photo credit: UC Irvine



Photo credit: UC Irvine



Source: Lori Mendez

Good communication of up-to-date best practices provided to the consumer, and also to the janitorial personnel responsible for sorting and removal of trash and recycling materials will ensure that recyclable materials actually make it to the Materials Recovery Facility (“MRF”) to

<sup>8</sup> Solid waste stream solutions from UC Irvine and Point Loma Nazarene University. (See Sustainability.UCI.edu).



be recycled.<sup>9</sup> Additionally, a well-maintained sustainability webpage offering transparency, current knowledge and best practices will go a long way toward garnering the support of an informed constituency.

### **WASTE AUDIT:**

I did not have access to the owner or manager at Caroline's to ask how many coffee cups, on average, are sold per day, week, month or year. I did speak with Nick, Cups' barista, and was told that Cups sells about 100 cups of coffee per day, with approximately 60% of Cups' customers bringing their own cups or other beverage containers. Because I wanted to get some idea about what was going on at Caroline's, and also to determine how customers were disposing of their waste at both locations, I decided to perform a waste audit. Additionally, I recognized that I would need metrics before I could effectively and measurably work toward reducing SUPs on the SIO campus.

Early in the morning on March 6, 2018, I met with Mr. Clarence Hancock of UCSD Facilities Management, who is responsible for emptying SIO Big Bellies when they are full, and SIO Safety and Sustainability Coordinator, Allyson Long, in front of the two side-by-side Trash and Recycle Big Belly bins at Pawka Lawn.



Photo Source: Hillary Eggers

As Mr. Hancock removed the two bags of recycling and trash items from the respective Big Bellies at Pawka Lawn across to Caroline's, I got to work dumping the contents of each bag on to a blue tarp sprawled out on the still dewy grass.

---

<sup>9</sup> College & University Recycling Coalition-Optimizing Bin Infrastructure Webinar(May 1, 2018) (CURC3r.org)





Photo source: Hillary Eggers

I began to sort and count items out loud, while Allyson meticulously tallied the number of each item found in each bag, and qualitatively recorded whether the item was recyclable, compostable or landfill waste, and further specifying whether the item was hot/cold coffee/tea related, such as plastic lined paper cups, lids, sleeves, stirrers, clear plastic cups with clear lids and straws, or bioplastic cups and lids. Also recorded was whether the item was plant based, and the type of plastic, nos. 1-7. (See Appendix 3 for rough, contemporaneous data authored by Allyson Long on 3/6/18; and See Appendix 4: Excel summaries of raw data).



Photo sources: Hillary Eggers and Lori Mendez

About 40 minutes later, Mr. Hancock appeared with two more recycling and trash bags from the Big Bellies nearest to Cups, the current Eckart coffee vendor, and we repeated the process. According to Mr. Hancock, prior to March 6, the Pawka bin was emptied eight days earlier on February 26. Thus, we were analyzing the contents of the Pawka Lawn bins that had accumulated for eight days. However, since the sensor was out on the Eckart Big Bellies, we could not be sure of the length of time that the contents were in the Eckart Big Bellies. Since there was fuzzy mold growing on some of the items, we estimate that the contents accumulated over the course of at least several days to over one week.

The purpose of the waste audit was to better understand what is being discarded into the waste stream; what is actually going to be recycled and composted, and what materials are going to the landfill, with the end goal of helping SIO better understand the nature of its waste stream, and prioritize its prevention, reuse and repurpose and lastly, recycling efforts.<sup>10</sup>

My hypotheses: 1) There would be a substantial amount of hot/cold coffee cup ensembles (cups, lids, and straws) that are not recyclable and go to landfill; and 2) The hot coffee/tea plastic lined paper cup ensembles would be in the wrong bin, because I believed people, and especially the general public that more often frequents Caroline’s, mistakenly believe they are recyclable, when only the cardboard sleeve and lid are recyclable, and also because the bins were not clearly labeled and did not reference actual containers that products are sold in at each of the two locations; Cups and Caroline’s on the SIO campus. Upon completion of the audit, both hypotheses were confirmed.

Waste Audit Findings and Conclusions:

1. Number of Items in Each Bin at Both Locations:

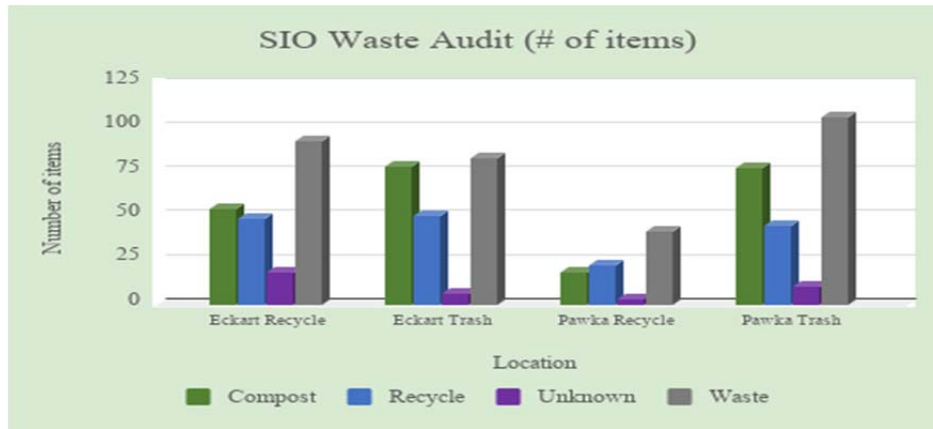
<b>BIN LOCATION/TYPE</b>	<b>TOTAL NUMBER OF ITEMS</b>
Eckart Recycle	212
Eckart Trash	217
Pawka Recycle	84
Pawka Trash	<u>237</u>
Grand Total	750

---

<sup>10</sup> Stephanie Barger, Director of Market Transformation and Development with the TRUE Zero Waste Program of the U.S. Green Building Council told me that recycling is not really what we want at all, and that the goal is really just to reduce, reuse and repurpose. This is consistent with UNEP’s Waste Hierarchy pyramid depicted on page 5 above.

2. Number of Items by Waste Stream (Compostable, Recyclable, Unknown, Landfill) in Each Bin: <sup>11</sup>

<b>BIN LOCATION/TYPE</b>	<b>COMPOSTABLE</b>	<b>RECYCLABLE</b>	<b>UNKNOWN</b>	<b>WASTE/LANDFILL</b>
Eckart Recycle	54	48	18	92
Eckart Trash	78	50	6	83
Pawka Recycle	18	22	3	41
Pawka Trash	77	44	10	106



3. Each Waste Stream by Weight: <sup>12</sup>

<b>BIN LOCATION/TYPE</b>	<b>COMPOSTABLE</b>	<b>RECYCLABLE</b>	<b>WASTE/LANDFILL</b>	<b>TOTAL LIQUID/DIAPER/DOG WASTE CONTAMINATION</b>
Eckart Recycle	1 lb.	10.5 lbs.	2 lbs.	Not recorded
Eckart Trash	8 lbs.	3.9 lbs.	12 lbs.	Not recorded
Pawka Recycle	0 lbs.	2.6 lbs.	2.7 lbs.	1.4 lbs.
Pawka Trash	8 lbs.	2.2 lbs.	13 lbs.	6.4 lbs.

<sup>11</sup> Information gleaned includes that the vast majority of items in all bins was waste destined for landfill. Coffee-related items were a significant amount of the volume in both the trash and recycle bins. Also, none of the compostable items in these bins will be composted, and many of the recyclable items were misdirected to the wrong bin, or were in the right bin but were extensively contaminated with chunks of food, liquid, or mold contamination.

<sup>12</sup>Note, HDH catering boxes themselves are plastic lined, and ergo currently non-recyclable in San Diego and contained more plastic, such as cutlery and salt/pepper wrapped in plastic; and plastic ramekins and lids.

## **BEST PRACTICES:**

See Appendix 5 for Summary of Best Practices.

## **CAROLINE'S BEST PRACTICES:**

**REDUCE:** Beside the fact that these items may be over-packaged in an unnecessary plastic wrapper, if you are a vendor, please do NOT assume that customers want plastic cutlery, napkins and condiments. A lot of times customers do NOT want or need these. Caroline's is requested to please ask customers, for both on-line and in person to go orders at the counter, whether they in fact want these. Additionally, please make sure that to-go boxes, cutlery and ramekins are reusable first, and then that the to-go ramekins for sauces, dressings and condiments are recyclable.<sup>13</sup> Please do not sell single-use water bottles. These should be banned across campus. They are unnecessary, wasteful, possibly unhealthful, and polluting of and damaging to the environment, including the ocean, and wildlife.

## **HOW CAN THESE CHANGES BE ACHIEVED?**

1) For to-go online orders, please make a box for customers to check, indicating whether they do not want cutlery, napkin, condiments, etc.; and 2) Keep plastic cutlery and FSC or SFI post-consumer recycled napkins behind the counter; 3) Nix the plastic packaging to contain the fork, knife, spoon, napkin and salt and pepper combo in favor of reusable and recyclable plastic sporks, or a spork with a serrated edge (3-in-one utensil),<sup>14</sup> and 4) Either keep condiments

---

<sup>13</sup> On May 24, 2018, Julie Muir, manager of PSSI Sanitation Service, Inc. on the Stanford Campus in Palo Alto told me that there is no market for polystyrene chase symbol no. 6 plastics following the Chinese National Sword policy. Earlier that same week, Bob Hill, Recycling Director for EDCO in Escondido told me that they take them, but they need to be very clean; unlike other plastics that can pass muster with dressing and sauce residue (but no chunks of food).

<sup>14</sup> Though I have not found any confirmed no. 5 3-in-1 utensils (note, just because the utensil is not labeled with a chasing symbol or solid triangle, doesn't mean that it is necessarily not recyclable. Accordingly, please check with UCSD about their purchase of 3-in-1 cutlery provided on Scripps Day to confirm the type of plastic (i.e. polypropylene #5 that is recyclable, or nylon #7 that is not recyclable). Additionally, please see Jollywares on Etsy.com that purports to sell recyclable polypropylene no.5 light weight and durable sporks, that claim to be perfect for take-out food, BPA-Free, dishwasher safe (upper rack), and recyclable. See [https://www.etsy.com/listing/563271317/colorful-plastic-spork-heavy-duty-sporks?gpla=1&gao=1&&utm\\_source=google&utm\\_medium=cpc&utm\\_campaign=shopping\\_us\\_b-craft\\_supplies\\_and\\_tools-party\\_and\\_gifting-party\\_supplies-tableware-cutlery&utm\\_custom1=efb2d195-2438-4814-958c-a3e88128ca69&gclid=EAAlaQobChMI\\_dCQgqj92wIVjrjACh3VCABnEAYYASABEgJUaPD\\_BwE](https://www.etsy.com/listing/563271317/colorful-plastic-spork-heavy-duty-sporks?gpla=1&gao=1&&utm_source=google&utm_medium=cpc&utm_campaign=shopping_us_b-craft_supplies_and_tools-party_and_gifting-party_supplies-tableware-cutlery&utm_custom1=efb2d195-2438-4814-958c-a3e88128ca69&gclid=EAAlaQobChMI_dCQgqj92wIVjrjACh3VCABnEAYYASABEgJUaPD_BwE).

behind the counter, and ask customers at the counter whether they want these, and provide them upon request only, or provide a bulk condiment serving station sans condiment containers and lids, so customers can take what they need.<sup>15</sup>

If these two practices are employed, they will both empower the customer to make his or her own choice while helping the planet by only taking what is needed. Caroline's should benefit as well, since ultimately they will be paying for less of these items.

**REDUCE/REUSE:** Replace single-use dressing/sauce/condiment ramekins and lids for dine-in service with melamine, glass or ceramic ramekins with no lids.<sup>16</sup> Then, only provide dressings/sauces upon request for to-go orders, and make sure the ramekins and lids are both recyclable.

**REUSE:** Replace plastic straws with reusable dish washable food grade (#304 or 80/18) stainless steel straws, and have a small box of Forest Stewardship Council ("FSC") or Sustainable Forestry Initiative ("SFI") certified and backyard compostable paper straws on hand for the anticipated 1% who complain/request a single use straw.<sup>17</sup> After the initial investment for the stainless steel straws that should cost around \$1.00 or less with a larger purchase,<sup>18</sup> given the long life, and expected 2,500 time usage, the straw should pay for itself over time. Additionally, the Aardvark or comparable paper straw will cost the vendor approximately \$.02 each, and the

---

For more information on the current recyclability and market for rigid plastics, including plastic utensils, and recycling challenges, please see: Granger, Trey, Earth 911.com (May 25, 2018).

<sup>15</sup> As reported by Dr. M. Sanjayan in a University of California-Vox Video Series video called "Takeout creates a lot of trash. It doesn't have to." Dr. Sanjayan tells us that often, vendors just assume that customers want plastic utensils and condiments and a bag, when they don't. In fact, the food delivery app service "Seamless" saved more than a million plastic sets of utensils and napkins, just by making a check box for customers to be able to check that says: "Spare me the napkins and plasticware. I'm trying to save the earth." (See <https://www.vox.com/videos/2018/1/3/16842068/climate-lab-takeout-food>).

<sup>16</sup> While melamine cannot be melted for recycling like other plastics, it can be ground down and used as a filler for other plastics or wood composites. Everything You Need to Know About Melamine Dinnerware. For a comparison of alternative materials, see table in Appendix 6. <https://www.webstaurantstore.com/.../61/top-eight-benefits-of-melamine-dinnerware.html>

<sup>17</sup> Letter from Kara Woodring of Aardvark Straws, received in February 2018.

<sup>18</sup> <https://www.amazon.com/Stainless-Drinking-Reusable>

cost can be passed along to the customer, if the vendor chooses.<sup>19</sup> Also, when UCSD has a digester that is expected to come on line by 2020, perhaps these, along with post-consumer waste can be composted, so long as they make it to the right composting bin.

**COMPOST:** Use unbleached FSC or SFI certified post-consumer recycled paper napkins, which ideally can be collected for composting.<sup>20</sup> Combined with our clear signs and educational material on the webpage, customers can't go wrong and, with a little practice, will put them in the right bin!

**REUSE:** Always ask customers if they are drinking their coffee on premises, or to-go? If they plan to consume their coffee on premises, then please serve in a reusable ceramic cup, or if the beverage is cold, in a glass. Hopefully, like Starbucks, Caroline's will actually save money on foregone cups, and associated materials.<sup>21</sup> Further, since Caroline's employees are already gathering and washing dishes, perhaps like at Pannikin, they will not be inconvenienced or lose labor time gathering, washing and sterilizing the cups. (See Appendix 7: Table of Vendor Summaries).

**RECYCLE:** Ideally, Caroline's would ask customers to bring their own carry-out, or "to-go" containers and offer a discount for that. Alternatively, Caroline's could have a reusable/dish washable strong, heat resistant microwavable and recyclable plastic number 5 polypropylene container, such as the GO Box, that can be used an estimated 500 times and then recycled at the end of their useful life cycle.<sup>22</sup> According to GO Box, 1 GO Box, when used only 40 times, it creates 10 times less greenhouse gases than 40 compostable containers.<sup>23</sup> The GO Box model presents two takeaways: 1) Customers pay \$18.00 per year for the privilege of using the GO Box, which likely represents the true cost of the product and associated service (box, plus labor

---

<sup>19</sup> This price is according to Sales Representative Kara Woodring at Aardvark Straws in February 2018.

<sup>20</sup> Note: Caroline's may already be using this more sustainable type of napkin, but this must be confirmed, and composting of these napkins at Caroline's and campus-wide, should be promoted, if not mandated.

<sup>21</sup> Report of the Starbucks Coffee Company/Alliance for Environmental Innovation Joint Task Force (April 15, 2000) (<http://business.edf.org/files/2014/03/starbucks-report-april2000.pdf>)

<sup>22</sup> <https://www.goboxpdx.com/faqs/>

<sup>23</sup> Id.

to collect, wash and distribute the GO Box) and encourages responsible return and minimal leakage of the GO Box into the environment; and 2) The convenience of being able to drop it off at several participating restaurants, having it washed for them and picking up a clean GO Box when they need another one. Here at SIO, there would be only two drop off sites, Caroline's and Cups/Eckart Vendor for now, and the GO Box would need to be returned to its place of origin so as not to become too labor intensive. Additionally, the vendor would have the added benefit of not needing to purchase single-use to-go containers, and the customer should reap the savings of less packaging. Technology, such as the RF tag, bar code scanning or scanning a student's/faculty/staff's Triton card would likely be a necessary addition. Of course, to help facilitate such a program, and to ensure its success, information about the GO Box (or similar) program would be available on the SIO sustainability website.

Both Caroline's and their customers should be made aware immediately that the plant-based bagasse (sugarcane) clamshell to-go boxes that Caroline's is currently using is NOT a best practice, is neither recyclable or compostable, and is going to landfill.<sup>2425</sup> To further reduce waste, Caroline's may consider offering two sizes of clamshells for leftovers. At some point in the future with the influx of biodigesters and industrial composters, and better labeling or color coding of containers, and with less chance of plastic contamination during the composting process, the currently BPI/ASTMI (Biodegradable Products Inc./American Section of the

---

<sup>24</sup> See Ban List 2.0 (Nov. 2017)

<sup>25</sup> Per my conversation with Environmental Specialist III, Ana Carvalho, with the City of San Diego Environmental Division stated that they are not compostable, nor are they recyclable and end up as landfill and do not break down within the closed plastic lined, essentially giant "trash bag" anaerobic landfill environment. Accordingly, in a sense, the vendor is wasting money paying for a product that says it is compostable, but is not actually compostable in San Diego. Additionally, the container gives the consumer a FALSE sense of being "eco-friendly" about single use consumption and waste. This is "green washing" no matter how you slice it. Transparency is needed. However, there could be another upside; namely the possible health benefit of eating out of a plant based product, assuming it is not genetically modified Roundup Ready GMO and petroleum based pesticide laden versus eating out of a potentially leaching and possibly carcinogenic and/or endocrine disrupting plastic container that is derived from fossil fuels. Also, if it is non-GMO plant based, even though the end life is terminal, the vendor may wish to purchase the non-GMO plant based containers because they are not derived from fossil fuels, should be less GHG intensive, less polluting, and safer for the consumer. However, during my telephone conversation with P&R Paper sales representative Rick Soto (951/453-6660) in April, 2018, Mr. Soto told me that unfortunately, probably 90% of domestically produced plant based plastics are most likely from GMO food stocks, and "...who knows where they come from if they are made in China or elsewhere." Additionally, another fact to consider is that these are made from food stocks, and food stocks could be used for feeding people.



International Association for Testing Materials International) certified “compostable” bio plant-based options may actually become widely compostable, including within San Diego county.<sup>26</sup>

Should that happen, there is the issue of methane production; a greenhouse gas,<sup>27</sup> plus there is the issue associated with feed stocks that will be used to make utensils to eat food with, instead of being used to feed people directly, by being food for them. Like Stephanie Barger, City of Portland, Oregon Business Sustainability Advisor, Lindsey Maser echoed the sustainable solid waste message: “Unfortunately, there is no silver bullet” when it comes to selecting alternative materials and products. “The best thing we can do is reduce the amount of our waste.”

**RECYCLE:** It was Ken Hall’s idea to check into this company called Smart Planet Technologies and its product reCUP, “paper cups engineered for recyclability.” Smart Planet uses a patented calcium carbonate mix in with its plastic that makes it more easily separable during the recycling process and given the added weight to the polypropylene with the added calcium carbonate, that sinks to the bottom when pulping, allowing the paper to be separated out from the plastic and recycled up to seven times.<sup>28</sup> Additionally, that company maintains that its calcium carbonate is sustainably mined by boring a small hole and extracting this mineral from the earth with minor disturbance and damage. Further, it maintains that due to the use of calcium carbonate as an additive to the polypropylene feedstock for the lining, the lining has between 49% and 51% less plastic. Accordingly, that amounts to a savings of plastic waste at the time of recycling of about half of the plastic of a regular polypropylene-lined paper coffee cup.<sup>29</sup> Ken will have to decide if the cups are cost effective, and whether they are the right option for Caroline’s and SIO. In either event, I feel strongly that it is entirely feasible for the

---

<sup>26</sup> See Ban List 2.0 (Nov. 2017)

<sup>27</sup> UCSD intends to install one to two biodigesters on upper campus made by Impact BioEnergy that will handle pre and post-consumer organic food scraps, paper towels and napkins. According to Sara McKinstry who spoke with the person most knowledgeable at Impact BioEnergy, BioEnergy in a conversation with Sara McKinstry at UCSD, they can test whether or not the digester can handle bioplastics on one of their existing biodigesters up in Seattle, and Ms. McKinstry will ask them to test it out.

<sup>28</sup> See Smartplanettech.com

<sup>29</sup> Id.

new coffee/snack cart vendor at Eckart to be 100 percent zero waste when it comes to coffee sales and consumption, and that rather, this is an interim solution for Caroline's.

#### **BELINDA'S FOOD TRUCK:**

**REDUCE:** Get rid of single-use to-go salsa containers and lids. Belinda's already provides self-serve salsa bins with a stainless steel spoon for customer usage. Customers can spoon the salsa directly onto their food, just as they already do. In the case of a burrito that cannot be easily unwrapped using only one hand while standing, perhaps whoever is making the burrito can just ask the customer: "0, 1 or 2 spoonfuls of salsa inside of your burrito?" Then the food preparer can apply the salsa when constructing the burrito.

**Single-use plastic water bottles:** Hopefully, in accordance with a campus-wide ban, these will not be sold, but Belinda's can continue selling sodas and other drinks in recyclable glass bottles or aluminum cans.

**Plastic straws and plastic lids for fountain beverages:** Do not give them. Do not overfill hand-made drink, use a little less ice and just hand the customer a cup with Horchata, Jamaica, etc.

Offer a discount, like \$.05 if customer brings own clean cup. To account for different cup sizes, use a single correct size cup to measure and pour from.

**Single-use plastic cups:** Please use recyclable cups that have as close to 100% post-consumer recycled material.

**Napkins:** Use unbleached FSC or SFI certified post-consumer recycled paper napkins, which can be collected for composting.

#### **CUPS/NEW COFFEE/SNACK VENDOR AT ECKART:**

**REDUCE:** Because of the more transient nature of patrons of Caroline's, versus the SIO students, faculty and staff customers that do their work on campus daily, and regularly frequent the Eckart vendor, currently known as "CUPS," a different suite of zero waste solutions is required. In the future, when an adequate industrial dishwasher is made available,

as with Caroline's, the new Eckart vendor (possibly in concert with, or subsidized by SIO/UCSD or paid for by the customers themselves) may wish to consider an investment in GO Box type of reusable, and ultimately recyclable, plastic to-go boxes. Please see benefits in Caroline's Go Box section above.

**REDUCE:** For cold drinks, consider not overfilling drinks and omitting the lid and the straw. Do not serve, or offer, but keep behind the counter, and provide No. 1 recyclable lids upon request only. No plastic straws. Keep paper compostable, FSC/SFI certified, post-consumer content recycled paper straws behind the counter, that are only given upon request. This resource and cost-saving measure was suggested by Duane Buske, SDSU Senior General Manager of Purchasing & Distribution during my meeting in April. (Appendix 7: Vendor Summary Table).

**REUSE:** Relying on lessons learned from sustainability officers, café and restaurant managers, case studies and pilot programs on other universities, the following are "takeaways" for best practices for a "Mindful Mugshare" program at the Eckart vendor location, and hopefully, with time, everywhere on campus. (Please see section addressing mugsharing immediately below).

#### **MINDFUL MUGSHARE AT ECKART VENDOR LOCATION:**

##### Background:

Please see Appendix 8: Mindful Mugshare Summary.

Many coffee stores have recycle bins on the premises, and as you deposit your empty paper coffee cup into the right "recycle" bin, you don't give a second thought, and you feel caffeinated, satiated, self-affirmed and guilt-free, knowing that you have just taken the first step in ensuring that your gently used cup is on the way to recycling heaven, where it will soon magically be made into some other useful paper thing, and all is well in the universe.

Unfortunately, given current Chinese National Sword policy,<sup>30</sup> plus the present world-wide dearth of recycling facilities that are able to separate plastic from paper, and then recycle the paper portion of the cup, that first step of tossing the plastic-lined paper cup into the recycle

<sup>30</sup> Wall Street Journal, Oct. 8, 2017: "Oh, Scrap: China, the Biggest Buyer of America's Trash, Wants No More (<https://www.wsj.com/articles/america-is-no-1-in-exporting-trash-what-if-no-one-wants-it-anymore-1507483011>)

bin, is the last step that actually moves the cup toward recycling, and your cup more than likely will NOT be recycled. As confirmed by Environmental Specialist III, Ana Carvalho, of the City of San Diego Environmental Services, single-use disposable paper coffee cups are lined with sprayed on polypropylene laminate to keep it waterproof and sturdy. This plastic layer cannot be easily separate using conventional recycling equipment that requires complex and costly plant and machinery, so they are not widely available in the U.S. The only plants that currently are able to recycle coffee cups are in San Francisco, Seattle, New York and Washington D.C.<sup>31</sup>

Additionally, the resources required to produce such a great number of cups is staggering, as well."43,000 trees, 1.5 billion liters of water, 320 million kWh of electricity, 3,000 tons of crude oil. Disposable cups turn into garbage after a short use, and this results in 40,000 tons of residual waste nationwide."<sup>32</sup> The cups are not recycled, in many places, discarded paper cups adversely affect the city cleanliness. The cups, lids and stirrers that lay around have the opportunity to make their way into the ocean.

Don't worry; there is a convenient and effective solution right here on SIO: "Mindful Mugsharing." According to the Alliance for Environmental Innovation ("Alliance") in its Joint Task Force study with Starbucks, a reusable cup is designed for 3,000 uses, and is used an average of 1,000 or more times. Accordingly, the Alliance concluded that the "...environmental benefits of using reusable cups in terms of reduced energy use, air and water pollution, and solid waste can be tremendous."<sup>33</sup> In fact, the Alliance found that for customers drinking their beverages in Starbuck stores, using reusable cups instead of a polyethylene lined paper cup topped with a polystyrene [toxic #6] lid for hot beverages, and polyethylene terephthalate (PET

---

<sup>31</sup> Also confirmed by Todd at Smart Planet Technologies discussing the launch of its ReCup Recycling initiative- traditional plastic-coated paper cups are typically too difficult for paper recyclers to process through their existing paper recycling equipment. (<http://smartplanettech.com/press/>). See also, Starbucks' response to misleading claims about cup recyclability: Starbuck's letter to Todd Paglia, Executive Director of Stand.earth on Nov. 28, 2017 summarizing the lack of municipal recycling infrastructure, except in San Francisco, Seattle, New York and Washington D.C. (<https://news.starbucks.com/views/starbucks-response-to-misleading-claims-about-cup>)

<sup>32</sup> City of Freiburg has a brilliant alternative to disposable coffee cups, December 4, 2017 (<https://www.treehugger.com/environmental-policy/city-freiburg-has-brilliant-alternative-disposable-coffee-cups.html>)

<sup>33</sup> Id.

#1) clear plastic cups for cold coffee based drinks and teas, can significantly reduce the environmental impacts of serving coffee.<sup>34</sup> In addition, by making glasses and cups available to in-store consumers, it was determined that Starbucks could lower its packaging costs, and save Starbucks over \$1 million a year, with only nominal increases in labor requirements or environmental impacts from running the dishwashers.<sup>35</sup>

Here's how it works. RELAX, IT'S EASY.

1. Use the Eckart coffee vendor's ("ECV") reusable "for here" ceramic mug or glass at no charge, just please remember to place it in the dirty mug/glass bin for washing and sterilization when you are done enjoying your beverage, and before you leave the premises. This will ensure that others can also have the mugs and glasses available for their use. Additionally, this is a step toward ensuring that we can get a projected 2,000 uses out of each mug and glass in order to maximally reduce GHG emissions and disposable cup waste; or
2. Bring your own mug or beverage container of your choice ("BYOM"), and get a discount for reducing the waste that you would have used if you bought a disposable cup, saving the vendor money to buy the single-use disposable cup, lid and sleeve, and saving the planet.
3. Use the community-shared mugs provided by the EV to carry your coffee or tea. Take the borrowed mug with you. When you are done, rinse and return it to the EV to be washed and sanitized, and put back into circulation for others to use.

If you are only visiting the campus, you do not have your own mug or container, and it's not practical to return the shared mugs, you may purchase a SIO branded coffee mug for \$10.00, or a SIO branded Mason jar with a handle and a lid for \$5.00 (Lori's suggested price points). The next time you return to campus, bring your new mug or jar with you and start earning your discounts with each subsequent purchase. After the 20th beverage purchase at the EV, the Mason jar will have paid for itself!

---

<sup>34</sup> Id.

<sup>35</sup> Id.

Other takeaways/suggestions: It is recommended that you write your name and telephone number on the bottom of your mug/tumbler, Klean Kanteen, etc. That way if it is lost, it may be returned. (Good advice from Carol Norman at U.S.D. Dining, and also from Sam, Art of Espresso's co-owner, who has noticed over the years, that students often forget their reusable water bottles). Also, students, vendors, maintenance and administration should be on board with a transparent and convenient way to retrieve lost and found items, and policy and procedure regarding return of lost/found reusable beverage containers. For example, at the end of the year, if they are not retrieved, but are in fine usable shape, they will be offered at the May Garage Sale at a steep discount. It is believed that this may work as a pilot program on SIO, given the population of scientists that understands that it would be a bargain to purchase the used beverage containers that could then be washed and sterilized for a steeply discounted purchase price. That way they will not end up in the waste stream until the very end of their life cycle! Also, UCSD upper campus may wish to implement such a pilot program.

#### **FUTURE HIGHER TECH MUGSHARE:**

Technology, such as USD's Validfill® RFID technology, or a barcode and scanner system or the Ozzi® return machine could be used. Perhaps a student could prepay quarterly for coffee, then the scanner/machine/app. can keep track of the amount that the student has used and the balance, that would be available and retrievable in real-time via an app. I see such a system in play on a grander scale on upper campus, rather than on our relatively small SIO campus.

**FUTURE METRICS:** Another waste audit and communication with the EV should be conducted within the first month, and at regular intervals thereafter to objectively determine whether the efforts are justified, and what more or differently. It is suggested that SIO be apprised of real time data by its waste hauler, currently Republic. Currently available technology makes this completely possible, and it has already been implemented at UC Irvine and UC Merced. (See UCI, and UC Merced sustainability web pages.) Perhaps this could be a Capstone project or undergraduate research project, or something that an intern could help start up.

## CASE STUDIES:

Two goals of mugshare are: 1) The reduction of waste; and 2) building environmental considerations into vendor decisions. To do so, we must combine the expertise and perspectives of scientists and economists to come up with solutions that make environmental and business sense, and are pleasing to the customer. Toward this end, there are two fairly large-scale pilot tests of big commercial coffee stores performed; one in Boston in the U.S. in August 1997 and August 1998 at Starbucks stores, and another in Wales from September to December 2016 at Bewley's Tea and Coffee UK.

## TAKEAWAYS FROM CASE STUDIES:

Please see Appendix 9: Summary of Case studies.

**Starbucks Coffee Company:** This pilot program was implemented in August 1997 and repeated in August 1998 in three Starbucks stores in Boston. It tested “for here” glassware and ceramic mug, plus signage and cup displays encouraging customers to choose reusable cups and glassware for in-store service.<sup>36</sup> Labor, dishwashing and reusable cup and glass use were monitored, and customers were surveyed. The results showed noteworthy environmental and economic benefits could be achieved, from even minor changes in store operations, and the use of reusables in the store increased overall from an average of 18 percent before the test to 57 percent during the pilot test.<sup>37</sup>

The test was duplicated in 1998 at 13 stores over an eight-week test period-in the morning after 10 a.m. All customers were asked if they wanted coffee for here, or to go. Unless requested otherwise, for here customers were given a ceramic mug, or glassware for cold beverages. Findings: With as few as three to four reusable cups used per hour, it was estimated that Starbucks store could save hundreds of dollars per year in paper cup costs per year alone; plus customers liked using the reusables option. Additional findings: Environmental benefits

---

<sup>36</sup> Report of the Starbucks Coffee Company/Alliance for Environmental Innovation Joint Task Force (April 15, 2000) (<http://business.edf.org/files/2014/03/starbucks-report-april2000.pdf>)

<sup>37</sup> Id.



included “...reduction of energy use, water pollution and usage by 64%, air pollution particulates by 86% and GHG by 29%, VOCs by 99.7% and NOx and Sox emissions by 99%; and solid waste by 88 percent by weight.”<sup>38</sup>

**Bewley’s Tea & Coffee UK Ltd.:** This study was conducted by Professor Wouter Poortinga with assistance from Cardiff University, the University of South Wales, University of Winchester, Imperial College and Contract Caterer Bartlett Mitchell at 12 business & university café sites in Wales, which participated from September 2016 through December 2016.<sup>39</sup> All 12 sites displayed a show card and/or poster with an environmental message regarding the number of cups ending up in landfill/asking customers to bring their own cups (“BYOC”). One site had the additional messages via intranet & social media, eight sites sold reusable coffee cups, and four sites distributed 200 unbranded FREE reusable coffee cups. Four sites had a financial incentive; a discount of between 15 and 25 pence (1 pence = \$.08 US) for customers who BYOC. Cafes were asked to capture daily sales of hot drinks for 25 days of sale before and after the study, and how many customers used disposable versus reusable cups. Researchers found that it was the combination of these methods that resulted in the greatest behavioral change among consumers.<sup>40</sup>

**Significant findings from Campus Mugshare Programs (UBC, Whitman and WWU Mugsharing, and “Kill the Cup” at UCSD):** Takeaways from the University of British Columbia mugshare program was that the sign-up closeout process needs to be easy and streamlined; a \$15 lost or damaged MUG fee keeps people honest; Keeping participants engaged through e-mail is good for communications; and project participants often joined the program to save the environment, but they enjoyed the program for the convenience. Likewise, “Kill the Cup” reusable cup pilot on UCSD and college campuses across the nation that ran from April 1 to May 26, 2013, was engaging, and made use of social media, corporate sponsorship, a

---

<sup>38</sup> Id.

<sup>39</sup> Study sponsored by Bewley’s, and performed by Professor Wouter Poortinga, Welsh School of Architecture & School of Psychology, Cardiff University (March 2017)

<https://orca.cf.ac.uk/99366/1/Coffee%20cup%20summary%20report%20-%20Poortinga%20%28FINAL%29.pdf>

<sup>40</sup> Id.

competitive spirit and fun prizes. Forgetfulness and loss of cups was an issue with all programs.<sup>41</sup>

### **ECONOMIC CONSIDERATIONS AND MARKET FORCES:**

In principle, I agree that in a perfect market scenario, pursuant to the Theory of Classical Economics, we may expect that in time, both environmental and economic forces will intersect, and result in consumers exerting increasing pressure for alternatives to petrochemical based packaging materials, given their large and unsustainable GHG footprint and energy use, and the need to eliminate, or at least substantially reduce, land and marine debris and associated impacts on wildlife; a major source of protein for people.<sup>42 4344</sup>

However, I believe that part of the reason the market in general, and more specifically, the market on the SIO campus, has not, and cannot, with a business-as-usual, laissez-faire approach, make the correction it needs to make in the case of single-use plastics, is because there is a market failure in the externality of information. This is due to a lack of transparency and asymmetric information, resulting from the consumer being provided with imperfect information, and less information, than firms in the supply chain.<sup>45</sup> Rather, there is greenwashing,<sup>46</sup> and most people believe that their coffee cups are recyclable or compostable.<sup>47</sup> Thus, the general public do not know the extent they are harming the environment with their consumption, and are duped into what they believe is a guilt-free purchase that requires no

---

<sup>41</sup> Id.

<sup>42</sup> [http://www.tellus.org/pub/Final\\_Report-Materials\\_Management\\_Options\\_for\\_MA\\_SW\\_Master\\_Plan\\_Review\\_-\\_h\\_Appendices\\_-\\_12-08.pdf](http://www.tellus.org/pub/Final_Report-Materials_Management_Options_for_MA_SW_Master_Plan_Review_-_h_Appendices_-_12-08.pdf)

<sup>43</sup> Where fossil fuel based plastics are still being used in consumer products, it is recommended that the recycled content is increased over time, ideally reaching 100% post-consumer recycled content. This will help to better foster a circular economy, spur design innovation and increase efficiency. (See Ban List 2.0 (Nov. 2017) <https://static1.squarespace.com/static/5522e85be4b0b65a7c78ac96/t/5a99d29d41920278291296a4/1520030386318/5Gyres+BAN+List+2018.pdf> [https://static1.squarespace.com/static/5522e85be4b0b65a7c78ac96/t/5acbd346562fa79982b268fc/1523307375028/5Gyres\\_BANlist2.pdf](https://static1.squarespace.com/static/5522e85be4b0b65a7c78ac96/t/5acbd346562fa79982b268fc/1523307375028/5Gyres_BANlist2.pdf))

<sup>44</sup> Approximately 3 billion people in the world rely on both wild-caught and farmed seafood as their primary source of protein. <https://www.worldwildlife.org/industries/sustainable-seafood> (Accessed 6/15/18)

<sup>45</sup> "Markets and the Environment," Nathaniel O. Keohane & Sheila M. Olmstead (2007), at pp. 138-140

<sup>46</sup> "Greenwashing" is defined by Investopedia as "the use of marketing to portray an organization's products, activities or policies as environmentally friendly when they are not. ... **Greenwashing** is a play on the term "whitewashing," which means to gloss over wrongdoing or dishonesty or exonerate without sufficient investigation or spurious data. (<https://www.investopedia.com/terms/g/greenwashing.asp>)

<sup>47</sup> Ban 2.0, supra at p. 11

further effort or thought on their behalf. In actuality, consumers are not paying the full cost of their consumption. Likewise, firms in the supply chain are not paying the full cost of their production. This is a classic problem of market failure, or external costs.

When properly informed and armed with true and accurate facts, both consumers and producers may make the right choice, and they may be willing to go along with a change in social norms, or even a “latte levy,” as recently was proposed by the British Parliament.<sup>48</sup> Thus, it would help to reinforce customer participation and buy in to have signs or posters at all SIO campus eateries and cafes informing students, faculty and staff why there are no single-use plastics in terms of environmental harm, and thank them for bringing their own, which is best for the environment and the ocean.<sup>49</sup>

To give coffee and tea drinking customers a further nudge to do the right thing, and to help them make the desired behavioral changes, studies show that people do not like to lose something, more than they like to gain something. This is called the “Prospect Theory.” Perhaps counterintuitive to conventional thinking that to bring about a change in behavior, it is better to reward people for their changed behavior, this theory holds that people are more sensitive to losses than gains when making decisions.<sup>50 51</sup> In other words, using the California bag ban as an example, it is believed that grocery shoppers despise being charged a bag fee so they forgo the bag. Though it is really too early to tell whether the bag ban legislation, requiring a charge for plastic bags has resulted in a reduction in the numbers of plastic bags used, the reduced findings of these bags at beach clean-ups is a hopeful sign that the \$.10 bag charge is working as a deterrent for the customer to take his/her groceries home in a plastic bag, resulting in

---

<sup>48</sup> House of Commons Environmental Audit Committee-Disposable Packaging: Coffee Cups: Second Report of Session 2017-19 (<https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/657/657.pdf>)

<sup>49</sup> Results of a field experiment to reduce coffee cup waste. Summary report to Bewley’s Tea & Coffee UK Ltd., March 2017, supra.

<sup>50</sup> Kahneman, D., & Tversky, A. (1979) Prospect theory: an analysis of decision under risk. *Econometrica*, 47(2), 263-292.

approximately 72 percent fewer plastic bags that blow or flow downstream to the beach and into the ocean.<sup>5253</sup>

Likewise, in a Wales study sponsored by Bewley’s Tea and Coffee UK Ltd. Researchers found that “...the provision of free reusable alternatives combined with clear environmental messaging and a charge on disposable cups increased the use of reusable cups from 5.1 percent to 17.4 percent.”<sup>54</sup> The study also noted an oddity of consumer behavior, in which consumers were less likely to be swayed by discounts on reusable cups than they were by fees for disposable cups. “There is an important nuance when it comes to financial incentives,” said Cardiff Professor Wouter Poortinga. “People are far more sensitive to losses than to gains when making decisions — so if we really want to change a customer’s behaviour then a charge on a disposable cup is more likely to be effective.”<sup>55</sup>

Additionally, the true cost includes all of the negative environmental and societal externalities that come to bear when the customer takes hold of a single-use plastic coffee cup ensemble. Hence, the disconnect inherent in using such packaging products on our campus where all are striving to improve the state of our planet and the ocean.<sup>56</sup> Further, economists refer to the ubiquitous plastics in the marine environment as a “public bad” that negatively affects our welfare in a non-excludable and non-rival manner.<sup>57</sup>

---

<sup>51</sup> Oosterhuis, F., et al., 2014 citing beneficial impact of environmental taxes on plastic items in terms of reduced use and corresponding low cost of implementation.

<sup>52</sup> See Prop. 67/Senate Bill 270 (<https://oag.ca.gov/consumers/bag-ban>)

<sup>53</sup> <https://www.mercurynews.com/2017/11/13/editorial-success-californias-first-in-the-nation-plastic-bag-ban-works/>; <http://www.sdcoastkeeper.org/learn/fishable/marine-debris/data-from-san-diego-beach-cleanups>

<sup>54</sup> See Bewley’s study (March 2017)(<https://orca.cf.ac.uk/99366/1/Coffee%20cup%20summary%20report%20-%20Poortinga%20%28FINAL%29.pdf>)

<sup>55</sup> Id.

<sup>56</sup> See Ban List 2.0 at p. 25 ([https://static1.squarespace.com/static/5522e85be4b0b65a7c78ac96/t/5acbd346562fa79982b268fc/1523307375028/5Gyres\\_BANlist2.pdf](https://static1.squarespace.com/static/5522e85be4b0b65a7c78ac96/t/5acbd346562fa79982b268fc/1523307375028/5Gyres_BANlist2.pdf))

<sup>57</sup> See Oosterhuis, 2014 citing Common & Slagle, 2005; Kolstad, 2010.

Based upon my interview findings, absent a hypothetical across-the-board mandatory “Latte Levy,” or Pigouvian (welfare-enhancing) tax, 100% of coffee vendors interviewed were loath to charge customers, for fear of losing them to their competition. (See Appendix 7: Table of Summary of Vendor Interviews and Takeaways). Accordingly, vendors favor building in the full wholesale cost to the customer’s charge, then discounting if the customer brings his\_ or her own clean beverage container.

#### Market Elasticity For Bring Your Own Mug (“BYOM”) Discounts.

Discount variability among vendors interviewed is high, ranging from \$.10 at Starbucks -SDSU and Peet’s Coffee, \$.15 at Looney Bin in Mammoth Lakes, CA, \$.25 at USD’s Aroma’s Café, to \$1.00 self-serve coffee at Sodexo-run Bobby B’s Café on the PLNU campus and \$1.00 (27.33%) off at UCSD’s student-run Muir Cafe, to 25% off at Art of Espresso, with an option for a \$1.25 self-serve coffee, and a \$1.00 savings if you purchase a large 16 oz. coffee (large is the same as the cost of a small) at Philz in La Jolla/UTC; while at Audrey’s Café at the UCSD Library, one can get a 15% discount (a 16 oz. cup of coffee is \$1.50 instead of \$2.00). (See Appendix 7). The discount generally represents costs saved by vendor for “paper” costs; the costs for the cup, lid and sleeve, which range from \$.08 at Muir Woods on the UCSD campus, to \$.12 cents at CUPS, and \$.18 per cup ensemble at Pannikin La Jolla. (Appendix 7). Additionally, according to UCSD Muir Woods manger Christian Conaway, the cost of labor must be factored into the equation. As Sam of UCSD’s Art of Espresso put it: “Time is money.”

CUPS co-owner Linda, did not factor in the barista’s extra labor, and explained that as long as she can save her time and money and doesn’t have to buy the “paper” (cup, lid, stirrer and sleeve), and the business breaks even, or -is saving, she does not mind passing along that savings to the customer. Similarly, others, like Johnny Fraher, manager of Pannikin in La Jolla, Duane Buske, Director of sustainable dining at SDSU and Carol Norman, Dining Director at USD, expressed that they were not worried if everything did not exactly pencil out with a little bit of extra labor, and slightly higher costs for alternative materials. Rather, each of these three individuals explained that they are committed to sustainability, and are most motivated when students, top administration or both have mandated that they implement sustainable practices

in the cafes, stores and dining halls on their respective campuses. (See Appendix 7). In conclusion, the wide range of discounts given by various coffee cafes both on and off campus suggests price inelasticity in the marketplace, as customers seem un-phased by the wide latitude when it comes to different BYOM discounts offered by different vendors.

In sum, it appears that absent a mandatory campus-wide Pigouvian tax, coffee vendors are not inclined to charge customers more for their purchase of a single-use disposable plastic lined, or plastic cup ensemble. Further, a customer's willingness to bring his or her own mug, and the customer's loyalty to a particular cafe appears not affected by whether the BYOM discount is small or large.

#### **OTHER CONSIDERATIONS:**

##### High Tech or KISS?

Although high tech solutions were considered, such as GO Box's mobile app, and USD's Sustain-a-bottle Freestyle program, it is my opinion that it is best to start low tech and simple.

The Sustain-a-bottle has a unique RFID chip that allows students to purchase a semester's worth of beverages at one time, and allows them to go right to the dispenser and get refills of 70 different options without having to pay each time. In the meantime, there is already a state-of-the-art RFID optical scanner in a Freestyle Coca-Cola beverage dispensing machine that keeps track of the number of refills a student gets toward a prepaid amount for the entire semester. This clear reusable plastic bottle has an electronic RF tag attached to the bottom, but the bottle can also be made out of stainless steel. Materials aside, it is a commendable effort; and the U.S.D. Sustain-a-Bottle program may keep hundreds of thousands of single-use disposable cups, lids and straws out of the landfill.<sup>58</sup>

In the future, a scanable mug or prepaid semester's worth of coffee may be a preferable option that may be more beneficial for both the vendor and customer. Perhaps this would be an ideal sustainability solution for UCSD upper campus to implement. It could consider amending its contract with Coca-Cola to implement such a program whereby Coca-Cola would provide its scanning Freestyle soda dispensers, and UCSD could provide students with the required RF

---

<sup>58</sup> USD Introduces Sustain-A-Bottle to Campus (9/29/16) (<http://uofsdmedia.com/usd-introduces-sustain-a-bottle-to-campus/>)

chipped reusable bottles that would, over the years, keep millions of disposable cups, lids and straws, currently used at Coca-Cola beverage dispensers, out of the landfill. An upper campus pilot program in one or more dining halls would be another alternative. “According to the University of San Diego, a student will only need to refill his or her bottle 15 times to cover the cost of the bottle.”<sup>59</sup>

#### Alternative Materials:

Best options to the single use plastic lined paper cup with recyclable, but toxic/carcinogenic number 6 plastic lids and a cardboard recyclable sleeve: There are four main materials for both cups and flatware that are viable options, such as melamine, glass, food-grade stainless steel and ceramic/porcelain. There are many variables to consider such as entire lifecycle analysis for greenhouse gas emission, pollution, erosion, transportation distance, recyclability, and health consequences.<sup>60</sup> (Please see Appendix 6 for table comparison of different alternative materials to plastic-lined paper coffee cups, and other single-use plastic containers.) When considering alternative materials, in addition to running a lifecycle analysis, we must also keep in mind that every time we use a reusable cup/mug/tumbler, that reusable item is taking the place of several more disposable cups. Based upon prior studies, the City of Portland has compiled break even points for reusables to compete against plastic or paper alternatives, and recognized that such materials should get at least 2,500 uses throughout that material’s life cycle. Durability and other factors like convenience are all taken into consideration.

#### Best Alternative Materials: Eco-Profile and Lifecycle Analysis:

See Appendix 6: Summary of Comparison of Alternative Materials. Starbucks/Alliance researchers found that “each 16 oz. paper cup also requires 33 grams of wood, 4.1 grams of petroleum, 1.8 grams of chemicals, 650 BTU’s of energy and almost a gallon of water.”

---

<sup>59</sup> Id.

<sup>60</sup> It is widely known now that Bisphenol A (BPA) or other chemicals that leach into foods and beverages much in the same way as BPA and mimicking estrogen in the human body, especially if the beverage is “hot filled” or if the bottle is placed in direct sunlight. (See Bello, D. (2/19/2018) Plastic (Not) Fantastic: Food Containers Leach a Potentially Harmful Chemical, <https://www.scientificamerican.com/article/plastic-not-fantastic-with-bisphenol-a/>).



Additionally, they found that “plastic cups are even worse, generating about 28 percent more greenhouse gases than paper cups.”<sup>61</sup>

First reduce consumption and production of single-use plastics, then reuse! It has been suggested, that if we cannot satisfy these first or second tiers of the waste hierarchy, and if fossil fuel based plastics are still being used in consumer products, SIO should, at the very least, insist that all packaging sold or used on campus be made from 100 percent post-consumer material. In this manner, it is expected that this will spur technological and design innovation and will foster a circular economy, while increasing efficiency.<sup>62</sup>

An eco-profile is a useful tool for fully determining the environmental impact of alternatives to a SUPs. The profile adds up all of the inputs & outputs from its manufacturing process (like natural resource extraction, or in the case of plant-based alternatives, water to grow plant based feed stocks as an alternative to fossil fuels and natural gas, CO<sub>2</sub> sequestered by plants, energy to produce fertilizers, and greenhouse gases emitted by the producer’s facilities) from the earth to the final cups leaving the production plant and then transported to campus. This calculation helps us determine the impact on several indicators including greenhouse gas emissions and non-renewable energy use. (See Appendix 6: Alternative materials and See also Ban List 2.0 report regarding plant based and other bio and oxi plastics). Next, we must compare greenhouse gas emissions. Two key indicators in a product's environmental footprint are greenhouse gases (GHGs) and non-renewable energy use.

Then we must consider the end-of-life sustainability of the product, including reusability, recyclability and compostability. We must first determine if the products are actually reusable, compostable or recyclable. According to the 2018 Ban 2.0 report issued by 5Gyres, no PLA or bioplastics are actually compostable on land or in the ocean within a one year period of time. Thus, once again, the best and only real option for zero waste with coffee cups is for as close to

---

<sup>61</sup> Report of the Starbucks Coffee Company/Alliance for Environmental Innovation Joint Task Force (April 15, 2000) (<http://business.edf.org/files/2014/03/starbucks-report-april2000.pdf>)

<sup>62</sup> Ban List 2.0 (Nov. 2015), p. 25 ([https://static1.squarespace.com/static/5522e85be4b0b65a7c78ac96/t/5acbd346562fa79982b268fc/1523307375028/5Gyres\\_BANlist2.pdf](https://static1.squarespace.com/static/5522e85be4b0b65a7c78ac96/t/5acbd346562fa79982b268fc/1523307375028/5Gyres_BANlist2.pdf))

100% of customers as is practicable to bring a REUSABLE cup/mug or tumbler a la the proposed “Mindful Mugshare” program.

A distant second option is to hope that the City or some business within the County of San Diego will start an industrial compost operation that can actually compost the compostable cups, lids, to-go boxes and cutlery. As a last-ditch effort that is temporary, use non-leaching products containing a minimum amount of plastic that is recyclable.

#### Third-Party Certification:

San Diego State does this, and it is expanding its on-campus Green Restaurant Association Certification (Dinegreen.com) program that ensures third party verifiable sustainability, including zero waste, goals are met. (See: Appendix 7). There are other sustainability certification programs like GBCI True Zero Waste Certification that could be utilized on SIO and/or UCSD, as well.<sup>63</sup>

Current best scientific and business practices: First formed in 2003, “...the Sustainability Steering Committee (SSC) engages decision makers from all ten campuses in developing and implementing a successful system-wide sustainability policy.”<sup>64</sup> Additionally, UCSD’s Global Climate Leadership Council (CGLC) advises UC on achieve the ambitious goal of net zero GHG from its buildings and vehicle fleet by 2025.<sup>65</sup> Likewise, if optimal decisions are to be made to attain zero waste for all on campus dining, catering and via vendors at SIO, UCSD, and all UC campuses, the University of California systems of campuses can have a significant impact on the further reduction of GHG emissions. Accordingly, I believe that to be effective, with consistent policies, the CGLC must include food and beverage associated single-use disposable packaging and the GHG emissions they cause, as part of its agenda to achieve its zero GHG emissions goals.<sup>66</sup>

---

<sup>63</sup> <https://true.gbci.org>

<sup>64</sup> <https://www.ucop.edu/sustainability/policy-areas/sustainability-steering-committee.html>

<sup>65</sup> <https://www.ucop.edu/sustainability/programs-initiatives/index.html>

<sup>66</sup> <http://www.sustainability.uci.edu/>

Dishwasher: The Eckart building sterilizing dishwasher will be a key component for a successful and scalable mugshare program, with the ultimate goal of across-the-board SUP packaging reduction at the new EV location.

Policy/Legal Zero Waste Challenges at UC San Diego/SIO:

The University of California's 2012 Waste Diversion Plan needs to be updated and turned into a plan that will take UCSD and SIO on a course to achieve 90% zero waste by 2020. Collectively, the system-wide diversion rate of U.C. campuses was reported to be 76 percent.<sup>67</sup> Without considering construction and demolition diverted waste, UCSD reported in 2016 that it diverted 45% of its waste from the landfill, the same as in FY 2014-2015.<sup>68</sup> While the goal is to reach zero waste by 2020, the diversion rates have plateaued on many campuses, including UCSD, in recent years.<sup>69</sup> According to the U.C. Office of the President, "the primary barriers to achieving zero waste include the challenges of capturing the compostable waste stream, convincing suppliers to provide reusable or recyclable packaging, the changing market for recyclable materials, and the limited number and proximity of composting facilities."<sup>70</sup> However, given the tremendous purchasing power of the U.C. system as a whole, I believe that the University of California could try harder and do better to convince suppliers to go along with best practices and current scientific knowledge, and first provide products that meet best standards, while lending themselves to the reduction of waste, second by facilitating the campus-wide use of reusable containers, then only as a last resort before landfilling, providing recyclable products and materials, and ensuring that items used on campus are actually recycled.

It is widely known that recently U.C. San Diego entered into a campus-wide sponsorship agreement with the Coca-Cola Company and BCI Coca-Cola Bottling Company of Los Angeles ("Coca-Cola") dated January 1, 2017.<sup>71</sup> Under this agreement, UC San Diego will be awarded \$4.09 million dollars in sponsorship fees alone, plus commissions for ensuring that Coca-Cola

---

<sup>67</sup> University of California Annual Report on Sustainable Practices 2016, page 17 (<https://www.ucop.edu/sustainability/files/annual-sustainability-report2016.pdf>)

<sup>68</sup> Id. at p. 62

<sup>69</sup> Id. at pp. 17 & 62

<sup>70</sup> Id. at p. 62

<sup>71</sup> <http://triton.news/2018/01/hdh-receives-millions-coca-cola-sponsorship-will-raise-price-products-3-percent-yearly/>; <http://triton.news/2018/03/student-frustrations-boil-hdh-forum/>

will be the exclusive beverage provider, providing exclusively Coca-Cola products on the UCSD campus, displacing PepsiCo.<sup>72</sup> In addition to the sponsorship fees, Coca-Cola will pay commissions to UCSD Housing, Dining and Hospitality Services (“HDH”) for beverages sold through Coca-Cola’s campus-wide vending machines.<sup>73</sup> Products that Coca-Cola sells on the upper UCSD campus include Coca-Cola soda, Powerade, Minute Maid Orange Juice, Minute Maid Apple Juice and Dasani water. Each and every one of these products is sold on the UCSD campus in single-use plastic bottles. The more that are sold, the more money U.C. San Diego makes. Additionally, HDH will receive 300 cases of 12 oz. company beverages and 300 cases of Dasani half liter water bottles yearly, to be used for any purposes they deem necessary except for resale.<sup>74</sup> Fortunately, after reading the contract, I determined that the SIO campus is not bound by that contract’s terms, and accordingly, SIO does not have the same conflict of interest when it comes to banning beverages, including water, that are housed in single-use plastic bottles as does upper campus.<sup>75</sup> Although SIO is bound by broader UC San Diego mandates, contracts, administrative and legal parameters, there is room for autonomy and more direct and streamlined zero waste policy making and implementation on the SIO campus.

#### Vendor Contract or No Contract?

No contract as to specific terms at this time: There are two issues: 1) Ever changing recycling markets, new technologies, availability of materials and state of the art recycling and composting facilities, and ever-evolving scientific best practices; coupled with 2) the issue of enforcement in the case of breach.

In my opinion both UCSD and SIO should establish uniform zero waste policies and procedures or “goals,” much like the Sustainability Guidelines for University of California Campus Foodservice Operations” attached as Exhibit C to Addendum 4-Operating agreement portion of the SIO Forum Cafe Lease-Caroline’s agreement for all vendors to follow. There should be a

---

<sup>72</sup>Id

<sup>73</sup> See UCSD/Coca-Cola contract link embedded in 1/16/18 Triton News article: <http://triton.news/2018/01/hdh-receives-millions-coca-cola-sponsorship-will-raise-price-products-3-percent-yearly/>

<sup>74</sup> Id.

<sup>75</sup> Id.

provision in the campus-vendor contract specifying that vendors must recognize that they are expected to follow best practices within the confines of the market place, which UCSD/SIO should periodically review and keep apprised of, and restaurants and cafes, food trucks and caterers must be held accountable to uphold, perhaps by right to periodic auditing of products in the restaurant, café, etc., and/or supplier purchase invoice audits. This requires a delicate balance with the vendor, and although initially, supply may have difficulty keeping up with campus demand, eventually, like Chipotles and its preference for non-GMO, sustainably and locally raised and livestock and crops to supply its nation-wide chain of restaurants, the UC system has tremendous buying power and can and should be a tremendous market driver.<sup>76</sup>

Suggested language can be found on pages 61-64 (Procurement Resources Sample Bid Specifications) and on page 65 (Sample Leasing Agreements) of the Product Stewardship Institute's February 2015 Marine Debris & Plastic Source Reduction Toolkit for Colleges & Universities.<sup>77</sup> These tools may be used with the proviso, as stated above, that the experts discourage requiring compostable materials that are not compostable in San Diego, and GMO corn based bio plastics may be especially harmful to the ecosystem. Without an appropriate industrial compost facility, any representation that products are compostable will result in imperfect information and an ill-informed constituency at best, and green washing and irresponsibility can be more environmentally devastating at worst. If industrial composting comes on line, and the technology allows compostability of cups, plates, napkins and cutlery, etc., the compostable materials/products must be BPI or ASTM certified compostable.

### Conclusion:

#### Takeaways:

1. Reducing SUPs and non-recyclable coffee cups and keeping them out of the waste stream, even on a relatively small and contained campus like SIO, presents a complex, and multi-faceted puzzle with moving pieces, requiring a suite of solutions across many platforms and

---

<sup>76</sup> <http://fortune.com/2015/04/27/gmo-free-chipotle-millennials/>

<sup>77</sup> <https://www.epa.gov/sites/production/files/2016-03/documents/marine-debris-toolkit-epar9-2015.pdf>

involving transparency, education, information, cooperation and communication among multiple stakeholders that is unique to each vendor.

2. Although there may be large upfront costs, for such items as plumbing for new or retrofitted hydration stations, a dishwasher, reusable tableware and flatware, mugs, stainless steel straws, etc.

3. Consideration must also be given to space availability, as well as to labor, water and electricity costs, alternative materials, convenience to vendors and customers and the right financial incentives.

4. There is both top-down and bottom-up support for a zero waste SIO campus.

5. SIO needs uniform, across-the-board policies and procedures that apply to all eateries, café's trucks, dining halls and caterers.

6. Once there is a dishwasher and an initial investment of mugs and glasses at the new Eckart vendor, the new Eckart vendor has the potential of going 100% or very close to 100% zero waste (no SUP plastic food or beverage container), by substituting containers made from best alternative and most sustainable and reusable materials.

7. With its insular location and academic minded and eco-conscious customers, the Eckart Coffee vendor should be the perfect incubator for the "Mindful Mugshare" pilot.

8. When done correctly, the Mindful Mugshare program can be scaled-up, and will satisfy the triple bottom line of saving money for the vendor, the customer and the environment/society.

9. By incorporating zero waste into SIO's core philosophy, and by "walking the talk" on the SIO campus, SIO will be leading and teaching of the importance of a clean and healthy ocean by example, with potentially far-reaching positive impacts for all who visit our campus, other institutions of oceanography world-wide, UCSD upper campus, other U.C. campuses, and beyond.

10. A co-benefit of SUP waste reduction, when done correctly according to best industry practices and based upon the best and most current science, is a clean environment and ocean, and also reduced GHG emissions.

11. SUP reduction policies will be implemented, and can be successfully scaled up, resulting in the impactful reduction of SUPs, with a net benefit to consumers, vendors, the environment and society.

12. Transparency, education and good information is imperative, and the Sustainability Website will be a convenient source of good and useful information.

13. Providing each incoming student a water bottle combined with convenient and accessible hydration stations in all campus buildings will immediately eliminate the need for plastic SUP bottled water. In the meantime, so the campus can move forward with the single-use water bottle ban, five-gallon water dispensers can be used.

Learning from past missteps and successes of prior programs and case studies, and relying upon current scientific and industry-wide best practices, if there is the will to achieve zero waste goals from the bottom up (demand from students, faculty and staff), from the top down (mandate from administration), or both, coupled with good communication, transparency and education, continuity, convenience, access to information, and accountability among all stakeholders, with built in flexibility for ever-changing resource and recycling markets, and emerging technologies, scaled-up zero waste programs at SIO can be successful.

Fin.