



fall 2019 capstone  
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# introduction

## reground— analysis of sustainability within the coffee industry

It's no surprise that a cup of coffee is a staple to start one's day. The average American drinks three cups of coffee.<sup>1</sup> Coffee has always been one of the most popular imported commodities in North America—especially within the United States. The industry is expanding and as we consume more coffee, it fuels the growth for its production, but at what cost?

The increase of coffee production comes at the expense of the environment due to factors such as rapid transportation (a result of imports and exports), solid waste, single-use materials used for packaging and consumption, and gas emissions.

Factors like climate change and environmental shifts cannot always be accounted for, but there are effects from the rapid commercialization of the coffee industry that contribute to the cause and expedite the deterioration of the earth. Some of these effects become irreversible, so companies have been taking action to transform the industry to become more environmentally sustainable.

**Given this, my project explores how might we maximize our knowledge by analyzing some of the current initiatives and issues regarding the coffee industry to establish a greater drive for standardized sustainability?**

<sup>1</sup> Americans Are Drinking More Coffee Than Ever | Food & Wine. (2018).

# executive summary

## four key insights regarding the coffee industry

### solid & water waste

The vast amounts of waste within the coffee industry are a direct result of production and consumption that contribute towards its heavy carbon footprint. The improper disposal of solid waste and wastewater from coffee production has led to an increase in environmental pollution. Water usage and wastewater differ depending on how coffee beans are processed. Wet processing requires higher water usage and therefore produces greater amounts of wastewater. The pollution resulting from processing can equate to large amounts of crude domestic sewage.<sup>1</sup> Furthermore, the wastewater resulting from production contains a higher acid content that affects surrounding wildlife if present within a biological circular flow.<sup>2</sup>

Larger corporations and coffeehouses have a better ability to measure their waste production due to size and corporatization that allow them to create industry reports. In contrast, local coffeehouses are owned independently with no set of standardized procedures regarding either type of waste disposal. It is important to note that geographical location can potentially restrict how waste can be disposed of.

The byproducts from the coffee industry simultaneously increase with the rapid commercialization and expansion of the coffee industry and additionally correspond with climate change. The need to manage solid waste and wastewater needs to become more urgent to reduce increasing the expedition of climate change.

1 Chanakya, H.N., & De Alwis, A. A. P. (2004). Environmental Issues and Management in Primary Coffee Processing. *Transactions of the Institution of Chemical Engineers: Part B*. Retrieved from <https://doi.org/10.1205/095758204323162319>

2 Ahn, J., Chilakala, R. & Thenepalli, T. (2017). Environmental Effect of the Coffee Waste and Anti-Microbial Property of Oyster Shell Waste Treatment. *Journal of Energy Engineering* Vol. 26. Retrieved from <https://doi.org/10.5855/ENERGY.2017.26.2.097>

## packaging & materials

Finding biodegradable alternatives and eco-friendly materials is the key to eliminating the large amounts of material waste before and after consumption. While studies have noted that packaging and other materials used in the industry are not the biggest contributors to coffee's carbon footprint, companies and consumers can help in lowering the amounts of waste that goes towards landfills.

The shift in eco-friendly packaging and materials has gradually grown, but it comes at a higher price. White labels and corporate chains have the opportunity to invest in eco-friendly packaging, as the cost of buying bulk materials is lower in comparison to local roasters and coffeehouses. The different varieties in coffee can also lead to the need for specific types and packaging which might hinder companies from using eco-friendly products.

The range in types of materials used for cups, straws, lids, cutlery, and bags vary follow the same principles as sustainable packaging for retail coffee. The drive to want to use eco-friendly materials comes down to company initiatives and implementations. The investment in the price of sustainable materials might not be justified in terms of revenue or return.

## consumption

Consumption fuels the rapid growth in coffee production. Over time, coffee has grown out of the confines of being labeled as a commodity and is now considered an artisanal or luxury food.<sup>3</sup> The way that consumers' behaviors and attitudes towards how they consume coffee have changed as this association has become more apparent.

Throughout this project, insights from reports on consumption and survey results show that millennials have a higher drive in contributing to sustainable initiatives within the coffee industry through reducing their use of singular-use paper and plastics. While this trend was popular amongst this age group, it is important to note that geographical location can hinder accessibility to more sustainable options of consumption and purchasing. Additionally, putting sustainable labels on coffee products influences customer's willingness to invest in their higher prices.

## climate change

The rapid expedition of climate change contributes to the decrease in harvests and yields due to droughts and climate variability. The increasing commercialization of coffee production has caused for pesticide use to increase which introduces parasites that hinder the growth of the beans. Shade-grown coffee has significantly decreased and temperature rises cause issues during coffee bean growth, especially within the arabica species.

While climate change is an issue in coffee production that cannot be entirely controlled, farmers and producers can take advantage of the positive effects of climate change to create and modify coffee species that can withstand temperature rises and higher altitudes.<sup>4</sup>

<sup>3</sup> Sammoggia, A. & Riedel, B. (2018). Coffee consumption and purchasing behavior review: Insights for further research. *Appetite*. Retrieved from <https://doi.org/10.1016/j.appet.2018.07.002>

<sup>4</sup> Pham, Y., Reardon-Smith, K., Mushtaq, S., & Cockfield, G. (2019). The impact of climate change and variability on coffee production: a systematic review. *Springer Climatic Change*. Retrieved from <https://doi.org/10.1007/s10584-019-02538-y>

# research methods

analyzing coffee through different means

## survey & interviews

### *surveys*

Sending out a survey allowed me to get quantitative data on (1) how people consume coffee and (2) at what different levels do different people engage in sustainable initiatives and responsibilities (generic and coffee-related).

### *interviews*

Doing brief interviews at the local coffee shops I visited allowed me to obtain qualitative data that could inform the quantitative data from the survey results.

## literature review

### *articles & journals*

Background knowledge on the coffee production process, life cycle assessments, climate change, and environmental impacts, and reports on consumer behaviors and attitudes came from analyzing various scientific articles and journals which gave me the bulk background knowledge needed to create this project.

### *industry reports*

When searching corporate coffee sustainability initiatives, my first instinct was to search as many industry reports from the companies themselves. I encountered a small number of industry reports from companies such as Starbucks, Peet's, and Dunkin' Donuts. These documents were official reports written and distributed by the companies and included extensive statistics and information regarding sustainability initiatives, environmental and corporate responsibility, as well as general company information.

### *web searches*

Web searches informed me of the process of coffee production from sourcing to consumption. This was also the best method to find any further information on corporate coffee companies that did not have industry reports or dedicated webpages available. This included images and coffee-related websites and blogs.

### *ethnographic observation*

As someone who frequents cafés, throughout this project I went to different coffee shops within the Dallas Fort-Worth area and one in Austin, Texas. These shops were a variety of independent businesses and small franchises. While there, I attempted to talk to baristas and managers and ask them basic questions about what their shop does in terms of sustainability. Additionally, for what information I couldn't find out verbally, I also took the time to observe the shop's environment and consumer behaviors.

# process book: research insights

## coffee life cycle assesment

### infographics

To understand a very generalized overview of coffee production, I started with web searches geared towards infographics. Many of the infographics include details regarding cultivation, processing, packaging, transporting, and consumption. They also replace consumption with the act of *brewing* and fail to mention waste from production and consumption.

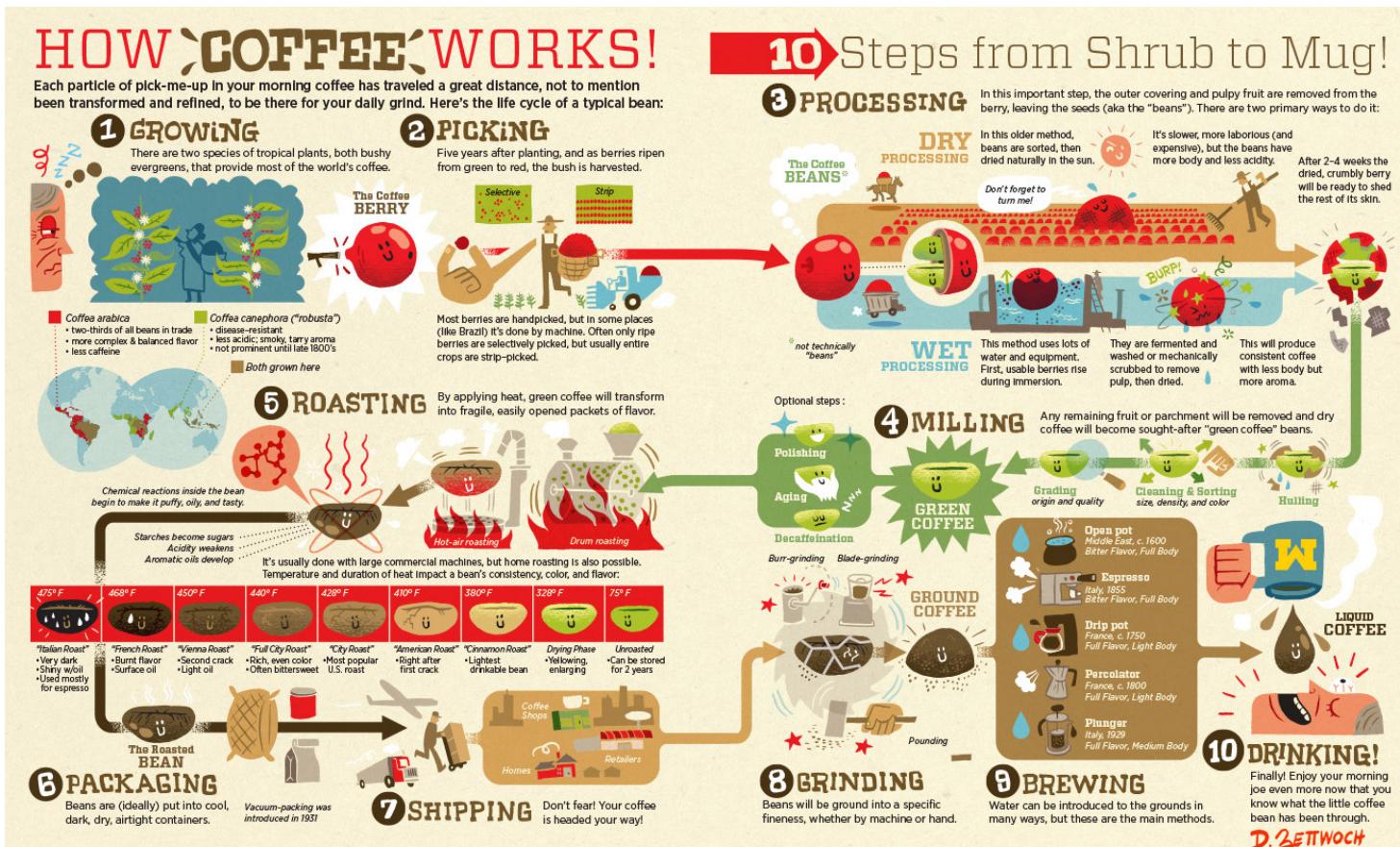


Figure 1 Zettwoch. (2012). How Coffee Works [Digital].

Zettwoch's infographic is extremely detailed, but fails to mention any details about waste during processing or consumption.

Both infographics are heavily focused on the production process, as they should be. They are extremely detailed in going through each step it takes to get from green coffee plant all the way to a consumer's cup. Waste is a large part of the process and shows up in multiple stages such as harvesting, sorting, pulping, milling, drying, and roasting. The failure to mention waste from the process does not illustrate how waste affects production and how specific types of waste (i.e. wastewater, pulp, and consumption



Figure 2 Fuetterer, T. (n.d.). 15 Steps to Coffee from Bean to Cup [Digital].

Much like Zettwoch's infographic, there is a lot of emphasis that goes towards the production process. Again, it fails to mention waste from major parts of production and processing.

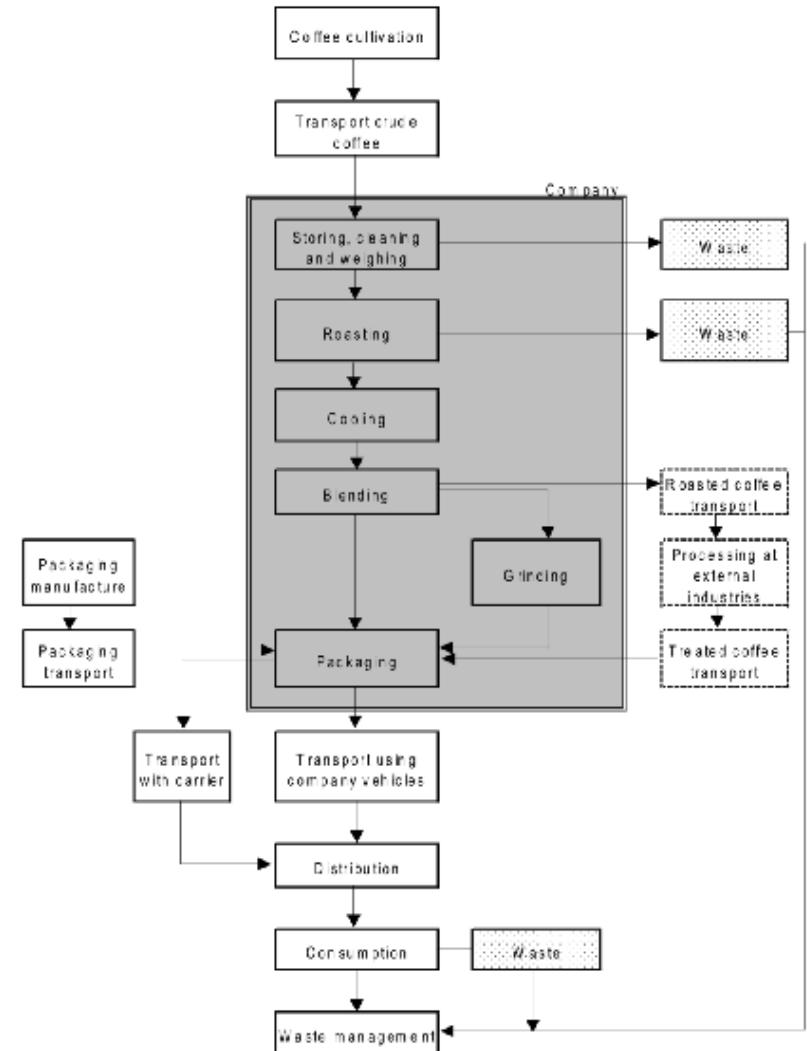
## mapping the coffee life cycle

Before going into depth with the coffee life cycle, I attempted to create my own initial life cycle to synthesize the process. I wanted to understand the overall general process from cultivation to cup, just like the infographics.

When creating my own chart (*Figure 4*), I combined components from Roberta Salomone's Life Cycle Assessment (*Figure 3*)<sup>2</sup> and the National Coffee Association's (NCA) 10 Steps from Seed to Cup<sup>1</sup> and simplified them into a single chart.

For reference, these are the 10 Steps from Seed to Cup according to the NCA.

- |                      |                     |
|----------------------|---------------------|
| <b>01</b> Planting   | <b>06</b> Exporting |
| <b>02</b> Harvesting | <b>07</b> Tasting   |
| <b>03</b> Processing | <b>08</b> Roasting  |
| <b>04</b> Drying     | <b>09</b> Grinding  |
| <b>05</b> Milling    | <b>10</b> Brewing   |



<sup>1</sup> National Coffee Association, 10 Steps from Seed to Cup. Retrieved from <http://www.ncausa.org/About-Coffee/10-Steps-from-Seed-to-Cup>

<sup>2</sup> Salomone, R. (2003). Life Cycle Assessment applied to coffee production. *Journal of Food Agriculture and Environment*. Retrieved from <https://www.researchgate.net/publication/234591049>

*Figure 3* Coffee Life Cycle, Roberta Salomone

## simplified coffee life cycle

This is the coffee life cycle I came up with based on my research. Although the diagram is brief, the main goal was to condense the entire process and highlight which parts of the process produce waste. Most waste from the production process is a result of *primary processing*. Even with my own diagram, there are instances of waste I failed to mention.

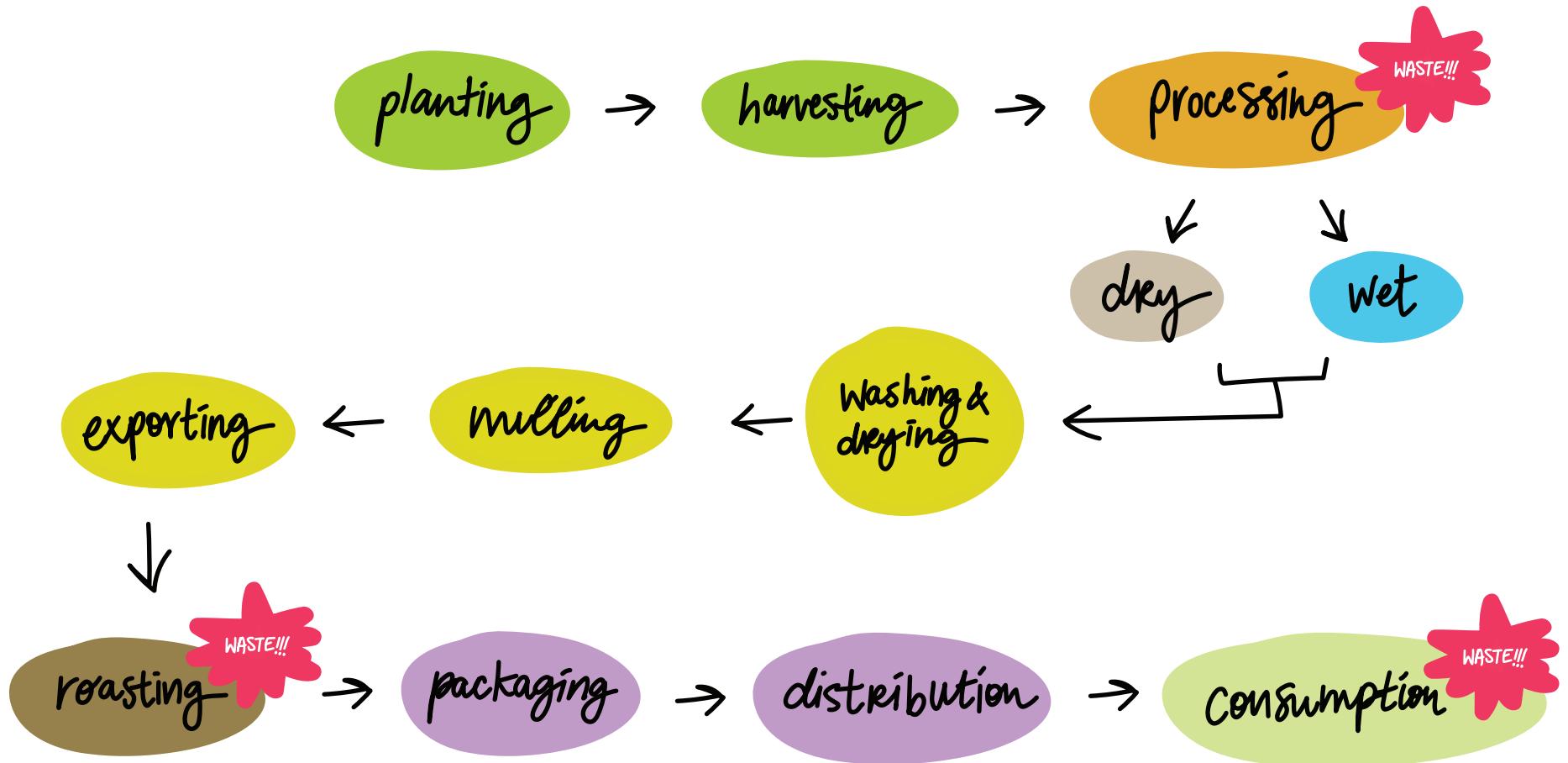


Figure 4 Simplified Coffee Life Cycle

## breaking down waste

Figure 3 goes in-depth on the coffee life cycle and addresses multiple instances where waste shows up in the production process. While this is true, there are some complexities in it.

The chart accounts for details of packaging, manufacturing boundaries within a company, and accounts for transportation. It includes far more details about intermediate steps, but groups together the stages of processing.

A study that was done by H.N. Chanakya and A. A. P. De Alwis discusses the environmental issues related to the three stages of coffee processing: *primary, secondary, and tertiary*.

Wastewater is the biggest byproduct of primary processing. Figure 5 shows different parts of primary processing that produce wastewater.

Unlike Salomone's chart, Chanakya and De Alwis point out that there are different types of wastewater produced during primary processing: *wash water and pulp wastewater*.

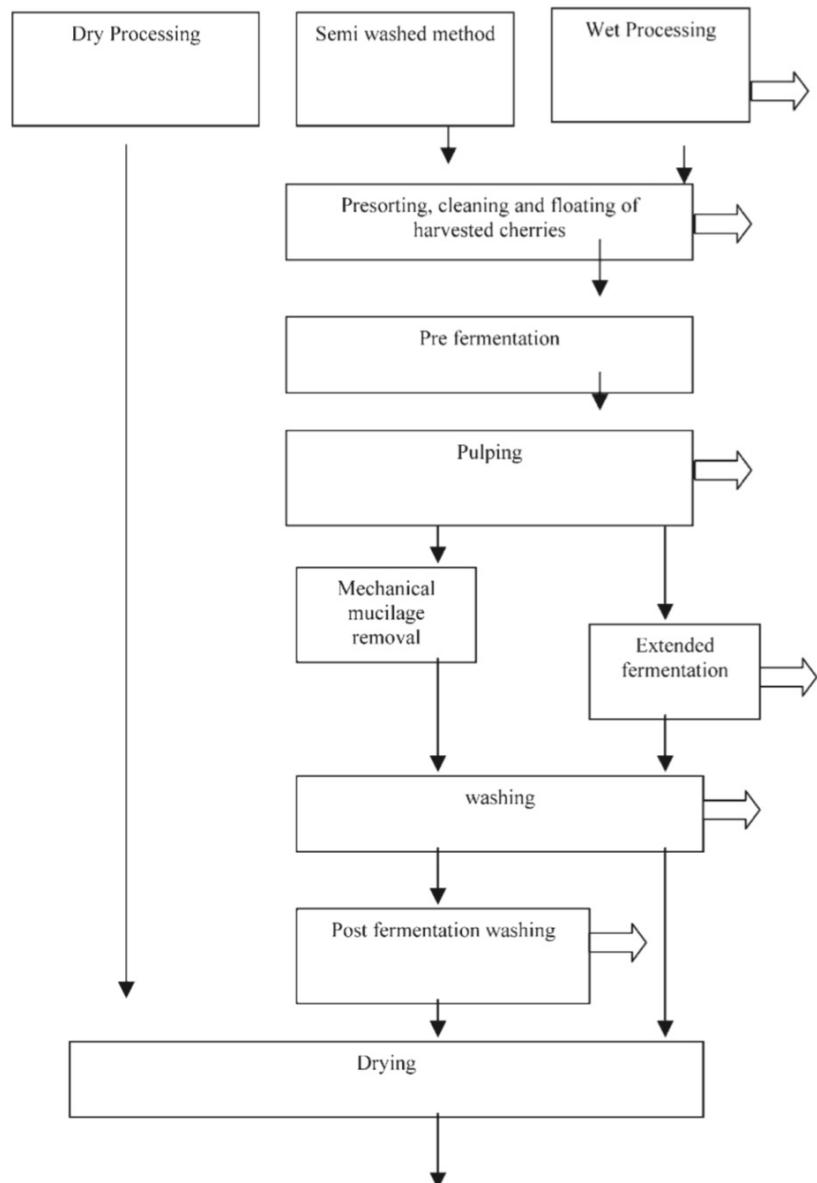


Figure 5 Primary processing of coffee (white arrows indicate where waste is produced)<sup>3</sup>

<sup>3</sup> Chanakya, H.N., & De Alwis, A. A. P. (2004). Environmental Issues and Management in Primary Coffee Processing. *Transactions of the Institution of Chemical Engineers: Part B*. Retrieved from <https://doi.org/10.1205/095758204323162319>

Tertiary processing focuses on instant coffee manufacturing where high amounts of particles enter the wastewater and are then discharged at high temperatures. Out of all the types of wastewater, the issue of pulp wastewater is the easiest to address since it can be reused for multiple cycles before being discarded. Similar to the wastewater from tertiary processing, wash water contains high amounts of dissolved organic matter.

Solid byproducts of production and consumption are harder to manage. Solid wastes such as husk and pulp are toxic and contribute to environmental pollution, limiting its use, particularly as livestock feed.<sup>4</sup> Spent coffee grounds from consumption have much more limited uses in comparison to the coffee pulp and husks.

The key to environmental management and waste management highly relies on geographical locations. Laws differ, which impacts how farms and production companies can discard waste and byproducts created during the process. Companies have done more to attempt to combat expediting the amounts of waste they contribute by attempting to reduce the amount of water used or reuse it during certain steps. Solid waste can become fuel, or in composting or even become livestock feed, but it must go through different processing and treatment to reduce the amounts of toxicity it contains.

Spent coffee grounds usually end up in landfills unless consumers or businesses have a disposal plan in place. Composting is the best use if it can be properly done. It can be used as fertilizer, but its pH level should be brought down towards a neutral level to not affect the soil.

Companies like Huskee have created reusable cups used coffee husks from the milling stage during primary processing.<sup>5</sup> They've skillfully designed a product that repurposes waste material from processing, creating a sustainable product for companies and consumers.



<sup>4</sup> Franca, A. S. & Oliveira, L. S. (2009). Coffee Processing Solid Wastes: Current Uses and Future Perspectives. *Agricultural Wastes*. Retrieved from [http://dx.doi.org/10.1142/9789814295048\\_0005](http://dx.doi.org/10.1142/9789814295048_0005)

<sup>5</sup> Huskee. <http://huskee.co>

## corporate establishments

### corporate insights

Coffee is a continuously growing industry and within it are big-name competitors that expedite its growth every year. Corporate coffee chains have the most impact on the coffee industry as the leaders of large-scale coffee production and consumption. To take a look at how corporate coffee takes on sustainability initiatives and responsibility, I looked at the top eight coffee chains that dominated the coffee industry in North America.<sup>1</sup>

After researching corporate coffee, it became apparent that only a few companies offer consistent reports on their social responsibilities and sustainable initiatives. Most of the companies had small sections on their websites that briefly explain their attempt to be sustainable and offered nothing more detailed.

Out of the eight companies, Starbucks, Peet's Coffee & Tea, and Dunkin' Donuts had the most information readily available. Most of the information found on their websites are categorized under the sections "environment" or "social responsibility" or in the form of official reports and documents distributed by the company. These three companies had information regarding different topics of sustainability including, but not limited to, responsible sourcing, materials, waste and reusability, greener stores and energy usage, and climate change. Starbucks and Peet's websites and reports included more qualitative data and explanations versus Dunkin' Donuts, which had actual sustainability reports available.

The following sections discuss some highlights from the literature review done over these companies.

### top 8 north american coffee chains

- 01 Starbucks
- 02 Dunkin' Donuts
- 03 Tim Hortons
- 04 Peet's Coffee & Tea
- 05 Caribou Coffee
- 06 The Coffee Bean & Tea Leaf
- 07 Dutch Bros. Coffee
- 08 BIGGBY Coffee

<sup>1</sup> 2017 Top 500: Coffee Cafe. (2017). Retrieved from <https://www.restaurantbusinessonline.com/2017-top-500-coffee-cafe>

## starbucks

Starbucks was the company that had the most readily available information about sustainability initiatives and environmental responsibility. Their website includes a section related to the environment (<http://starbucks.com/responsibility/environment>). This section of their website includes sub-sections separated into four categories: *Greener Stores, Greener Cups, Greener Power, and Climate Change*.

### greener stores & climate change

Starbucks discusses their attempts to build the greenest coffeehouses through LEED® (Leadership in Energy and Environmental Design) certified stores. To create greener stores, they track their environmental footprint where food, dairy, and packaging are the biggest contributors.<sup>1</sup> They currently have 1,600 LEED® certified stores and claim that the stores are greener by the following criteria.<sup>2</sup>

- 01 Energy efficiency & renewability
- 02 Use of responsible materials
- 03 Waste diversion & stewardship
- 04 Creating healthy environments



1 LEED® Certified Stores | Starbucks Coffee Company. (2018).

2 Tackling Climate Change | Starbucks Coffee Company. (2018).

## peet's coffee & tea

In contrast to Starbucks' website, Peet's focused highly on social responsibility. Their website section (<http://peets.com/learn/social-responsibility>) is separated into subsections that highlights its alliances with farmers and growers and focuses on ethical sourcing. The bottom section of the page showcases their "green" initiatives in terms of energy, water conservation, and materials. Furthermore, their report titled Lasting Quality Sustainably Peet's published in 2011 goes in depth to discuss sustainability regarding energy and green roasting.

## farmer's assistance and sustainable sourcing

Peet's created the Farmer Assistance Program that aims to introduce farmers and growers in coffee-exporting countries such as Ethiopia and Guatemala to obtain skills and techniques to produce high-quality coffee and create fair wages.<sup>1</sup> Along with the program, Peet's sells coffees that are USDA Organic, Fair Trade™, Utz™ and Rainforest Alliance certified. Varying certifications are meant to show that certain coffees were grown using sustainable and eco-friendly practices or work with laborers and farmers in coffee-growing countries to contribute to their betterment of living. Below are certification type comparisons.<sup>3,4</sup>



Production management system to promote natural soil activity and disregards the use of pesticides and synthetic agrochemicals. Regulated by the USDA to ensure sustainable and low-impact practices were used in farming.



Aims to increase the well-being and livelihood of smaller producers by paying them fair prices set by the FLO International organization.



An independent organization certifying that coffees are sustainably produced and sourced through basic conditions. It is more or less a "code of conduct" to regulate agricultural practices specifically in Latin American and Asian



Refers to coffee that has been grown with biodiversity and sustainable living initiatives; this specifically refers to shade-grown coffee which promotes ecological relationships.

<sup>1</sup> Farmer Assistance | Peet's Coffee. (2018).

<sup>2</sup> Responsible Sourcing | Peet's Coffee. (2018).

<sup>3</sup> Lasting Quality Sustainably Peet's. PDF. (2011). Retrieved from <http://vfop.com/wp-content/uploads/2011/08/peetseco.pdfv>

## green energy & products

Much like Starbucks, Peet's has taken the initiative to become LEED® Gold Certified, but rather in their roasting facility than their public coffeehouses. They have decreased their usage in natural gas and light both by 40% and have created water-efficient landscaping.<sup>4</sup> Since the company is based in the Bay Area, the runoff water gets treated and redirected to the Bay.

## dunkin' donuts

Much like Starbucks, Dunkin' Donuts' website consists of a landing page that has an overview of their three subsections regarding sustainability: sustainable food, sustainable restaurants, and sustainable communities. These subsections can also be found in their 2017-2018 Sustainability Report<sup>5</sup> which goes into more depth than the website does.

From this report, Dunkin's biggest initiatives are focused on developing ways to decrease the use of plastic and other non-reusable materials and increase the percentage of sustainably sourced coffee and overall store sustainability.

## packaging & materials

Since 2005, Dunkin' has attempted to increase the sustainability of their packing materials by replacing their current materials with more eco-friendly options. The image to the right shows their major milestones in packaging and material conversions.



<sup>4</sup> Giovannucci, D. & Ponte, S. (2005). Standards as a new form of social contract? Sustainability initiatives in the coffee industry. *Food Policy*. Retrieved from <https://doi.org/10.1016/j.foodpol.2005.05.007>

<sup>5</sup> 2017-2018 Sustainability Report. Dunkin' Brands®. (2018). Retrieved from [https://www.dunkinbrands.com/internal\\_redirect/cms.ipressroom.com.s3.amazonaws.com/226/files/20196/2018%20Sustainability%20Report\\_Final.pdf](https://www.dunkinbrands.com/internal_redirect/cms.ipressroom.com.s3.amazonaws.com/226/files/20196/2018%20Sustainability%20Report_Final.pdf)

<sup>6</sup> Our Commitment to Corporate Social Responsibility | Dunkin' Donuts. (2019).

Figure 6 Milestones in packaging and materials conversions<sup>7</sup>

Not only did Dunkin introduce the double-walled paper cup, they also increased the recyclability of their hot and cold lids to be made with #5 polypropylene that can be recyclable in cities that offer #5 recycling.<sup>7</sup> Looking at the rest of its packaging and materials, the company continues to work on finding ways to implement more eco-friendly supplies.

### responsibly sourced coffee

Sustainable coffee has been a long-time implementation with many corporate coffeehouses, which began with Starbucks. Over time, Dunkin' has worked to gradually increase its percentage of sustainably sourced coffee used and sold within their stores. Their main initiative has been to partner with the Rainforest Alliance to ensure that they transition to Rainforest Alliance Certified™ coffees for their espresso blend and Dark Roast blend.<sup>6</sup> The company continues to make developments and place goals to source other foods such as cocoa in a more sustainable manner as well.

### environmental impacts

In comparison to Starbucks and Peet's, Dunkin's Sustainability Report delivered quantitative data on their energy and GHG emissions from 2013 to 2018. The table shows the total emissions have decreased to a quarter of the amount in 2018.<sup>6</sup>

To expand on the environmental impacts of their stores, Dunkin' has also become conscious of water usage levels and have "energy reduction commitments" focused on decreasing the total amount of energy usage.

DUNKIN' BRANDS ENERGY & GHG EMISSIONS DATA <sup>4</sup>	2013	2014	2015	2016	2017	2018
<b>Corporate Facilities <sup>5</sup></b>						
Direct Energy Use (GJ) <sup>6</sup>	3,371	2,918	3,165	2,743	3,149	3,217
Indirect Energy Use (GJ) <sup>7</sup>	20,785	18,613	15,914	15,455	14,266	12,791
Total Energy Use (GJ)	24,156	21,531	19,080	18,197	17,451	16,008
Normalized Energy Use (GJ/Sq Ft)	.12	0.10	0.09	0.09	0.08	0.08
GHG Emissions (MT CO <sub>2</sub> e)	2,040	1,819	1,588	1,394	1,194	1,068
<b>Corporate Fleet <sup>8</sup></b>						
Fuel Usage (Gallons)	339,856	310,946	287,835	276,586	230,925	207,047
Normalized Fuel Usage (Miles Per Gallon)	23.5	27.6	28.4	27.4	26.7	26.7
GHG Emissions (MT CO <sub>2</sub> e)	3,007	2,755	2,527	2,428	2,028	1,818
<b>Company-Owned Restaurants <sup>9</sup></b>						
Direct Energy Use (GJ)	4,130	3,942	5,295	1,755	N/A	N/A
Indirect Energy Use (GJ)	18,827	15,842	22,988	10,098	N/A	N/A
Total Energy Use (GJ)	22,957	19,784	28,283	11,853	N/A	N/A
Normalized Energy Use (GJ/Sq Ft)	0.46	0.44	0.42	N/A <sup>6</sup>	N/A	N/A
GHG Emissions (MT CO <sub>2</sub> e)	3,003	2,446	3,262	1,399	N/A	N/A
Total Emissions Scope 1 (MT CO <sub>2</sub> e)	3,384	3,101	2,955	2,656	2,187	1,980
Total Emissions Scope 2 (MT CO <sub>2</sub> e)	4,665	3,920	4,422	2,565	1,035	906
<b>Total MT CO<sub>2</sub>e</b>	<b>8,049</b>	<b>7,020</b>	<b>7,377</b>	<b>5,221</b>	<b>3,222</b>	<b>2,886</b>

Figure 7 Dunkin' Brands Energy & GHG Emissions Data<sup>6</sup>

<sup>7</sup> Sustainable Restaurants | Dunkin' Brands. (2019).

### *conclusion*

As the influencers in coffee consumption, corporate coffeehouse establishments have the advantage and responsibility to implement large-scale change within the industry, but this is meant to offset the thousands of stores that these companies have not only just in North America but in the world.

The growth of coffee production works hand-in-hand with the growth of these companies. The social responsibility and the urge to become more sustainable is meant to offset the commercialization and prolong the cultivation of coffee. The price of sustainability is an investment, which will later be explored in this section.

## local coffeehouses

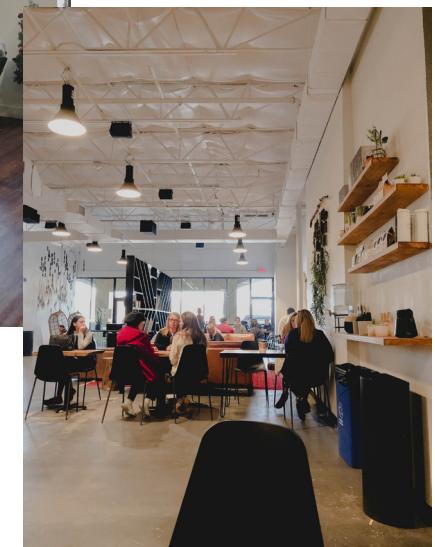
While researching corporate coffeehouses provided a bulk of background information for the different ways that popular companies defined and implemented sustainable initiatives, the scale of local and independently owned businesses might not be able to support sustainability. As previously established, the issues of sustainability and social responsibility are a lot easier for corporate companies who have the resources to implement multiple sustainable initiatives.

### coffeehouses visited

- The Aussie Grind** (Frisco, TX)
- The Pearl Cup** (Richardson, TX)
- George Coffee + Provisions** (Coppell, TX)
- Lemma Coffee Roasters** (Carrollton, TX)
- Mañana** (Austin, TX)
- Merit Coffee** (Dallas, TX)
- Mudleaf Coffee** (Plano, TX)
- Summer Moon Coffee** (Frisco, TX)
- Parks Coffee** (Carrollton, TX)



*Lemma Coffee Roasters Store interior*



*Mudleaf Coffee Store interior*

## observation insights

When asked about the types of disposables they used, most coffee shops had no response to whether or not their disposables were eco-friendly. The only way I could possibly tell was if there was a visible sign for things that could be recycled or composted or if the item was made of a specific type of plastic that could be recycled.

I myself own reusable coffee-related products, but for the times I visited these shops, I stayed for long periods of time and knew I would use in-house options for my food and beverages.

A majority of the shops visited had options for here or to go, but some shops automatically gave me disposable items because they were busy.

Additionally, one of the coffeehouses gave me a disposable cup, even though I had asked for a glass. Places that offered ceramic and glass options had bus bins. While using in-house options reduces the use of disposable items, water usage increases from dishwashing.



2/11 shops had recycling bins up front



2/11 shops had signs about composting



6/11 shops automatically ask "for here or to go"



Parks Coffee Point of sale

Spent coffee grounds make up the majority of waste from coffee shops along with food scraps. Most of the time, spent coffee grounds are trashed and usually end up in landfills. Only two out of ten coffee shops had some type of initiative in place concerning spent-coffee grounds.

Mañana (Austin, TX) indicated that they dispose of their coffee grounds by composting them.

The Pearl Cup has a local bin where they place their spent coffee grounds in bags and offer them to customers to take home for DIY projects and other repurposing methods.

Being independently owned businesses, there are a lot less opportunities for local coffeehouses to be sustainable. Investing in greener resources, greener energy, and eco-friendly packaging and materials is expensive. The investment in sustainable initiatives might not be worth it for an independent business to invest in since shops would most likely have to raise their prices to compensate for more expensive items and resources.

The following section takes a look at corporate prices and also analyzes cost differences between eco-friendly and generic packaging and materials.



Mañana Composting sign



The Pearl Cup Espresso ground upcycling

## cost comparatives

Sustainability causes price increases. The investment in sustainability and eco-friendly products and packaging. After pinpointing which corporate coffeehouses had the most initiatives regarding sustainability and environmental responsibility, I took the time to compare the average costs of beverages between all eight corporations to see if there was any correlation with sustainability initiatives.

If we compare the prices thinking about which companies had the most information and initiatives concerning sustainability, it's no surprise that Starbucks has the highest average price. Peet's comes in second, just nine cents less on average than Starbucks. Dunkin' Donuts is second to last, which comes as a surprise since they had the most quantitative data available.

While this isn't a formal comparison of price and sustainability initiatives, the majority of these results correspond with the idea that the more sustainable a company, the higher the prices.

average drink prices at north american coffeehouse chains

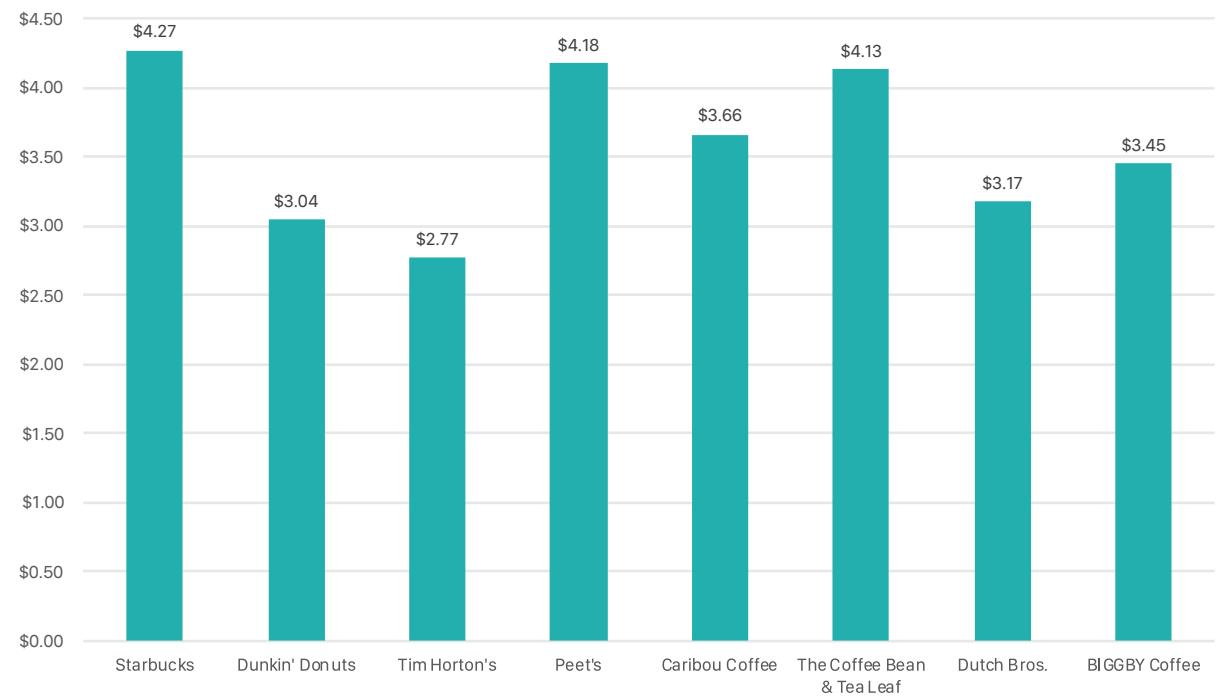
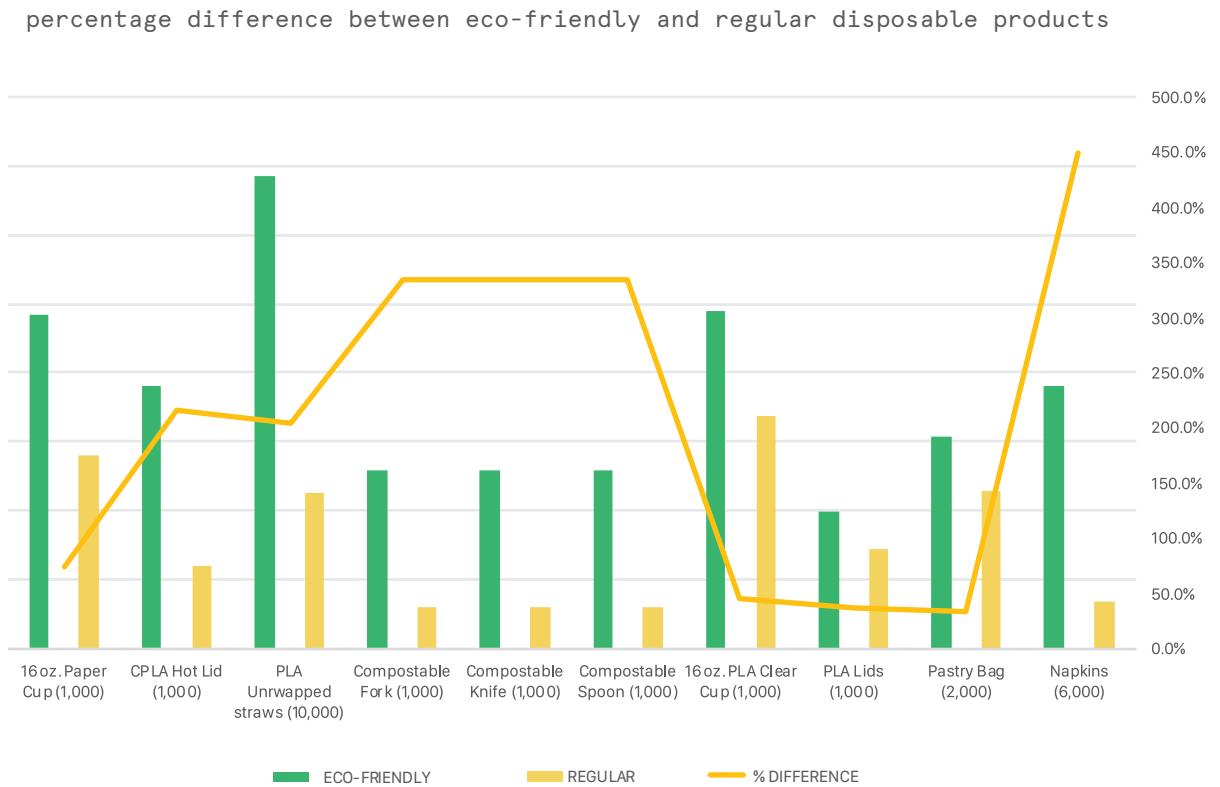


Figure 8 Cost comparison of average drink prices at major North American coffeehouse chains

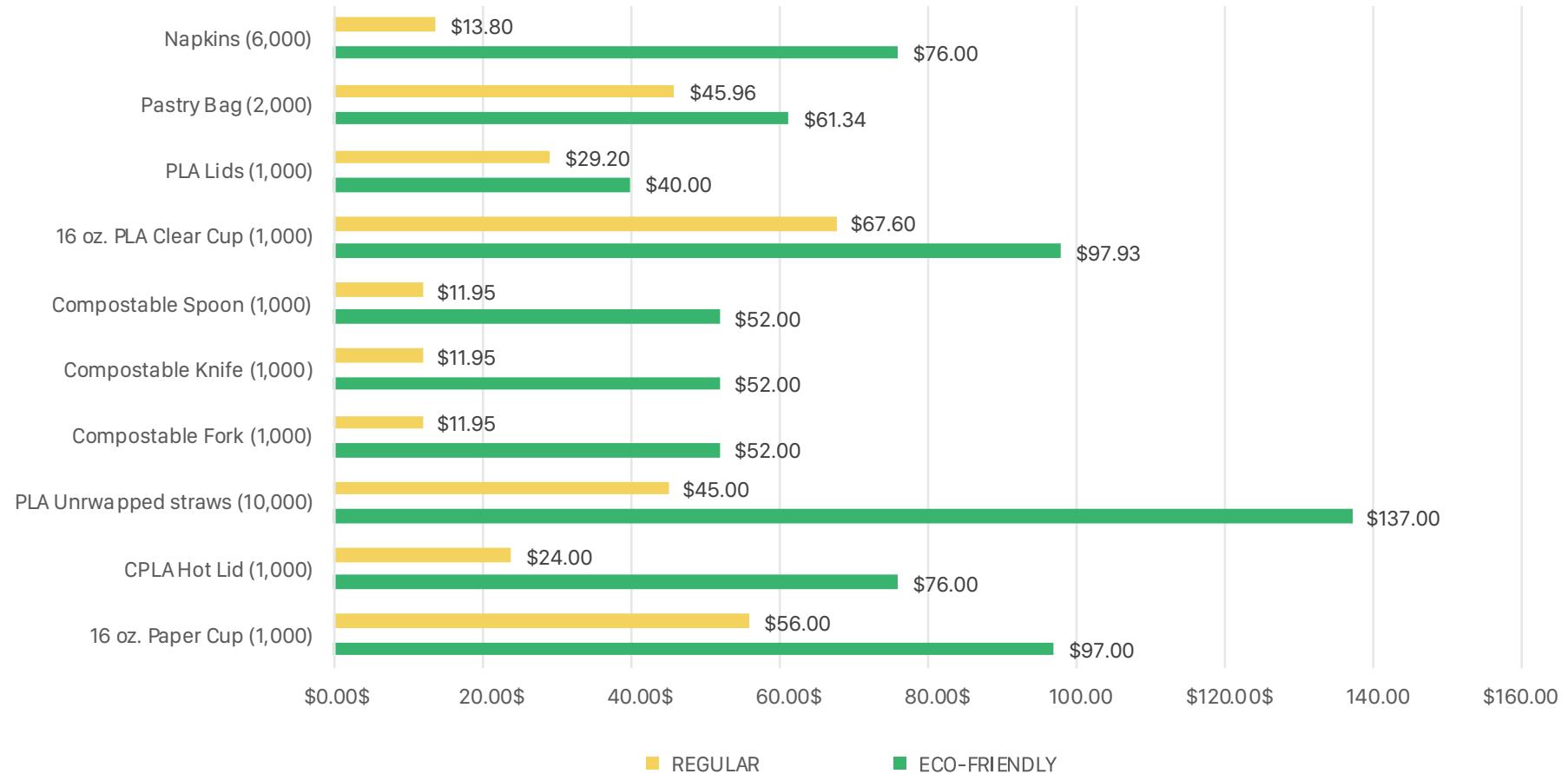
Independent coffeehouses do not have a set standard of what brands of products they use, but it is clear that eco-friendly products and materials cost more. Most of the local coffee shops I had visited seemed to use the same brands of cups, which to my knowledge, are not eco-friendly. Thus, I took the time to create a basic list to compare eco-friendly vs. regular product prices. Below is the list of the ten item prices I compared.



On average, the increase between each product is 206%. The most expensive item out of the ones listed are unwrapped straws. Compostable straws cost \$92 more than regular straws. The highest percentage difference is 216% with hot lids.

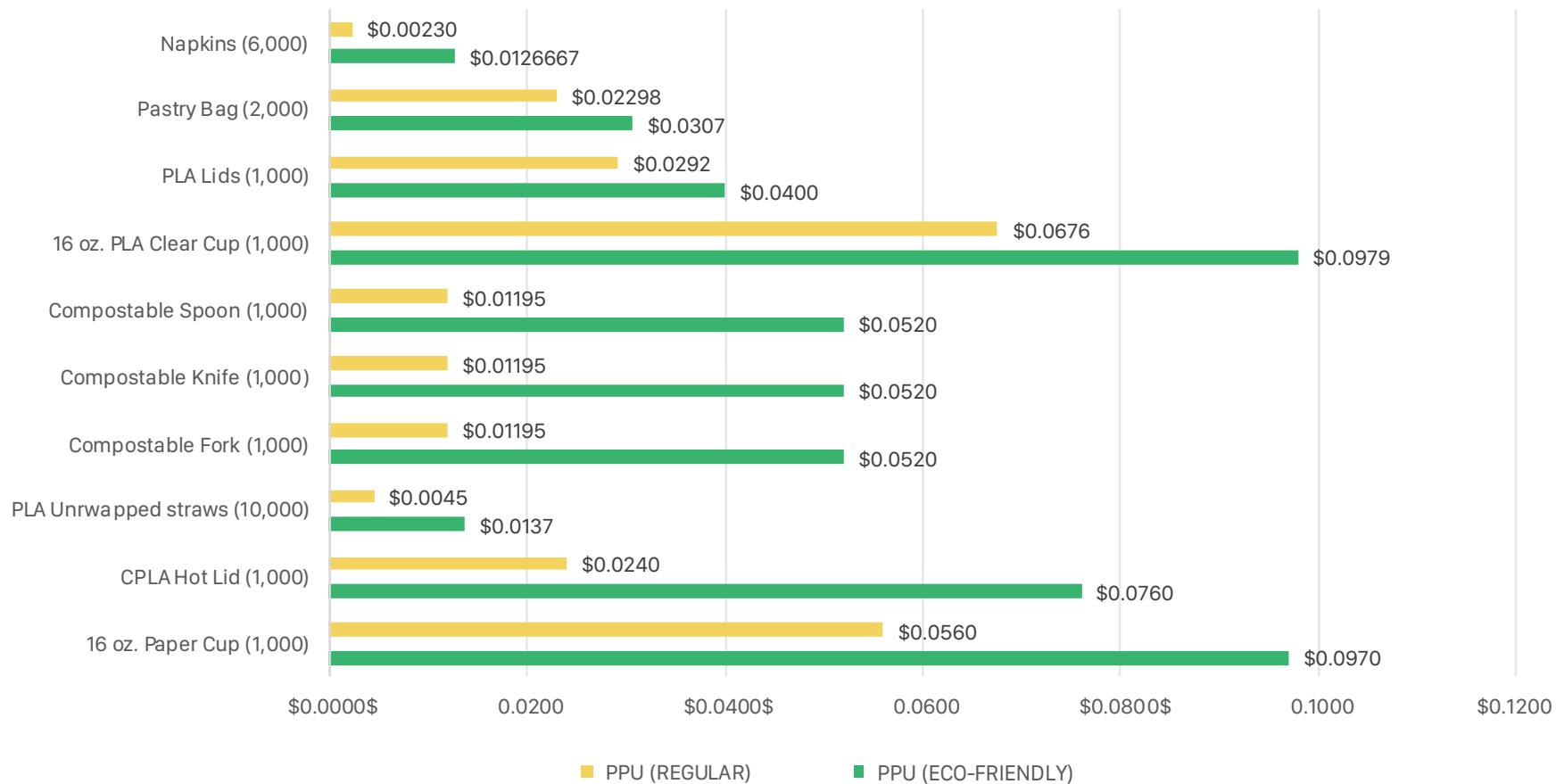
Figure 9 Percentage difference between eco-friendly and regular disposable products

### disposable product price comparison (bulk)



*Figure 10* Disposable bulk product price comparison

### disposable product price comparison (price per unit)



*Figure 11 Disposable product price comparison, price per unit (PPU)*

These graphs compare the bulk prices versus the prices per unit. Based on the data, there is a total difference of \$423.86 between the total cost of the bulk items and a 134% increase in the prices. While packaging and materials are not the only way a coffeehouse can become more sustainable, buying eco-friendly materials and products is the easiest way to reduce waste, but it comes at an expensive cost.

# consumption

## survey results

I surveyed coffee consumption and sustainability habits. I sent out the link via social media and e-mail and received 76 responses. Below are the questions I asked. The responses to these questions varied as multiple-choice (one selection or multiple selections) and number scales (1 to 5) with descriptions.

While this is only a select number of participants and is not fully representative on a larger scale, the survey allowed me to understand the participants' habits and how they relate to coffee consumption.

Even though varying local and corporate coffee shops encourage sustainability and environmental responsibility, the results of the survey vary greatly. This can be due to multiple factors such as personal motivations and accessibility to recycling and environmental responsibility based on their current location.

The following pages are key insights regarding the questions asked in the survey and the participants' responses.

- 01 How many times per day do you drink coffee?
- 02 When drinking coffee, do you make it at home or purchase it from a shop or café?
- 03 How many times per week do you frequent coffee shops or cafés?
- 04 Do you own any coffee-related reusable products?
- 05 When you purchase coffee to-go, do you bring your own reusable cup or use the one provided for you?
- 06 When you sit in a café for an allotted period of time, do you use in-house glassware, ceramics, or utensils?
- 07 If you are drinking something from in-house glassware, do you use a straw?
- 08 If you buy retail coffee beans, what do you do with the bag when finished?
- 09 If you make coffee at home in any way, what do you do with your used coffee grounds?
- 10 How often do you recycle?

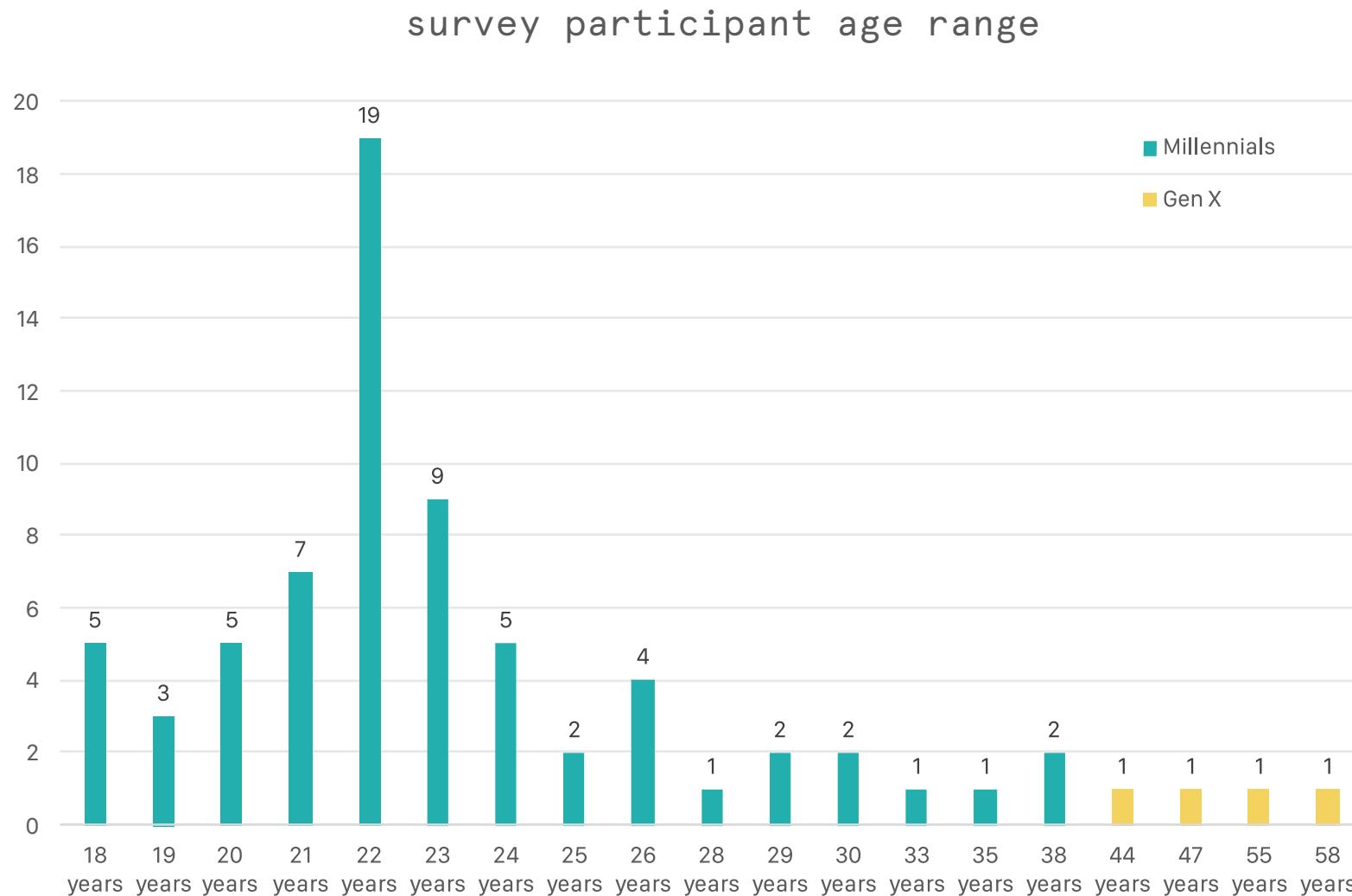


Figure 12 Survey participant age range graph comparison; generational cycle from Strauss and Howe<sup>1</sup>

<sup>1</sup> LifeCourse Generational Archetypes. (2019). Retrieved from <https://www.lifecourse.com/about/method/generational-archetypes.html>

do you own any reusable coffee products?

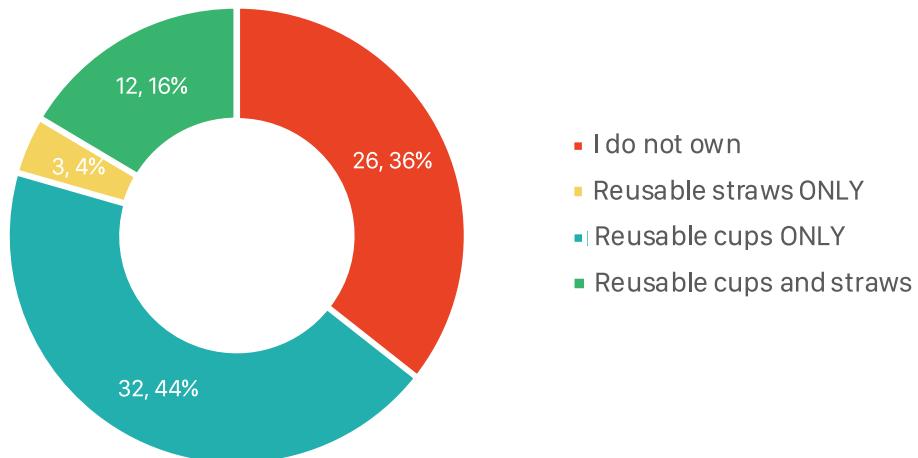


Figure 13

cup choices when purchasing to-go coffee

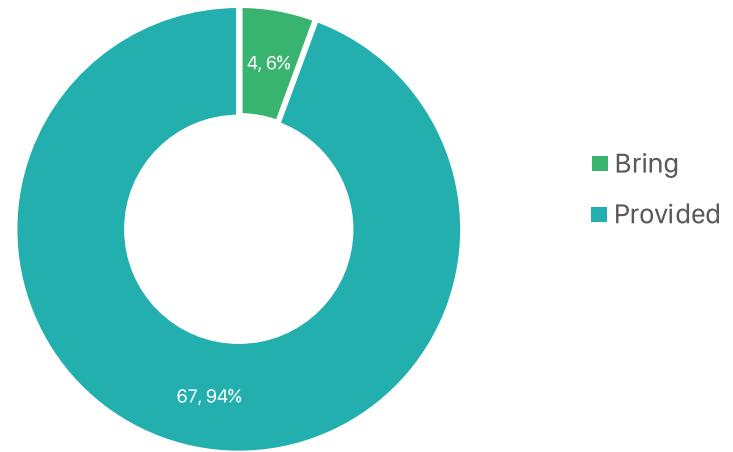


Figure 14

use of in-house coffee products at coffeehouses

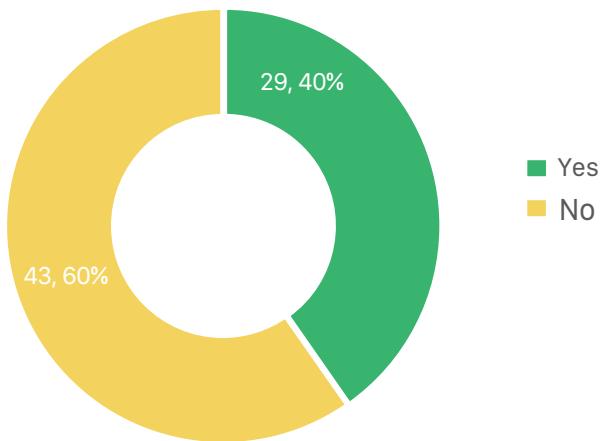
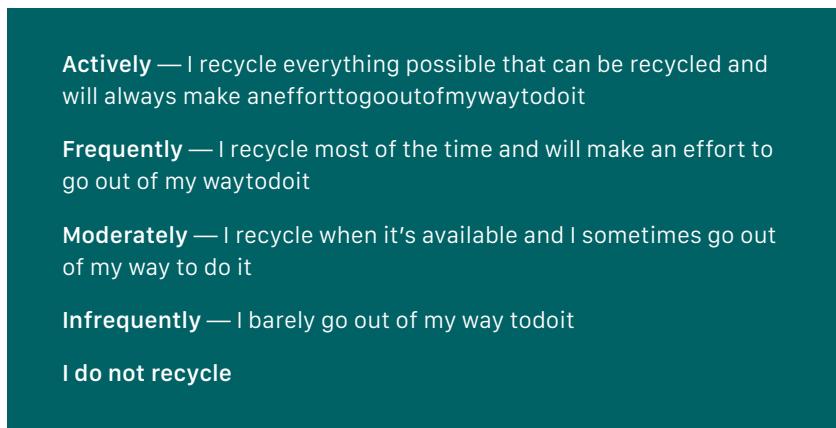


Figure 15

Looking at *Figure 13*, **64%** of individuals own some type of coffee-related products including reusable cups, straws, or both items. Interestingly enough, while 64% of participants own some type of coffee-related reusable products, *Figure 14* shows that **only 6%** of participants actually bring their reusable products when purchasing coffee to-go.

According to *Figure 15*, **60%** of individuals do not use provided in-house utensils when staying at a coffeehouse for an allotted period of time. If you compare these results to the amount of people who claim to have reusable coffee-related products, why do the results vary so much, even when glassware or utensils are provided at a coffeehouse?

To get a more broad and concise analysis of people's recycling habits, there were five answer choices that participants could choose from.

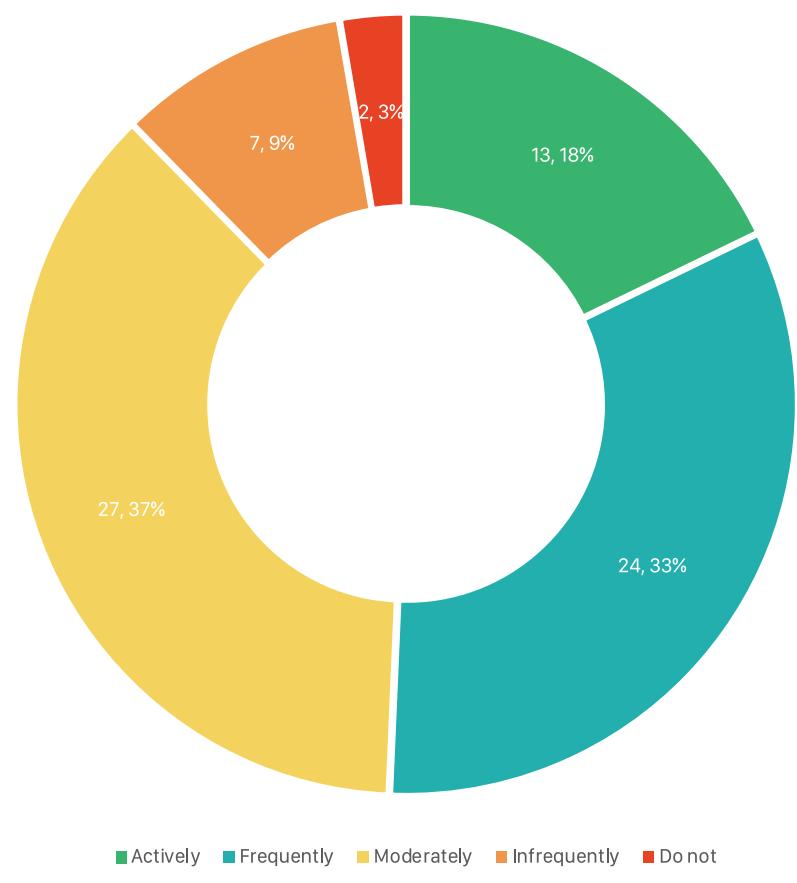


Looking at *Figure 16*, it is apparent that a large majority of participants categorized themselves to be moderate in their recycling habits. Overall, **88%** of individuals have conscious efforts to recycle whether it ranges from moderately to actively.

### overall results

The overall survey results indicate insight into the mind of consumers and how they think about sustainability and environmental responsibility. While over 60% of participants own products related to reusability, less than 6% actually use or bring their products with them. Additionally, while **88%** individuals participate in recycling in some way shape or form, only 18% of individuals categorized themselves to be active recyclers. The varying results pose bigger questions regarding sustainability and environmental responsibility in regards to **motives and other personal habits**. While these questions are a great start to understanding the minds of a consumer, they don't necessarily give *all* the details of how consumers participate in sustainability with and without regards to coffee.

how often do you recycle?



*Figure 16*

## interviews

I talked to individuals and asked them generic questions regarding sustainability and environmental responsibility in general. I attempted to ask brief questions to follow up the quantitative data results from the online survey. Below are some questions I asked.

These were some of the questions I asked that I found had the most varying answers. There were responses that were extremely supportive of sustainability whereas there were individuals who didn't think it really made a difference.

### *question 1 responses*

Many individuals said they care about sustainability, but most individuals answered that it is not something they prioritize or feel is urgent. Comparing this to the quantitative data from the online survey I created, this matches up with the fact that **27%** of participants categorized themselves as moderate recyclers (*Figure 15*).

### *question 2 responses*

A lot of the answers regarding to Question 2 had a lot to do with buying products that promote eco-friendliness, but I realized there were no answers that responded to being environmentally conscious in other ways (i.e. upcycling, energy usage, consumerism regarding eating and buying products with excess packaging).

While the list goes on and on, it became apparent to me that people's idea of being environmentally friendly is fairly limited. Thus, the issue regarding being as environmentally responsible as possible has to do with knowledge and understanding how it affects the Earth.

- 01 Is sustainability a big initiative as a part of your daily life?
- 02 What motivates you to take part in being environmentally friendly
- 03 What do you do to be more eco-friendly?
- 04 Do you think being sustainable in small ways is beneficial?

This is reflected within Sammoggia and Riedel's study done on coffee consumption<sup>1</sup>; while people, specifically millennials are more likely to invest in more expensive coffee product because of the "sustainability labels". Their results also proved that there are inconsistencies between the attitudes and behaviors of consumers regarding sustainability.

### *question 3 & 4 responses*

Questions 3 and 4 asked participants how they are eco-friendly and then is followed up by asking if it makes a difference.

Again , the responses correlate with Question 1 responses where the motivation to be eco-friendly can be regarded as moderate. Participants responded that they think it matters and makes a difference. As a popular answer, this then leads me to recognize that the background knowledge of sustainability between participants vary greatly, which is something that could have been included in the survey.

<sup>1</sup> Sammoggia,A.&Riedel,B.(2018).Coffeeconsumptionandpurchasingbehaviorreview:Insightsfor further research. Appetite. Retrieved from <https://doi.org/10.1016/j.appet.2018.07.002>

# concerns and possible solutions

## suggestions regarding sustainability in the coffee industry

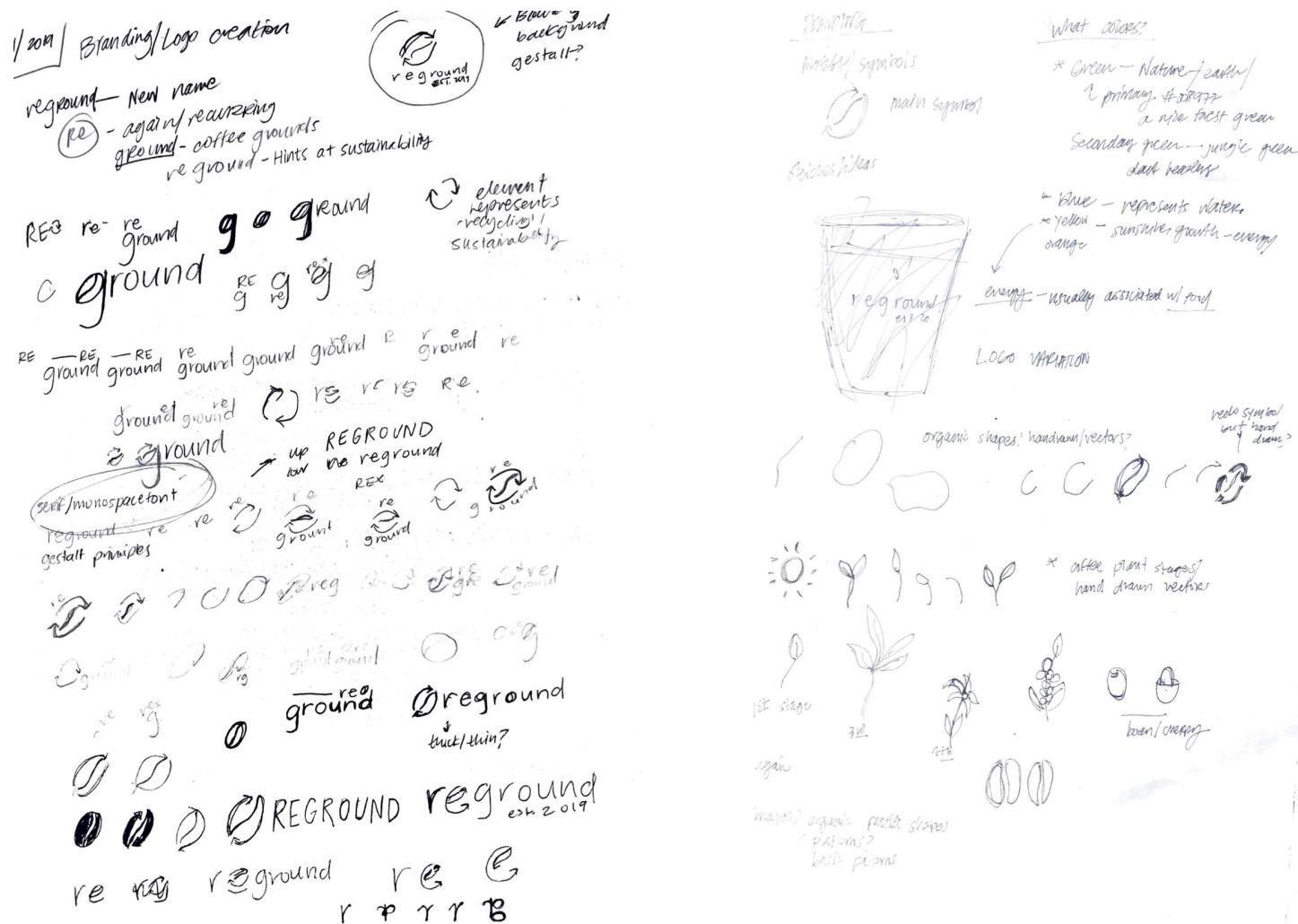
Through my research, I noticed some discrepancies that make it difficult to measure sustainability. Whether a coffeehouse is a corporately owned establishment or an independent business, there were multiple questions and insights that came to mind when thinking about sustainability.

- 01 No set of broad guidelines exist for measuring sustainability—what criteria are these companies and stores needing to meet to be considered sustainable in varying areas? The issue is that sustainability is a generic term. Starbucks was the first company to kickstart sustainability and social responsibility in the coffee industry, but even they do not have a single definition tied to sustainability.
- 02 In terms of corporate coffee shops, not all chain stores follow the same management style. Some stores within franchises are still independently owned, meaning that the owner is responsible for choosing initiatives to implement. This applies to companies like Dunkin' Donuts or BIGGBY Coffee.
- 03 Concerning waste reduction, recycling, and composting, geographical location is a determining factor for waste disposal regarding local and corporate coffeehouses. Every city varies in what is and is not recyclable. Not all coffeehouses are built in areas that have the proper infrastructure concerning waste management, meaning that there is no choice but to send waste to landfills.

# design language

## brainstorming process

To begin creating a branding identity, the first step was to brainstorm potential logos and names that would represent this project and the ideas and initiatives behind continuing to make coffee a sustainable commodity.



## logo creation

The sketches on the previous page show the process I went through to come up with the logo. I knew I wanted it to be minimalistic while still alluding to sustainability. Shown below are some of the iterations created in Illustrator.



The components of the logo consist of two self-referential arrows in the shape of an oval, and a solid waved line in the middle. The arrows represent sustainability and its cyclical nature. The line in the middle alludes to a coffee bean. This logo represents the ideas and initiatives of sustainability minimally and effectively.

The final logo and its secondary variation can be seen below.



## color palette

Color choice is important, and that's why each color in the primary palette has been chosen with careful consideration. It is important to have colors that work well together while making sure they represent an ideology. Each color represents an element within nature.



**name**  
petiole



**name**  
inked pine



**name**  
sea green



**name**  
sun vein



**name**  
sun flare



**name**  
steel



**name**  
deep waters

**rgb**  
64 180 110

**rgb**  
31 29 27

**rgb**  
180 77 69

**rgb**  
244 211 94

**rgb**  
238 150 75

**rgb**  
96 96 96

**rgb**  
0 97 99

**cmyk**  
73 2 77 0

**cmyk**  
21 0 31 15

**cmyk**  
77 1 0 31

**cmyk**  
0 14 61 4

**cmyk**  
0 37 68 7

**cmyk**  
0 0 0 100

**cmyk**  
91 41 55 24

**hex**  
#40b46e

**hex**  
#1f27fb

**hex**  
#2cafafv

**hex**  
#f4d35e

**hex**  
#ee964b

**hex**  
#606060

**hex**  
#006163

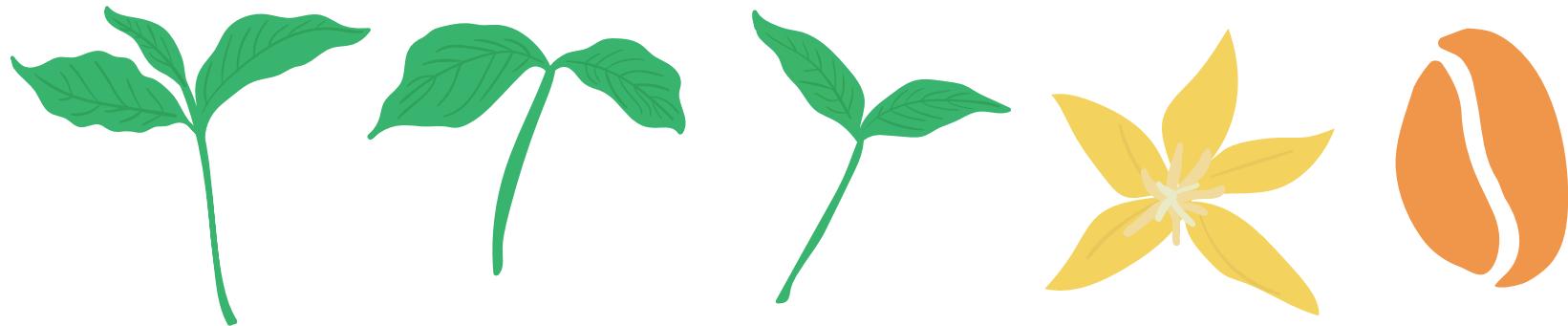
## typography

To continue with the theme of minimalism, choosing readable yet effective type to complement the logo was important. A monospace font face was used for the branding name whereas sans-serif font face was chosen for the date. Using all lowercase type is intentional to keep the logo looking friendly and modern.

Apercu Mono Pro  
SF Compact Display

## branding applications

Since reground's branding identity revolves around the icon and typography, I wanted to add some illustrated elements that could be incorporated with some of the real estate products to add character and variety. I create three simple hand drawn shapes that relate to coffee production: coffee bean plant leaves, a coffee bean, and the coffee bean flower. These elements can be rearranged in any way to form a pattern or stand alone.



Instead of working with digital signage, I chose to go the traditional route. Most local coffeehouses (from my research) use physical signage in their store for their menus, reward programs, and any other assets they might have. Digital signage is used in cohesion, but it seems more traditional to go with physical signage. Additionally, local coffeehouses that serve mostly traditional coffee drinks have no need to change their signage very often.

The following pages are examples of branding applied to various real estate.















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