CheckOut Reuse

It's not recycling, composting, or garbage.
The next step for Seattle to reduce single-use packaging.

Evans School of Public Policy and Governance
Prepared for Seattle Public Utilities

Brady Winsten, Daniel Colvin, Ryan Harlow, Tiana Ahmed

TABLE OF CONTENTS

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We work and learn on Coast Salish land, which also touches the shared waters of all tribes and bands within the Duwamish, Puyallup, Suquamish, Tulalip, and Muckleshoot nations. Please visit https://native-land.ca/ to learn more about the Indigenous lands, territories, treaties, and languages where you live.

Contact Us

Tiana Ahmed: tianalynnahmed@gmail.com
Brady Winsten: bradywinsten@gmail.com
Ryan Harlow: harlowryan10@gmail.com
Daniel Colvin: danieljcolvin@gmail.com

GLOSSARY

These definitions are for the context of this report. They should not be construed as the only definitions for different ideas, systems, or products. Other definitions may exist from different organizations focusing on a similar topic that appear similar, are more encompassing, or are more widely accepted.

Break-Even Point
The number of uses at which a reusable product has an equal environmental impact as a single-use product.

Circular Economy
An economic system where resources are continuously recirculated from the end-of-use back into production by way of recycling, reusing, or repurposing resource materials. This system eliminates the current linear consumption-to-disposal economy where finite resources are extracted for production and items are disposed of through landfilling or incineration.

Deposit Return Scheme (DRS)
A reuse or recycling system where a customer pays a refundable charge for an item that they will receive back once the item is properly returned.

Durable
A product that is designed to be reused.

Food Service Business (FSB)
Businesses that sell or provide food for consumption on or off the premises, including full-service restaurants, fast food restaurants, grocery stores, cafes, coffee shops, food trucks or carts, delicatessens, bakeries, and food courts.

Food Packaging and Serviceware
Products that food is provided in or with, including containers, plates, clamshells, trays, cups, lids, wrappers, straws, and utensils.

Recyclable
A product that is made solely from material that can be separated from a waste stream and processed for remanufacture into the same or other products. Per the regulations established by the City of Seattle, for a product to be considered recyclable it must be accepted by and able to be processed by local programs and facilities.

Refillable
The ability for a product to be filled more than once after its initial use.

Reusable
Any product that is designed for more than a single use.

Reuse
The action of using a product designed for multiple uses, more than once, in the same form.

Reuse Pilot
A small-scale operation conducted by a single reuse business or multiple reuse businesses in a confined foodservice business area for a set period of time. This is done to gather data and assess the economic feasibility of a reusable system at Food Service Businesses. It can be done independently or with support from local governments.

Reuse System
A system that incorporates reusable products at a Food Service Business. This system incorporates the storage, use, distribution, sanitation, and reverse logistics of reusable products.

Seattle Public Utilities (SPU)
This report's client. SPU is the publicly-owned Utility for the city of Seattle, managing water, wastewater and drainage systems, and solid waste management.

Virgin Plastic/Feedstock
The new plastic material that has not been previously incorporated into a product. Used to create a fresh plastic product.

Recoverability
The recyclability of a material. Some materials may degrade after being recycled a certain number of times while other materials can be continuously recycled without degradation.

Request For Information (RFI)
A request typically from a local municipality or government agency on how a private business or non-profit organization would address a problem or idea proposed by the governmental entity.

Request For Quotation (RFQ)
A request typically from a local municipality or government agency regarding the costs a private business or non-profit organization would have for solving a problem or implementing an idea.

EXECUTIVE SUMMARY

Seattle has seen unprecedented population growth in the last 30 years, requiring innovative approaches from the City to provide essential services. Seattle Public Utilities (SPU) provides water, sewage, drainage, and solid waste services for the residents of Seattle. Since its first curbside recycling program in 1988, the City of Seattle has enacted path-breaking solid waste management programs. Within SPU's Solid Waste Division, the Commercial Recycling and Composting program provides education, outreach, and enforcement to bring the city's Food Service Businesses (FSBs) into compliance with city ordinances that regulate food packaging and utensils. SPU's 2020 Strategic Business Plan outlines the Utilities' new Vision Statement: "Community Centered, One Water, Zero Waste." This year, SPU partnered with our Evans School Consulting Team to explore how Food Service Businesses can transition to reusable food packaging to support the City's zero waste goals. Reuse systems provide reusable to-go cups and food packaging to food service business (FSB) customers, both eliminating single-use packaging waste and reducing the overall environmental impacts of food packaging. This report contributes to the existing literature on reuse systems with an original evaluation tool (Appendix D) that illustrates how each type of system is graded on the criteria of cost, equity, accessibility, environmental impact, scalability, and health and safety.

Research Questions

To understand the background and context of food packaging in Seattle, we asked:

1. What is the current environment of reuse systems, SPU capacity and resources, current ordinances, and what type/amount of single-use food service products are being used in Seattle?

To look at future programs to maximize waste prevention in Seattle, we ask:

2. a) Given SPU's current budget and resources, how can SPU pilot a reuse system to demonstrate the feasibility for a single-use food packaging reduction ordinance?
   b) How should SPU support the startup, scaling, and ongoing operations of reuse businesses in Seattle?

Research Methods

To answer our first research question, we conducted a literature review of primary research, systematic analyses, case studies, and grey literature[1] to understand the context and background of single-use packaging reduction policy and programs. We also conducted semi-structured

[1] "**Grey literature** is generally material not published commercially or indexed by major databases.
A more complete definition is information "produced on all levels of government, academics, business and industry in electronic and print formats not controlled by commercial publishing i.e. where publishing is not the primary activity of the producing body" (University of Washington, 2020)

interviews with SPU staff to review the current SPU capacity and resources, and to understand the type and amount of single-use packaging used in FSBs.

To answer our second research question, we collected qualitative data from 15 semi-structured interviews with reuse business owners, municipal leaders, and non-profit leaders. We gathered information on reuse businesses, pilots, and systems, and used snowball sampling to identify subsequent interview subjects.

Recommendations

Based on our findings, we recommend SPU:

I. **Leverage NGO and/or private funds** for a large-scale Seattle reuse pilot.

1. Publish an RFP for one or more reuse businesses to provide to-go cups and packaging for FSBs in multiple business districts.
2. Establish minimum accessibility and equity requirements to ensure inclusive access.
3. Use the pilot to collect data on the environmental, economic, and community impact of reuse systems.

II. **Center equity** to establish leadership among municipal reuse initiatives.

1. Create minimum equity requirements for all reuse pilots and grants.
2. Conduct community and stakeholder engagement as a central part of supporting reuse systems.
3. Design Seattle's food service reuse system to maximize equity and ease institutional barriers for consumers based on community and stakeholder engagement

III. Expand and tailor SPU's existing programs to support reuse systems:

1. Support the development of Seattle's reuse market through **grants**.
    a. Solicit applications from reuse businesses for SPU's Waste-Free Communities Matching Grant.
2. Create **social marketing campaigns** to stimulate behavior change for reuse systems.
3. Conduct **community and stakeholder engagement** as a central part of supporting reuse systems.
4. **Ease institutional barriers** for reuse businesses.
    a. Partner with Public Health Departments to ease undue burdens related to public health guidelines.
    b. Partner with the Seattle Department of Transportation to place public return kiosks.

IV. Support reuse systems through legislation:

1. Incentivize participation in reuse systems through **progressive ordinances**.
2. Coordinate **advocacy for Extended Producer Responsibility** (EPR) with other municipalities for statewide implementation.

Key Findings

Findings from our literature review and interviews show that many North American municipalities have experimented with city-supported FSB reuse pilots, but none have implemented city-wide systems. Key findings to guide SPU's work include:

- Reuse systems are gaining support and enthusiasm nationwide but face barriers from the COVID-19 pandemic. Some municipalities are focusing on amplifying public health directives that emphasize the safety of reuse systems to gain back customer support.
- The reuse market is in a development phase where most businesses are concerned with innovating models to find economic viability and need financial and technical support to develop equitable, inclusive, and standardized systems.
- Reuse systems need a sustainable funding source to increase equity and accessibility; more research and advocacy are needed to analyze potential sources including Extended Producer Responsibility.
- Ordinances can be used to incentivize participation in reuse systems but they can also increase the administrative burden on FSBs.
- In general, smaller food service businesses are seeking to minimize costs associated with food serviceware while corporate chains are more concerned with branding associated with food serviceware - this is the primary tension between open-source and proprietary system designs.
- Measuring the environmental impact of a reuse system is complex but key metrics can minimize environmental impact; initial reuse system environmental impacts come from materials choices and manufacturing, while ongoing impacts come from transportation and washing.
- Disaggregated data is needed to understand disparate impacts of a city-wide reuse system on different user groups, including by race/ethnicity, language, geographic location, socioeconomic level, and other factors.

Reuse Systems and Evaluation Method

Pilots are an integral part of establishing reuse systems and often function to experiment or build momentum for a larger project. Our report reviews different types of existing reuse systems and establishes criteria to evaluate how well a system maximizes the criteria of **cost, equity, accessibility, environmental impact, health and safety, and scalability**. We also use these criteria to envision the ideal reuse system. Our Evaluation Tool (Chapter 4) can help SPU to understand how to design a reuse pilot to collect the necessary data to inform an eventual inclusive, city-wide reuse system. It can also be adapted to include additional criteria or for specific locations other than Seattle.

CHAPTER 1: INTRODUCTION

This report outlines how Seattle Public Utilities (SPU) can take the next step in Seattle's Zero Waste initiative by examining the feasibility of reuse systems for Food Service Businesses (FSBs). There are many opportunities to replace single-use foodware items, including for FSB to-go and dine-in service, on university or work campuses, and at sporting stadiums. Our review is focused on reuse systems that include third-party reuse businesses, can serve multiple FSBs, and include to-go food packaging. We review types of reuse system models, their key components, and develop criteria to evaluate each system's impact. An original evaluation tool is included for SPU and other municipalities to use to prioritize funding and support for reuse systems (Appendix D). Finally, we synthesize key findings from interviews and a systematic review to make recommendations for how SPU can support Seattle's reuse system development. This project builds on Seattle's history of progressive policies to reduce single-use food packaging to benefit people and the planet.

Image 1. Zero Waste Alameda

I. Seattle Public Utilities Overview

> **"Community Centered, One Water, Zero Waste"**
> -Seattle Public Utilities Vision Statement
> (*Draft Strategic Business Plan, 2020*)

Seattle Public Utilities provides three major services for the city of Seattle: the Water Utility, the Drainage and Wastewater Utility, and the Solid Waste Utility (Seattle Public Utilities, 2021). The Solid Waste Utility division of SPU manages garbage, recycling, and compost (Policies & Director's Rules, 2021). Since 1989, the City of Seattle has also maintained its own Comprehensive Solid Waste Management Plan, which is updated every 5 years (Revised Code of Washington **70A.205.040**). The Transportation and Utilities Committee of the City Council provides guidance and recommendations on legislative issues related to SPU and solid waste management (Seattle City Council: Transportation & Utilities, 2021). Inside the Solid Waste Line of Business, Commercial Recycling and Composting Program engage in outreach, education, and enforcement to bring Food Service Businesses into compliance with solid waste ordinance requirements (outlined in Chapter 2).

II. An Iterative Process

In 1988, the City of Seattle became one of the first major US cities to offer curbside recycling services (SPUMedia, 2013). One decade later in 1998, Seattle implemented a Comprehensive Solid Waste Management Plan that began long-term planning to organize its efforts to reduce solid waste sent to landfills (Seattle's Solid Waste Plan, 1998). In 2007, the City's Zero Waste Resolution outlined 5-year goals for waste reduction and provided strategic guidance for the future of waste reduction initiatives (Zero Waste, 2007). A 2011 revision to the Solid Waste Management Plan included a goal of recycling 60% of solid waste by 2012 and 70% of solid waste by 2025 (Weaver & Hegstrom, 2013). The Revision also laid out waste prevention strategies featuring reuse as one of the primary approaches. In this plan, SPU focused on supporting existing reuse programs to divert construction waste, electronics, and bolster industrial exchange markets and the charitable donation of reusable goods (Weaver & Hegstrom, 2013). SPU's 2021-2026 Draft Strategic Plan is currently in revision and will further emphasize waste prevention and reuse.

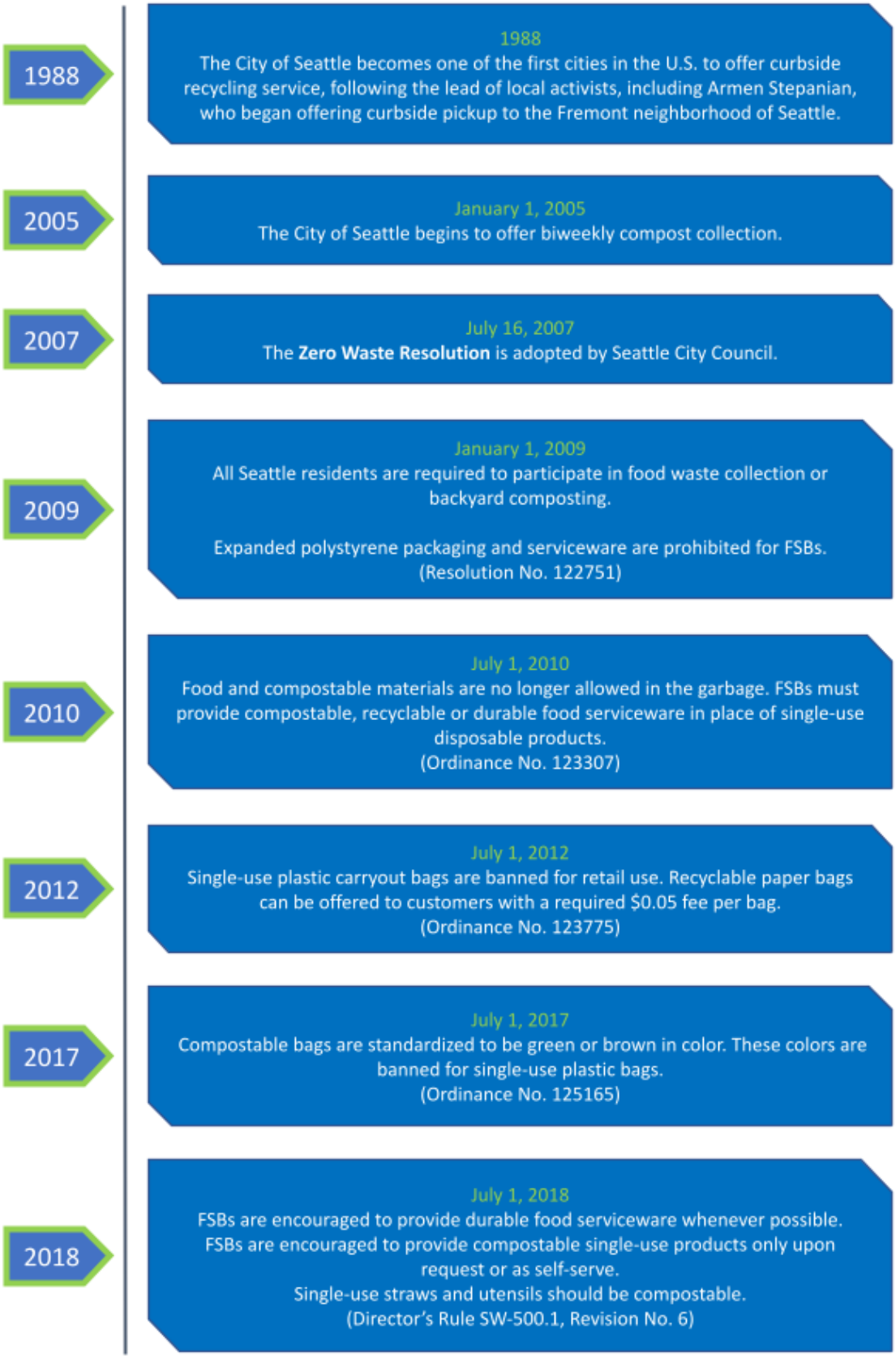

Image 2: Timeline of Seattle Waste Management Initiatives

III. The Shift to Waste Prevention

Seattle benefits from close proximity to numerous plastic, metal, and glass recycling facilities in the Pacific Northwest. 100% of recyclable metal and glass collected in Seattle is processed for recycling within the city and two-thirds of all its recyclable material is handled domestically (Seattle's Recycling Process, 2021). However, the value of recyclable materials often does not cover the full costs related to collecting and processing materials for recycling. SPU reports on the annual recycling rate, which includes solid waste that is reused, recycled, and composted. The recycling rate for Seattle in 2019 was 54.4% and the city saw the lowest per capita solid waste generation to date at 2.1 pounds per day (2019 Annual Waste Prevention & Recycling Report, 2020). Seattle has grown by nearly 23% from 2010 - 2019 and kept its recycling rate steady (2019 Annual Waste Prevention & Recycling Report).

In recent years, compostable containers and utensils have gained popularity as an alternative to single-use plastics. Seattle Ordinance 122751 requires restaurants and cafes to use recyclable or compostable containers for takeout, compostable straws, and compostable packaging for dine-in service. These policies have diverted hundreds of thousands of pounds of waste away from landfills (Riotta, 2018). However, compost contamination is a significant problem, as many consumers make the mistake of throwing non-compostable items into compost bins (Wozniacka, 2020). Contamination is also seen in the recycling stream as consumers continue to discard recyclables that are food contaminated. Additionally, customers and FSBs alike may be confused by "greenwashed" products that appear compostable but are not (Ballinger, Lemon, Olson, Smith-Groening, 2019).

Even with these challenges, recycling and composting are far superior to landfill disposal. SPU's vision statement references the importance of healthy communities and waterways through a Zero Waste strategy, which is likely the most efficient tool to maximize community and environmental health. In this report, we examine reuse systems as an opportunity to implement zero waste practices in Food Service Businesses to contribute to Seattle's zero waste goals.

IV. Research Questions

To understand the background and context of food packaging in Seattle, we ask:

1.) What is the current environment of reuse/refill systems, SPU budget/resources, current ordinances, and what type/amount of single-use food service products are being used in Seattle?

To look at future programs to maximize waste prevention in Seattle, we ask:

2.) Given SPU's current budget and resources, how can SPU pilot a reuse/refill system to demonstrate the feasibility for a single-use food packaging reduction ordinance?
    - How should SPU support the startup, scaling, and ongoing operations of reuse/refill businesses in Seattle?

V. Report Overview

This report is divided into five chapters including a review of literature, research methods, analysis and findings, and recommendations to SPU.

Chapter 1: Introduction provides an overview of the report, including a description of SPU's work, a summary of the shift towards reusables for waste prevention, and research questions.

Chapter 2: Background includes a review of the background and context of reuse and refill systems, including previous SPU Capstone reports, current Seattle single-use plastic reduction ordinances, system models, criteria used for evaluation, and research on marketing and consumer behavior, contracting and management considerations, and pilot programs.

Chapter 3: Research Design and Methods details our mixed methods for research, including our interview protocol, review of literature, and the limitations of our approach.

Chapter 4: Findings and Analysis contains the quantitative and qualitative data collected from interviews and systematic review. Existing reuse models are evaluated with an original evaluation tool using criteria of cost, equity, accessibility, environmental impact, scalability, and health and safety.

Chapter 5: Recommendations outlines how SPU can support the reuse market through pilots, grants, institutional support, and public education. It also outlines how SPU can be a leader in the reuse field by collecting and evaluating data on the environmental, economic, and community impacts of reuse systems.

CHAPTER 2: BACKGROUND

Our literature review is designed to examine the context and background of reuse and refill systems. The review included primary research, systematic analyses, case studies, and grey literature. It also included previous SPU Capstone reports, current Seattle ordinances, notable reuse/refill pilots, and the major components of reuse and refill systems. We also conducted semi-structured interviews with SPU staff to learn about SPU's organizational structure, feasibility for recommendations regarding SPU's role within the pilot, and to understand the type and amount of single-use packaging used in FSBs.

This literature review will answer our first research question:

What is the current environment of reuse/refill systems, SPU budget and resources, current ordinances, and what type and amount of single-use products are being used in Seattle?

I. Prior Evans School Capstone Research

Four previous groups of student researchers from the University of Washington Evans School of Public Policy and Governance examined solid waste management strategies in Seattle. These studies examined products and packaging offered in retail environments and food service businesses that were the subject of City Ordinances, including plastic and paper bags, straws, and utensils. These reports document the progress Seattle businesses have made toward food packaging compliance and provide recommendations to increase compliance rates.

2017 Evans Consulting Team

This study looked into the impacts of the Seattle ban on single-use plastic bags for retail use on waste prevention efforts and on the various waste streams: recycling, compost, disposal and litter, and recommended action to bolster these efforts and improve rates of compliance.

Key Findings:

- Variances in compliance were present between the type of retail store and council district
- Convenience stores had the highest rates of non-compliance at about 55%.
- The most cited reasons for non-compliance were the cost of alternatives and customer preference.

Key Recommendations:

- Expand research on impacts of plastic bags on litter and compost streams

- Improve messaging on compliance messaging to include diverse culturally relevant materials
- Amend the then-ongoing study on compost-characterization to include distinctions between different types of bags
- Continue support for industry-led plastic bag and films take-back programs

(Evans, Fina, & Pham, 2017)

2018 Evans Consulting Team

This student team built upon the 2017 Team's research on compliance with the retail single-use plastic bag ban and expanded their study to examine other materials addressed in SPU's waste reduction efforts including the then-approaching ban on single-use plastic utensils and straws.

Key Findings:

- Improved compliance with plastic bag ban among retail stores including convenience stores where non-compliance dropped to 20%. Problems still persisted in other areas as only 14 out of 70 convenience stores provided large paper bags, and only 8 of 70 charged the required $0.05 fee.
- 48% of surveyed convenience stores and food service businesses provided compostable utensils and straws (82% provided one or the other), and showed low awareness (36%) of the approaching ban on plastic single-use utensils and straws.

Key Recommendations:

- Improve outreach materials to encourage "Bring Your Own" over "ban" language
- Provide free toolkits to assist businesses to comply with requirements
- Expand the retail plastic ban bag to include food service businesses
- Discontinue curbside plastic bag recycling

(Cao, Haider, Hornsby, & Pietschmann, 2018)

2019 Evans Consulting Team

The 2019 research team continued research on ordinance compliance focusing on banned plastic straws in particular at bubble tea FSBs, and the required provision of bendable straws for consumers with physical and medical needs, upon request.

Key Findings:

- 64% of food service businesses were fully compliant in providing compostable straws and utensils with 77% providing compliant straws and 68% providing compliant utensils.
- Very low compliance among bubble tea FSBs with only 15% providing compostable bubble tea straws, and 33% providing compliant regular straws.

Key Recommendations:

- Improve messaging by providing more languages on compliance fliers, and provide more complete language regarding the bendable straw exemption
- Partner with product suppliers to address product greenwashing confusion, and to provide more options for durable product alternatives to plastic single-use bubble tea straws

- Examine ways to lower costs of compliant materials to FSBs

(Ballinger, Lemon, Olson, Smith-Groening, 2019)

2020 Evans Consulting Team

The 2020 Evans team continued previous research regarding levels of compliance on banned materials, this time focusing on what single-use products are provided, the materials they are composed of, and methods to reduce the provision of single-use products at food service businesses while minimizing potential challenges.

Key Findings:

- 29% of survey respondents reported providing single-use utensils as the standard rather than only upon request and the same percentage provided single-use straws as the standard.
- 72% of respondents did not have bendable straws available upon request for customers with physical or medical needs.
- 76% of food service businesses reported having an onsite dishwasher, and 23% reported lacking one. The research team noted this could be a significant barrier for FSBs to switch to reusable products.
- Personnel involved with the City of Berkeley Single Use Foodware & Litter Reduction Ordinance reported on their findings from implementing this ordinance:
    - Perceived cost is a barrier to FSB adoption of reusable products
    - Outreach, stakeholder engagement, and public input are important in the program's success
    - Key challenges of this program included limited washing capabilities, sourcing of products, and the provision of technical assistance for FSBs

Key Recommendations:

- Revise strategies to achieve universal compliance including further promotion for public awareness and individual responsibility
- Address health concerns about reusable products emerging from COVID-19 mitigation recommendations
- Use district-level data and initiatives to leverage the strengths of each area, and address the local challenges that each area experiences.

(Carros, Faller, Jones, Perkins & Stapnes, 2020)

II. Seattle Policies: Food Service and Retail Single-Use Materials

The Seattle Zero Waste Resolution (30990) outlined waste reduction goals and strategy: offer new services on a voluntary basis, implement initiatives that encourage participation, pursue product stewardship, and consider prohibiting the disposal of targeted materials in the garbage to encourage full participation. Since then, the City has passed progressive ordinances that move to

reduce single-use plastic as retail packaging and food serviceware, and grant expanded rulemaking authority to the Director of Seattle Public Utilities to modify certain provisions of the ordinances.

- Ordinance No. 122751 - Effective January 1, 2009, Expanded Polystyrene (styrofoam) packaging prohibited as food serviceware from FSBs as of January 1, 2009. As of July 1, 2010, FSBs must use compostable or recyclable packaging only, and expanded polystyrene is banned as packaging for raw meat and seafood.
- Ordinance No. 123307 - Effective July 1, 2010, Banned the provision of disposable food service ware at food service businesses. Established recyclable and compostable options as acceptable alternatives. Mandated collection and proper disposal of compostable and recyclable materials, especially food serviceware with requirements for clearly marked containers.
- Ordinance No. 123775 - Effective July 1, 2012 - December 31, 2016, Single-use plastic bags prohibited for retail use. Businesses are required to provide recyclable paper bags at $0.05 per bag.
- Ordinance No. 123880 - Effective June 7, 2012- July 1, 2013, Revised the rulemaking authority of the SPU Director to revise single-use packaging and serviceware waivers and granted the Manager/CEP of SPU to annually revise the product waiver list.
- Ordinance No. 125165 - Effective July 1, 2017, Established standards for compostable bags to be colored green or brown and banned these colors for use in single-use plastic bags. The original end date for the single-use plastic ban was also lifted.
- Director's Rule SW-500.1, Revision No. 6 - Effective July 1, 2018, Encouraged FSBs to provide durable food serviceware or compostable products whenever possible. Single-use straws and utensils now only are only offered as compostable products and food service businesses are encouraged only to provide single-use compostables upon customer request or via self-service dispensers.

III. System Models

There are many opportunities to replace single-use foodware items, including for FSB to-go and dine-in service, on university or work campuses, and at sporting stadiums. Our review is focused on reuse systems that include third-party reuse businesses, can serve multiple FSBs, and include to-go food packaging. These systems are modeled after others such as libraries, bike-share programs, membership clubs, and grocery delivery services. In Chapter 4 we outline specific components of reuse systems and an expanded list of reuse pilots and systems can be found in Appendix A.

Reuse System Incentive/Payment Models

System models are tailored to the local landscape as well as the venue where a reuse model is being implemented. Closed systems like stadiums, theaters, festival events, corporate campuses, and universities have more control to offer centralized services. Dispersed business centers and neighborhood systems will require increased logistics for the shipment and collection of reusables (Closed Loop Partners, 2020).

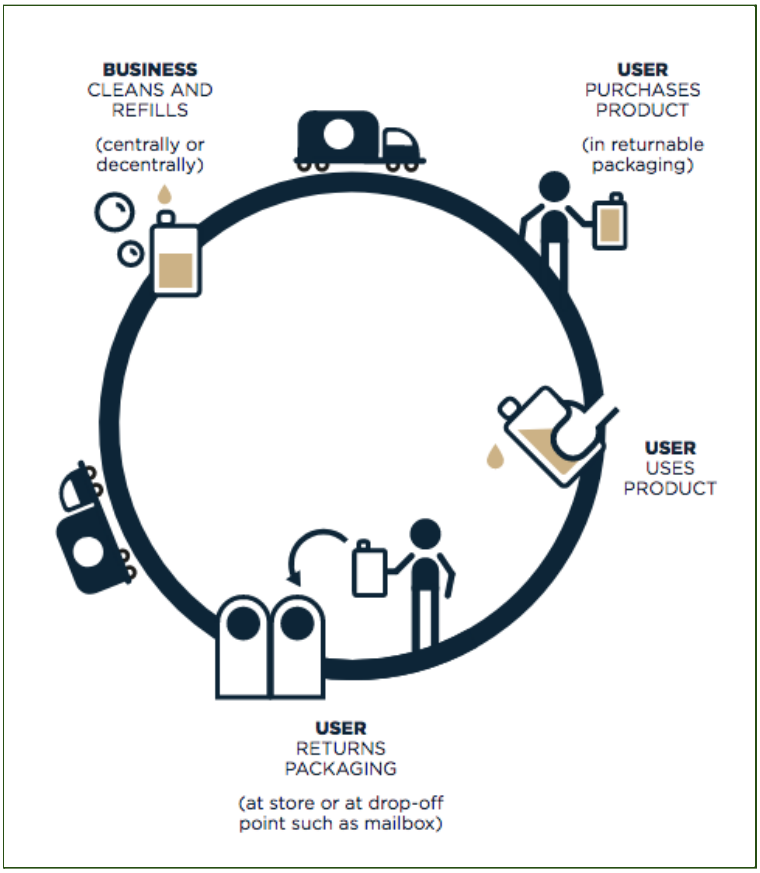

Image 3: Return on the Go, MacArthur Foundation

The Ellen MacArthur Foundation categorizes reuse systems into four categories: refill at home, return from home, refill on the go and return on the go (Reuse - Rethinking Packaging, 2019). Of these, return on the go systems is most common among the businesses offering reusable packaging for food service businesses. Reuse businesses such as Go Box use a smartphone application to list participating FSBs and return kiosk locations. Reuse businesses can coordinate with partnering locations and City governments to establish drop-off locations that meet equity needs and the reuse business's logistical requirements for easy pick-ups.

Within the category of 'reuse on the go' many different models exist to pay for the system and incentivize users to return products. Four main model types are outlined below: lending model, deposit return scheme, subscription model, and fee-based model. An example of each system model is evaluated in Chapter 4 using criteria of cost, equity, accessibility, environmental impact, scalability, and health and safety.

1.) Lending Model

The lending model allows customers to check out reusable food ware with no cost to the customer at the point of sale. Like a library, this model instead issues a fee or fine if the product is not returned within a predetermined length of time. Customers will sign up for the service and check out items using an account tied to banking information that can be charged if the customer

fails to return the items. Vessel Works is an example of a reuse business that uses this model. FSBs pay $0.25 per cup use and no charge to the customer. The Vessel Works system is enabled by a smartphone application and users are allowed to retain reusable containers for 5 days. Those who do not return containers are charged $15 per cup and $2 per lid (*Vessel Works FAQ*, 2021).

2.) Deposit Return Scheme

Much like a bike share, a deposit return scheme (DRS) requires the customer to place a deposit on the reusable item. In a closed system, such as a college campus, a token can be used to signal the deposit made, and payment is refunded once the token is returned (Harvard University, 2013). For more dispersed DRS systems, deposits can be refunded at return locations or through a smartphone application once the item return is confirmed.

3.) Subscription Model

A subscription model includes a minimal fee or membership fee paid by the FSB or customer to run the reuse system. Customers pay a subscription fee to lease out a specified number of containers and return them to a drop-off location. The customer has access to a specified number of containers and obtaining extra containers costs additional fees. An example of this is Go Box, based in Portland, Oregon. Customers choose a monthly or annual subscription to have access to a set number of reusable items for use at many participating restaurants and cafes.

4.) Fee-Based Model

Dispatch Goods, a San Francisco-based reuse business, partners with restaurants and cafes to provide to-go food in reusable packaging that costs the customer $1.99 per reusable item. Customers return items to centralized collection bins or schedule a pickup from their homes.

Hybrid Models and Return from Home

There are some systems that use elements from multiple models. London Dabbawala meal delivery service in London, UK delivers meals in metal tiffin containers that are returned, washed, and reused. Customers pay a subscription fee for a certain number of meals, they then pay a deposit for the containers which they receive back once the container is returned (London Dabbawala, 2021).

The London Dabbawala service providers deliver and pick up reusables from customers' homes. This feature represents a further step toward customer convenience that is not typical in most food packaging reuse systems in the U.S. In a recent pilot of reusable cups at Starbucks, a Return Deposit Scheme was the primary mechanism to incentivize return. This pilot also included a partnership with Ridwell, a subscription-based recycling and reusables collection service. Ridwell subscribers could return cups using this subscription-based collection service (Ridwell, 2021).

IV. Criteria for Evaluation

To evaluate types of reuse systems, we conducted a literature review to understand the background, context, and metrics for equity and accessibility, cost, environmental impact, health and safety, and scalability. Findings from this literature review contributed to our criteria definitions found in Chapter 4.

EVALUATION CRITERIA KEY FINDINGS

Equity and Accessibility

- Not all waste reduction policies have adequately considered individuals with disabilities and subsequently have negatively affected these individuals' health, safety, and inclusion in public life
- FSBs face barriers that include cost and availability of compliant packaging, which can be exacerbated by language barriers or other factors

Costs

- Reuse organizations characterize their systems as having higher upfront costs that become cost-savings over time
- Costs are determined by a number of factors and can vary by the number of reuses, the initial cost of the stock of food service ware, cost of transportation and washing service, cost of a circular inventory management system
- Extended Producer Responsibility (EPR) is an environmental management approach is a potential sustainable funding source for reuse system that shifts end of life management for products and packaging to the producers and consumers of those materials
- EPR legislation has not yet been enacted for packaging at the city level in the United States, however, many states have had packaging EPR proposed in recent legislative sessions
- Washington legislation HB1118 includes targets for 90% of plastic and other packaging materials to be recycled or reused by 2040 with the intent that these materials are managed using EPR schemes

Environmental Impact

- Most of a product's impact comes from sourcing the raw materials to produce the foodware
- The more recycled content a reusable item the lower the manufacturing impacts are
- Life cycle assessments (LCAs) works well for comparing different types of emissions across a product's lifetime for their potential to warm the planet
- There is no standardized amount of times a product must be reused to be labeled a "reusable" product

- Transportation is a key component of assessing a material's environmental impact, it is measured by how far a product travels from sourcing materials, the use period of the product, and to the disposal site
- Waste diversion is generally a faster metric for businesses and municipalities to calculate compared to doing an LCA of products

Health & Safety

- The Washington State Retail Food Code states that any reused utensils must be cleaned with a three-compartment sink or commercial dishwasher before being used again

Scalability

- For a reuse pilot to grow into a full-scale system, reusable items and system logistics must be standardized; some key components of scalability found in our research are transferability, marketability of packaging, and creating open-source systems

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Equity and Accessibility

There are many facets of equity in waste reduction programs, including considerations of who is disproportionately producing and affected by waste, who has access to and bears the burden of paying for zero waste solutions, and who is included in designing and implementing solutions. Internationally, more developed countries use a disproportionate amount of resources and energy, while less developed countries suffer disproportionately negative externalities (Rice, 2007). Around the world, plastic pollution has a disproportionate impact on low-income communities and communities of color (Mohai et al., 2009).

SPU is moving toward zero waste and circularity to guide their programs, and some scholars have suggested that circular economies[2] should be guided by Sustainable Development's conceptions of equity, including "human rights and social justice" and "intra-generational equity." They assert that equity should be considered both between the global North and South, and between the current and future generations (Millar et al., 2019). These conceptions of equity are related to SPU's motivation and reasoning for achieving zero waste goals. The following conceptions of equity relate to the direct outcomes of SPU's policies and programs.

Not all plastic bans have considered individuals with disabilities in the planning stages, and subsequently negatively affected these individuals' health, safety, and inclusion in public life (Caverly, 2019). Previous SPU Capstone reports have found that 72% of Seattle FSBs did not have bendable straws available for customers with disabilities (Carros et al., 2020). Additionally,

[2]A circular economy is an economic system aiming for the continual use of resources and thus elimination of waste.

FSBs face barriers that include cost and availability of compliant packaging, which can be exacerbated by language barriers or other factors (Evans et al., 2017, Ballinger et al., 2019).

To guide its equity work, SPU has a Racial Equity Toolkit as well as many utility-wide initiatives. The Environmental Justice and Service Equity (EJSE) Division of SPU works to implement the City of Seattle's Race and Social Justice Initiative. EJSE also uses Seattle's Office of Planning & Community Development's "Equitable Development Monitoring Program" which uses community indicators to guide equitable development (OPCD, 2020). Previous SPU Capstones recommended that EJSE should be consulted before implementing recommendations (Cao et al., 2018).

In 2020, SPU Commercial Recycling & Composting initiated SPU's Race and Social Justice Toolkit to analyze how the program can begin enforcing the food packaging ordinance while centering race and social justice. The resulting recommendations used the framework of Targeted Universalism and centered on disaggregating program data by type of restaurant (sit-down, quick serve, food truck, cafe, etc), type of FSB ownership (corporate, independent, franchise), FSB geographical location, FSB owner race/ethnicity and FSB owner language spoken. See Appendix C for additional resources on Targeted Universalism and how it is being implemented in SPU's programs.

Conducting thorough stakeholder engagement is a central part of equitable programs. Seattle's Executive Order 2016-06 mandates "equitable outreach and engagement practices that affirm the City's commitment to inclusive participation" for all City departments (Executive Order 2016-06, 2016). Previous SPU Capstone reports have identified stakeholder engagement that includes FSB owners, operators, and staff, as well as community members, as a vital component of single-use packaging reduction (Carros et al., 2020). Other important stakeholders include single-use packaging manufacturers, disability advocates, environmental NGOs, zero waste organizations, Business Improvement Associations, SPU staff, City Council, and reuse business owners.

Factors Impacting Costs

There are many ways to organize the costs associated with switching from disposable products to reusable food service ware, and many companies working in the field have developed different cost structures. There are major limitations to estimating costs for reuse systems for retail food service, chiefly that such systems are highly individualized, and emerging companies have little public information available. Thus, it is difficult to estimate generalized costs of such systems.

For food serviceware reuse systems, costs to food service businesses and their customers are the most concrete. Food service businesses pay for packaging products, and customers pay for them

when they make a food purchase. The costs incurred by reuse businesses are related to inventory tracking, collection, washing, delivery and manufacture or procurement of new durable goods. Costs to municipalities include those for grants, public education, and technical assistance to FSBs and reuse businesses.

The main goal for reuse businesses is to create a cost effective product and service that is equal in cost or less expensive than single-use alternatives. In many localities supporting reuse pilots, ordinances place additional fees on single-use disposable products that help to level the cost difference with compostable or reusable products to customers. Reuse organizations often characterize these systems as having higher upfront costs that become cost-savings over time (Powell, 2015).

In the City of Seattle, Food Service Businesses compliant with current ordinances are offering compostable or recyclable food service ware. In general, compostable products are more expensive than landfill-disposed products (*Polystyrene Food Service Ware in Los Angeles County*, 2018).

For reusable products and systems, costs are determined by a number of factors and can vary by the number of reuses, the initial cost of the stock of food service ware, cost of transportation and washing service, cost of circular inventory management system. Some reuse businesses offer cost calculators to help food service business owners calculate cost savings[3].

Costs for disposable food service ware include many of the same costs related to transportation, inventory management, production cost per item. Costs associated with disposal or end-of-life management are often overlooked as externalities for disposable products. However, the associated costs for SPU solid waste management including litter mitigation, though difficult to calculate for individual products, constitute a central expense for which there is no direct ratepayer revenue stream.

Extended Producer Responsibility

Extended Producer Responsibility (EPR) is a potential sustainable funding source for reuse systems. EPR refers to an environmental management approach through legislation that shifts end of life management for products and packaging to the producers and consumers of those materials. This requires companies to internalize the costs and processes associated with managing these materials, alongside existing costs to develop, manufacture, transport and market these products (Giroux Environmental Consulting, 2014).

EPR legislation can also require that producers finance the infrastructure needed to manage the products and materials they produce, especially as it is needed to meet environmental goals such as recycling and reuse targets. This approach can help fund reuse and recycling programs, and

[3]This is an example of a simple cost calculator by Usefull: https://www.usefull.us/caferestaurant

lead to efficiencies from innovative product design that ease challenges associated with end of life for these materials. This type of legislation has not yet been enacted for packaging at the city level in the United States, however, many states have had packaging EPR proposed in recent legislative sessions, including Washington state.

In 2016, 25 of 28 the European Union Member states had voluntarily set up packaging EPR schemes for household waste (as opposed to waste from businesses), and the Canada-wide Action Plan for Extended Producer Responsibility is a key part of Canada's national waste diversion plan (EXPRA, 2016; Giroux Environmental Consulting, 2014).

In the United States, EPR schemes have been legislated in many states to handle a variety of materials including paint, pharmaceuticals, electronics and batteries, and medical sharps (i.e. needles) (Northwest Product Stewardship Council, 2021). EPR legislation for packaging has been introduced in several states, including in Washington (SB5022 and HB1118).

The Washington legislation HB1118 included targets for 90% of plastic and other packaging materials to be recycled or reused by 2040 with the intent that these materials are managed using EPR schemes. The Bill further acknowledged that applying EPR schemes to all recycled materials would lead to greater efficiencies through "greater economies of scale and operational efficiencies than could be achieved under a policy applied only to a subset of materials collected through that system." Unfortunately, HB1118 did not pass during the 2020-2021 legislative session.

SB5022 was passed by the Washington legislature and was signed into law on May 17th, 2021. This bill includes requirements for post-consumer recycled content for plastic beverage containers, trash bags, and household cleaning and personal care product containers. Importantly, SB5022 lays the groundwork for future EPR legislation by requiring beverage producers to register with the State, report on materials content of their products, and requires producers of packaging and paper products to pay for recycled content (Northwest Product Stewardship Council, SB 5022, 2021). This is a step towards internalizing costs to producers for recycling and end-of-life material management that have traditionally been paid by the public.

There are many specific designs that can be integrated into EPR to generate cost efficiencies and generate revenue for reuse systems. However, Extended Producer Responsibility is likely out of reach for SPU or the City of Seattle to enact through a local ordinance. EPR would likely need to be enacted at the state level with funding allocated to local recycling and reuse programs. Such an arrangement would shift costs related to packaging disposal and litter management from municipalities and ratepayers to producers and consumers of single-use products. In theory, this would allow producers to find increased efficiencies and reduce the overall costs related to end-of-life management. This means that the overall costs associated with material end-of-life management are likely to decrease when shifted from the public sector to materials producers.

This dynamic is the subject of debate, and more research is needed to define the economic outcomes of this strategy, especially in U.S. markets.

Environmental Impact of Materials Choices

Many different materials are used to manufacture reusable food packaging that vary in cost, durability, reusability, and consumer experience. Materials also vary by how they are treated at the end of their useful life and the resulting full life-cycle environmental impact. To understand how to assess a reusable item's environmental impact, this report conducted a review of research on life-cycle analyses, focusing on components of material choices, manufacturing, number of uses, and transportation in reuse systems.

Material

A product's environmental impact is dependent on the material, recycled content, local recycling markets, and the number of reuses of the foodware item (Closed Loop Partners, 2020). Most of a product's impact comes from sourcing the raw materials to produce the foodware. Durable foodware items that contain more recycled content have a smaller environmental impact than durable foodware with virgin feedstock (Vendries et al., 2018). Washington State's HB5022[4], recently signed into law by Governor Inslee, will substantially reduce the environmental impact of some plastics by requiring minimum levels of recycled content in certain plastic packaging products. There are typically four material choices of reusable foodware to choose from: metal, glass, plastic, and ceramic.

Manufacturing

Sourcing of materials and creation of products from virgin feedstock typically produces the largest portion of a product's environmental impact in its lifetime (Vendries et al., 2018). Metal foodware is endlessly recyclable and durable, but expensive to source and energy-intensive during initial production and recycling of the material. The more recycled content a reusable item has lowers the manufacturing impacts (Reloop & Zero Waste Europe, 2020). Plastic is relatively durable, fairly reusable, cheap, and moderately recyclable. However, most plastics are petroleum-based, dependent upon fossil fuels for production. This creates higher emissions, and causes long term land and water impacts once the plastic is disposed of. An increasing number of plastics may contain material from plants, which have lower emissions compared to petroleum-based plastics, but similar land and water impacts. Ceramics are relatively expensive, not recyclable, but preferred for in-house dining due to customer preference. Lastly, bottle glass[5] is moderately expensive but endlessly recyclable (though not highly recycled nationally), and

[4] Washington States House Bill 5022 concerning the management of certain materials to support recycling and waste and litter reduction can be found here.

[5] Bottle and jar glass is endlessly recyclable because this type of glass has a consistent melting point. Drinkware glass is usually made from borosilicate and is not highly recyclable. This is because its melting point can vary, which allows it to handle hot and cold temperatures more effectively than bottle or jar glass.

somewhat fragile (See Image 1). Trade-offs exist between each material that depend upon the factors stated in this section plus the context of use - take-away, dine-in, or events.

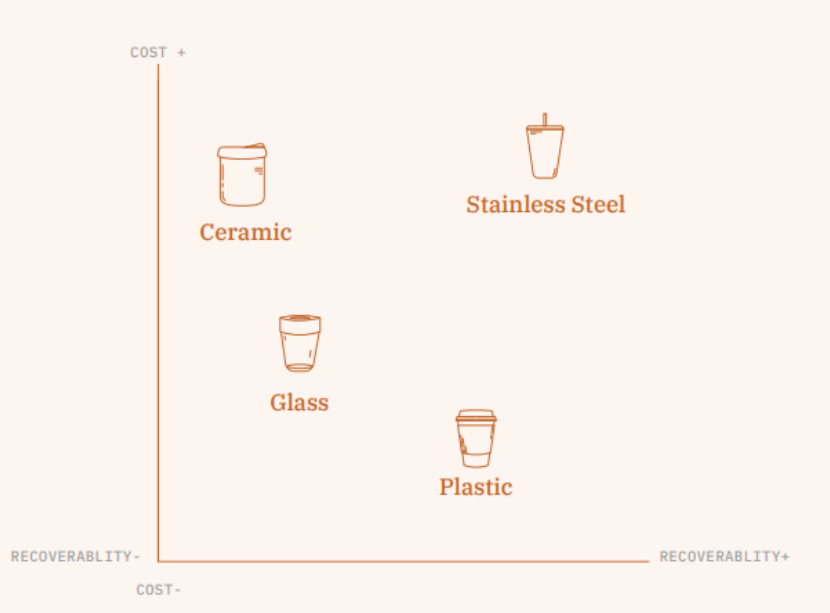

Image 4. Closed Loop Partners

Life Cycle of Materials

Life cycle assessments (LCAs) include all aspects of producing and using reuse containers, from resource extraction to end-of-life management. This is a way to quantify the true cost of a product across its complete life, sourcing to disposal. Typically, the main unit measure that is focused on is carbon dioxide (CO_2) equivalent emission. This works well for comparing different types of emissions across a product's lifetime for their potential to warm the planet. Often this is referred to as Global Warming Potential (GWP).

LCAs often include other impacts that are difficult to quantify as simply as CO_2 equivalents. These can include eutrophication, human toxicity, land use, and water consumption (Vendries et al., 2018). There are numerous models that allow organizations to attempt to quantify the impact of different policies or materials. One example is the EPA's Waste Reduction Model (WARM), that quantifies the impact of a material using numerous metrics.

However, there are limits for what current LCAs account for. LCAs usually do not measure impacts such as littering (Reloop & Zero Waste Europe, 2020). Often, LCAs treat the end of life of an item as going to a landfill, incinerator, or composter. A blindspot towards litter impacts is important to note here because food packaging, like single-use cups, are one of the most littered items globally. These materials can impact water quality and animal life in ways typically not accounted for in these assessments. Furthermore, another limitation of LCAs, noted by Reloop and Zero Waste Europe (2020), is measuring waste generation in total. Assessments usually

quantify the impacts of a single item over its life to compare to another similar item. This disregards the total amount of a particular item being produced compared to another. This may unintentionally place greater focus on items that have lower impacts versus items that are more economically feasible. If these items cannot be widely adopted, their total impact reduction on the environment may be limited.

Number of Uses

There is no standardized amount of times a product must be reused to be labeled a "reusable" product. This number has a large range within the reusable market, with products ranging from two to a thousand uses needed before reaching its breakeven point with a similar single-use item. A breakeven point can be defined as the point in which the environmental impact of a reusable product matches the environmental impact of a comparable single-use product in total impact or in a specific impact category. The Ellen MacArthur Foundation (New Plastics Economy Global Commitment: Definitions, 2020) defines reuse of packaging as an:

> *Operation by which packaging is refilled or used for the same purpose for which it was conceived, with or without the support of auxiliary products[6] present on the market, enabling the packaging to be refilled.*

Establishing a breakeven point is challenging because there are a wide variety of material choices and different product thicknesses. Additionally, the distance a material travels can dramatically alter a product's breakeven point.

A reuse business typically establishes what the expected number of reuses per container or cup is. This may or may not be tied to the true number of reuses necessary for the product to have a lower environmental impact than a competing item. Furthermore, a reusable product has a certain number of reuses before it starts to deteriorate. These factors all contribute to a business or system's definition of reuse.

Transportation

This is a key component of assessing a material's environmental impact. It is even more critical when assessing the environmental impact of products in a reuse system. Transportation in most LCAs is measured by how far a product travels from sourcing materials, the use-period of the product, and to the disposal site. Within a reuse system, there are additional transportation considerations within the use-period of a product. Every cycle of reuse includes transportation for collection and redistribution.

[6] From *New Plastics Economy Global Commitment: Definitions*: An auxiliary product is a product used to support the refilling/loading of reusable packaging. (...) An example of an auxiliary product is a detergent pouch used to refill a reusable container at home (ISO 18603). As per ISO 18603, auxiliary products that are one-way products (i.e. designed to be used once) are not considered reusable packaging.

Because this transportation is present in each cycle, there is a diminishing return regarding the reduction of a reuse product's CO_2 equivalent impact (Reloop & Zero Waste Europe, 2020). The first several cycles of a reuse product see dramatic decline in its impact as the effects of sourcing and manufacturing are spread over each use (See Image 2). Eventually, this levels off due to transportation for collection and redistribution, and water usage for sanitation being present each cycle. Additionally, the type of transportation used for collection affects a reuse product's LCA. Using fossil-fuel vehicles, electric[7] vehicles, or bicycles (electric or human-powered) should also be considered.

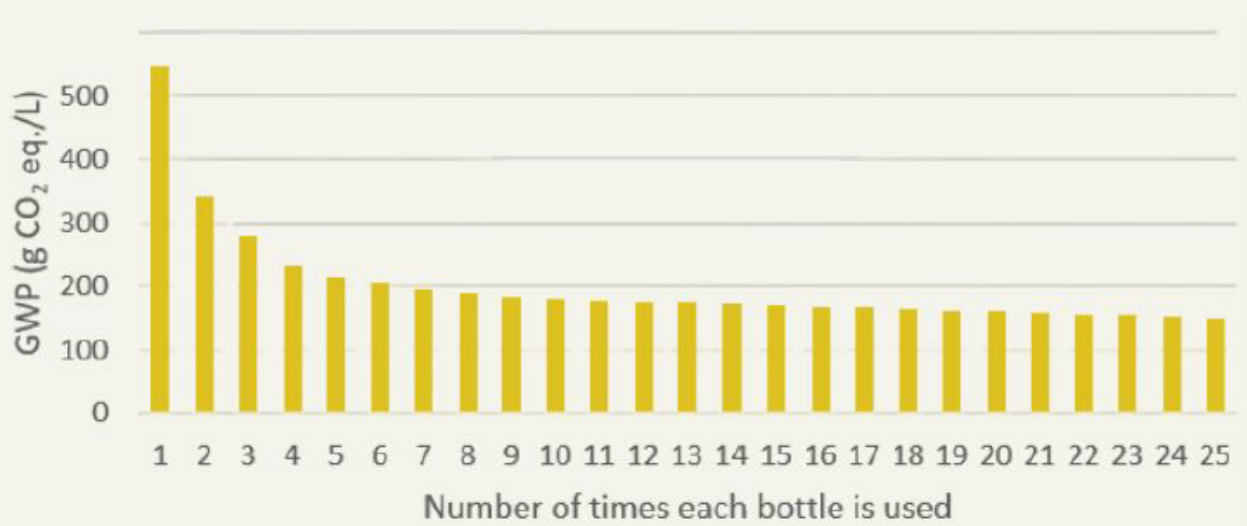

Image 5. Reloop & Zero Waste Europe

Waste Diversion

An environmental impact metric municipalities and reuse businesses also use is waste diverted from a landfill or incineration. This can be similar in most instances to waste prevention. Currently, SPU[8] defines waste prevention as "the practice of minimizing waste through responsible purchasing and consumerism. Essentially, removing waste from the waste stream by not creating it in the first place" (2019 Annual Waste Prevention & Recycling Report, 2020). Diversion rates can be defined by weight diverted or number of single-use products diverted. The diversion number depends upon the number of reuses a group expects from a reusable item. For example if a reusable container averages 25 reuses before it is decommissioned, a business can generally assume it diverted 25 single-use containers from being disposed of.

[7] An LCA can also go further by assessing what fuel source generates the power for electric vehicles or electric bicycles.

[8] SPU's recycling rate is a weight-based metric comparing the percentage of recyclable and compostable material diverted from the landfill, incorporating reuse data when appropriate (2019 Annual Waste Prevention & Recycling Report, 2020).

This is generally a faster metric for businesses and municipalities to calculate compared to doing an LCA of products. The data is easier to collect because it is less time-consuming and burdensome for all parties. Cascadia Consulting conducted a composition study of Seattle's commercial solid waste on behalf of SPU in 2016. Cascadia divided material from the commercial waste substream and measured different categories of waste by weight (Commercial Waste Stream Composition Study, 2017). They found that single-use food service plastics accounted for 543 lbs out of 17,858 lbs of plastic waste in the study. Overall, plastic waste accounted for 14.6% of commercial solid waste by weight. This can be an easier metric to communicate to the public than an LCA because it depends upon fewer inputs to measure the impact.

There are limitations to the waste diversion metric. It helps give context to the land impacts of single-use products vs reusable products but it does not help compare emissions or other resource uses such as water. Furthermore, waste diversion by weight treats products made of different materials equally, when they may have widely different impacts after incorporating other factors like production and transportation (SPU Measurement Symposium Summary Report, 2018). This is why supplementing waste diversion metrics with LCA research is important to truly understand the environmental benefits of a reuse system.

Health and Safety

Very few health and safety guidelines have yet to be updated for reuse systems since most cities and multi-business programs are still in their pilot phases. However, many food establishments already provide reusable items in the form of utensils, plates, bowls, and cups for in-dining services. Guidelines for the sanitation of reusable to-go containers would be similar to these items. Washing either requires commercial dishwashing or a three-sink method of manually washing (see below) (U.S Public Health Service, 2013).

The Washington State Retail Food Code states that any reused utensils must be cleaned with a three-compartment sink or commercial dishwasher before being used again for preparations or given to customers. The FDA Food Code of 2017 specifies that containers and utensils must be durable in terms of thickness and weight to withstand repeated washings, especially because sanitation guidelines among different cities call for water temperature anywhere from 179-252℉ for proper heat sanitizing (NYC Health, 2021).

Three-Sink Method:

1. *Wash* - Washing includes a mixture of water and either soap, detergent, degreaser, acid/alkaline cleaner, or another type of abrasive cleaner. A thermometer is required to maintain a steady temperature between 95-120 degrees Fahrenheit.

2. *Rinse* - Rinsing temperature varies by local health codes but usually is a minimum of 120 degrees Fahrenheit (Seattle is 110 degrees Fahrenheit). (WA State Retail Code)

3. *Sanitize* - Sanitizing can be accomplished through two methods: chemical and hot water. Chemical entails using an EPA-approved water sanitizer that contains a chlorine solution. Hot water requires a sanitizing sink heater in order to maintain the requirement of 171 degrees Fahrenheit or warmer.

Concentration Range (MG/L)	Minimum Temperature pH 10 or less °C (°F)	Minimum Temperature pH 8 or less °C (°F)
25 – 49	49 (120)	49 (120)
50 – 99	38 (100)	24 (75)
100	13 (55)	13 (55)

Image 6: WA State Retail Code

Another important factor for health and safety, widely regarded as a main concern of NGOs, is material degradation. (Ali Chamas, et. al.) When using hard plastic containers in a reuse system, there is concern that the material will leach into the contents of the container after a certain amount of reuses. Degradation for plastics can be classified into two categories: physical and chemical. Physical refers to changes in the structure of the container, such as breaking, cracking and flaking. Chemical refers to the molecular level, which is not seen, and has negative long term health effects. Both classifications can be accelerated by extreme temperatures and mishandling, which are both highly possible if collection bins are left outdoors and if customers hold onto containers for prolonged periods of time.

Scalability

Reuse systems are in pilot phases in many localities around the country. For a reuse pilot to grow into a full scale system, reusable items and system logistics must be standardized. This can mean a system is designed to handle several different reuse business products or the products are standardized from each business with each other to allow for easy transferability. A few key components of scalability found in our research are transferability, marketability of packaging, and creating open source systems.

Transferability: Reusable foodware containers come in a variety of shapes and sizes and may need to be standardized to transfer between independent systems. Independent reuse businesses currently have their own set of container or cup designs that attempt to appeal to a wide range of FSBs. Technology used for tracking containers or cups is typically through proprietary smartphone applications so reuse businesses cannot easily share logistics systems. Standardized packaging and processes also enable multiple reuse businesses to share centralized washing

facilities. This further highlights the need for standardization with data collection and sharing. If reuse businesses are going to work under a broader system, certain data needs to be shared within that system in order for reverse logistics to work.

Marketability of Packaging: The importance of brand image is generally important to FSBs. Small FSBs, especially those who operate in a single storefront, may not be as concerned with branding as their customer base is more localized. However, large FSB chains that span the country prioritize recognizable brand marketing. These larger FSBs have greater resources to create proprietary reuse systems to maintain control over branding.

Proprietary versus Open Source System: A proprietary system is one in which the system design and technology is owned and operated by a business providing reuse services. Proprietary systems are specific to a FSB chain or a reuse system that does not integrate with others.

An open source system is one in which many FSBs or reuse businesses can operate with either compatible products or compatible processes within a single system. In this design, competitors offer compatible, interchangeable products or the system has been designed to handle numerous independent products for collection, cleaning, and redistribution.

V. Marketing and Consumer Behavior

According to the Center for Disease Control, social marketing is an effective systemic tool in prompting voluntary behavior change through framed messaging. The social marketing approach contains five major elements for sustainable success: 1.) a program management process, 2.) designed to influence human behavior on a large scale, 3.) by creating benefits and reducing barriers that matter to specific audiences, 4.) through consumer oriented decision making, 5.) leading to increased societal benefits (Smith, 2006).

Simplifying the process of switching to a reuse system for FSBs and consumers requires an emphasis on understanding consumer behavior for large scale intervention, which is centered on making the message relatable, desirable, contextual and easy (Phipps, 2020). Studies have found that "customers are more likely to choose a reusable (vs. disposable) takeaway box when they observed others using or choosing a reusable takeaway box," indicating that social modeling[9] has a larger impact than normative messaging (Dorn, 2018). Social modeling requires attention, retention, reproduction and motivation in order to succeed, which can be accomplished through targeted marketing and outreach efforts.

[9] Social modeling, also termed social learning, is a theory developed by Albert Bandura that states we can learn behavior by observing the actions of others.

Social marketing uses an 'intervention mix,' which targets multiple areas of influence. Interventions of any kind have been shown to be effective in changing behavior of those with higher levels of uncertainty for new systems, and further strengthening behavior change among consumers more receptive to a new reuse system (Novoradovskaya, et al., 2021). The Nudge Theory promotes behavior change by introducing changes through 'nudges' to persuade people to make certain decisions. This is accomplished by decreasing the mental barrier of uncertainty for changing known systems through the encouragement of smaller scale decisions and laying out simple groundwork for future decisions. Key propositions in the Nudge Theory are: tap into consumer motivations, understand the consumer landscape, power of simplicity, no one size fits all, and think long-term (Ledsham).

Using behavioral economics when communicating with FSBs will help reassure the benefits of the new system from an economical standpoint. Literature suggests that companies demonstrating greater alignment with sustainable initiatives receive more favorable evaluations by consumers (Choi & Ng, 2011). Also, providing a break-even calculation, that showcases ultimately a decrease in cost to FSBs, may provide comfort for the potential financial burden of changing established systems. Reducing mental barriers for FSBs and consumers will create an easier transition and reduced pushback for a reusable foodware pilot and future scaled system.

VI. Contracting and Management for Innovative Programs

Seattle Public Utilities may bring a novel reuse program to the city using contracting and/or public private partnership. While many small reusable food service ware programs exist, there are few examples that are supported by local municipalities through contracting. We could find no examples in which competing reuse businesses interact with the same system or platform to provide the same service. Open innovation is a collaborative work style in which members of a value chain work in an open, collaborative setting to create innovative programs. Literature on this framework may be helpful to achieve an inclusive reuse system.[10]

Recent studies in both contracting and open innovation indicate that relationship-centric project management yields lower failure rate of federal contracts and greater financial performance of innovative products (Brunjes, 2019; Cheng 2021). SPU will be in a position to manage collaborative relationships to help a reuse pilot or system succeed. Additionally, circular public procurement requires increased transparency and communication between public and private sectors to create innovative solutions (Jones et al., 2017). These findings suggest utilizing a collaborative approach to supporting innovation in the reuse market.

Public-private partnerships play a key role in reuse system development. In these partnerships, organizational design can increase the likelihood of success. In particular, cross-functional teams

[10] From Interview 6 with Reuse Logistics Business

between public and private institutions are shown to work best under the supervision of a specially trained manager, in which the scope of the project duties are well-defined, and that risks and resources are balanced and shared among partner stakeholders. (Petković, 2015).

VII. Pilot Programs

Pilots are used in the private and public sectors to test new programs before committing to wide scale adoption. Governments can run independent pilots to test public service programs or partner with private businesses to give support for pilots that will provide public benefit. In public-private partnerships, governments help private businesses mitigate risk while they develop innovative programs (Taylor et al., 2012). Successful pilot design requires cost estimates for the pilot and scaled-up system, outcome criteria to evaluate success, and sufficient time and sample size to draw conclusions (Nordstrom, 2017). A pilot to support reuse innovation fits with SPU's focus on outreach and education to increase environmentally friendly behavior (Cato et al., 2018). Pilot programs have an inherent risk of failure, and therefore evaluation methods must be carefully determined (Taylor, et al., 2012).

As an example within the City of Seattle, the Seattle Department of Transportation's (SDOT) Scooter Share Pilot design process consisted of three phases that heavily incorporated research from other localities, stakeholder engagement, and collecting public feedback. Stakeholder and resident priorities were incorporated into the pilot goals and evaluation metrics. The resulting pilot design prioritizes equity, safety, and maintaining access to public spaces. We discuss this pilot further in our findings (Chapter 4) and recommendations (Chapter 5) (Davis, 2019).

Image 7. SDOT Scooter Share Pilot Process

CHAPTER 3: RESEARCH DESIGN AND METHODS

The research design and methods are divided into two parts. First, we pose the main research questions and explain the methods we chose for our process. Second, we explain the limitations of the report that were due to unforeseen health circumstances and time constraints of the project in general.

I. Research Design & Methods

Our first research question was outlined in Chapter 2 and was answered using a literature review and qualitative data from interviews. Our second research question is:

Given SPU's current budget and resources, how can SPU pilot a reuse system to demonstrate the feasibility for a single-use food packaging reduction ordinance?

And sub-question:

How should SPU support the startup, scaling, and ongoing operations of reuse businesses in Seattle?

To answer these questions, we conducted a systematic review of journals, research, and case studies for quantitative and qualitative data for reuse and refill pilot design. We also collected original qualitative research from interviews with reuse business owners, municipal leaders, and non-profit leaders to gather information on reuse/refill businesses, pilots, and systems.

From research and interviews, we identified the essential components of reuse systems, common types of reuse pilots, and criteria to evaluate pilots for success. We also collected data on the municipal ordinance process, and municipal development of technical assistance for reuse/refill systems.

We utilized a semi-structured interview approach to collect nuanced insights into complex systems and used snowball sampling to identify subsequent interview subjects. This method elicited key insights that may be missing from other research methods, including proprietary business information not available publicly, possible backlash from single-use packaging manufacturers, and innovative pilots without public results or reports. It also enabled us to build on findings from research and adapt them to Seattle's needs and considerations.

Interview Protocol

We conducted 15 interviews: four with reuse business owners, six with municipal leaders, two with zero waste NGOs, and two with environmental justice leaders. To create consistency among interviews, we used an interview protocol (see Appendix B). Our interviews consisted of 10-20 questions and lasted approximately one hour each. We began by interviewing contacts provided by our client and asked each subsequent interviewee to identify important contacts to speak with. We requested permission from each interviewee to record the interview. Following each interview, we analyzed themes and opportunities for further research.

Examples of questions asked to interviewees include:

- What would a successful city-sponsored multi-business reuse pilot look like in Seattle?
- What role should SPU play to support this type of pilot?
- How can reuse programs be accessible to individuals with disabilities?
- What support do Food Service Businesses need when transitioning to reusable packaging?

II. Limitations

The main limitation of our research design is the exclusion of FSB owner feedback. Many FSBs are struggling due to the economic downturn from the COVID-19 pandemic. We were encouraged by our client to omit an FSB survey due to the burden this would place on FSB owners at this time. FSB owners, operators, and staff will shoulder the responsibility of implementing new systems to comply with a reuse/refill pilot or ordinance.

Another limitation to our analysis is the scope. We are primarily focused on independent Food Service Businesses rather than corporate chains, sports stadiums, or school campuses. These other sectors present different challenges and opportunities to eliminate single-use food packaging and require further research and analyses.

CHAPTER 4: FINDINGS AND ANALYSIS

Our findings[11] and analysis are divided into six parts, designed to evaluate new and ongoing reuse systems. First, we break down the major components of a reuse system in order to understand structure and defining characteristics. Second, we aggregate findings from interviews based on common themes from at least two interviewees. Third, we define criteria to evaluate reuse systems including cost, equity, accessibility, environmental impact, scalability, and health and safety. Fourth, we evaluate existing reuse systems with our criteria. Fifth, we outline findings from stakeholder engagement, pilot design, technical assistance design, and other support tools for municipalities. Finally, we outline findings from progressive food packaging ordinances around the country.

I. Overview

The Ellen MacArthur Foundation is a charity that seeks to accelerate the transition into a circular economy. The foundation published a framework to understand reuse models under their New Plastic Economy team, which evaluated 100 initiatives and 50 expert interviews to create a business-to-consumer application. All reuse systems were categorized into four categories: (Reuse-Rethinking Packaging, 2019)

Image 8. Ellen MacArthur Foundation Reuse Models

In each system, the reusable packaging is owned by a different system member and is filled and returned in different ways. Each system has unique benefits and will work best in certain geographic and business sectors. Most reuse systems for food packaging utilize a refill on the go model. The Nextgen Consortium, a global

[11] A Note on Findings: Findings were derived from common themes found in two or more interviews or that comported with research found in the literature review. Findings also include specific details that fall within common themes but were not provided by multiple interviewees. Findings that include information about interviewees own business practices did not require a secondary source.

consortium to address food packaging waste, identified six ways to design successful reuse systems:

1. Engage diverse stakeholders
2. Make sustainable material choices
3. Select the perfect spot
4. Choose the right payment model
5. Optimize health & safety protocols
6. Measure impact and success

To design a successful reuse pilot in Seattle, it is necessary to understand the individual components of a reuse system and how to maximize the benefits of each one. Therefore, our findings next outline the essential components of a reuse system and criteria to evaluate the system.

II. Components of a Reuse System

Within the four types of reuse system outlined above, there are seven system components identified in our research[12]. Reviewing these components individually allows for a systematic analysis of existing reuse systems and also a catalog of options from which to build new systems.

1. **Customer Enrollment**

A customer can sign up to participate in a reuse system through:

- A reuse business smartphone application
- A participating FSB application
- No sign up needed (this option is usually paired with a closed system like a university campus or food court)

2. **Point of Sale: Payment or Deposit**

When a customer is placing a food order, they can select reusable packaging and pay applicable fee, deposit or use a membership credit through:

- The FSB Point of Sale
- Reuse business smartphone application

3. **Point of Handoff: Customer Inventory**

The location at which the customer receives their food order within a reusable container and tracking of the reusable container passes from the FSB to the customer. This occurs through:

- On FSB location

[12] System components adapted from Closed Loop Partners and IDEO's Bringing Reusable Packaging Systems to Life

- Home delivery through FSB
- Home delivery through secondary provider (GrubHub, Uber Eats, DoorDash)

4. **Point of Return**

How a customer returns the reusable product and receives applicable deposit back to their original payment method or membership credit through:

- Kiosk on FSB location
- Kiosk on public location
- Reverse vending machine
- Home pick-up

5. **Washing and Sanitizing**

The system in which reuse containers are cleaned and sanitized for their next use through:

- On FSB location with a three sink method
- On FSB location with a dishwasher
- Permanent commercial dishwashing facility
- Temporary commercial dishwashing facility
- Off-site three-sink method

6. **Pick Up and Delivery**

The collection system (including transportation method) reuse businesses implement to collect used food serviceware and return clean products for reuse from:

- On FSB location
- Kiosk
- Home pick-up

7. **Inventory**

How reusable packaging inventory is managed throughout the system with:

- In-FSB inventory
- Off-site inventory
- Off-site inventory informed by smartphone application user data

III. Key Themes from Stakeholder Interviews

Interviews were conducted with 15 reuse business owners, municipal leaders, and non-profit leaders. We utilized a semi-structured interview approach to collect nuanced insights into complex systems (See Appendix B for Interview Protocol). We analyzed common themes within subgroups of interviews as well as across all interviews.

A major limitation of these interviews is that none were conducted with FSBs. Due to the increased hardship faced by most FSBs because of the COVID-19 Pandemic, it felt inappropriate to engage FSBs at this time. However, understanding the concerns and barriers that FSBs face when attempting to implement a new system is crucial. FSBs need to be constantly engaged when a pilot program is being considered and when a broader system is being implemented.

Reuse Business, Consultant, and Non-Profit Interviews

Below are common themes from interviews conducted with non-governmental representatives. These three groups are focused upon expanding reuse by collaborating with FSBs and governmental agencies. This is done either through attempts to enact legislation that favors reuse or by working with FSBs directly to implement a particular reuse system. These findings were directly expressed by more than one interviewee.

Findings:

- Methods for integrating customers without smartphones, low-income groups, individuals who are less tech-literate, or individuals with data privacy concerns are lacking.
- Reuse systems should maximize convenience to FSBs, who lack extra time and resources to implement new systems on their own.
- Reuse systems can produce cost-savings for FSBs compared to using single-use recyclable and compostable products.
- Reuse businesses need support from local governments in order to scale-up their systems and conduct customer outreach and education.
- Reverse logistics and data collection are essential components of reuse business operations.
- Standardization of packaging and product tracking is in an experimental phase.
    - Many reuse businesses are concerned about increasing market share and not about fitting into a broader system with multiple reuse businesses.
- Beyond being economically feasible, reuse systems must be less environmentally impactful than single-use systems.

City and County Officials' Interviews

Below are findings from interviews conducted with officials from government agencies that are working on reducing single-use foodware and implementing more reusable systems. These findings were expressed by more than one interviewee.

Findings:

- FSBs respond better to incentives rather than punishments through ordinance enforcement.
- Equity concerns are not always incorporated into pilot designs.

    - Care should be taken to identify potential disparate impacts before a pilot or broader system is implemented.
- Public-private partnerships between solid waste utilities and reuse businesses or FSBs are critical for waste reduction efforts.
    - Early collaboration will lead to faster scalability and interoperability of multiple reuse business models under one large system.
- Government agencies should put minimum standards in place for reuse system operations to address equity and environmental concerns.
- Government agencies can greatly benefit reuse business operations through grant funding and access to City facilities or storage and sanitation operations.
- Government agencies must develop incentives and ordinances that encourage participation by FSBs without drastically increasing administrative burdens for businesses.

IV. Stakeholder Engagement

An SPU supported pilot must be aligned with City guidelines for "equitable outreach and engagement practices that affirm the City's commitment to inclusive participation" (Executive Order 2016-06, 2016). SPU's Racial Equity Planning and Analysis tools include templates for Stakeholder Analysis and Inclusive Outreach and Public Engagement (Appendix E). Findings from our interviews emphasize that time spent conducting these processes before pilot design and implementation will increase equitable outcomes and reduce time spent altering the system later on.

Stakeholder and Community Engagement Findings:

- Creating inclusive community and stakeholder engagement requires a significant amount of time[13]
- Community liaisons and business owners should be compensated for their time spent giving input[14]
- Traditional outreach captures a white, college educated, english fluent population; a more flexible outreach strategy is needed to reach BIPOC communities[15]
- Many programs apply a racial equity lens after program design. However if the original design is flawed, the toolkit can't fix that- only restructuring the program can[16]
- Accountability is an important part of community engagement. Program managers should make changes as a result of community input[17]

[13] From Interview 3 with EJSE and Interview 1 with Seattle Public Agency
[14] From Interview 1 with Seattle Public Agency and Interview 2 with Zero Waste Consulting
[15] From Interview 1 with Seattle Public Agency and Interview 3 with EJSE
[16] From Interview 3 with EJSE
[17] From Interview 3 with EJSE

V. Pilot Design

City supported reuse pilots have taken place in Berkeley, California and Palo Alto, California. San Francisco, California has a city sponsored pilot currently on hold. There are many private reuse pilots (an expanded list is in Appendix A). Cities typically partner in reuse pilots to support a single-use food packaging reduction ordinance.[18]

Berkeley, CA
A reusable cup pilot ran in ten pilot sites from 2019-2020 in partnership with the reuse business Vessel and the Ecology Center, a local health and environmental non-profit. The pilot utilized Vessel's system to provide stainless steel cups with silicone lids through local FSBs. Customers could check out cups by scanning a QR code with their smartphone camera and return the cup within five days. If customers did not return the cup within five days, they were charged for the item. Dirty cups were collected and washed with a Vessel bicycle service, sanitized, and delivered back to the FSB[19].

Palo Alto, CA
A reusable cup pilot ran for four weeks in 2020 in partnership with reuse company CupClub and five cafe locations. The City hosted three additional cup return locations. Customers could participate by using the CupClub smartphone application to scan and return reusable cups[20].

San Francisco, CA
A reusable cup pilot is currently on hold in San Francisco.

Pilot Design Findings:

- A City's role in reuse pilots can include hosting return kiosks, making connections between businesses, increasing community and business awareness of pilots, and providing technical assistance and grants [21]
- Multiple types of pilots and locations of pilots can help test different models and user demographics.[22]
- Data collection and evaluation is an integral part of leveraging pilots to inform future programs.[23]
- A trusted community partner or City support helps gain the public's trust and respect for a pilot[24]

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[18] As has happened in Berkely, CA; Palo Alto, CA; Vancouver, BC; Alameda, CA; and Marin County, CA
[19] Announcing Berkeley's first reusable cup program
[20] Help us test the CupClub reusable cup pilot program
[21] City of Palo Alto, City of San Francisco pilots, Berkeley Single Use Foodware and Litter Reduction Ordinance, Bringing NextGen Cups to Market
[22] From Interview 9 with Municipal Leader and Interview 10 with Environmental Justice Leader
[23] From Interview 9 with Municipal Leader, Interview 10 with Environmental Justice Leader
[24] Interview 7 with Reuse Business Owner

- Making funding available can help create a more robust and equitable model and bring in businesses focused on social impact and accessibility[25]
- Funding for pilots can support market development and reduce risk for testing different scenarios.[26]
- Community engagement can occur before the pilot goal setting and design process[27]
- Close relationships between reuse owners and FSB owners make pilots run well[28]
- Reuse businesses can rent space in commissary kitchens for temporary pilots[29]

VI. Technical Assistance Design

SPU can provide guidance to FSBs and reuse businesses to support reuse system development. SPU Commercial Recycling and Composting Program currently provides outreach and education to FSBs to bring them into compliance with city ordinances. These efforts could be expanded to include support for reuse system implementation. Additionally, SPU could provide assistance to reuse businesses that are establishing new programs or scaling up service provision in Seattle.

SPU Support for FSBs:

- Large, corporate FSBs are focused on marketing and packaging performance while small FSBs are focused on packaging cost effectiveness[30]
- Assistance for navigating FSBs through health department regulations will ensure that rules are not unintentionally broken.[47]
- Providing marketing materials and outreach will help transition customer behavior.[31]
- Customer outreach materials can help to form perceptions of reusables as safe.[32]

SPU Support for Reuse Businesses:

- Assistance for navigating city requirements for streetside return kiosks will support reuse businesses.[47]
- Capital availability is the number one support needed for reuse businesses.[33]
- Reuse businesses would appreciate support coordinating with Public Health Departments[34]

[25] Interview 7 with Reuse Business Owner
[26] From Interview 9 with Municipal Leader
[27] SDOT Scooter Share pilot process
[28] From Interview 4 with Zero Waste NGO
[29] From Interview 5 with Reuse Business Owner
[30] From Interview 8 with Reuse Business Owner
[31] From Interview 2 with Zero Waste Consultant and Interview 8 with Reuse Business Owner
[32] From Interview 9 with Municipal Leader
[33] From Interview 7 with Reuse Business Owner
[34] From Interview 7 with Reuse Business Owner

- Public support from trusted environmental leaders in a region with operations, helps to offer legitimacy to a new reuse operation.[35]
- Marketing and promotion can be difficult for startup companies earning thin margins in the pilot stage. Offering generalized promotion for reuse systems in FSBs can attract consumers.[36]

VII. Other Support Tools

Municipalities are using a variety of tools to support reuse pilots and systems. From our research and interviews local and state governments are using:

1. Waste Prevention/Reuse Grants
    a. Massachusetts Department of Environmental Protection awarded Reuse grants to Usefull and Portico Brewing[37]
    b. Hennepin, Minnesota awarded a Waste Prevention grant to Foreverware[38]
    c. Alameda County Stop Waste Reuse & Repair Grants[39]
2. Reusable cup giveaways
    a. San Francisco, CA purchased reusable cups and gave them away to select FSBs[40]
3. Request For Information (RFI)
    a. The City of Victoria is legally barred from giving financial support directly to businesses. They ran an RFI to understand the market interest in reuse and to identify barriers and opportunities for reuse businesses in Victoria.
4. Request for Quotation (RFQ)
    a. Alameda County is in process to publish a RFQ for reuse businesses services such as mobile dishwashing and foodware rental. The County will then work with Cities to form matches between reuse companies and FSBs.

VIII. Ordinances

Ordinances regulating the food packaging provided at food service businesses have progressed in recent years to address a wide range of single-use foodware. There are hundreds of ordinances regulating the use of expanded polystyrene (styrofoam), while fewer limit single-use products like straws and utensils, and there are very few examples of ordinances requiring that reusable

[35] From Interview 7 with Reuse Business Owner
[36] From Interview 1 with Seattle Public Agency
[37] MassDEP Reduce, Reuse, Repair Micro-Grant
[38] Hennepin County Environment and Energy Waste Prevention Grant
[39] Reuse & Repair Grants
[40] From Interview 13 with Municipal Leader

food packaging for use for dine-in or take-out food service (*Introductory Report on Single Use Food Service Ware Policies*, 2019). Many of the ordinances requiring reusable packaging options were slated to begin in 2020 or 2021 and have been delayed as a result of the COVID-19 pandemic.

Palo Alto, CA

The City of Palo Alto Disposable Foodware Ordinance was effective January 1, 2020. Technical assistance is available to help food service businesses acquire permitted materials.

Major features:

- Food service establishments are prohibited from providing plastic straws, plastic utensils, plastic stirrers, beverage plugs and novelty drink accessories, plastic food picks and toothpicks and plastic produce bags
- These products may be provided only if they are compostable or reuseable
- Permitted disposable foodware items, not including food containers, must only be provided upon request or as self-serve

Exemptions:

- Food prepared or packaged outside of the City of Palo Alto
- The Director of Public works may grant an exemption to food service businesses who apply and demonstrate that these provisions would cause undue hardship
- In situations deemed to be an emergency for public peace, health or safety according to the City Manager
- Single-use plastic straws may be provided upon request to individuals who require them due to disability, or medical conditions

Enforcement:

- The primary enforcement responsibility is that of the Director of Public Works and may enter food service businesses to verify compliance
- Penalties are the same as existing penalties for infractions of the municipal code, and may including fines up to $250, if convicted

Berkeley, CA

The Berkeley Single Use Foodware and Litter Reduction Ordinance was effective March 27, 2019. This phased approach has been fully implemented, with enforcement for its Phase 3 beginning in July 2021.

Phase 1: Effective March 27, 2019 (Enforcement began March 27, 2020)

- Foodware accessories can only be provided upon request or as self-service
- Establishes color coding and signage requirements for landfill, compost, and recycling collection containers
- Mandates foodware purchased by the City to be reusable or certified compostable

Phase 2: Effective January 1, 2020 (Enforcement Began January 1, 2021)

- Disposable foodware and accessory foodware must be certified compostable and free of added fluorinated chemicals
- Establishes a $0.25 charge for disposable as a receipt line item and as a verbal notice for phone orders.

Phase 3: Effective July 1, 2020 (Enforcement Begins July 1, 2021)

- All dine-in food service must use only reusable durable foodware
- Technical assistance and mini-grants are made available to help Food Service Businesses comply

Marin County, CA

This ordinance is expected to be adopted no earlier than Fall 2021, with enforcement starting one year later.

Major Features:

- Built upon previous ordinance requiring foodware and foodware accessories be made from 'natural fiber' compostable products (compostable plastic-like products prohibited)
- Foodware accessories must be available upon "affirmative request" separate from food order
- A non-reusable cup charge of $0.25 will be applied as a line item charge at the point of sale
- Dine-in foodware is required for dine-in service
- Takeout foodware must be a.) reusable, b.) compliant compostable natural fiber foodware, or c.) composed entirely of glass or aluminum[41]
- Condiments must be offered in reusable dispensers or containers
- Receptacle guidelines address garbage, recycling and compostable containers and omit mention of receptacles for reusable products

Exceptions:

- Customers present a WIC payment card or voucher, EBT card, and individuals with disabilities are exempt from the non-reusable cup charge
- Foodware and foodware accessories entirely composed of aluminum are exempt
- If foodware products are not commercially available as compliant natural fiber compostable materials, requirements will not be enforced

Enforcement:

- Written notice of non-compliance will be issued with reasonable opportunity to correct
- Administrative Citations may be applied at the discretion of the Director
    - No more than $100 fine for first violation
    - No more than $200 fine for a second violation

[41] Glass has been added in the draft ordinance expected to be adopted in Fall 2021

    - No more than $500 fine for third and subsequent violations
    - Non-payment for longer than one year is deemed a nuisance which can lead to penalties up to $2,500 per violation per day

Vancouver, BC

Vancouver, British Columbia established a collection of City bylaws as a part of their Single-Use Item Reduction Strategy accompanied by a public awareness campaign, a bylaw guide, and a business toolkit to inform the public, and help food service business operators comply. This strategy uses a phased approach to introduce new requirements.

<u>January 1, 2020</u>

- Foam cups and takeout containers were banned as packaging for prepared food

<u>April 22, 2020</u>

- All plastic straws (including those labeled as compostable) are banned for food service except bendable plastic straws which are to be available upon request at every business for accessibility
    - Exemptions:
        - Hospitals and community care facilities
        - Temporary exemption for service with bubble tea products to allow for the market to provide alternatives (expired April 21, 2021)
        - Straws attached to drink boxes or pouches
        - Packages of 20 or more straws sold for personal use
- Single-use utensils can only be provided by business license holder upon customer request or by self-service for all dine-in and takeout service

<u>January 1, 2022</u>

- A minimum fee of $0.25 must be applied for each disposable cup. The charge must be displayed on menus and ordering platforms, as a line-item on receipts, and verbally indicated in phone orders. Fees are retained by the business
- Starting in 2023, business license renewal will require reporting on the number of single-use cups distributed at each location
    - Exemption for business locations that participate in a reusable cup-share program
- Bans the use of single-use plastic and compostable retail shopping bags and establishes a minimum fee schedule for paper and reusable retail bags:
    - Paper bags (contain at least 40% recycled content): $0.15 in 2022 and $0.25 in 2023
    - Reusable bags (usable for at least 100 uses): $1 in 2022 and $2 in 2023
- Businesses must report the number of paper shopping bags and reusable bags upon request by the city starting in 2023.

Findings:

- Currently, most FSBs do not have the labor or space capacity for reusable systems, new policies could dictate that new FSBs are required to contain appropriate dishwashing facilities[42] or sign up for locally outsourced washing and sanitizing.
- Fees for single-use products are retained by the business. This creates a financial incentive for businesses to provide single-use products.
- Municipalities want to gather information before passing an ordinance[43]
- Municipalities should gather data on disparate impacts before passing an ordinance.[44]
- There needs to be a combination of consumer interest and political will to pass an ordinance.[45]
- Enforcement of ordinances can represent a significant cost for localities and an administrative burden for FSBs. A Cost Benefit Analysis could illuminate if enforcement is a worthwhile strategy.[46]
- An ordinance could include waivers for FSBs who may experience financial burden due to the regulations.[47]

IX. Criteria for Evaluation of Reuse Systems

There are many ways to build a reuse system and each alternative includes inherent tradeoffs. Seattle Public Utilities' 2021-2026 Draft Strategic Plan emphasizes maximizing:

- Environmental and public health benefits
- Community benefits
- Economic benefits

To understand how different reuse systems maximize these benefits, we created criteria based on a review of relevant research, qualitative data from interviews, and the goals and legal requirements of Seattle Public Utilities. Reuse system components can be evaluated using the following criteria: **cost, equity, accessibility, environmental impact, scalability, and health and safety**. Criteria can be changed or weighted following a community and stakeholder input process.

[42] From Interview 4 with Zero Waste Consultant
[43] From Interview 9 with Municipal Leader
[44] From Interview 10 with Environmental Justice Leader
[45] From Interview 9 with Municipal Leader
[46] From Interview 10 with Environmental Justice Leader
[47] From Interview 9 with Municipal Leader

Cost

Reuse systems represent both costs and savings for FSBs, customers, and Seattle Public Utilities. Managing costs is important to encourage FSB and customer participation. The cost criteria is measured by the **cost of the reuse system components and is differentiated by which reuse system member pays the cost**.

Findings:

- Upfront cost investments pose a barrier to FSB owners transitioning to reusable packaging items[48]
- Reuse systems should aim for cost neutrality for FSB owners- participation at or below the cost of purchasing equivalent single-use items[49]
- Reuse businesses are profitable but require infusions of capital for start-up and expansion costs.[50]
- Providing subsidies to either FSBs, reusable foodware suppliers, or manufacturers can bridge the gap in cost between the price to run the system and what FSBs are able to pay.[51]
- Labor represents a significant cost to reuse businesses and FSBs in the transition to reusables[52]
- Reuse systems represent a cost savings to municipal solid waste services and further research is necessary to quantify these savings[53]
- Case studies show a net cost savings for FSBs that transition to reusable food ware for dine-in service;[54] more research is needed on net cost for to-go service
- Customers generally feel they should not pay to participate in a reuse system[55]

Equity

SPU's Environmental Justice and Service Equity (EJSE) Division defines equity as "the distribution of resources that accounts for past history and current position, so that future outcomes are fairly distributed." Our research found that to address equity, SPU must consider outcomes based on race, primary language, geography, ability, and capital and/or income. Therefore, we define our equity criterion as: **addressing the structural barriers that impede universal access to a reuse system**.

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[48] From Interview 2 with Zero Waste Consulting
[49] From Interview 12 with Reuse Business Owner
[50] From Interview 5 with Reuse Business Owner, Interview 12 with Reuse Business Owner, Interview 7 with Reuse Business Owner
[51] Interview 7 with Reuse Business Owner
[52] From Interview 4 with Zero Waste NGO
[53] From Interview 5 with Reuse Business Owner
[54] Business Cost Impacts, Clean Water Action Fact Sheet
[55] From Interview 8 with Reuse Business Owner

Findings:

- Private companies may not have the capacity to invest in service equity without support or requirements from public partners[56][57]
- Culturally relevant, in-language messaging is necessary to engage diverse populations[58] [59]
- Public funding can play a role in increasing equitable access to reuse systems[60]
- City-sponsored pilots can set minimum requirements for equitable access for different populations[61] (see Case Study below)
- Return kiosks should be designed to be compliant with The Americans with Disabilities Act[62]
- Reuse systems with no up front fees are more equitable for low-income customers[63]

Case Study: Equity in SDOT's Scooter Share Pilot

The Seattle Department of Transportation required vendors to include an Equity Programming Plan in their application to participate in the Scooter Share Pilot. Vendors are required to outline how their "services are affordable, accessible, equitably distributed, equitably managed, and engaged with Environmental Justice Communities, people with disabilities, people experiencing homelessness or housing insecurity, LGBTQ people, women and girls, youth, and seniors." Specific requirements included low income access, low barrier access (smartphone, no charge card and no bank account), a 10% requirement for deployed fleet in Environmental Justice Communities Areas of Focus, and translation of materials into Seattle's Tier 1 languages[64].

Accessibility

Much like a conception of user experience, this criterion measures the convenience, utility, and ease of use for a system. Maximizing accessibility will result in increased new and repeat users, increasing system success. Accessible reuse systems have convenient locations of system components and items and processes that fit into existing FSB practices and customer habits. The presence of succinct and actionable marketing reduces the cognitive burden on consumers, which in turn makes the switch to a reusable system easier for both FSBs and consumers. The accessibility criterion is defined as: **maximizing the ease of use for FSBs and consumers at each stage of the reuse system**.

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[56] From interview 1 with Seattle Public Agency
[57] SPU defines service equity as "Service equity is the delivery of inclusive and equitable service to all customers recognizing our systems carry important and documented inequities based on race, income, gender, and sexual orientation among others"
[58] From Interview 1 with Seattle Public Agency and Interview 2 with Zero Waste Consulting
[59] From Interview 2 with Zero Waste Consulting
[60] From Interview 4 with Zero Waste NGO
[61] From Interview 1 with Seattle Public Agency
[62] From Interview 8 with Reuse Business Owner
[63] From Interview 12 with Reuse Business Owner
[64] Tier 1 languages include Traditional Chinese, Spanish, Vietnamese, Somali, Amharic, Korean, and Tagalog

Findings:

- Collection points in public spaces that are accessible 24/7 provide important convenience for consumers.[65]
- FSBs are concerned with new systems that could create slowdowns during busy periods.[66]
- Cultural differences can result in different needs to achieve ease of use.[67]
- Business owners will be more likely to adopt a system that has clear action steps and regulations laid out so that no additional research is required. [68]
- Consumers will need to be trained on any new reuse system and behavior can be reinforced by technology tools (i.e. smartphones)[69]
- Marketing the safety of using reusable foodware through outreach materials is vital in easing consumers' apprehension of using the system[70]
- Providing signage that emphasizes the long term effects of using single-use products vs. reusables will educate consumers of their personal impact on the environment[71]

Environmental Impact

A reusable packaging item's environmental impact is the summation of its material sourcing, manufacturing, transportation, and end of life disposal impact, spread across the number of times it is used. Life cycle analyses[72] (LCAs) can be used to determine the break-even point of a reusable item, which is representative of this overall environmental impact. If the number of reuses a reusable item achieves in a system is greater than the break-even point - i.e. the number of times a product *needs* to be reused to have an equal environmental impact as a single-use item – the reuse system has a lower environmental impact. The transportation distance and energy source for transportation, along with washing impacts are key factors to highlight in a reuse system. These factors are present in every reuse cycle. We define the environmental impact criterion as: **the break-even point of a reusable product with a comparable single-use product; emphasizing washing, transportation, and the amount of recycled content.**

Findings:

- Some localities and businesses focus on quantifying the pounds of waste eliminated from the solid waste stream as that data is easier to collect than data needed for an LCA[73].

[65] From Interviews 5 & 7 with Reuse Business Owners
[66] From Interview 5 with Reuse Business Owner
[67] From Interview 2 with Zero Waste Consultant
[68] From Interview 2 with Zero Waste Consultant
[69] From Interview 7 with Reuse Business Owner
[70] From Interview 9 with Municipal Leader and Interview 2 with Zero Waste Consultant
[71] From Interview 13 with Municipal Leader
[72] There are numerous models available to conduct an LCA, such as the US EPA's Waste Reduction Model known as WARM, or SPU's usage of the MEBCalc model.
[73] From Interview 12 with Reuse Business Owner

- There is no single minimum number of reuses for a container - but there are break-even points.[74]
- LCA metrics must be continuously reassessed to ensure that reusable products' true cost (monetary and environmental cost) is lower compared to single-use products.[75]
- Businesses have varying targets for a number of reuses - typically dependent upon business costs, not true cost.[76]
- Washing becomes the largest non-emissions environmental impact once a reusable system is established.[77]
- Transportation distance and modality to collect and return reuse products will heavily impact break-even points for reusable items.[26]
- Increasing the amount of recycled content in packaging consistently lowers the break-even point of a product.[78]

Scalability

Scalability is the capacity of a system to maintain or increase performance when expanding the scope and geographical range of a project. This report focuses on three factors of scalability: transferability of the system to other FSBs, marketability for FSBs, and tradeoffs between proprietary and open source systems. The definition of the scalability criterion is: **the ability of a reuse system to be utilized by different sizes and types of FSBs across the city.**

Findings:

- The main challenge to standardizing systems across reuse businesses is gathering stakeholders and gaining buy-in[79]
- Having a data language that diverse reuse businesses can use is a top priority of standardization[80]
- Reuse businesses can integrate logistical processes and leverage shared inventory and washing facilities[81]
- Multiple washing facilities throughout the city can increase system integration[82]

[74] From Interview 6 Reuse Logistics Business
[75] From Interview 6 Reuse Logistics Business
[76] From Interview 4 Zero Waste NGO
[77] From Interview 7 Reuse Business Owner
[78] Reloop and Zero Waste Europe (December, 2020)
[79] From Interview 6 with Reuse Logistics Organization
[80] From Interview 6 with Reuse Logistics Organization
[81] From Interview 5 with Reuse Business Owner and Interview 7 with Reuse Business Owner
[82] From Interview 7 with Reuse Business Owner

Health and Safety

Health and safety for this pilot involve the sanitation guidelines for cleaning the reusable containers and maintaining sterility of the containers as they are transported back to FSBs. This criterion is defined as **the reuse systems's adherence to the Washington State Retail Food Code for washing method and the FDA Food Code for item thickness and weight.**

Findings:

- Outside dishwashing options are vital to supporting FSBs, as they often do not have the capacity to wash durable foodware.[83]
- Washing facilities need to be supported through a partner or a cluster of partners.[84]
- Since there is no guidance on health and safety requirements from the federal level, reuse businesses can coordinate with local Public Health Departments[85]
- Marketing and educating the public on the safety of using reusable foodware can reduce public health concerns[86]

X. Evaluating Existing Systems

Pilots are an integral part of establishing reuse systems and often function to experiment or build momentum for a larger project. A reuse pilot is unlikely to fulfil all the criteria for a full scale reuse system because of limitations in scale, location, or capital. However, our criteria were developed for SPU to understand how to design a reuse pilot to collect the necessary data to inform an eventual inclusive, city-wide reuse system. Where data on specific systems were not available, we made assumptions based on a review of relevant literature. Reuse pilots should be evaluated after a pilot period to understand to what extent the relevant criteria were fulfilled.

There are four system model evaluations below, corresponding to the four system models we reviewed in Chapter 2.

Evaluation Method

This tool evaluates how well a system maximizes the criteria of cost, equity, accessibility, environmental impact, health and safety, and scalability. It can be adapted to include additional criteria or for specific locations other than Seattle. Each item can be required or preferred, or given a point range to assign overall scores to different proposals (Full Evaluation Tool in Appendix D).

[83] From Interview 4 with Zero Waste Consultant
[84] From Interview 7 with Reuse Business Owner
[85] From Interview 7 with Reuse Business Owner
[86] From Interview 9 with Municipal Leader

Category	Element	Description
Cost	Cost to consumer	The cost of enrollment and/or membership and/or deposit per item to customer
Cost	Cost to FSB	The cost of enrollment and/or membership, and/or deposit per item to FSB
Equity	Low-income access	The mechanism for providing no fee/no deposit access for qualifying customers
Equity	Geographical Location	The neighborhood/s served and what level of priority they are on the City of Seattle's Race and Social Equity Index
Equity	Disabled Access	The plan to ensure single items are available for customers with disabilities[87]
Equity	Disabled Access	The plan to make return locations ADA accessible
Accessibility	FSB Ease of Use	The plan to supply the size and shape of products participating FSBs most often use
Accessibility	Customer Ease of Use	The plan to include new and existing customers with high convenience and usability, including details of customer enrollment and membership

[87] Some disabled customers require access to bendable plastic straws to eat safely without aspiration; single use food packaging can also increase accessibility for disabled customers who have issues lifting or gripping rigid, reusable packaging items. See Caverly (2019); Wong, The Last Straw

Accessibility	Customer Ease of Use	Locations of return kiosks for customers
Environmental Impact	Break-Even Point	The number of uses packaging items need to achieve to reach a net even environmental impact. Include details of applicable LCAs
Environmental Impact	Transportation	The number of transportation miles between participating FSBs and the washing facility
Environmental Impact	Transportation	The type/s of transportation used: vehicle, bicycle, other
Environmental Impact	Washing	The form of washing: dishwasher, handwashing other
Health and Safety	Washing	Does the washing process meet the Washington State Retail Food Code for washing method and the FDA Food Code for item thickness and weight?
Scalability	Including more FSBs	Could this reuse system could be expanded to include other FSBs?
Scalability	Including more Reuse Businesses	Could this reuse system could be expanded to include other reuse businesses?

Key Findings:

- An external, sustainable funding source such as Extended Producer Responsibility or solid waste rate payer funding is necessary to minimize the cost burden and maximize accessibility to all parties.
- Minimizing the cost burden to customers and FSB owners will increase equitable access.
- Gathering and evaluating user data is necessary to analyze equitable use of reuse systems. Locating participating FSBs in demographically distinct census tracts will enable evaluation of who uses reuse systems.
- Environmental benefit is maximized by choosing materials that will easily reach their break even point, reducing transportation to and from washing facilities, and using water efficient washing strategies.

Evaluation Key

The criteria of cost, equity, accessibility, environmental impact, scalability, and health and safety are evaluated on a criteria-specific grading scale. However all criteria are color coded to indicate general levels.

Green	High positive impact
Yellow	Medium positive impact
Red	Lower positive impact

FEE-BASED MODEL: To go food packaging system

An independent reuse business partners with 10 local restaurants to provide reusable food packaging for to-go orders. The reuse businesses created five different options for stainless steel boxes and bowls that have silicone lids. Restaurants charge customers $2 per item to order their food in reusable packaging. There are return kiosks at every participating restaurant, and customers can also have reusable packaging items picked up from their house. There is no item scanning or tracking in this system.

COST Cost in dollars of the reuse system components and is differentiated by which reuse system member pays the cost.		
Cost to consumer	No membership fee. Per item charge that	Medium burden

	is not refunded.	
Cost to FSB	No membership or ongoing fees.	Low burden
Cost to municipality	No public assistance was given.	No burden

EQUITY Addresses the institutional barriers that impede universal access to a reuse system.		
Customer Income	Per item charge that is not refunded. No exemptions.	Does not address
FSB Capital	No upfront or ongoing costs to FSBs.	Does address
Race and Social Equity[88]	Participating locations are dispersed evenly in census tracts with demographically distinct populations. Some participating FSBs are situated in census tracts that are prioritized for investment by the City Index.	Does address[89]
Geography	Participating locations are dispersed evenly around the city.	Does address
Ability	Single-use items still available for customers with disabilities. Return kiosks are ADA compliant.	Does address

[88] Race and Social Equity is a metric specific to Seattle, based on Seattle's Race and Social Equity Index created by the City of Seattle's Office of Planning & Community Development. The Index includes information on a census tract population's demographics in race, language, socioeconomic indicators, and health indicators. Other municipalities should use location specific equity tools. If there are none available, U.S. Census Bureau data can be used.

[89] This assessment was made based on the reuse model's plans. To fully address race and social equity, a reuse model should be evaluated for the demographics of its users and an analysis of root causes of participation. Cost burden, inclusive messaging, in-language marketing materials, and community based engagement are also factors in who will participate in a reuse system.

ACCESSIBILITY		
Maximizing the ease of use for FSBs and consumers at each stage of the reuse system.		
Accessibility for consumer	Customers do not have to alter their current process to order food in reusable packaging. There are return kiosks at participating FSBs and home pickup is available.	High access
Accessibility for FSB	Reusable items are similar size and shape to previously used single-use items. The FSB will not have to alter the food preparation process.	High access

ENVIRONMENTAL IMPACT RATING		
The break-even point of a reusable product with a comparable single-use product; emphasizing washing, transportation, and recycled content components.		
Break-Even Estimate	Reusable items reach their break even point after a high number of uses due to material choice; which an item in this system is not attaining. LCAs show that impacts from sourcing, manufacturing, initial transportation, and end-of-life disposal result in higher greenhouse gas emissions than would result from single-use packaging.	Increased impact
Recycled Content	Reusable items are constructed from greater than 50% recycled content	Lower Impact
Transportation	Reusable items have longer travel distances per reuse trip (at-home collection drives up impact), typically by a fossil-fuel vehicle, increasing emissions. But many reuse items can be washed in-house at FSBs, minimizing travel.	Comparable Impact
Water Usage	Reuse items are washed at different sanitation facilities depending on proximity of collection. Washing facility uses an efficient dishwashing machine.	Lower Impact

CITY-WIDE SCALABILITY		
The ability of a reuse system to be utilized by different sizes and types of FSBs across the city.		
Scalability	Reusable packaging is in the sizes and shapes that most FSBs use, and includes options for different cuisines. The reuse business has been designed to handle independent products for collection, cleaning, and redistribution.	High scalability

HEALTH AND SAFETY		
Reuse systems's adherence to the Washington State Retail Food Code for washing method and the FDA Food Code for item thickness and weight.		
Customer and employee safety	Reusables meet the standards of the Washington State Retail Food Code for washing methods and the FDA Food Code for item thickness and weight.	High safety

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SUBSCRIPTION MODEL: To go food packaging system

A reuse business partners with 70 grocery stores, cafes, restaurants, and food trucks to offer customers to-go orders in BPA free plastic containers. Customers enroll in a monthly or annual subscription based on how many reusable containers they want access to. Costs to customers range from $21-$48 per year. Customers can check out and return reusable items at any participating FSB location using the reuse business' smartphone application and scanning QR codes. Reusable items can be used up to 300 times throughout their life and are picked up, washed, and delivered back to FSB using a mix of bicycle and car transportation.

COST		
Cost in dollars of the reuse system components and is differentiated by which reuse system member pays the cost.		
Cost to consumer	Membership fee paid monthly or annually.	Medium burden

Cost to FSB	No membership or ongoing fees.	Low burden
Cost to municipality	No public assistance given.	No burden

EQUITY Addresses the institutional barriers that impede universal access to a reuse system.		
Customer Income	Flat membership fee with no exemptions.	Does not address
FSB Capital	No up front or ongoing costs to FSBs.	Does address
Race and Social Equity[90]	Participating locations are dispersed evenly in census tracts with demographically distinct populations.	Does address[91]
Geography	Participating locations are dispersed evenly around the city.	Does address
Ability	Single-use items still available for customers with disabilities. Return kiosks are ADA compliant.	Does address

ACCESSIBILITY Maximizing the ease of use for FSBs and consumers at each stage of the reuse system.		
Accessibility for consumer	Customers must slightly alter their current process to order food in reusable packaging. Customers must download the reuse business smartphone application. There are return kiosks at participating FSBs and home pickup is available.	Medium access

[90] Race and Social Equity is a metric specific to Seattle, based on Seattle's Race and Social Equity Index created by the City of Seattle's Office of Planning & Community Development. The Index includes information on a census tract population's demographics in race, language, socioeconomic indicators, and health indicators. Other municipalities should use location specific equity tools. If there are none available, U.S. Census Bureau data can be used.

[91] This assessment was made based on the reuse model's plans. To fully address race and social equity, a reuse model should be evaluated for the demographics of its users and an analysis of root causes of participation. Cost burden, inclusive messaging, in-language marketing materials, and community based engagement are also factors in who will participate in a reuse system.

Accessibility for FSB	Reusable items are similar in size and shape to previously used single-use items. The FSB will not have to alter the food preparation process.	High access

ENVIRONMENTAL IMPACT RATING

The break-even point of a reusable product with a comparable single-use product; emphasizing washing, transportation, and recycled content components.

Break-Even Estimate	Assumed that material reaches break-even point between 20 and 50 reuses, which is lower than the average reuses for the system. Items have the potential to be reused up to 300 times. LCAs show that impacts from sourcing, manufacturing, initial transportation, and end-of-life disposal result in comparable greenhouse gas emissions from single-use packaging.	Lower Impact
Recycled Content	Products contain at least 30% recycled content	Medium Impact
Transportation	Products are transported by vehicle and bicycle during the reuse cycle.	Lower Impact
Water Usage	Products are washed with water efficient dishwashers off-site.	Lower Impact

CITY-WIDE SCALABILITY

The ability of a reuse system to be utilized by different sizes and types of FSBs across the city.

Scalability	Reusable packaging is in the sizes and shapes that most FSBs use, and includes options for different cuisines. The reuse business has been designed to handle independent products for collection, cleaning, and redistribution.	High scalability

HEALTH AND SAFETY		
Reuse systems's adherence to the Washington State Retail Food Code for washing method and the FDA Food Code for item thickness and weight.		
Customer and employee safety	Reusables meet the standards of the Washington State Retail Food Code for washing methods and the FDA Food Code for item thickness and weight.	High safety

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LENDING MODEL: Reusable cup system

A reuse business provides stainless steel cups with silicone lids to 12 participating cafes. To participate, customers order a beverage at the cafe and scan the cup's QR code with their phone. There is no charge to the customer unless the cup is not returned within 5 days. Return kiosks are located at participating cafes and at convenient streetside locations. Dirty cups are collected, washed, and returned to cafes by the reuse company.

COST		
Cost of the reuse system components and is differentiated by which reuse system member pays the cost.		
Cost to consumer	No upfront cost. Fee for unreturned items.	Low cost burden
Cost to FSB	No upfront cost. Per item fee that is comparable to single-use costs.	Low cost burden
Cost to municipality	Funding for pilot provided by the City.	Medium burden

EQUITY		
Addresses the institutional barriers that impede universal access to a reuse system.		
Customer Income	No upfront cost or deposit.	Does address
FSB Capital	No upfront cost or deposit.	Does address

Race and Social Equity	Pilot does not include locations dispersed evenly in census tracts with demographically distinct populations. No participating FSBs are situated in census tracts that are prioritized for investment by the City.	Does not address
Geography	Pilot does not include locations dispersed evenly around the city.	Does not address
Ability	Single-use items still available for customers with disabilities. Return kiosks are ADA compliant.	Does address

ACCESSIBILITY

Maximizing the ease of use for FSBs and consumers at each stage of the reuse system.

Accessibility for consumer	Customers do not have to alter their current process to order food in reusable packaging. There are multiple convenient return locations in high traffic areas.	High access
Accessibility for FSB	Reusable items are similar size and shape to previously used single-use items. The FSB will not have to alter the food preparation process.	High access

ENVIRONMENTAL IMPACT RATING

The break-even point of a reusable product with a comparable single-use product; emphasizing washing, transportation, and recycled content components.

Break-Even Estimate	It is assumed that the break-even point is attained between 50 and 75 number of reuses due to material choice. This reusable cup is nearly attaining this number. LCAs indicate that impacts from manufacturing, initial transportation, and end-of-life disposal of this item would result in comparable greenhouse gas emissions of single-use packaging.	Comparable Impact

Recycled Content	Reusable items are constructed from greater than 50% recycled content	Lower Impact
Transportation	The distance travelled per reuse cycle is low and typically by bicycle pedicab.	Lower Impact
Water Usage	Reuse items are washed with efficient commercial dishwasher	Lower Impact

CITY-WIDE SCALABILITY		
The ability of a reuse system to be utilized by different sizes and types of FSBs across the city.		
Scalability	Reusable packaging is in the sizes and shapes that most FSBs use. There are no scanning requirements for FSBs.	High scalability

HEALTH AND SAFETY		
Reuse systems's adherence to the Washington State Retail Food Code for washing method and the FDA Food Code for item thickness and weight.		
Customer and employee safety	Reusables meet the standards of the Washington State Retail Food Code for washing methods and the FDA Food Code for item thickness and weight.	High safety

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DEPOSIT RETURN SCHEME: Proprietary cup chain system

A coffee chain created its own proprietary reusable cup program. To enroll, a customer downloads the chain's smartphone application and sets up an account. The customer places a drink order inside the application and selects the reusable cup option. This selection adds $1 dollar to the customer's cart as a deposit and informs the employee that the drink is to be made in a reusable cup. The reusable cup material is plastic and has the branding of the FSB's single-use to-go cup. After the customer receives their drink in a reusable cup, they can either drink at the FSB location or take the cup with them.

The customer can return the cup at an on-site return kiosk or from home. To return on-site, the customer scans their cup at the return kiosk, places the cup inside the kiosk, and then scans a

barcode inside the FSB's smartphone application to finalize the deposit return. Their deposit is then placed on a rewards card within the application. If the customer returns from home, the collection company will send the customer an email with the $1 credit once the cup is scanned back into inventory.

COST Cost in dollars of the reuse system components and is differentiated by which reuse system member pays the cost.		
Cost to consumer	$1 refundable deposit to customer, returned via membership program.	Low cost burden
Cost to FSB	The company paid for reusable inventory, return kiosks, development of a proprietary system, fees to a third party washing and sanitizing partner, and a collection partner. However, there is no cost to chain locations for using these services.	N/A
Cost to municipality	No public funding.	No burden

EQUITY Addresses the institutional barriers that impede universal access to a reuse system.		
Customer Income	Must purchase store credit to participate in the program through a smartphone application.	Does not address
FSB Capital	This model is proprietary and therefore does not represent a financial burden for participating locations.	N/A
Geography	Participating stores are located only in one neighborhood.	Does not address
Race and Social Equity	Participating locations are not dispersed evenly census tracts with demographically distinct populations. No participating FSBs are situated in census tracts that are prioritized for	Does not address

	investment by the City Race and Social Eqiuty Index.	
Ability	Single-use items still available for customers with disabilities. Return kiosks are ADA compliant.	Does address

ACCESSIBILITY		
Maximizing the ease of use for FSBs and consumers at each stage of the reuse system.		
Accessibility for consumer	Existing users can participate easily. New or one time customers must download a smartphone application to participate, and only receive their deposit as store credit. Customers must bring cups to a return kiosk located at the FSB if they do not have a membership for the home pickup service. There are no centrally located return kiosks other than the FSB.	Medium access
Accessibility for FSB	Utilizes the cup sizes and shapes previously used and does not change the drink preparation process.	High access

ENVIRONMENTAL IMPACT RATING		
The break-even point of a reusable product with a comparable single-use product; emphasizing washing, transportation, and recycled content components.		
Break-Even Estimate	Break-even point is attained after 20 to 50 number of reuses due to material choice. LCAs indicate that impacts from manufacturing, initial transportation, and end-of-life disposal of this item would result in lower greenhouse gas emissions of comparable single-use packaging.	Lower Impact
Recycled Content	Reusable items have no recycled content.	Increased Impact

Transportation	Most reuse cups travel a short distance per reuse. At-home pick-up travel is high from collection to sorting to sanitation and finally redistribution by fossil-fuel vehicles. Results in moderate impacts	Comparable Impact
Water Usage	Cups are washed in-bulk using a commercial dishwasher.	Lower impact

CITY-WIDE SCALABILITY		
The ability of a reuse system to be utilized by different sizes and types of FSBs across the city.		
Scalability	Proprietary system that only includes one FSB with many locations in the same geographic region.	Low impact

HEALTH AND SAFETY		
Reuse systems's adherence to the Washington State Retail Food Code for washing method and the FDA Food Code for item thickness and weight.		
Safety of customers	Cups are deposited at a single point with no contact of other customers or staff. Every cup is washed and sanitized after each use off site.	High safety

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IDEAL SYSTEM MODEL: A model for the future

Multiple reuse businesses operating in the city and use a mostly standardized set of packaging shape and size. This enables the reuse businesses to use shared washing facilities and reverse logistics if they wish to collaborate. FSBs can contract with reuse businesses to offer reusable cups and/or to-go food packaging that have equivalent or lesser cost than recyclable or compostable single-use alternatives. Customers can select reusable packaging through their normal ordering process (be it in person, over the phone, or online) and are not charged a fee unless they don't return the item. Reusable items are tracked by barcode, QR code, or RFID (this technology is being tested for application in reuse systems). There are multiple washing facilities clustered near dense business districts. Reuse businesses collect and report user data which is aggregated by the City to determine gaps in service. Targeted outreach strategies are in place to provide inclusive messaging for populations that experience disparate service or use. Data is also

evaluated to determine the reuse system's environmental impact. Customers may use their own reusable items that meet health and safety requirements. Single-use items are still available for disabled customers or customers that opt out of the system.

COST Cost of the reuse system components differentiated by which reuse system member pays the cost.		
Cost to consumer	There is no cost to the customer for enrolling or participating in the system unless an item is not returned.	Low cost burden
Cost to FSB	There is no upfront cost to the FSB for enrolling. There are ongoing costs for participation that are equivalent to or lower than the FSB's previous cost for recyclable or compostable single use items.	Low cost burden
Cost to municipality	Subsidies available for FSBs and reuse businesses for up front costs are funded through solid waste rate payer fees or through Extended Producer Responsibility (EPR) schemes.	Low cost burden

EQUITY Addressing the institutional barriers that impede universal access to a reuse system.		
Customer Income	Customers do not have to place a deposit or pay a membership fee.	Does address
FSB Capital	FSB owners do not have to invest in upfront costs for reusables, return kiosks, or technology.	Does address
Geography	Participating locations are dispersed evenly around the city.	Does address
Race and Social Equity	Participating locations and washing facilities are dispersed evenly in census tracts with demographically distinct populations. System is	Does address

	evaluated for its user demographics including race/ethnicity, language spoken, and other factors that were found to affect reuse system participation[92].	
Ability	Single-use items still available for customers with disabilities. Return kiosks are ADA compliant.	Does address

ACCESSIBILITY Maximizing the ease of use for FSBs and consumers at each stage of the reuse system.		
Accessibility for consumer	Customers do not have to alter their current process to order food in reusable packaging. There are multiple convenient return locations in high traffic areas, such as transit hubs.	High access
Accessibility for FSB	Reusable items are similar in size and shape to previously used single-use items. The FSB will not have to alter the food preparation process. FSB staff training is included in the reuse business' services.	High access

ENVIRONMENTAL IMPACT RATING The break-even point of a reusable with a comparable single-use product; emphasizing washing, transportation, and recycled content components.		
Break-Even Estimate	Reusable items reach their break even point after 10 to 30 number of uses, which this item is surpassing on average in this system. LCAs show that impacts from manufacturing, initial transportation, and end-of-life disposal result in lower greenhouse gas emissions than would result from comparable single-use packaging.	Lower Impact
Recycled Content	Reusable items are constructed from greater than 50% recycled content	Lower Impact

[92] Pilots should be evaluated to determine root causes of participation and barriers to participation to inform future systems.

Transportation	Moderate amount of reuse items travel short distances per reuse trip, mostly by electric vehicles and bicycles. Man reuse items washed in-house at FSBs.	Lower Impact
Water Usage	Collected reuse items washed with efficient commercial dishwashing facility. In-house FSB washing done by commercial dishwashers.	Lower Impact

CITY-WIDE SCALABILITY		
The ability of a reuse system to be utilized by different sizes and types of FSBs across the city.		
Scalability	Reusable packaging is in the sizes and shapes that most FSBs use. There are opportunities for FSBs to add their own branding. Digital language is open source and scanning technology used is accessible for a wide variety of businesses. The reuse business has been designed to handle independent products for collection, cleaning, and redistribution.	High scalability

HEALTH AND SAFETY		
Reuse systems's adherence to the Washington State Retail Food Code for washing method and the FDA Food Code for item thickness and weight.		
Customer and employee safety	Reusables meet the standards of the Washington State Retail Food Code for washing methods and the FDA Food Code for item thickness and weight.	High safety

CHAPTER 5: RECOMMENDATIONS

Our recommendations are meant to provide a menu of options that Seattle can pursue to support reuse systems. They were formulated based on common themes from interviews and major findings from research that best fit the Seattle context and SPU's work. We focused on ways that SPU can mitigate risk for innovative reuse businesses, support equitable access for all city residents, and make investments in the near-term with the future state of reuse systems in mind. Next steps for SPU address easing the initial barriers to reuse systems but should be designed to facilitate scaling up to a full, city-wide system.

We recommend SPU do the following:

I. **Leverage NGO and/or private funds** for a large scale Seattle reuse pilot.

1. Publish an RFP for one or more reuse businesses to provide to-go cups and packaging for FSBs in multiple business districts.
2. Establish minimum accessibility and equity requirements to ensure inclusive access.
3. Use the pilot to collect data on the environmental, economic, and community impact of reuse systems.

II. **Center equity** to establish leadership among municipal reuse initiatives.

1. Create minimum equity requirements for all reuse pilots and grants.
2. Conduct community and stakeholder engagement as a central part of supporting reuse systems.
3. Design Seattle's food service reuse system to maximize equity and ease institutional barriers for consumers based on community and stakeholder engagement

III. Expand and tailor SPU's existing programs to support reuse systems:

1. Support the development of Seattle's reuse market through **grants**.
    a. Solicit applications from reuse businesses for SPU's Waste-Free Communities Matching Grant.
2. Create **social marketing campaigns** to stimulate behavior change for reuse systems.
3. Conduct **community and stakeholder engagement** as a central part of supporting reuse systems.
4. **Ease institutional barriers** for reuse businesses.

a. Partner with Public Health Departments to ease undue burdens related to public health guidelines.

b. Partner with the Seattle Department of Transportation to place public return kiosks.

IV. Support reuse systems through legislation:

1. Incentivize participation in reuse systems through **progressive ordinances**.
2. Coordinate **advocacy for Extended Producer Responsibility** (EPR) with other municipalities for statewide implementation.

I. Leverage NGO and/or private funds for a large scale Seattle reuse pilot

SPU should seek partnerships using connections through the Partnership to Reduce, Reuse and Replace Single Use Plastics, US Plastics Pact, Sustainable Packaging Coalition, Government Reuse Forum, National Reuse Network, Ocean Plastics Leadership Council, World Economic Forum, local businesses and other NGOs to leverage funds for a reuse pilot. If there isn't sufficient funding for a large-scale pilot, these recommendations can be used to design one or more smaller City- supported pilots. SPU should also work to attract private pilots, making Seattle an innovation center for reuse pilots.

→ Publish an RFP for one or more reuse businesses to provide to-go cups and packaging for FSBs in multiple business districts.

- Piloting reusable to-go cups and food packaging simultaneously in multiple geographical clusters is an innovative and progressive approach that has not be attempted in other city sponsored pilots
- The RFP should solicit one or more businesses to provide reusable items, return kiosks, transportation and logistics, washing and sanitizing, and inventory management.

→ Use the criteria in this report to set minimum RFP standards and evaluate applicants to center considerations of cost, equity, accessibility, environmental impact, scalability, and health and safety of applications.

Minimum requirements support accessibility and equity for all customers and FSBs include:

- Cost minimization for customers. Up front deposits or membership plans are not preferred.

- Access plans for customers without a smartphone or internet connection.
- Access plans for single-use items for customers with disabilities. Return kiosk design and locations should also consider customers with disabilities.

The preferred applicant will:

- Use standardized packaging shapes and sizes for efficient inventory, transportation, and storage.
- Use commercial dishwashing machines for washing and sanitizing.
- Have per-use costs of reusables are less than or equal to that of a typical compostable alternative for FSBs.
- Have an average number of item reuses that is greater than the break even point for the products compared to single-use

→ Require that pilots include business clusters in multiple demographically distinct business districts

- Pilots should be conducted across several demographically unique areas to test multiple user groups. Reuse systems will have disparate impacts on users of different races/ethnicities and geographic locations. These impacts need to be understood for SPU to support an inclusive City-wide system.
- Participating FSB and washing facility locations should take into consideration the City of Seattle's Race and Social Equity Index[93] when prioritizing investment opportunities. Areas that experience disproportionate litter impacts could also be prioritized.

→ Require the RFP winner to collect data on the environmental impact of reuse systems.

Collecting data on the main drivers of environmental impact will inform how to structure reuse systems for the greatest environmental benefit. In pilots that SPU funds or supports, data should be collected on:

- *Transportation*: The distance a product travels from collection to sanitation and back to a FSB, as well as the modality of that transportation. This impact is present in every reuse cycle.
- *Washing Process*: The amount of water used per reusable product. This impact is present in every reuse cycle.
- *Number of Reuses*: The average number of times a product is used. Each product has a break-even point that signifies the number of uses it must meet before it has a lower

[93] City of Seattle Race and Social Equity Index

environmental impact than a single-use item. Incorporate the percentage of items not returned into the system to give greater context to the average number of reuses.

- *Recycled Content:* The percentage of recycled content each foodware container[94] contains. A reusable product's break-even point is lowered by increasing the recycled content in reusable items.
- *Pounds of Waste Prevented:* The pounds of single-use food packaging prevented will inform the value reuse systems are bringing to SPU.

→ **Collect data on the community impact of reuse systems**

Gather demographic data through surveys. To understand which groups are using reuse systems, SPU should collect demographic data from customers. SPU could conduct the survey themselves or require its completion as part of a reuse grant. The survey should come with a monetary incentive. SPU and reuse businesses can identify which groups are not participating in a reuse system and design strategies to engage these groups.

II. Support the development of Seattle's reuse market through grants.

For many startup companies operating in emerging markets, attracting investors to build capital requires a focus on capturing market share and a wide customer base. These incentives forgo the public values inherent in a government-sponsored program. By providing grant funding, SPU opens the door to companies that aspire to develop more equitable or accessible products but otherwise would not be able to raise the capital needed to operate in Seattle. This approach allows any reuse business to operate in the city and allows SPU to incentivize the reuse business market to meet certain requirements established as conditions of the grant funding. SPU should offer reuse specific waste prevention grants. Specific areas of interest from our research include:

→ **Start-Up Costs**: The reuse business model relies on high start-up costs, and requires scale to become profitable. Start-up costs appear in manufacturing and installing return kiosks, integrating tracking software into food service businesses, and generating the initial stock of reusable food service products. This means that reuse businesses that begin operations early in Seattle will be exposed to greater risk and lower operating margins. Start up costs may also be passed along to FSBs or customers which increase barriers to joining a reuse system. SPU should consider allocating grant funding to support the early development of reuse businesses in seattle.

[94] Washington State HB 5022 sets minimum post-consumer recycled content standards for plastic beverage containers, trash bags, and household cleaning and personal care product containers. HB 5022 bans polystyrene or styrofoam but it does not set recycled content standards for foodware containers.

→ **Technology Development**: At present QR codes and barcodes are among the most commonly used scanning mechanisms to transfer the inventory of a reusable product from business to customer and business to business, tracked within a system run by one reuse business. Grants addressing technology development could explore the role of different technologies, such as RFID and system compatibility between multiple reuse business inventory tracking systems.

→ **Equity Structuring:** System components specifically designed to enhance equity. These elements may include options for unbanked users, non-smartphone users, or culturally relevant, in-language outreach.

→ **Different use-cases and promote market development.** There are many service environments and food products that a reuse system will need to accommodate. SPU should support grants that:

- Test systems in diverse food service environments, ranging from closed school campuses, office buildings, and hospitals, to food trucks, pop-up restaurants, and take-out windows. These locations will have different dishwashing capacity and storage space capacity.
- Test systems in businesses that use different service flows.[95] Service flow can determine how and when businesses interface with the reuse system, choose packaging and track the hand off of the reusable containers to the customer. In some FSB service flows, the container or cup is supplied at the point of sale, which is common in cafes, whereas in others packaging is supplied immediately before handoff to a customer after an order is prepared.
- Help develop standardized reusable packaging products that address the variety of food products that will need containers. Packaging needs vary greatly and yet standardization of reusable packaging products is a key attribute that will allow reusable systems to self-sustain.

III. Create social marketing campaigns to stimulate behavior change for reuse systems

Social marketing has the potential to drastically decrease cognitive burden to consumers and FSBs. During the pilot stage, marketing is vital to educate FSBs on the reuse process to ensure that they are comfortable and supportive in taking next steps for a city wide scaled system. SPU should coordinate with reuse businesses and participating FSBs to establish a City-run reuse campaign. Marketing expenses are often not an area that reuse businesses can afford especially in start up or pilot stages. Providing marketing materials and campaigns, priming residents about

[95] Service Flow is the order in which food is ordered, prepared, packaged and expedited to the customer.

reuse systems in Seattle can generate greater buy-in and user adoption. Furthermore, certain customers may be more inclined to purchase food from an FSB that provides reusable foodware, providing incentives for FSBs to adopt a reuse system.

→ **Promote Seattle reuse practices through multiple media platforms.** This can promote early FSB adopters to begin using reusable food service products, and prime customers with an understanding of how the systems work. This can begin the social modelling process, and reduce uncertainty around these new practices. Coordinate with SPU Community Affairs and social marketing groups to maximize the impact and coordinate messaging.

→ **Develop Reuse in Food Service Toolkit and integrate with the Green Business Program** The Green Your Business program already promotes waste prevention practices and assists businesses to manage and prevent waste with free tools and assistance. Use this same framework to outreach regarding reusables at food service businesses, and direct those who need financial support to any grant opportunities that defer upfront costs of reusable products.

→ **Provide outreach materials to clarify misconceptions on the health and safety of reusables** with certification from the Department of Health. This certification from the administrative authority can mean higher trust in the materials.

IV. Engage stakeholders and the community

Stakeholder engagement from residents, customers, FSB owners and employees, reuse businesses, and other City partners is crucial.

→ **Evaluate each reuse pilot with community feedback.**
To design an inclusive reuse system, SPU must understand who is experiencing barriers to use and for what reasons. Much like the SDOT Scooter Share Pilot, any City sponsored reuse project should collect continuous user data and plan to evaluate data with qualitative data collection from community meetings, targeted surveying, or other flexible feedback tools.

→ **Conduct a full scale community engagement process prior to an ordinance or major reuse system investment.**
The Berkeley, CA ordinance process included an online survey, extended public comment period, and other public presentations that gathered community and stakeholder input. Resulting recommendations were incorporated into the ordinance.

→ Engage FSB owners, specifically those who have previously lacked opportunities to give feedback.

FSB owners will play a vital role in implementing reuse systems, and may experience disparate impacts based on the type and location of FSB, and FSB owner demographics. SPU should utilize the Targeted Universalism framework to solicit feedback from FSBs that is disaggregated by the race/ethnicity of an FSB owner, language spoken by FSB owner, type of restaurant (sit-down, quick serve, food truck, cafe, etc), type of FSB ownership (corporate, independent, franchise), and geographical location of FSB. FSBs that have not received outreach and support previously should be prioritized.

→ Establish a stakeholder group for reuse businesses in Seattle.

Reuse businesses understand best the opportunities and challenges that exist for reuse in Seattle. Creating a feedback loop between these stakeholders and SPU will strengthen the overall market for reuse and build strong relationships that are vital to innovative public-private partnerships.

V. Ease institutional barriers for reuse systems

Reuse systems are still young in conception compared to other environmentally focused regulations and therefore usually do not have established relationships with City and County agencies. SPU can ease institutional barriers by offering guidance on navigating the authorizing environment of Seattle city government.

→ Partner with Public Health Departments to ease barriers to reuse.

SPU can provide connections between reuse businesses, FSBs, and health inspectors to ensure all health and safety guidelines are met. These relationships can additionally ensure that FSBs and reuse businesses do not encounter undue burdens related to public health guidelines.

→ Partner with the Seattle Department of Transportation to place public return kiosks.

Providing convenient access for returning reusable foodware is critical for community buy-in and for reuse businesses to reach a sustainable scale. Providing return stations that are available 24/7 is necessary in areas that are densely populated with FSBs and see high amounts of foot traffic. SPU can leverage their connection with SDOT to ease barriers for reuse businesses to place kiosks in public right of way.

VI. Incentivize participation in reuse systems through progressive ordinances

The City of Seattle has already used progressive ordinances to move retail stores away from providing single-use plastic bags and single-use plastic utensils. Some municipalities are taking the same approach to incentivize reusable food service ware.

→ **Start with cups** As with pilots, cups should be the first product addressed by city ordinance for reuse.

Require a fee for single-use cups:

- Many municipalities have required that each disposable cup that is dispensed is accompanied by a $0.25 fee that appears as a separate line-item on a receipt. This raises the cost of disposable cups, and raises awareness of disposable products to customers. SPU may consider a fee of a different amount or a phased approach that slowly increases the fee over time as reusable cups become more widely available.
- Establish a common fund to collect fees or require that collected fees be used to offset expenses related to providing reusable products. This removes the financial incentive for businesses to provide disposable cups, and generates a funding stream for SPU or food services businesses to support reuse systems.

VII. Coordinate advocacy for Extended Producer Responsibility (EPR) with other Washington municipalities for statewide legislation.

Since Extended Producer Responsibility will be most effective if enacted at the state level, SPU's role in enacting EPR schemes should be that of advocacy. Since SPU manages solid waste for the state's largest economic center and most populous city, SPU's advocacy and support for such a scheme will likely be an important factor in the success of such an initiative.

→ Support EPR schemes that include targets for reusable products and incentivise producers

EPR schemes succeed only when the details of the scheme are carefully designed to lead to a particular outcome. For EPR to support reuse systems in Washington, they need to address how reusable packaging is dealt with in the scheme, and how to catalyze and incentivize reuse. In its role as a statewide waste management leader and aspiring leader in reuse systems, SPU will be in a position to help answer these questions.

Recommendations Summary

There is a major opportunity for the city of Seattle to become an innovation center for reuse. Many reuse businesses offering third party collection and washing services have already established small programs that have sustained service to multiple food service businesses demonstrating that this business model can work, and work at scale. The most important aspects of these recommendations are to:

- Attract reuse businesses.
- Study the diverse needs of Seattle food service businesses and customers.
- Design equity into the foundation of reuse systems.
- Make reuse easy to use.
- Use social marketing and outreach to popularize reuse.
- Ensure that system aspects supporting equity, diversity, and environmental impact are sustained.

Limitations and Risks

Risks to SPU

City supported pilots are a way to test new programs while mitigating risks to businesses. This inherently means that the City takes on the risk of pilot failure, which should be acknowledged in the pilot design and evaluation. Pilots should be designed to collect more data on reuse systems' full environmental, social, and economic impacts, and will likely need improvement before a city-wide system can be created.

Risks to FSBs

The main limitation of our research design is the exclusion of FSB owner feedback. Many FSBs are struggling due to the economic downturn from the COVID-19 pandemic and we were encouraged by our client to omit an FSB survey due to the burden this would place on FSB owners at this time. FSB owners, operators, and staff will shoulder the responsibility of implementing new systems to comply with a reuse/refill pilot or ordinance and therefore should be consulted before designing a reuse pilot. Additionally, City regulations can create undue administrative burdens for FSB owners who already face a daunting recovery from the COVID-19 pandemic. Future food packaging ordinances should strive to avoid these burdens.

Risks to an Inclusive City-Wide Reuse System

Large food service businesses may attempt to challenge an open-source reuse system in favor of using their own proprietary systems. Without strong public-private partnerships or City regulation, reuse systems could take hold in Seattle without the crucial elements to support equity, diverse food service business models, and diverse consumer needs.

Secondly, social marketing is sometimes viewed as a tool that blames consumers for their individual actions. Social marketing for reuse systems should emphasize creating accessibility and convenience for consumers, rather than blame. It is vital that marketing includes all populations, from offering materials in different languages, distributing outreach on many platforms and checking in to see that all populations are exposed to the materials.

Unintended Consequences
There is no way to predict all possible outcomes and effects that a reusable foodware pilot will have on consumer behavior and waste reduction. Unintended consequences of eliminating commonplace single-use plastic may ultimately lead to a less effective waste management solution to combat environmental harm. It is important to keep these uncertainties in mind in order to effectively react and adapt components of the system in a manner that will counter ineffective consequences as the processes evolve over time.

Areas for Further Research

There are many entities working on reuse systems in Seattle and across the country. We also foresee more Evans Capstone groups working on this issue. Possible areas for further research include:

- FSB engagement and feedback, including surveys, interviews, or focus groups.
- A benefit-cost analysis of reuse systems to include a monetized evaluation of environmental, economic, and social benefits.
- A review of reusable packaging tracking, inventory, and reverse logistics systems and technology.
- A review of Seattle ordinances that present challenges and opportunities for reuse systems.

Next Steps

This is a time of immense opportunity for SPU to make Seattle an innovation hub for reuse systems. Using the recommendations from this report, SPU can move immediately to:

- Conduct community and stakeholder engagement to inform the pilot design
- Develop an RFP for a reuse pilot that centers equity; and
- Tailor existing programs to support reuse

These steps will allow SPU to continue its leadership on progressive waste prevention strategies.

APPENDICES

Appendix A: Reuse Pilots and Businesses

Reuse Pilots

We conducted an initial review of past and ongoing reuse pilots. Pilots encompass all aspects of the value chain including FSBs, reuse/refill businesses, customer interactions, durable manufacturers, payment systems, government entities, and logical partners. Some of these pilots will be used to collect data for our systematic review in **Chapter 4**.

- **Anella and Toro Ironworks Restaurants** *(Brooklyn, NY)* - A pilot for repeat customers, allowing them to personally return containers at their own convenience (does not include soup and sauce container)
- **Berkley Reusable Cup Service Project** *(Berkeley, CA)* - Partnered with the business Vessel as a nine-month pilot program for a cup loan service, which uses stainless steel cups with silicone lids
- **Nestlé** - Will be offering reusable and refillable dispensers for a range of their products from coffee to cat litter
- **Palo Alto Unified School District** *(Palo Alto, CA)* - Phased out seven single-use foodware items in a single school year with the partnership of the ReThink Disposable program
- **Reusables** *(Vancouver, BC)*- Pilot program running 8 weeks with 100 test users that allows restaurants to offer take-out with a washable, returnable container
- **Rogue to Go** *(Ashland, Oregon)* - A group of five restaurants worked together to implement reusable take-out containers
- **University of Dayton** *(Dayton, OH)* - Campus pilot that works on the honor system for returning unwashed containers
- **Zuni Café** *(San Francisco, CA)* - Partnered with the business Dispatch Goods for a full-scale conversion to reusable containers that is not optional and automatically included in the bill

Reuse Businesses and Organizations

A reuse business supplies reusable packaging and containers to vendors and customers, as well as tracking and logistics.

- **Canteen by Dig** - Brooklyn, NY. A mobile app that allows customers dining in Washington Square Park to rent and return food containers
- **Cup Club** - United Kingdom based. A business that provides returnable cups, both hot and cold, that sanitize their own products through scheduled drop-off and pick up times

- **GreentoGo** - Durham, NC. A business that provides membership-based service that allows customers to check out a reusable food container at participating restaurants
- **GoBox** - Portland, OR based business that provides reusable packaging to vendors and customers with customer subscription options
- **Dispatch Goods** - A business located in San Francisco, CA that partners with restaurants to provide reusable food containers and currently works with seventeen restaurants.
- **ENCORA** - Seattle, WA. A business that offers a free individual membership for reusable to-go containers that can be used on an individual, vendor, and corporate level
- **London Dabbawala Meal Box Delivery** - London. A business that offers a meal box delivery service, the London Dabbawala Meal Box Delivery or 'Tiffin Boxes', operating in the United Kingdom
- **Loop** - A business that partners with companies to pilot their reusable container programs that is available internationally, with current partners including big brands such as Kroger and Häagen-Dazs
- **Forever Ware** - Minneapolis, MN. A reusable food packaging company with a deposit return scheme
- **Useful** - Boston, MA. A reusable cup company that provides stainless steel cups, washing, and logistics for FSBs
- **Vessel** - A reusable cup company with operations in California, Colorado, and more

Appendix B: Interview Protocol

This is the standard set of interview questions asked to a variety of stakeholders whose positions included City municipal employee, reuse business owner/operator, reuse non-profit organizer, or green-business consultant. Additional questions were added to each interview in order to target specific aspects of the interviewee's role in the reuse system. These additional questions do not appear here because the variety was broad to be hyper-specific for each interview. Below is what a standard set of questions for an interview looked like, removing any specific information to maintain anonymity.

I. Email Contacting Potential Interviewee:

My name is _____ _____ and I am one of the University of Washington graduate student consultants working with Sego Jackson at Seattle Public Utilities (SPU) on creating a reuse/refill pilot in Seattle.

We are really interested in learning from your experience with reuse pilots. We have some background information on *specific organization's work*. Would you be willing to speak with us? We have set aside times in early April when our project team has availability here: https://calendly.com/.

We greatly appreciate any time and information you can provide us. Please let me know if you have any questions about our project. We are eager to provide SPU the best information possible so they can get a pilot up and running.

Sincerely,

II. Conducting the Interview

Interviews are scheduled for one hour. Upon accepting our invitation for an interview and selecting a time. The Interviewee was sent a Zoom link. Provided in the Zoom link email is a request to record the interview:

> We would like to ask for your permission to record this interview. This is only for our internal usage; to assist us with transcription and make sure we have accurate notes. All interview recordings will be deleted upon completion of this report.

All recordings were kept in a Google Drive folder and subsequently deleted when this project was completed.

Roles:

- Lead Interviewer:
- Supporting Interviewer:
- Note Taker #1:
- Note Taker #2:

Introductions and Recording:

- Evans Capstone Consultants introduce themselves and the project.
    - Pilot related to a single-use material
    - Ask again for permission to record.
- Interviewee describes their position and current work.

Main Questions:

1. How would you describe your business's work?
    a. What are you most excited about in your work currently?
2. Can you describe the current state of reuse and refill businesses?
3. Can you describe how a restaurant or cafe reuse pilot generally works?
4. What are the most important aspects of a pilot? (provide our framework for feedback)
5. How do you see a multi-business reuse pilot working?
6. What kind of assistance do FSBs need in a transition to durable reusables?
7. How would a city transition from a pilot to scaling up a reuse system?
8. How can pilots approach encouraging customer behavior changes?
9. How could a reuse system integrate multiple reuse businesses like Go Box?
    a. How would the system standardize reusable item size, washing, returns, scanning and tracking, labor standards, deposits/incentives?
10. What role should SPU play to support this type of pilot?
    a. What support would you like to have from SPU to support your business in Seattle?
    b. What support do Food Service Businesses need?
11. How can reuse/refill programs be accessible to individuals with disabilities?
    a. Who are low income
    b. Who have disabilities
    c. Without a smartphone
    d. Who live in less geographically dense areas
    e. Who primarily speak languages other than english
12. Is there anyone else you think we should talk to? (specific to our framework categories)

Secondary Questions:

13. Are there any pilots that have started during the COVID pandemic?
    a. What health and safety precautions did they take?
    b. What feedback have they gotten from customers?
    c. During COVID and the future implication of attitudes towards reuse systems due to germs/disease
14. How do pilot programs decide on materials; payment systems; pick up/delivery systems?
15. How can the pilot design and implementation process engage stakeholders?

16. Are there concerns from FSBs about marketing their business effectively with reuse foodware? I.e. logos on cups.

III. Follow-Up After Interview

The Evans Consulting team provided each interviewee with a follow-up email thanking them for their time and information. We included any specific follow-up questions we thought were pertinent and were unable to get answers to during the allotted interview time.

Appendix C: Equity in Food Packaging Enforcement Memorandum

To: Susan Fife-Ferris, Jeff Fowler, Sego Jackson, Sylvia Cavazos
From: Pat Kaufman, Veronica Fincher, Vicky Raya, Lynn Knapp (Cascadia Consulting), Miguel Nigenda (Cascadia Consulting), Joycelyn Chui (ECOSS), David Han (ECOSS), Brady Winsten
Date: 14 September 2020
Re: Equity in Food Packaging Enforcement

The Commercial Recycling, Composting, and Packaging Program provides education and technical assistance to Food Service Businesses (FSBs) to help them reach compliance with the food packaging Ordinance #123307. However, the program **does not currently enforce the ordinance using fines**. As businesses are aware that SPU does not enforce the ordinance, some choose not to comply. We would like to begin incorporating fines as a tool for increasing compliance, while continuing to stress education and assistance as our primary approach. To ensure that fines do not disproportionately affect small businesses and communities of color, we propose using a Targeted Universalism framework. Through this framework, we will establish an initial goal of 80% compliance and will only begin enforcement for an FSB sector once all segments within have reached that goal. This will ensure that, prior to enforcement, we have successfully alleviated barriers to compliance that are influenced by business sector, ownership structure, geography, ethnicity, and language. **To take the next steps toward enforcement as a strategy, we need approval to begin piloting this framework.**

Current Program Approach

Currently, outreach teams from SPU, Cascadia Consulting, Environmental Coalition of South Seattle (ECOSS), and Tilth Alliance provide education and technical assistance to FSBs through in person visits, phone calls, email, vendor events, and mailings. While this includes in-language assistance in more than 12 languages, there is little variation otherwise in the strategies we use to help businesses achieve compliance. When a business is found to be non-compliant, the Commercial Recycling and Composting program sends letters through mail and certified mail to inform FSBs of compliance issues. However, the FSBs are not fined.

FSBs are currently selected for outreach based on non-compliance reports, geographic focus areas selected annually, new business permits, and language capacity of SPU staff and consultants. While data is used in our selection process, it is not done in a way that systematically addresses gaps and barriers to compliance.

Proposed Modifications

In 2020, a working group comprised of members of the SPU Community Partnerships Team, Cascadia Consulting, ECOSS, and the Environmental Justice and Service Equity Division used SPU's Race and Social Justice Initiative Toolkit to assess how the Commercial Recycling and Composting program can begin enforcing the food packaging ordinance in a way that centers race and social justice. As a result of this process, the group recommends piloting the following modifications to the current program approach:

- Establish a Targeted Universalism goal of 80% FSB packaging compliance. This goal is based on current data and may be modified after further piloting.
- Enhance use of data and research to more strategically allocate resources and implement innovative and tailored approaches to effectively help each FSB segment reach the 80% goal.
- Incorporate fines as a compliance tool once the 80% goal is met by all segments within a sector. We will first assess barriers for the remaining 20% of businesses to determine if it is appropriate to proceed with enforcement.

Targeted Universalism Framework

This recommendation was created using Targeted Universalism, a framework developed by john a. powell[1], Stephen Menendian, and Wendy Ake at the University of California, Berkeley Haas Institute for a Fair and Inclusive Society.

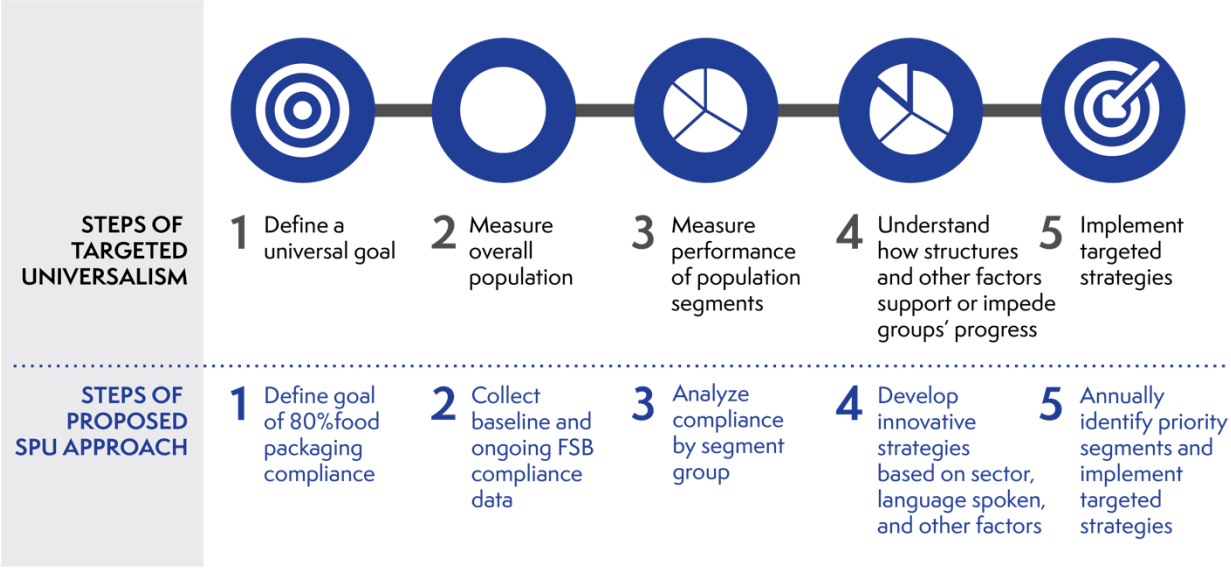
Targeted Universalism is used to build inclusive policies and programs by creating a universal goal and targeting strategies for different communities to reach that goal.

Targeted Universalism considers the barriers that marginalized communities face by acknowledging that groups are situated differently relative to institutions and resources. Targeted Universalism is used in many localities around the country in social service provision to build more equitable and inclusive communities.[2]

This framework offers us an opportunity for SPU to be a leader in racially equitable enforcement and integrate recommendations from SPU's Race and Social Justice Initiative Toolkit.

Steps of Proposed SPU Targeted Universalism Approach

Figure 1. Alignment of Proposed SPU Approach with Targeted Universalism



1. Define a Universal Goal

Previous research found that City-wide straw and utensil compliance was 64%, with Council Districts varying from 40%-90% compliance (Groening-Smith et al., 2019). Therefore, 80% was agreed on as a reasonable and achievable baseline compliance rate. Enforcement will only begin for a sector when each segment group within reaches 80% compliance. Our assumption is that once 80% of the sector and segment groups within have reached compliance, it is likely that businesses have access to adequate resources and support to comply with the ordinance. At that point, SPU may begin utilizing fines as a tool to achieve compliance for the remaining businesses within the sector.

SPU will have discretion to begin enforcement before 80% compliance if we have exhausted all avenues of support available to us, but this framework ensures that racial equity is always considered before fines are issued. SPU will also have discretion to delay enforcement if compliance has reached 80% but FSBs face continued barriers to compliance.

2. Measure Overall Population

As part of our initial pilot, we will first establish a baseline compliance rate by surveying 15-30 businesses from each sector and segment in each Council District to create a representative sample of FSBs. SPU staff and contractors will collect compliance data on all aspects of the food packaging ordinance and information on specific barriers each FSB faces.

Once the pilot is complete, we will continue to update compliance data each time we visit a business and assess compliance for each sector and segment at least annually.

3. Measure Performance of Population Segments

As part of the baseline and ongoing compliance measurement, we will analyze compliance by segment group for each sector. Previous research commissioned by SPU found that food packaging compliance varies by FSB type, Council District, and language spoken by the owner, indicating the need to tailor strategies to these categories (Smith-Groening et al., 2019). Therefore, the targeted strategies framework separates FSBs by segment based on type of business, business ownership structure, Council District, ethnicity and language spoken.

- Nine **FSB sectors** range from quick serve restaurants to grocery stores to bubble tea cafes, each having different packaging needs and barriers.
- **Ownership structure** includes independently owned, corporate owned, and franchisee run businesses, which informs the owner or manager's ability to change food packaging.
- **Council Districts** illustrate geographic trends in compliance and assist in identifying and addressing geographic barriers, such as availability of compliant packaging in local stores.
- Lastly, **ethnicity and language** categories allow cultural and linguistic specificity in outreach and allow us to address packaging needs and barriers for specific types of food. Analyzing data by ethnicity and language also helps identify and alleviate disproportionate barriers to compliance.

4. Understand How Structures and Other Factors Support or Impede Groups' Progress

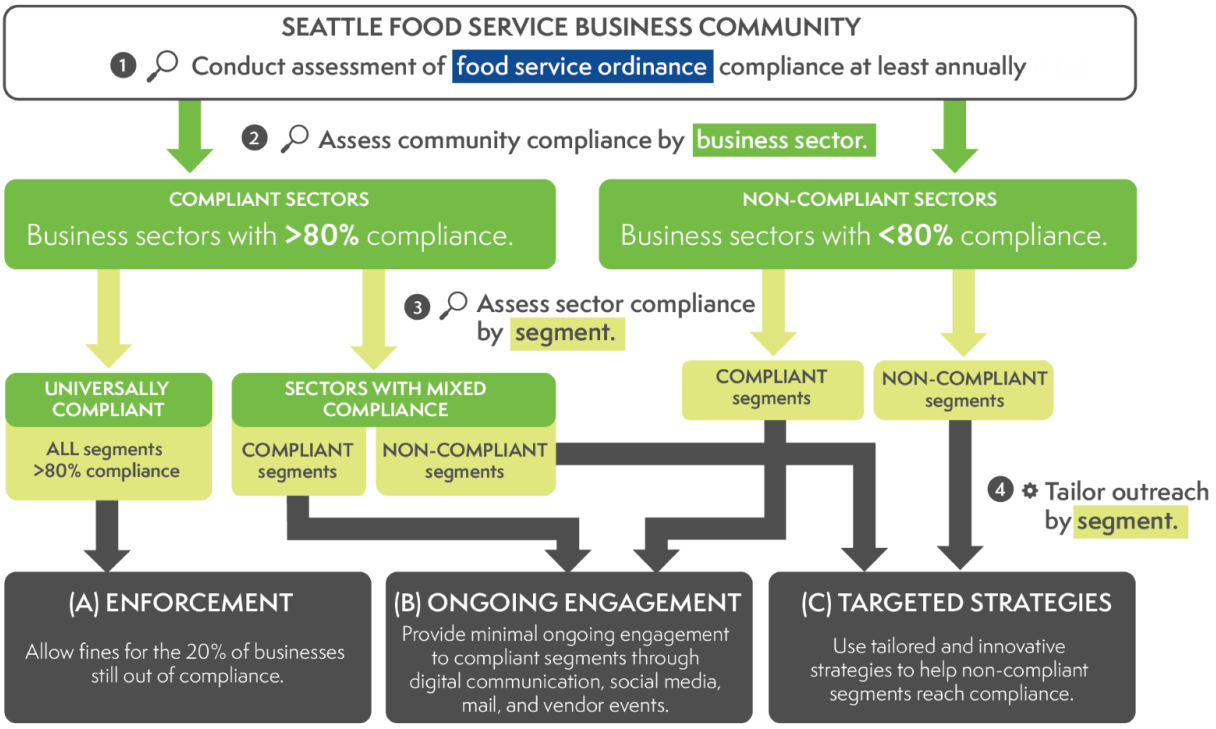
Based on the outreach team's knowledge and experience, we will develop summaries for each segment group documenting the history of outreach, relevant community stakeholders, and cultural considerations, as well as the segment's greatest barriers, opportunities, and resources required to achieve packaging compliance. Quantitative data from baseline collection surveys and qualitative data from the outreach team will be synthesized to inform initial prioritization of segments and the development of innovative and tailored approaches.

The initial baseline work will also help us identify gaps in our knowledge and experience for some segment groups. We will conduct additional research and/or bring on new partners to help us fill those gaps.

5. Implement Targeted Strategies

The Targeted Universalism process will involve an annual assessment of compliance for each FSB sector. We will prioritize Targeted Strategies for **non-compliant** ethnicity, language, Council District, and ownership segments within each sector. We will continue to maintain a low level of Ongoing Engagement with the **compliant** segments, such as through mailings and digital communication.
If during the annual assessment we find that all segments within a specific sector are at 80% compliance or higher, we will determine if it's time to begin Enforcement for the remaining 20% of businesses.

Figure 2. SPU Approach to Targeted Strategies



KEY

Food service ordinance	Business sectors	Segments
Foam packaging	QSR	Ethnicity
Compost/recycle packaging	Sit down restaurant	Language
Straw and utensil	Cafe: Bakery & Dessert	Council District (1-7)
Compost service	Cafe: Bubble tea	Type of ownership (corporate, franchise, independent)
Indoor collection bins	Food truck	
	Grocery w/ food service	
	Grocery w/out food service	
	Convenience stores	

Targeted Strategies

Targeted strategies will ensure more equitable and efficient allocation of SPU resources by tailoring strategies to narrow groups and focusing resources where we will have the greatest impact. Compliance data will illustrate trends within FSB sector, ownership structure, geography, or ethnicity and language that can be used to create innovative strategies to bring businesses into compliance. Tools could include packaging cost comparisons, improved outreach imagery, working with local stores to increase availability of compliant packaging, and more. Segment groups will be prioritized on an annual basis and phased in by quarter. Criteria for selecting segment groups include:

- The segment with the **largest number** of FSBs out of compliance. This group represents the largest opportunity for impact on compliance rates.
- The segment with the **largest percentage** of FSBs out of compliance. This segment may be smaller in number of FSBs but face significant barriers to compliance and may not have received support in the past.
- Segment groups that have **received minimal or no outreach** in the past. These groups have not been adequately engaged either because of small numbers, lack of data, insufficient capacity, or another reason.

An example of targeted strategies can be found in Story 1 in Appendix 1. SPU will identify additional partners to engage communities not represented within our current outreach team of staff and consultants. The timeline of engagement with priority segments will vary based on compliance barriers faced by FSBs, development of appropriate outreach materials, and other factors. The program will be modified as needed to reach equitable enforcement.

Ongoing and New Business Engagement

Compliant FSBs will be included in more general ongoing engagement, including digital communication, social media engagement, physical mail, and vendor events (See Story 3 in Appendix 1). New businesses will receive a letter and an in person visit outlining packaging requirements and gathering information on their barriers to compliance. If additional follow up is required, they will be assigned to the appropriate outreach team and provided with support (See Story 2 in Appendix 1).

Enforcement

Once a sector and all segments within reach 80% compliance, then an FSB can be issued a fine after a minimum of three in-language visits, and three notices by mail: an initial inspection form, a follow up letter, and final notice by certified mail. For franchise owners, SPU will assign an outreach specialist to engage corporate representatives before ticketing. Following the exhaustion of outreach efforts, FSB owners will receive one fine for non-compliant packaging, with the possibility of further fines for continued non-compliance. (See Story 4 in Appendix 1)

Enforcement data will be evaluated regularly to assess what type of FSBs are being fined and potential disproportionate enforcement burdens.

Next Steps

Stakeholder Engagement

Upon receiving approval to move forward with a Targeted Universalism approach to enforcement, our next step is a stakeholder engagement process to further refine our approach before piloting. We will collect feedback on aspects of our proposal from stakeholders including SPU staff, contractors and subcontractors engaged in outreach, and Food Service Business owners. We may modify our approach as a result of this feedback, such as changing the target groups. We will present any significant changes to SWLOB leadership before moving to the pilot phase.

We will design engagement based on public health guidelines for the COVID-19 pandemic and intend to complete the stakeholder process by December 2020. The timeline may shift if it is challenging to find Food Service Business owners with the capacity to engage at this time.

Piloting

Once the stakeholder engagement process is complete and our approach refined, we will move to the pilot phase. This phase will involve updating our database and forms, training outreach staff, conducting baseline research, identifying priority segment groups, and developing and implementing tailored engagement strategies. We will evaluate the success of the pilot project at increasing compliance with packaging requirements, and modify our Targeted Universalism approach to enforcement as needed. We will not issue fines during the pilot phase. At the completion of the pilot, we will present the outcomes and recommendations to SWLOB leadership.

We anticipate completing the pilot phase by December 2021, with the goal to begin implementing fines as a tool for compliance in 2022. Before implementing, we will first evaluate if the timing is appropriate so as to avoid undue burden on FSBs recovering from economic impacts of COVID-19.

Other Tools to Reach Compliance

The recommendation to develop targeted strategies stemmed from a Race and Social Justice Initiative toolkit process. This process also identified other key areas that could be addressed to increase FSB packaging compliance. These recommendations include:

- Partnering with King County Public Health to provide food packaging information and support during FSB business application and renewal
- Modifying the food packaging ordinance to place accountability on corporate owners of Quick Serve Restaurants rather than franchise owners

These recommendations could be considered as complementary to targeted strategies.

Appendix D: Reuse System Evaluation Tool

Category	Element	Description	Required Y/N	Rubric	Response	Max Score	Score
Cost	Cost to consumer	List the cost of enrollment and/or membership, deposit per item					
Cost	Cost to FSB	List the cost of enrollment and/or membership, deposit per item					
Equity	Low-income access plan	Describe the mechanism for providing no fee/no deposit access for qualifying customers					
Equity	Geographical Location	Describe the neighborhood/s served					

Equity	Race and Social Equity	Describe the effort to locate participating locations and washing facilities in demographically distinct census tracts					
Equity	Race and Social Equity	Describe how you will evaluate the system for its user demographics including race/ethnicity, language spoken, and other factors					
Equity	Disabled Access	List your plan to ensure single use cups and straws are available for customers with disabilities					
Equity	Disabled Access	List your plan to make return locations ADA accessible					
Accessibility	FSB Ease of Use	List your plan to supply the size and shape of products participating FSBs most often use					

Accessibility	Customer Ease of Use	List your plan to include new and existing customers with high convenience and usability. Include details of customer enrollment and membership					
Accessibility	Customer Ease of Use	List the locations of return locations for customers					
Environmental Impact	Break Even Point	Enter how many uses do your packaging items need to achieve to reach a net even environmental impact. If you have done an LCA, please attach here					
Environmental Impact	Transportation	Enter how many miles are between participating FSBs and the washing facility					
Environmental Impact	Transportation	Enter the type/s of transportation you will utilize: vehicle, bicycle, other					

Environmental Impact	Washing	Enter the form of washing: dishwasher, handwashing, etc					
Health and Safety	Washing	Enter if the washing process meet the Washington State Retail Food Code for washing method and the FDA Food Code for item thickness and weight					
Scalability	Including more FSBs	List how this reuse system could be expanded to include new FSBs					
Scalability	Including more Reuse Businesses	List how this reuse system could be expanded to include other reuse businesses					

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