2025

Day 1

Concurrent PM

12:45 PM
Oct 22
Track A

A Comprehensive Approach to Reuse & Reduction at Universities

Moderator: Olivia Johnson

NATIONAL ZERO WASTE CONFERENCE

Speakers:
Sarah Healey
Devin Rauscher
Savannah Robledo

ZERO WASTE USA

Boston University Sustainability

WELCOME.

A Collaborative Approach to Standardizing Reuse and Reduction

Sarah Healey
Zero Waste Manager

Devin Rauscher
Zero Waste Data Intern

BOSTON UNIVERSITY

Agenda

1. Introductions

2. Boston University Background
   a. Zero Waste Plan
   b. Zero Waste Progress
   c. Reduction & Reuse Roadmap

3. Reuse and Reduction Data
   a. Goals
   b. What we Track
   c. How we Track
   d. Best Practices

4. How can you do this?

Introduction

- Sarah Healey (Any/All) – Zero Waste Manager
  - TRUE Zero Waste Advisor
  - Zero Waste Associate
  - Founding member of the MassRecycle Campus Collaborative (MRCC)
  - MBA Sustainable Innovation – UVM

- Devin Rauscher (He/They) – Zero Waste Data Intern
  - BU Sustainability – Zero Waste Data Intern
  - 3 years interning with our team
  - BU Class of 2026

Boston University

- Located in Boston, Massachusetts
- 29,854 Students (undergraduate + graduate)
- 10,461 Employees
- 3 campuses in Boston (Charles River, Fenway & Medical)
- Total Campus Area: 918 Acres
- Total Building Space: 15,591,247 Gross sq ft
- Diversion rate: 54%
- Reduction since 2006: 45%

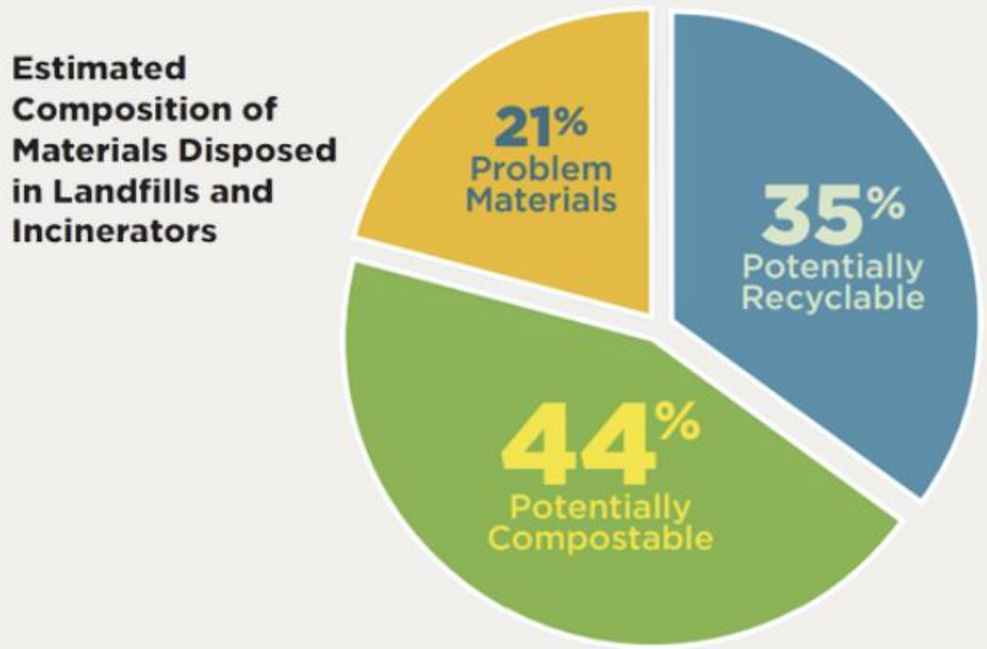
Boston University Sustainability

Zero Waste Plan

Target: 90% Diversion by 2030

Meaning, we divert more than 90% of our total materials generated from landfill and incineration by 2030. We have 6 main categories of initiatives to achieve this goal:

- Redesign
- Reduce
- Reuse
- Recycle/Compost
- Culture Change
- Market Development



Boston University Sustainability

Zero Waste Plan

Tracking our progress is key to meeting this target

- Rolled out in 2021
- Developed through a 54-person task force

2019 Stats

Zero Waste Plan Baseline Year

- Simple Diversion Rate: 42%
- Complex Diversion Rate: N/A
- Total Waste Generation: 9,708 tons

2025 Stats

Zero Waste Plan Baseline Year

- Simple Diversion Rate: 54%
- Complex Diversion Rate: 56%
- Total Waste Generation: 6,148 tons

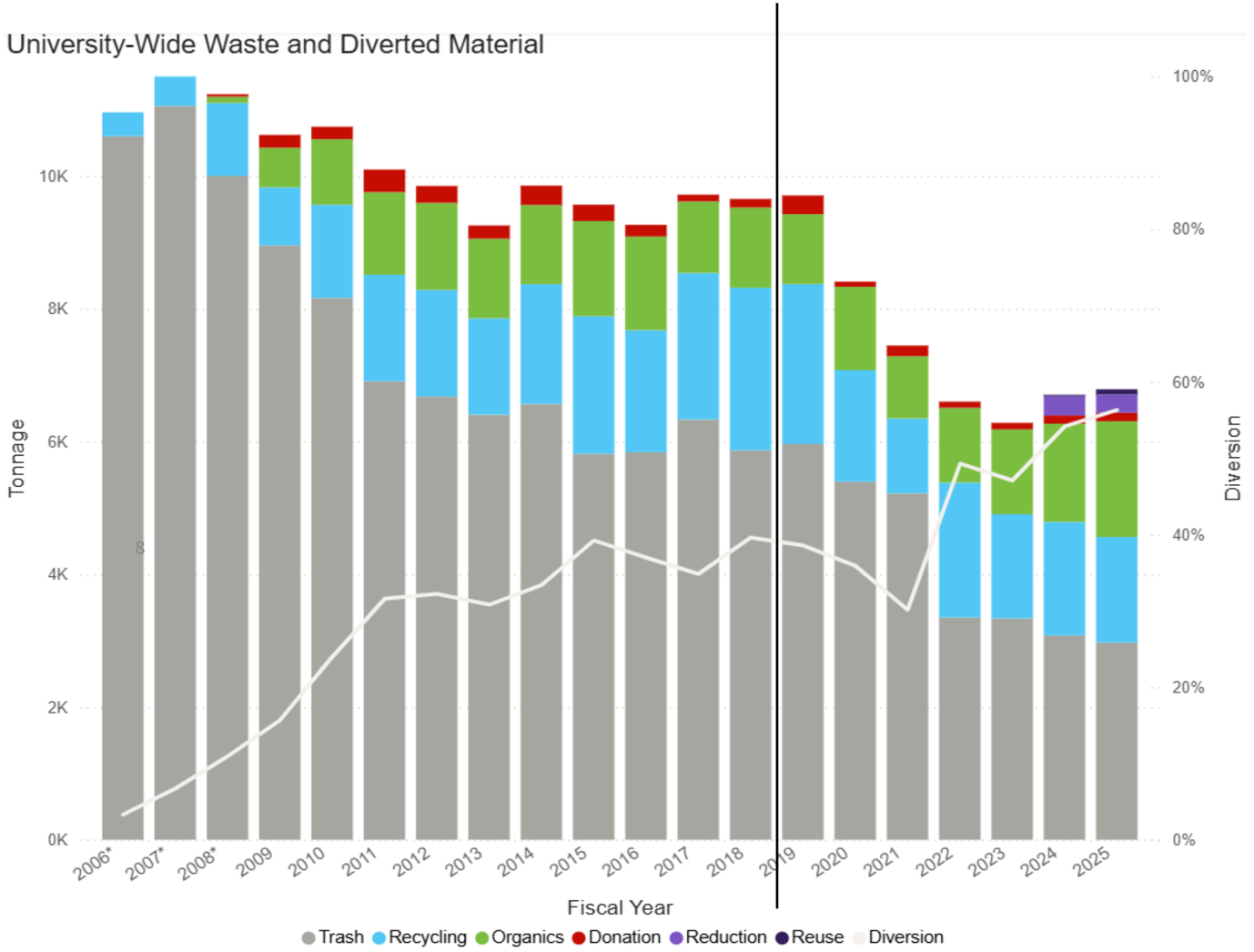
Waste Reduction Over Time

Baseline Year for Measuring Zero Waste Progress: FY2019

Last non-covid year prior to the implementation of our ZWP

Reduction from 2019

39%

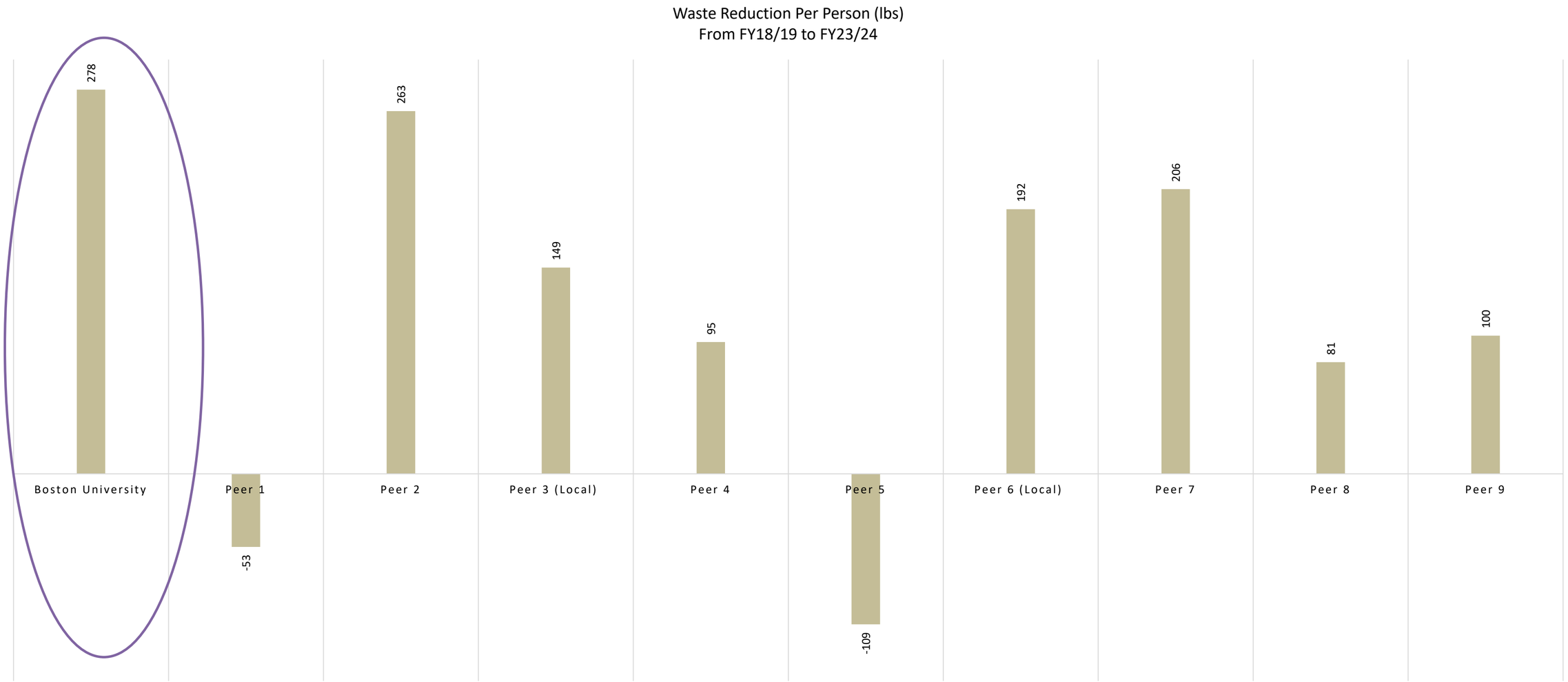


During this time frame we:

- Increased campus size by more than 600,000 gross sq ft
- Increased FTE (Faculty, Staff & Students) by more than 3,500

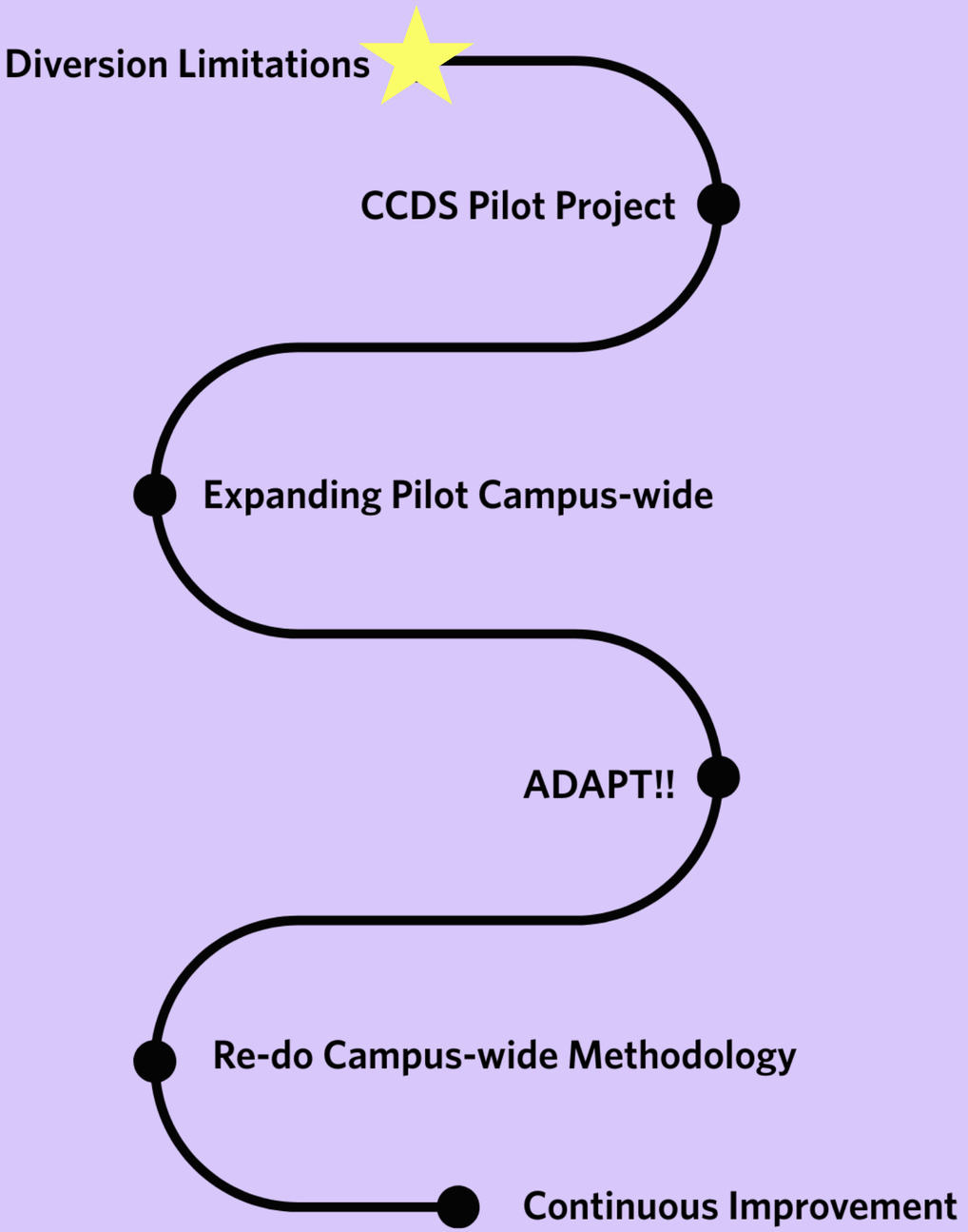
Boston University Sustainability

Reduction Benchmarking



Identify Limitations

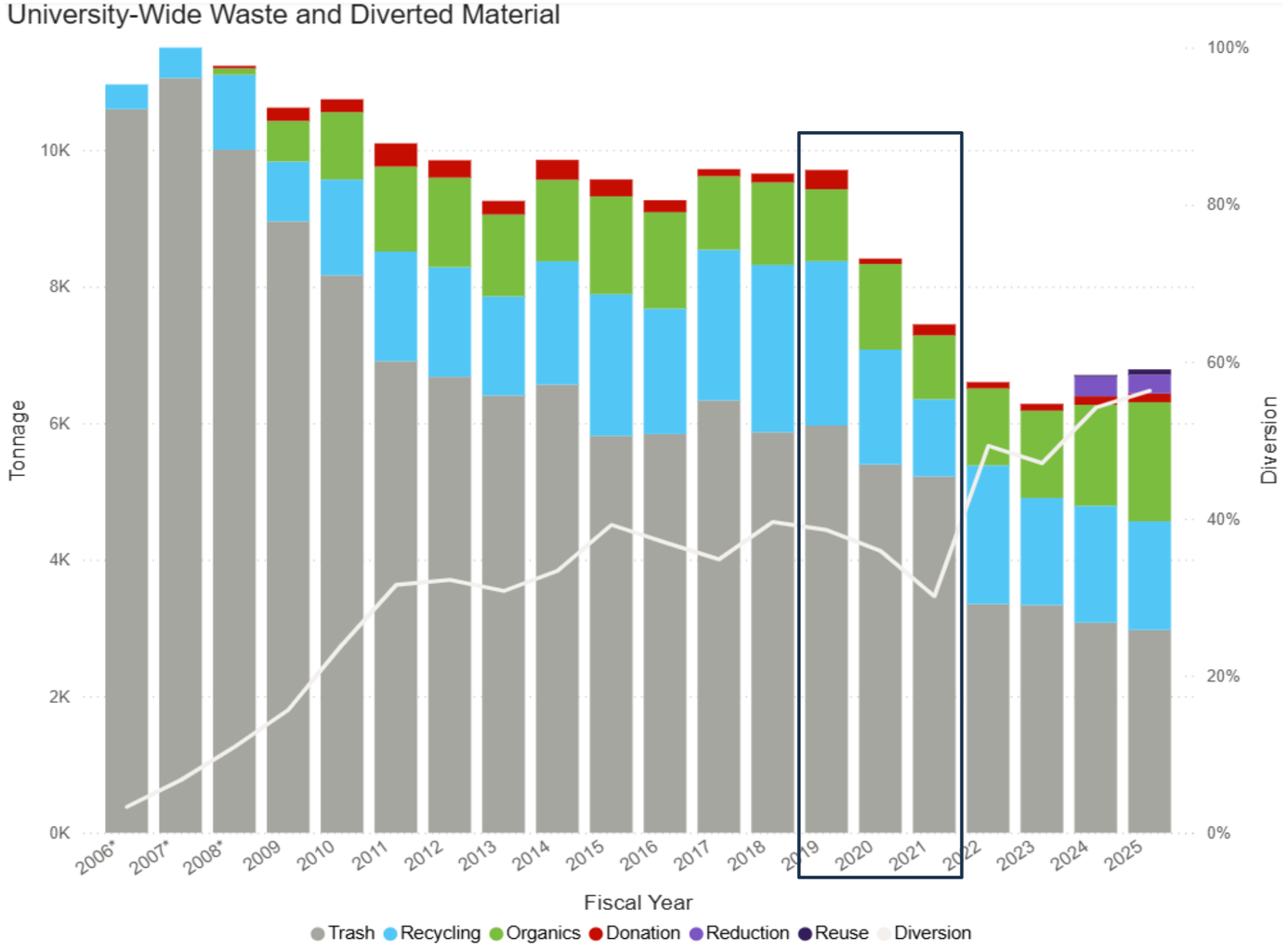
- Started with an ambitious Zero Waste Goal for a new LEED platinum building that was constructed with zero waste in mind
- Found limited diversion potential without including reduction and reuse from built-in design features (hand dryers)



Why Reduction & Reuse

- Highest on the zero waste hierarchy
- The overall goal is less waste - reduction & reuse are the most impactful strategies
- If we continue to reduce materials across all waste streams, our diversion rate will stagnate or decrease, particularly if reduction occurs in streams other than trash
    - To more accurately represent our progress towards 90%, we must incorporate “lost” streams into our diversion rate

ZWP Gaps: Reuse & Reduction

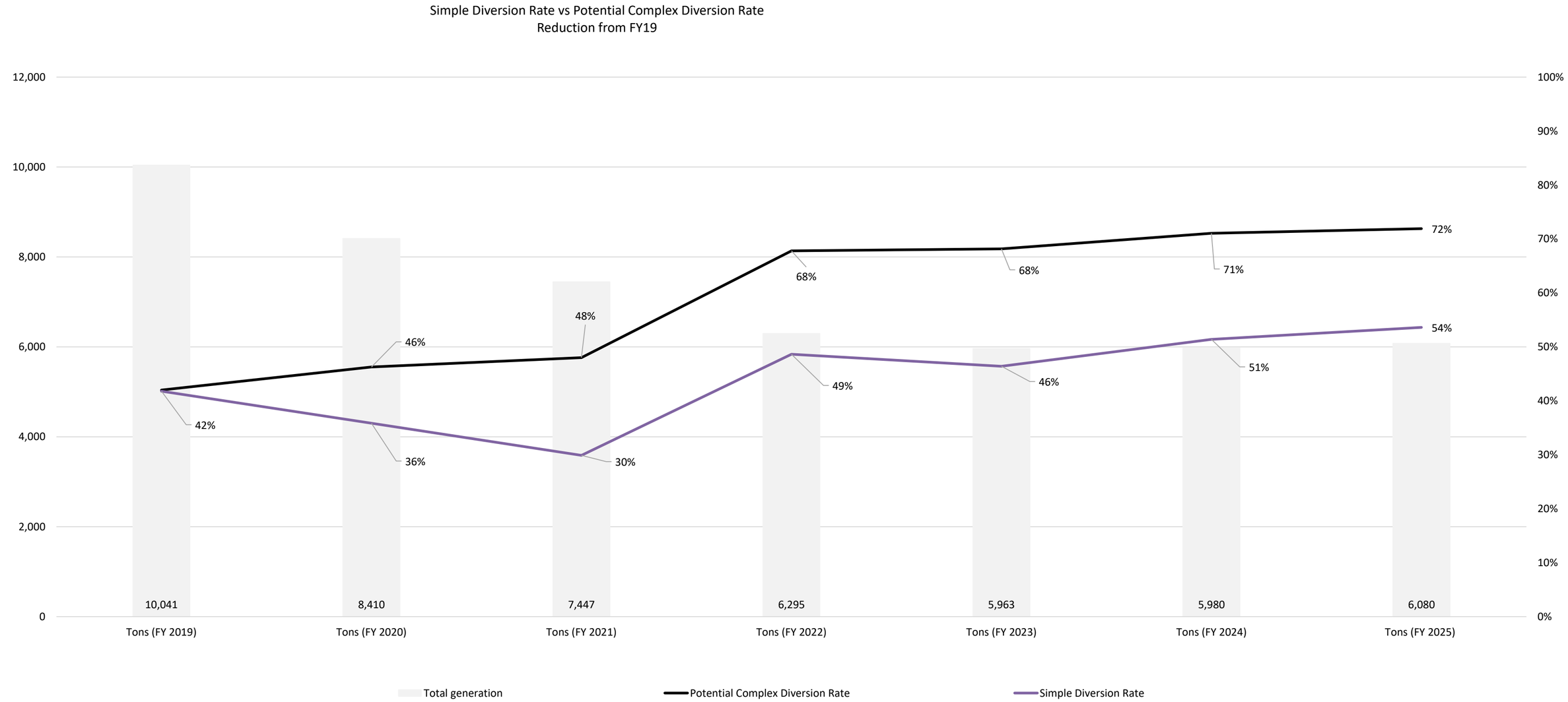


	2019	2020	2021
Tonnage	9,708	8,410	7,447
Diversion	39%	36%	30%

	2019	2020	2021
Tons Reduced since FY19	-	1,298	2,261
Potential Diversion w/ Reduction	39%	44%	46%

Boston University Sustainability

Zero Waste Progress Report

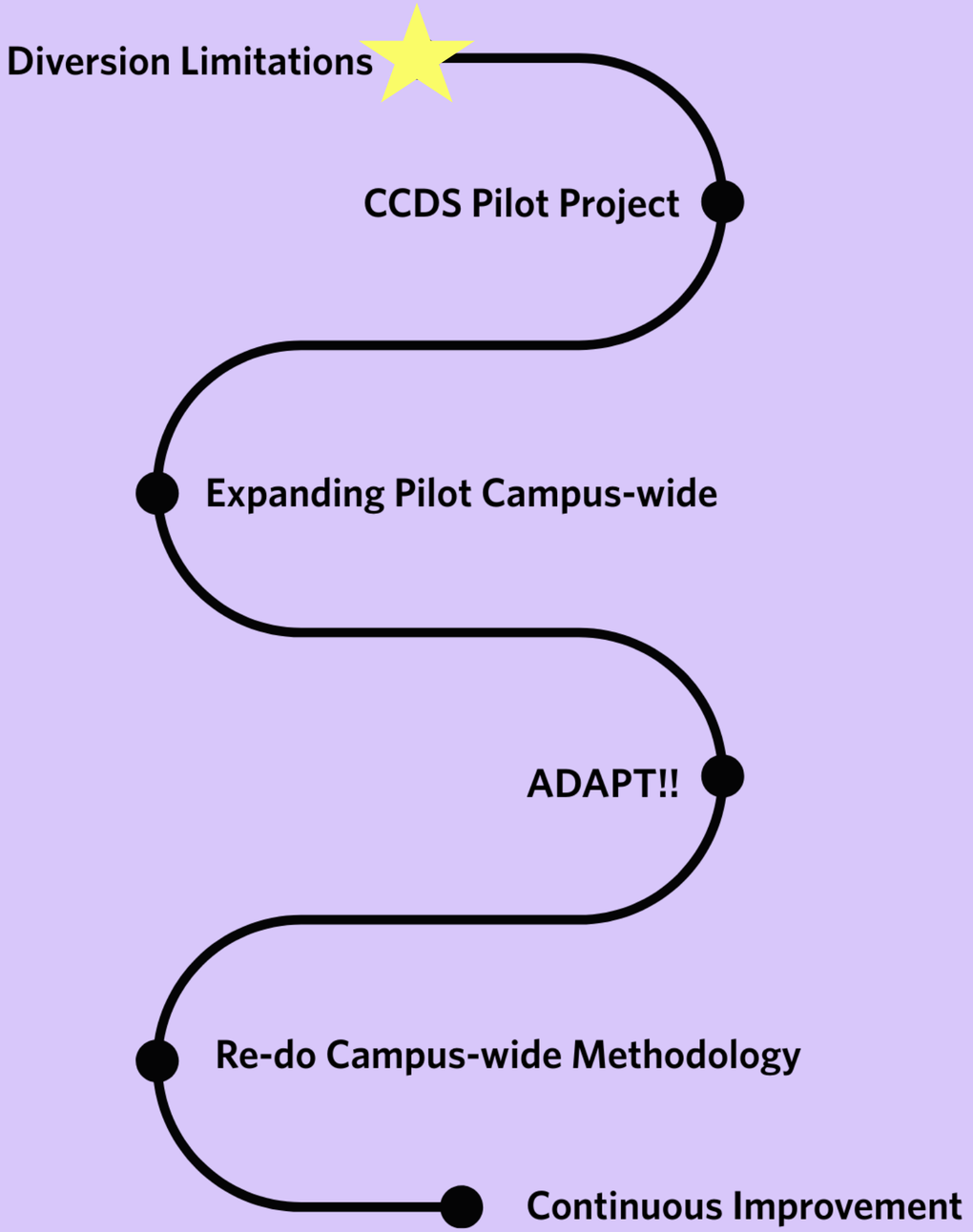


The Reuse & Reduction Landscape

The conservation of all resources by means of responsible production, consumption, *reuse*, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health. -- ZWIA

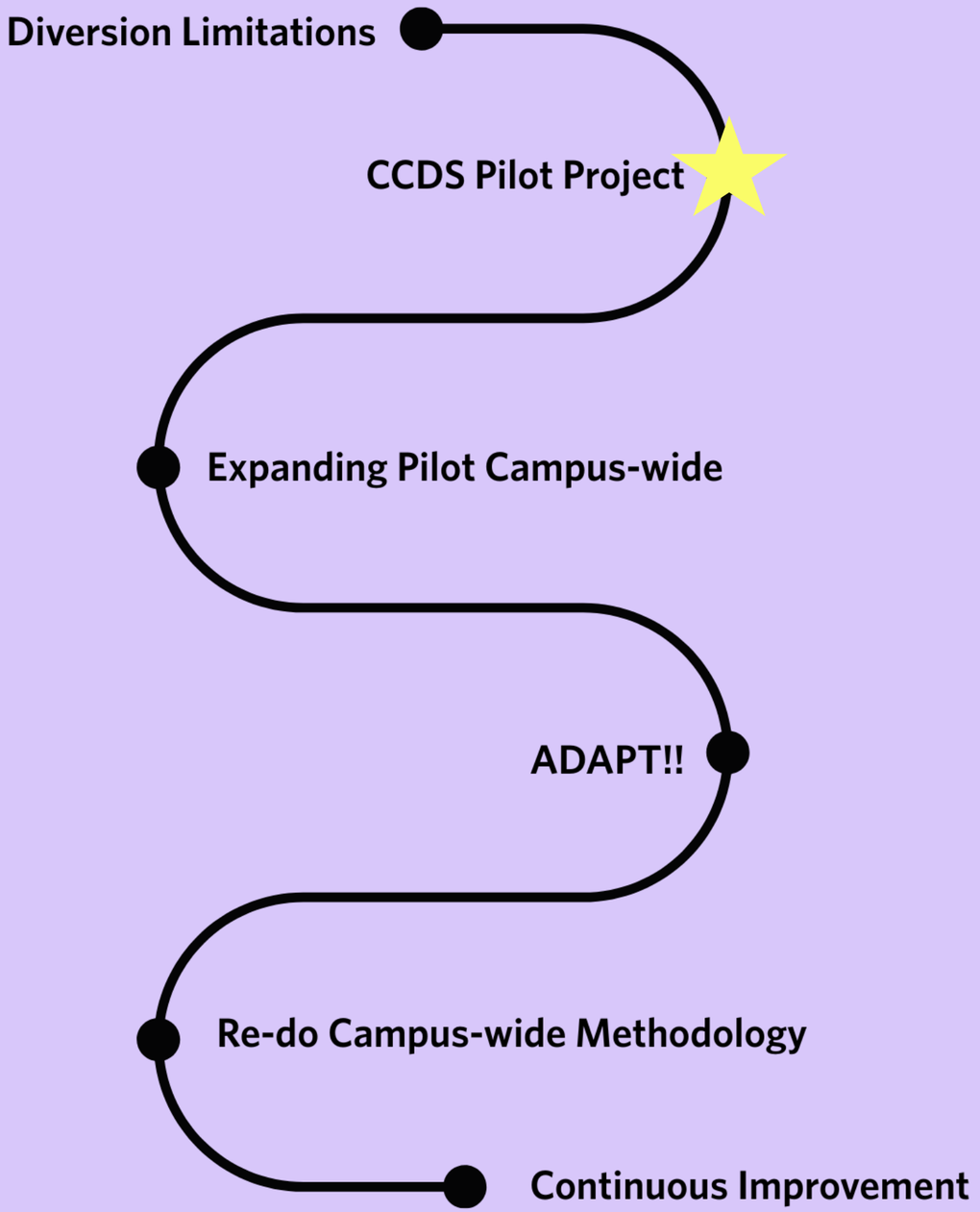
Getting Started

- Used a single building as a pilot that laid the groundwork for tracking reduction and reuse
- Allowed us to test materials that were “worth it” – balance tracking difficulty and impact
- Needed to first define reduction and reuse



Getting Started

- Used a single building as a pilot that laid the groundwork for tracking reduction and reuse
- Allowed us to test materials that were “worth it” – balance tracking difficulty and impact
- Needed to first define reduction and reuse



Boston University Sustainability

Defining Reduction

Reduction:
Reduction can be thought of as the theory of choice; you are choosing a reusable item over a disposable item that would be thrown away. Reduction is counting theoretical items that do not exist because they are no longer being made and purchased because a reusable item is instead being made and purchased.

Defining Reuse

Reuse:
Reuse can be thought of as a 1:1 exchange of goods. You are giving an object that would otherwise have been thrown away a new life, while at the same time avoiding another purchase of that same item. You are not replacing an otherwise disposable item; you are eliminating the purchase of a new, identical item. Reuse is counting tangible items.

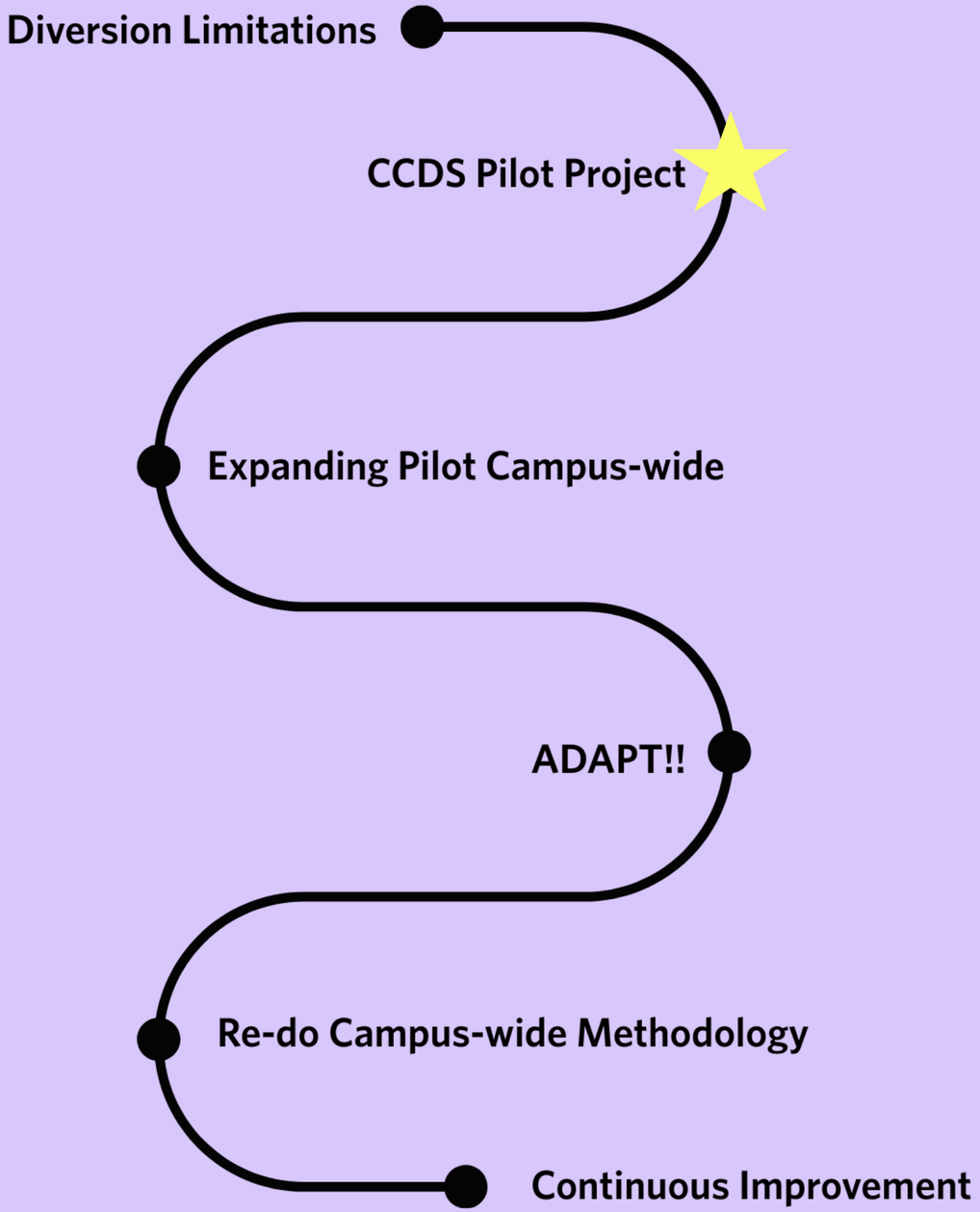
Ex: Pallets, Furniture

Expansion

- Took initial methodology and tried to expand scope of those materials for the whole campus

- Challenges
  - Methodology didn't easily scale
  - Calculations didn't make sense at full campus level
  - Certain materials were only being reused or reduced in that one building

- Positives
  - Better availability of data at a campus-wide level

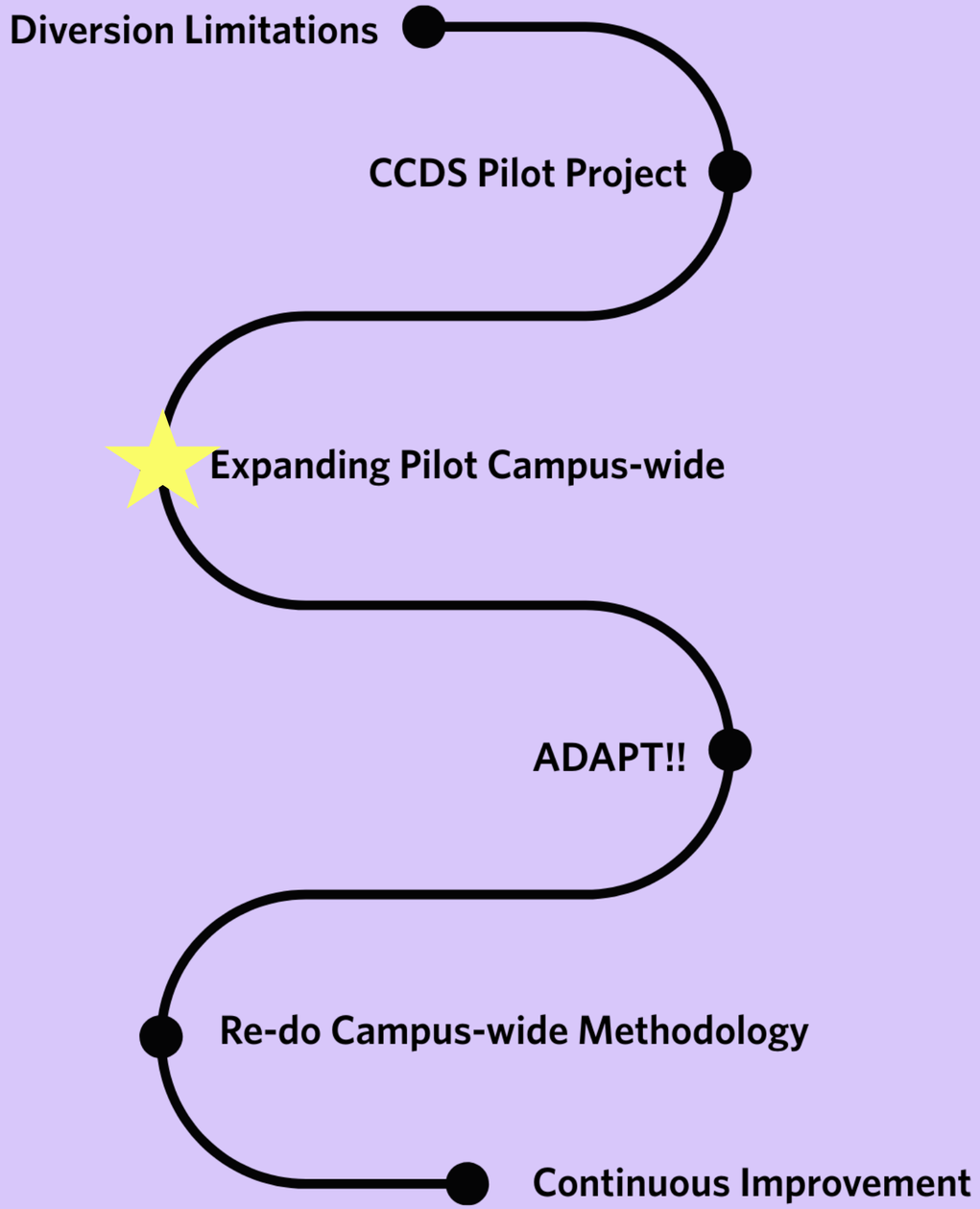


Expansion

- Took initial methodology and tried to expand scope of those materials for the whole campus

- Challenges
  - Methodology didn't easily scale
  - Calculations didn't make sense at full campus level
  - Certain materials were only being reused or reduced in that one building

- Positives
  - Better availability of data at a campus-wide level

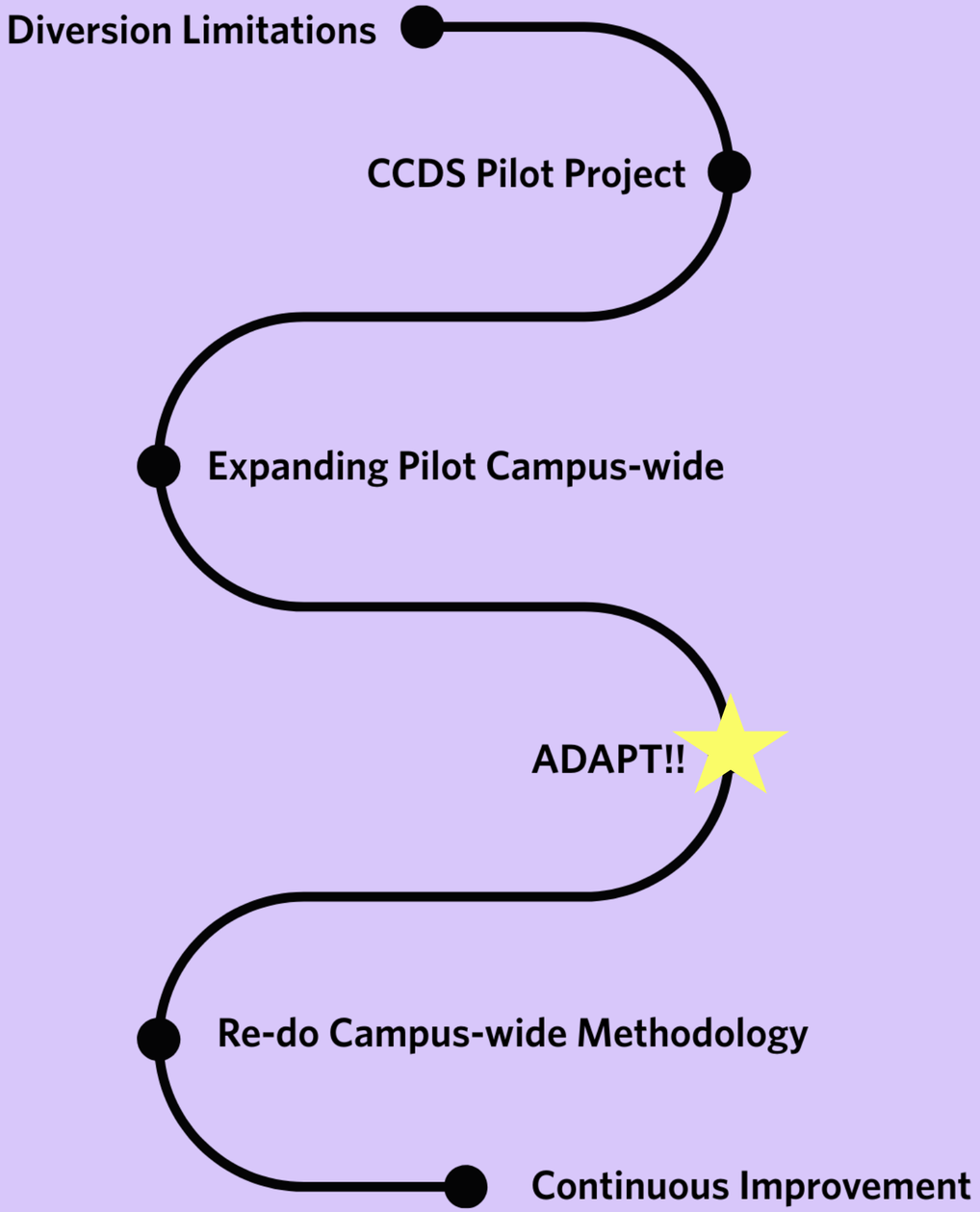


Expansion

- Took initial methodology and tried to expand scope of those materials for the whole campus

- Challenges
  - Methodology didn't easily scale
  - Calculations didn't make sense at full campus level
  - Certain materials were only being reused or reduced in that one building

- Positives
  - Better availability of data at a campus-wide level



Adapting Our Methodology

Paper Towels (CCDS Only)

The CCDS building was designed for Zero Waste, which included hand dryers being installed in all bathrooms.

Challenges:

- Paper towel purchases are by custodial area, not specific buildings
- No baseline data
- New building space

Scope: CCDS

Data Source: Custodial Averages

- # of rolls per week
- Broken down by space type

Responsible Team(s): Custodial

Difficulty: Hard

Paper Towels (Campus-wide)

The CCDS building was designed for Zero Waste, which included hand dryers being installed in all bathrooms.

Adapting:

- Purchasing data was readily available broken down by custodial area
- Baseline data from 2019
- Accounting for changes in sqft by normalizing data

Scope: Campus-wide

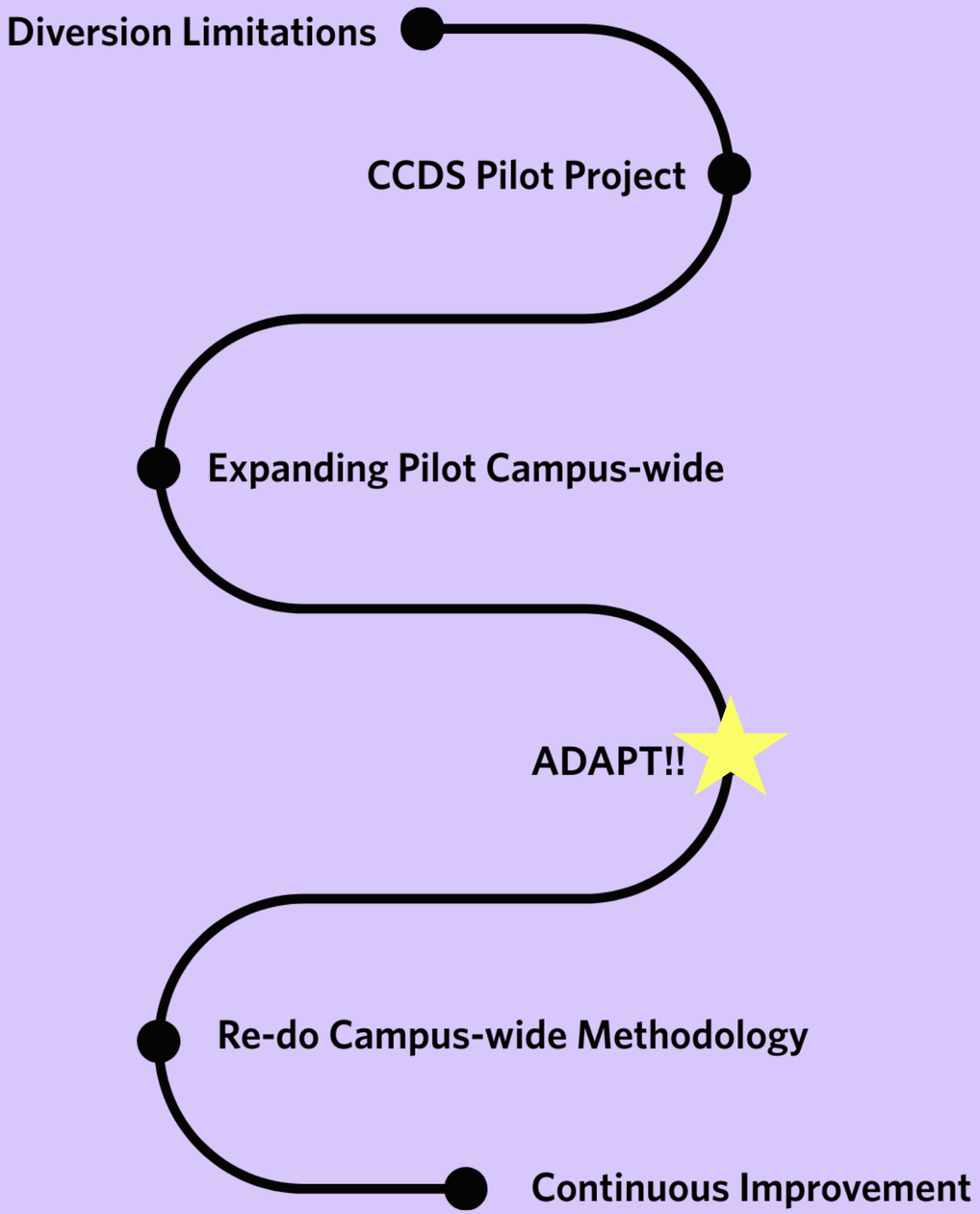
Data Source: Procurement data

Responsible Team(s): Custodial

Difficulty: Easy-Medium

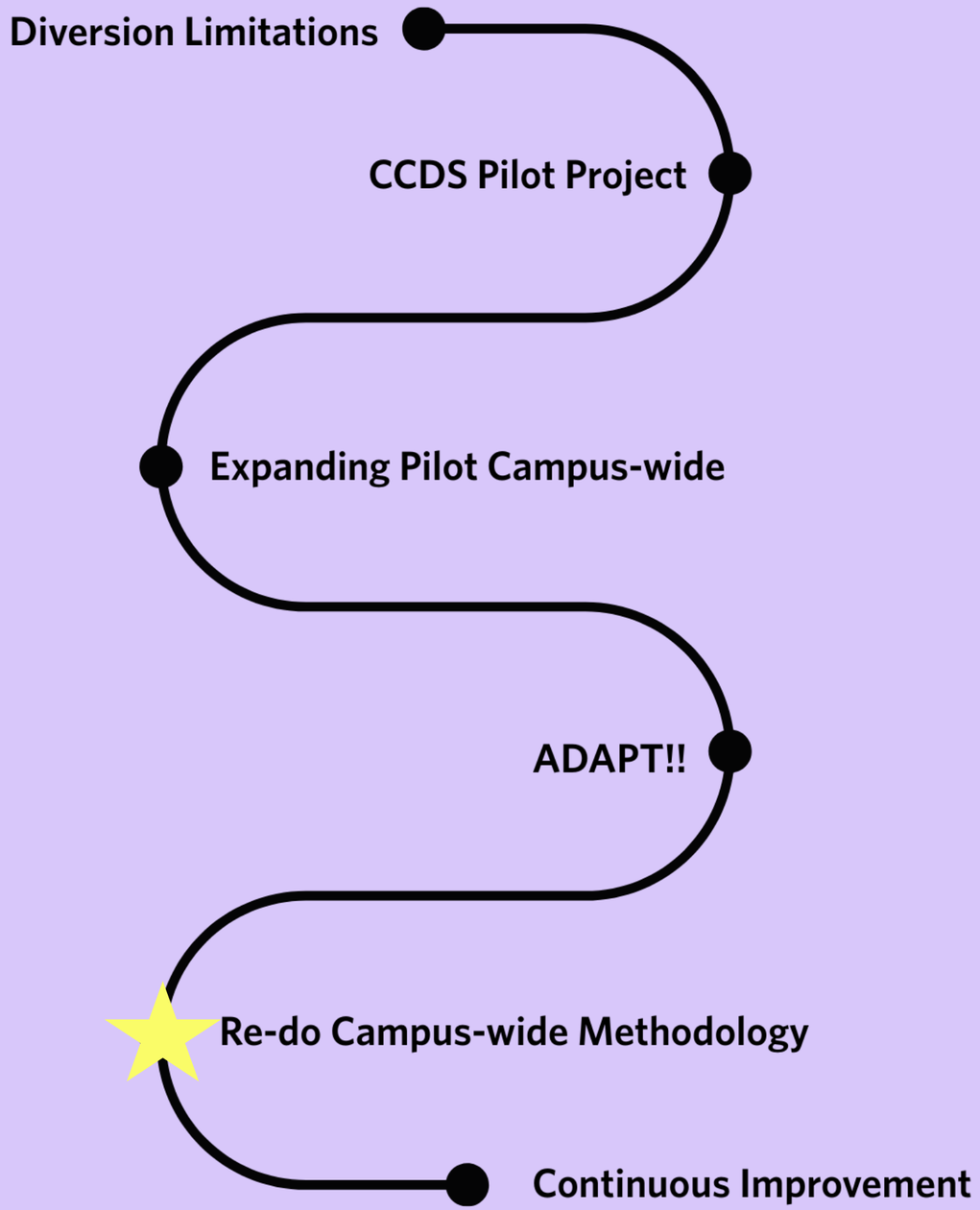
Back to the Drawing Board

- Built a new methodology using better more available data
- Developed a stronger more transparent base of assumptions
- Added new materials that were being reduced or reused outside of a single building.
- Continuous expansion



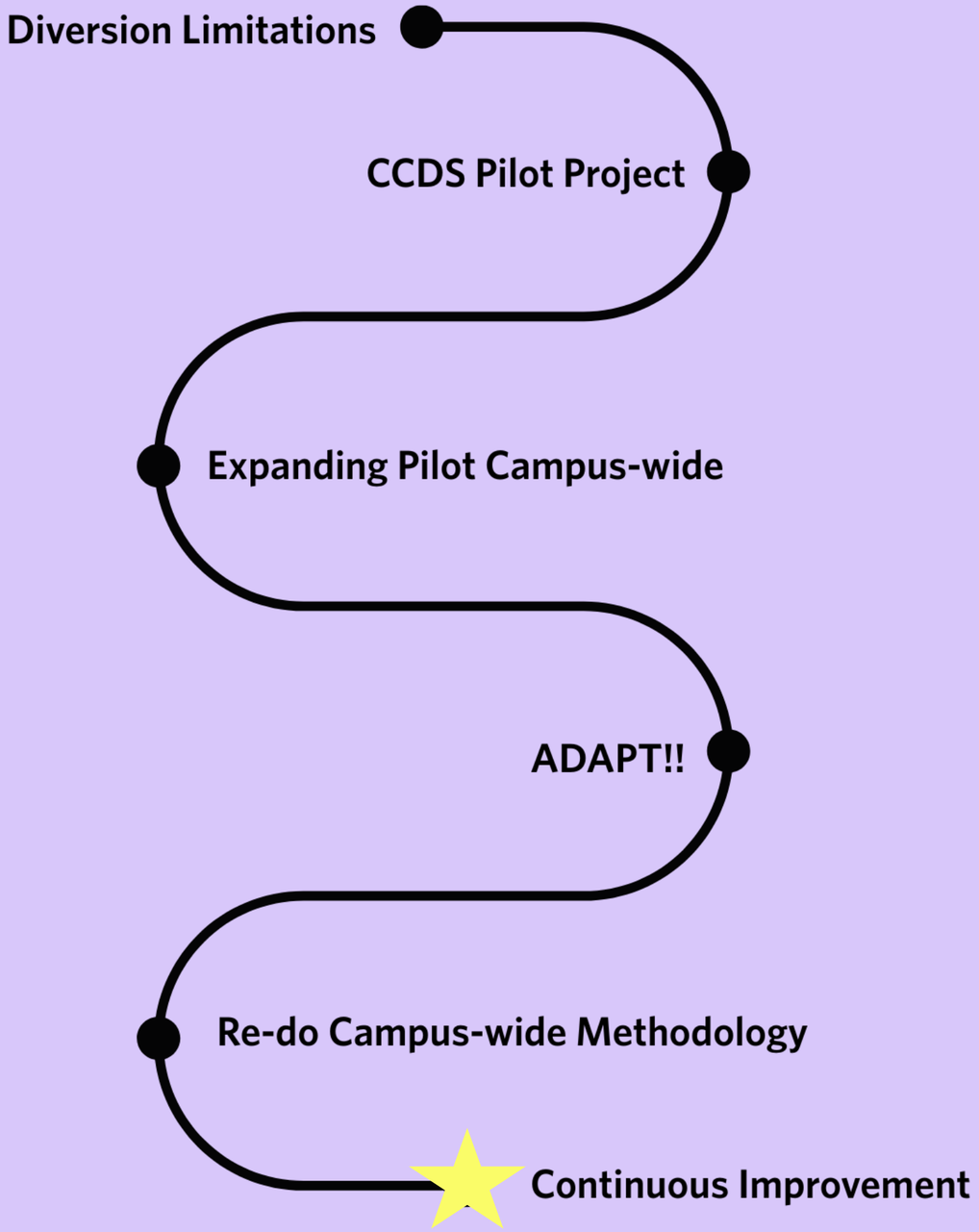
Back to the Drawing Board

- Built a new methodology using better more available data
- Developed a stronger more transparent base of assumptions
- Added new materials that were being reduced or reused outside of a single building
- Continuous expansion



Back to the Drawing Board

- Built a new methodology using better more available data
- Developed a stronger more transparent base of assumptions
- Added new materials that were being reduced or reused outside of a single building
- Continuous expansion



R&R Goals

- Identify additional materials being reduced or reused
- Build detailed and accurate methodology and justification for inclusion for every material stream
- Utilize our methodology to standardize and inform reduction & reuse tracking amongst our peers for improved peer-to-peer benchmarking for Zero Waste

Reduction

Program Name	Scope	Impact Potential	Priority for Tracking	Difficulty to track	Have we discussed it?	Are we tracking it?	Credits	Reason for inclusion	Method for retrieveing data	Actual/Estimate	Monthly/Annually	Completion
Choose to Reuse	Campus-wide	High	High	Easy	Yes	Yes	Reduce credit 1 Reuse credit 1 Reuse credit 5 Redesign credit 3	Eliminates the use of single-use containers	Topanga dashboard	Actual	Monthly	100%
Hand Dryers (Paper Towels)	campus-wide	High	High	Easy	Yes	Yes	Reduce credit 1 Reduce credit 4 Redesign credit 3	Eliminates use of paper towels	Comparison of procurement data from FY19 to current year adjusting for changes in sq ft.	Estimate	Annually	100%
Communal Waste Bins (Trash Bag Liners)	CCDS (current); Campus-wide (FY	Medium	Medium	Easy	Yes	Yes	Reduce credit 1 Reduce credit 4 Redesign credit 3	Eliminates desk side bins and bag liners	Determine average number of bags used per week based on space type and occupancy	Estimate	Annually	100%
Catering Reusables (Zero Waste Catering)	Bldg Specific	High	High	Medium	Yes	Yes	Reuse credit 1 Reuse credit 5 Redesign credit 3	Eliminates the use of single-use dishware and tablecloths	Catering report and number of attendees from 25 live	Estimate	Monthly	50%
Catering Reusables (China)	Campus-wide	Low	Medium	Easy-Medium	Yes	No					Monthly	0%
Post-Consumer Food Waste Reduction	Dining	High	High	Medium	Yes	Yes	Compost Credit 4 Reduce Credit 2		Data from Lexie weigh the waste events	Estimate	Semesterly	100%

Reuse

Program Name	Scope	Impact Potential	Priority for Tracking	Difficulty to track	Have we discussed it?	Are we tracking it?	Credits	Reason for inclusion	Method for retrieveing data	Actual/Estimate	Ongoing/Monthly	Completion
Office Kitchen Reusables	Bldg Specific	Medium	Medium	Hard	Yes, working on methodology	No	Reuse credit 1 Reuse credit 5 Redesign credit 3	Eliminates the use of single-use dishware in office kitchens	Determine average use of kitchen items	Estimate	Monthly	25%
Milk Jugs	Bldg Specific	Low	Medium	Easy	Yes	Yes	Reuse credit 1 Redesign credit 3	Eliminates the use of plastic milk cartons	Determine average number of reusable glass jugs used by CDS and taken back each week dpeending on occupancy	Estimate	Monthly	100%
Furniture Re-use (Trucking)	Campus-wide	High	Medium	Medium	Yes	Yes	Resude credit 1 Redesign credit 4	Furniture is reused rather than thrown away and re-purchased	Use work order to identify furniture redistribution	Estimate	Monthly	75%
Furniture Re-use (PDC)	Project Specific											0%
Stockroom	Campus-wide	Medium	High	Easy	Yes	No	Resude credit 1 Redesign credit 4	Resue of boxes and film plastic for shipping items across campus		Estimate	Monthly	100%

Removed

Program Name	Scope	Impact Potential	Priority for Tracking	Difficulty to track	Have we discussed it?	Are we tracking it?	Credits	Reason for inclusion	Method for retrieveing data	Actual/Estimate	Ongoing/Monthly	Completion
Cleaning supplies		Low	Low	Hard	No	No						
Toilet Seat Covers		Low	Low	Hard	Exclude	No						
Light Bulbs	Campus-wide	Medium	High	Medium	Yes, exclude for now	No						
Dining Reusables at main dining halls	Campus-wide	High	Low	Medium	Yes, exclude	No						

Program Name	Choose to Reuse	Hand Dryers (Paper Towels)	Stockroom	Office Kitchen Reusables
Scope	Campus-wide	Campus-wide	Campus-wide	Building-specific
Impact Potential	High	High	Medium	Medium
Priority for Tracking	High	High	High	Medium
Difficulty to Track	Easy	Easy	Easy	Hard
Have we discussed it?	Yes	Yes	Yes	Yes, working on methodology
Are we tracking it?	Yes	Yes	No	No
Credits	Reduce credit 1 Reuse credit 1 Reuse credit 5 Redesign credit 3	Reduce credit 1 Reduce credit 4 Redesign credit 3	Reuse credit 1 Redesign credit 4	Reuse credit 1 Reuse credit 5 Redesign credit 3
Reason for Inclusion	Eliminates the use of single-use containers	Eliminates use of paper towels	Reuse of boxes and film plastic for shipping items across campus	Eliminates the use of single-use dishware in office kitchens
Method for Retrieving Data	Topanga dashboard	Comparison of procurement data from FY19 to current year adjusting for changes in sqft		Determine average use of kitchen items
Actual/Estimate	Actual	Estimate	Estimate	Estimate
Monthly/Annually	Monthly	Annually	Monthly	Monthly
Completion	100%	100%	100%	25%

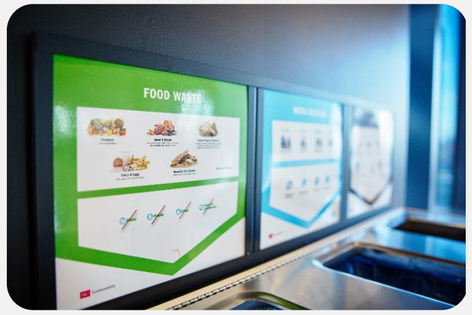
Example Reduction Streams

Trash Bag Reduction

Through waste bin updates and operational changes, we have been reducing the amount of trash bags used.

Scope: Across all campuses
Data Source: Procurement data
Responsible Team(s): Custodial, Stockroom
Difficulty: Low

11.86 Tons Reduced



Soup Reduction

Through purchasing soups from a local retailer, rather than making them all in-house, we have reduced food waste from soups in our dining halls.

Scope: Dining halls
Data Source: Dining
Responsible Team: Dining
Difficulty: Low

8.58 Tons Reduced

Choose-to-Reuse

Students have the option to use reuseable containers at our retail dining locations, rather than single-use containers.

Scope: Across all campuses
Data Source: Topanga
Responsible Team(s):
Difficulty: Low

7.68 Tons Reduced

Example Reuse Streams

E&C Summer Reuse

Every summer, the Events and Conferences department hosts more than 15,000 overnight guests in campus accommodations. They reuse and store items like bedding, linens, and air conditioners for attendees.

Scope: Charles River Campus
Data Source: Events and Conferences
Responsible Team: Events and Conferences
Difficulty: Low

37.78 Tons Reused

Reusable Delivery

The stockroom has developed a system to collect and repurpose cardboard boxes and bags. They utilize them to deliver stockroom supplies around campus.

Scope: 120 Ashford Street
Data Source: Stockroom
Responsible Team: Stockroom
Difficulty: Low

13.91 Tons Reused

Furniture Reuse

Through the Reuse Teams group, PDC and departmental reuse, we have been able to track items reused that are moved by BU trucking.

Scope: Across all campuses
Data Source: Trucking FSR Report
Responsible Team(s): Trucking, PDC, ZW
Difficulty: Medium

14.65 Tons Reused

Boston University Sustainability

Total Data Recap

Reduction Programs

- Oil jibs
- Post-consumer food waste
- Soup
- Choose-to-Reuse
- Printer paper
- Paper towels
- Single-use dining
- Trash bags
- Plastic water bottles
- Bean-to-cup brewers

274.76 Tons Reduced

Reuse Programs

- Furniture
- Stockroom cardboard boxes
- Miscellaneous campus reuse
- Milk jugs
- Reusable delivery containers
- Events & Conferences summer programming

78.38 Tons Reused

We count reuse and reduction together as our R&R category.

FY24 - 311 Tons

FY25 - 353 Tons

Best Practices

Develop a Prioritization Process

- Track all possible items in a spreadsheet even if data is not yet available
- Prioritize by:
  - Impact potential
  - Data availability
  - Difficulty of calculating
- Skip items with low potential that are too difficult and stalling progress

Develop Templates for Common Data Sources

- Determine category groups for like materials that use similar data sources
- Develop template spreadsheets with standard methodology for like materials
- Example: Items utilizing procurement data
  - Paper Towels
  - Trash Bags
  - Office Paper

Standardize Assumptions

- Develop and document standards for all assumptions used in calculations
- Example: Furniture
  - Have a master document with furniture pieces and their estimated weight and where that weight estimate came from

Best Practices

Centralize Data Reporting

- Maintain a single spreadsheet to track total weight for all materials
- Create individual spreadsheet for each material and calculation per year
- In the same place as the individual spreadsheet, create folder to add back-up documentation
- Maintain a single document with written methodology

Validate Data & Integrate Transparency

- Given the wide variation in materials, having a transparent process with detailed methodology helps maintain clear reporting
- Develop a process for validation that isn't just a single person
- Report on progress to internal and external stakeholders, don't make strides without buy-in

Build Flexible Methodology Architecture

- Develop framework to scale from pilot to full campus
- Have a documented process for adding new materials or revising existing materials
- Discuss new materials definitions and methodology with stakeholders

Your turn!

Getting started:

- Identify a list of materials/programs you are interested in tracking (1 to start is totally fine!)
- Develop your infrastructure:
  - Methodology documentation & definitions,
  - All possible materials tracking sheet
- Identify your team
  - Zero/Waste Sustainability Person
  - Data Specialist (bonus pts if they are in sustainability)
  - & Intern or Data Entry Support

Thank You.

Contact us:
waste@bu.edu

BOSTON UNIVERSITY

Reusable To-Go On College Campuses

Logistics and Costs (ROI)

PLAN Post-Landfill Action Network

Today’s Facilitator

Savannah Robledo (she/her)
Plastic Campaigns Coordinator

Tech Support

Jensen Quinn (they/them)
Director of Education & Advising


Beyond Waste
LEADERSHIP CERTIFICATION
S.T.O.P
PLAN
Post-Landfill
Action Network
#BreakFreeFromPlastic
Campus Pledge

About PLAN

About PLAN

The Post-Landfill Action Network cultivates, educates, and inspires the student-led zero waste movement.

We currently work with over 1,000 campuses across the US and Canada.

facebook.com/postlandfill

@postlandfill

@postlandfill

PLAN Membership

Campus Network

Resources

Advising

Plastic Campaigns

Events

Atlas Zero Waste

Atlas Zero Waste

A 3-Stage Student Fellowship Program that Provides Zero Waste Consulting Deliverables to College Campuses

The Atlas Zero Waste project empowers and trains young leaders to facilitate their campuses through the process of establishing zero waste commitments, Action Plans, and Return on Investment (ROI) Analyses.

50+
Atlas Campuses

188
Paid Student Fellows

2,171
Campus Stakeholders Engaged

Stage **1**

Clark University · Carleton University · Haverford College · Earlham College · UConn · Berkeley · Eckerd College · University of Massachusetts Dartmouth · University at Buffalo · Colby College · Ramapo College of New Jersey · University of Georgia · UST · University of Washington · University of South Dakota · University of Puget Sound · SJSU San José State University · Tufts University · University of Massachusetts Boston · University of Massachusetts Amherst · USF · Washington University in St. Louis · Wesleyan University · University of Guelph · Iowa · Seattle University · Southern New Hampshire University · Prescott College · Marshall

Stage **2**

Carleton College · Cal State East Bay · Florida State University · Chabot College · Las Positas College · University of Tennessee Knoxville · Colby-Sawyer College · WCU West Chester University · UMass Lowell · UMass Dartmouth · University of Arizona · Johns Hopkins University · University of Louisville

Stage **3**

University of Wisconsin-Madison · Williams College · Macalester College · College of the Atlantic · University of New Hampshire · College of Charleston · Cal Poly Humboldt

History of Reusable Containers on College Campuses

Containers

Carabiners or Tokens

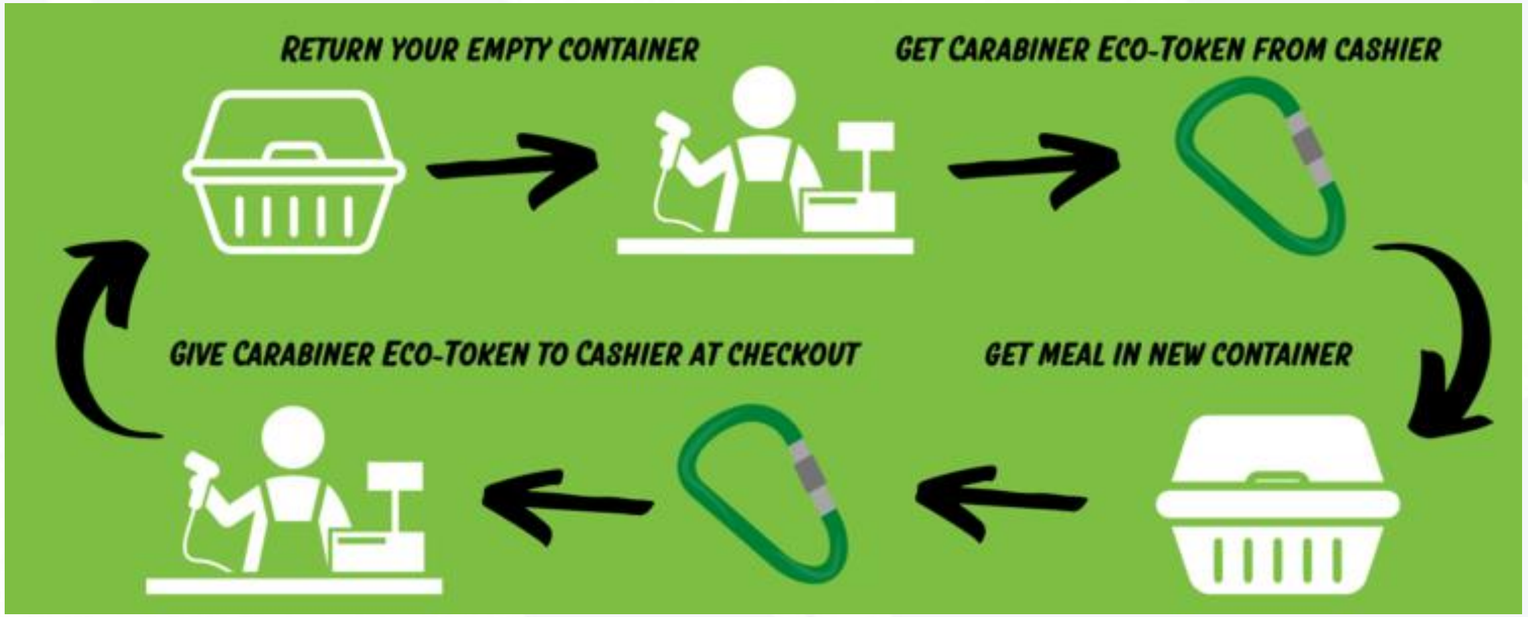
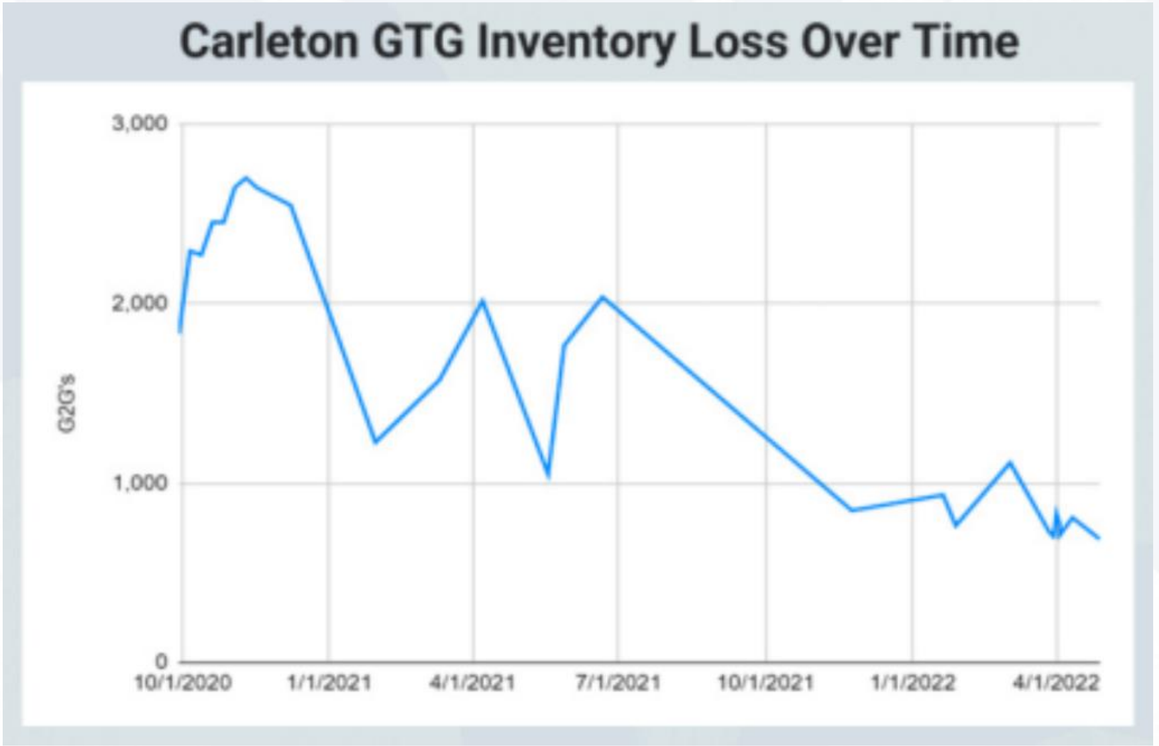


Table of Contents:

Challenges with these Programs

- Most programs started around 2013-2015
  - ~300 Total Campuses
- Low Return Rates
  - 50-70% losses annually
- Low accessibility
  - Many programs require paying up-front
- Lack of options for all container types
  - Bowls, drink cups, silverware, etc.
- Lack of options for non-plastic alternatives
- Limited integration into Retail Dining
- Major setbacks during COVID



Tracking Apps Introduced in 2022

Tracking Apps Introduced in 2022

PLAN's Apps and Containers

reuzzi™
the reusable container app

Topanga.io

USEFULL™

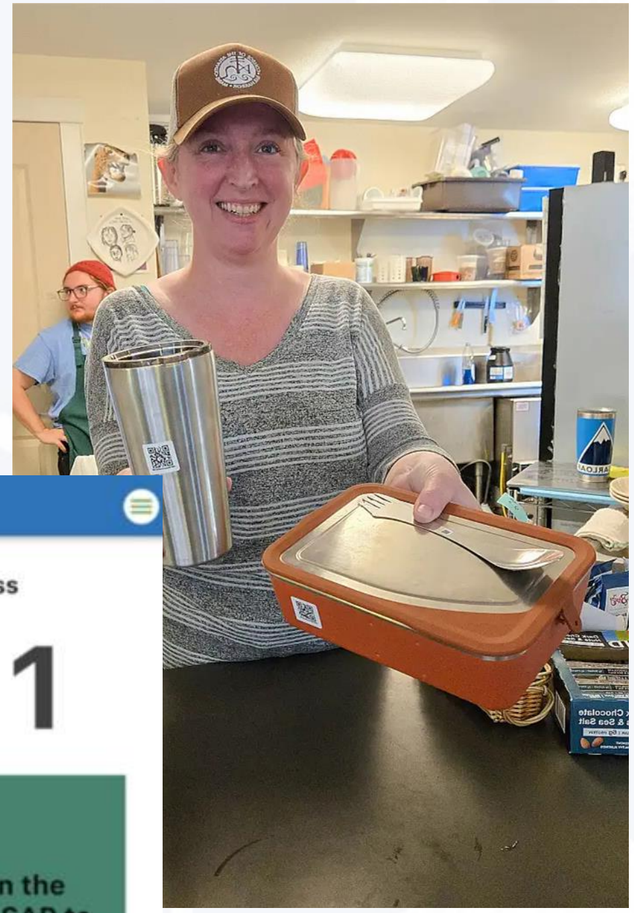
Fill it Forward

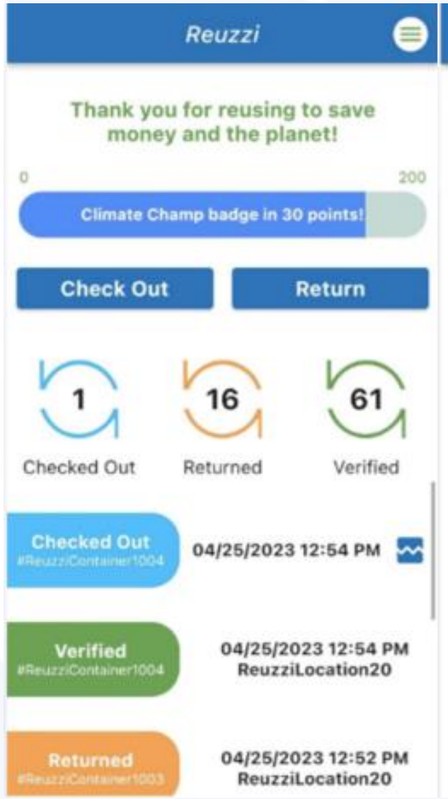
the reusies

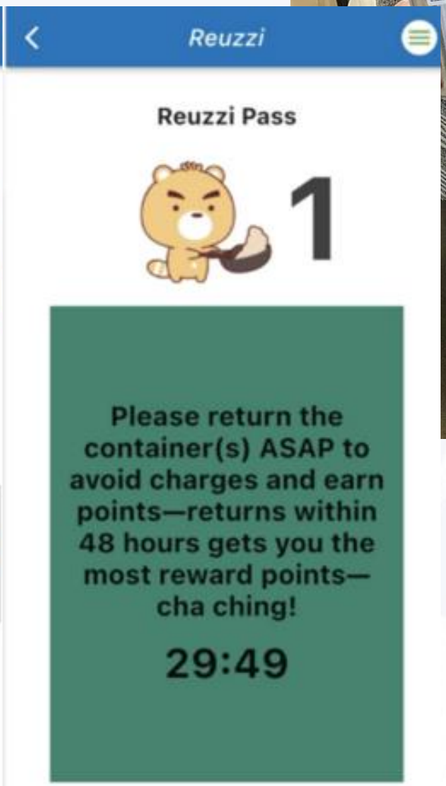
Tracking Apps

- Used at ~50 campuses nationally
- QR Code Stickers can last through hundreds of washes
- QR Code Tracking has increased return rates dramatically
  - ~30% → ~97%
- Increase in accessibility
- Data Dashboards
- QR Codes applied to any product
- QR stickers can include RFID chips

This opens the door for full system circularity.





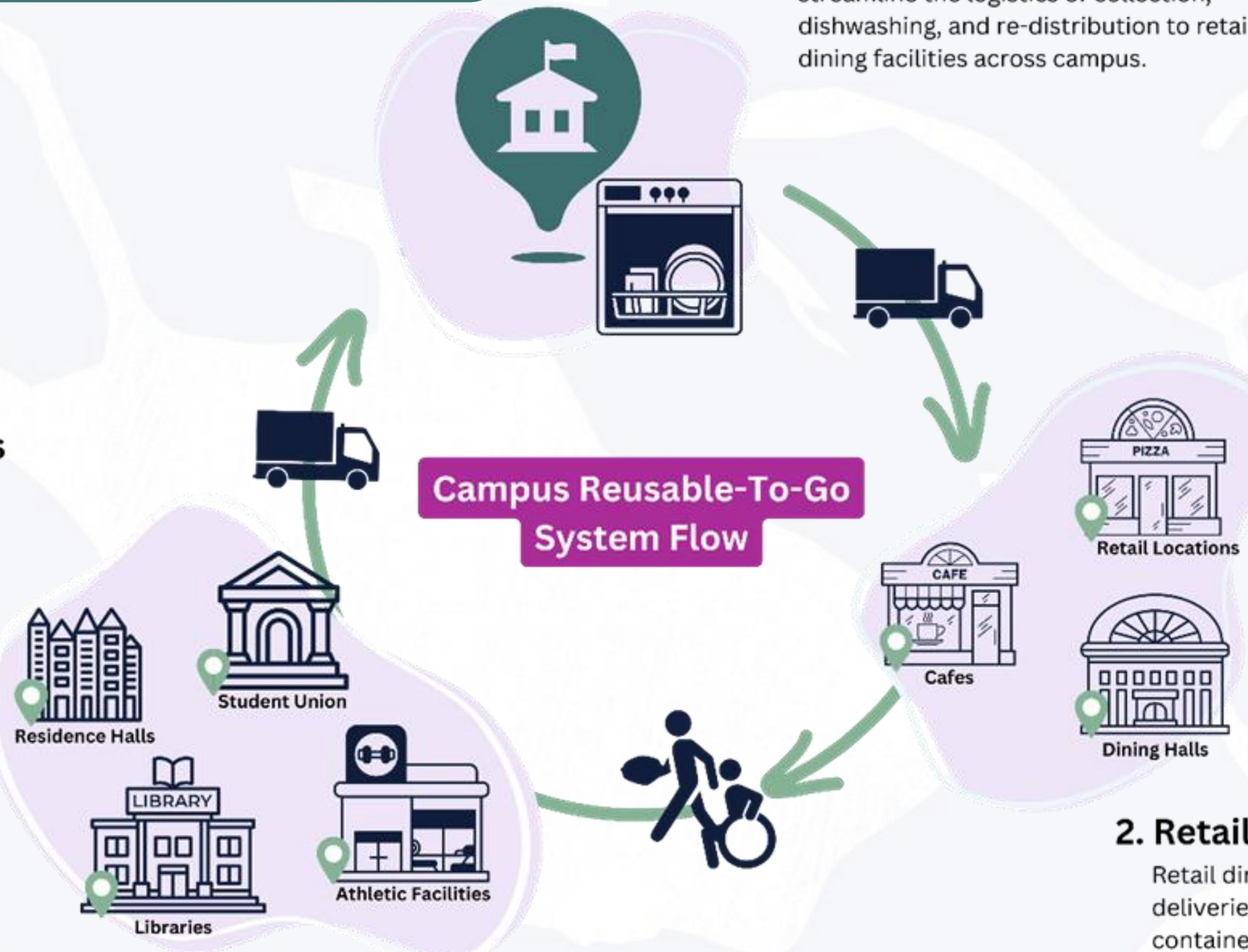


Reusable To-Go ROI Calculation Course

A Certificate Module of the Atlas Zero Waste Fellowship

1. Centralized Washing Facility

Reusable to-go ware starts at a centralized washing facility. This hub functions to streamline the logistics of collection, dishwashing, and re-distribution to retail dining facilities across campus.



2. Retail Dining Facilities

Retail dining facilities receive daily deliveries of reusable to-go ware containers, tailored to their specific day-to-day requirements.

3. Student Drop-Off Locations

Throughout the day, as students gather containers, drop-off locations are scattered across the campus to facilitate easy deposit. These locations also function as collection points for facilities to retrieve containers for washing and redistribution.

Logistics Advising: Key Areas of Focus

Review Container Options
Material and size preferences

Review Tracking App Options
QR codes vs. RFID chips, carrot/stick return incentives

Logistics Mapping
Program labor (Campus-wide collection, container transportation, dishwashing)

Infrastructure Research
Volume/capacity of current dishwashing machine(s) and transportation equipment (truck, crates, dollies)

Dining Purchasing Records Example

Dist SKU	Item Name	Pack	Size	Unit Type	Brand	Quantity	Weight	Quantity per uni	Total Disposables		Price per Unit
12 oz Bowl											
606719	BOWL 8 OZ 100% SUGARCANE PAPER	20	50 EA	CS	WORLD CENTRI	1	18.96	50	1000		$0.079
16 oz Bowl											
338447	CONT PLAS 16 OZ COMBO DELI SOUP	1	240 CT	CS	KARIOUT	11	180.4	240	2640		$0.110
9x9 clamshell container											
249085	PLATE SUGARCANE 10"" SQ IVORY	4	125 CT	CS	BARE	12	356.64	125	3000		$0.128
240272	CONT RND ALUM 9"" 30 GAUGE	1	500 CT	CS	FIRST MARK	4	73.8	500	2000		$0.250
655699	CONT DELI 32 OZ COMBO	1	240 CT	CS	KARIOUT	8	179.2	240	1920		$0.418
462255	BAG PAPER BRWN 8 LB	1	500 CT	CS	DURO	2	24	500	1000		$0.020
240318	CONT ALUM 9"" COMBO RND W/BOARD	1	200 CT	CS	SILVER SOURCE	2	31.44	200	400	8320	$0.250
6x9 clamshell container											
470980	BAG PAPER 6 X 6.5 IND KRAFT	1	2000 CT	CS	ECOCRAFT	1	11	2000	2000		$0.020
618979	BAG QT RECLOSABLE 2 MIL	1	500 CT	CS	FIRST MARK	3	15.6	500	1500	3500	$0.015
12 Oz Cups (hot and cold)											
591670	CUP SUGARCANE 12 OZ HOT NAT	20	50 CT	CS	WORLD CENTRI	4	112	50	1000	1000	$0.094
16 Oz Mugs (hot and cold)											
245962	CUP PLAS 16 OZ COLD CLR	20	50 CT	CS	WORLD CENTRI	6	198.6	50	6000		$0.181
Reusable silverware (sporks)											
292985	TEASPOON CORN STARCH 6""	20	50 CT	CS	WORLD CENTRI	2	23.69	50	2000		$0.056
292980	FORK CORN STARCH 6""	20	50 CT	CS	WORLD CENTRI	5	58.4	50	3000		$0.052
898711	MEAL KIT F-K-S-N BLK HW ROLLED	2	50 EA	CS	HOFFMASTER	0	21.51	50	0	5000	
Items automatically eliminated											
279125	LID CUP 10-24 OZ SLOTTED CLR	10	100 CT	CS	WORLD CENTRI	2	14.2	100	2000		$0.028
240258	LID CLR DOME RND 9 IN	1	500 CT	CS	FIRST MARK	4	41.84	500	2000	4000	$0.182

Reusable Container Options

(Industry has to catch up)

Containers

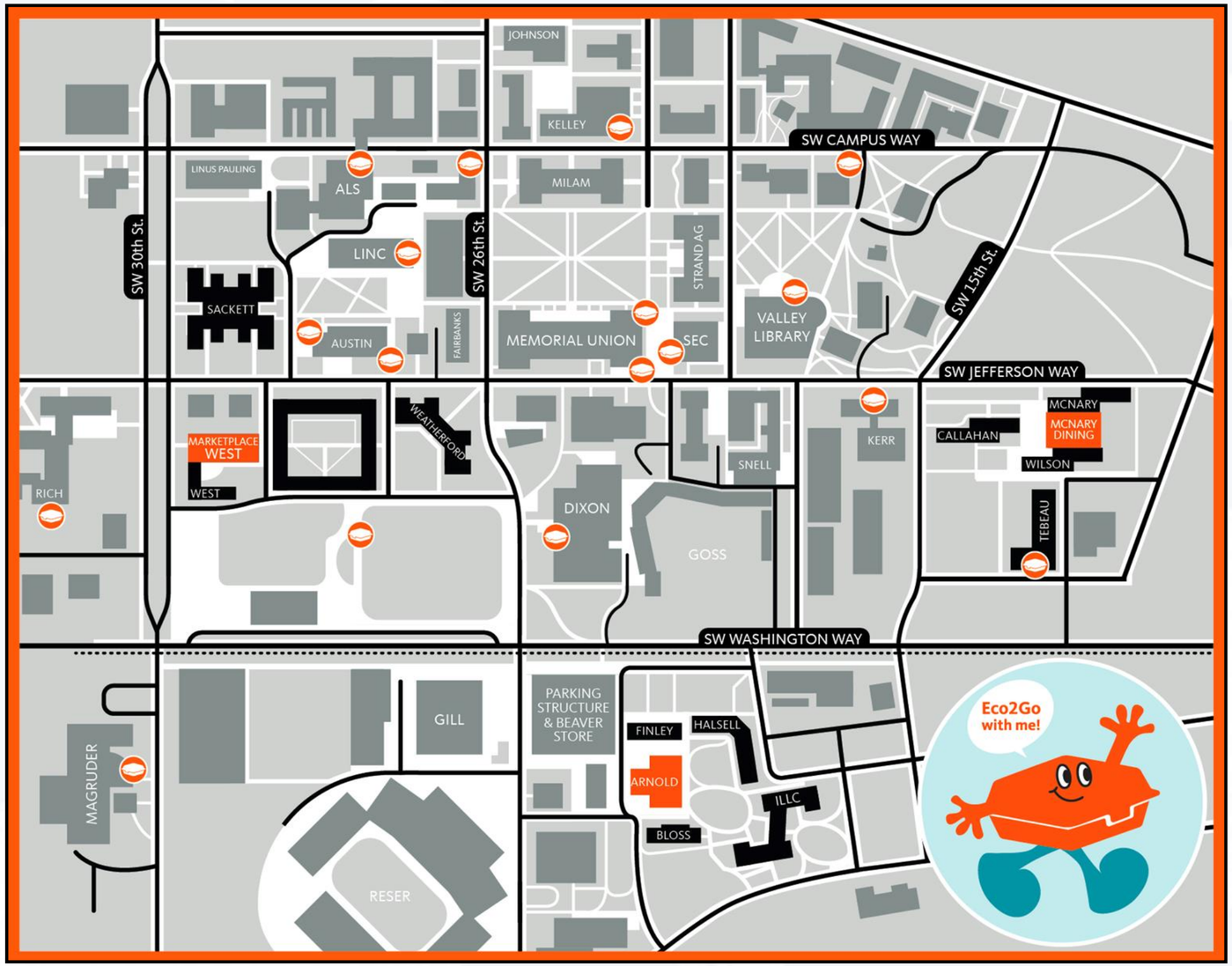
Reusable Plastic

Stainless Steel

Reusable Mugs (hot/cold)

Sporks

Container Drop-Off



Oregon State University

Boston University

Container Redistribution

Central Dishwashing Facility

Truck or Cart Delivery

Dining Locations

Year 1 - Capital Investment		
Expand Reusable Dishware and Reusable To-Go Container System	**Estimated Investment**	**Notes**
Establish On-Campus Dishwashing Facility		
Equipment		
Dishwashing Machine	$0	We have the Meiko M-IQ Rack Type Machine in the J Dining Hall, and based on the number of reusable containers we anticipate integrating into the dishware system, we will not need to purchase an additional dishwasher.
Infrastructure		
Installation / Renovation / Setup	$0	We will not need to install a new dishwasher, and RFID chip readers are simple to install.
Establish Pick-Up System		
Equipment		
Box Truck (Electric)	$15,000	Assume $65k vehicle with $15k down and monthly payments for 6 years. The cost of this vehicle will vary based on campus preference
Crates for transporting clean/dirty containers	$1,064	Each crate can hold about 75 dishes 1468 dishes/75 = 20 crates (rounded up to 28 crates/day for lost or damaged crates and some backstock) x 2 (one set of yellow and one set of green to keep clean and dirty crates separate) = 56 crates x $19 each = $1064
Dollies for transporting crates	$476	7 dollies x $68 each
Infrastructure		
Purchase 95 gallon collection containers	$5,800	Since there are 24 suggested locations for dish return, we recommend rounding up to buy 30 bins for easy replacement for totes that are damaged or lost shortly after purchase. Some of these totes will need to be emptied (replaced with an empty tote) more than once per day. We estimate that at most, 5 of these locations will need to be emptied 2-4 times per day. To cover the anticipated usage based on foot traffic, we are adding 10 totes to cover this, bringing us to 40 totes. $145/bin x 40 bins = $5,800
Build collection container cabinets	$0	Collection container cabinets are not necessary, but can be put in place if CPH so desires. This would include building custom cabinets around collection containers to create a more aesthetic look around campus - this can be reassessed after the program is in full swing.
Transition and purchase reusable ware and compostable ware		
Reusable to-go ware	$24,451	The costs of reusables will vary. We recommend getting quotes from multiple companies based on your calculated needs, however, our calculations are based on purchasing through Preserve for containers and Hogg for mugs. For more details on these calculations, see Table 1: Reusable To Go-Ware Substitutes and Cost in the ZWAP.
Reusable to-go Tracking App		
Annual App Service Fee	$13,919	Reuzzi App Service - Annual Fee. The initial fee for setting up the Reuzzi system is $11,999, but we add 8% of cost for RFID chips and an additional 8% for CBoard Integration.
Check Out Scanner Equipment	$0	Reuzzi doesn't require scanning equipment. However, other companies do require the purchase of a check out scanner.
RFID Scanner	$2,000	Only needed for one dishroom on one dishwasher - $2,000 each including installation.
QR Code / RFID Stickers	$6,097	$0.90 each sticker x 6,774 dishes = $6,097.
Integration into Campus ID Card System	$0	Built into Reuzzi app service fee.
Year 1 Capital Investment:	**$68,807**	

Year 1 - Operations			
Expand Reusable Dishware and Reusable To-Go Container System	**Total Costs**	**Cost Savings and/or Revenue Generation**	**Calculation Notes**
Reusable-Ware Maintenance Costs			
Dishwashing Equipment			
Dishwashing water usage	$25	N/A	- 1 dishwashing hour per day x 44 gallons of water per hour = 44 gallons per day - 44 gallons per day x 170 peak days = 7,480 gallons per year - Our water rates are $1.84 per CCF (748 gallons) = $1.84/CCF x 1 CCF/748 gallons = $0.0025/gallon - 7,480 gallons x $0.0025 per gallon = $18.70 (Round up to $25 - to account for extra run time and off-peak usage)
Dishwashing electricity usage	$3,500	N/A	- 1 dishwashing hour per day x 55kWh (dishwasher's reported electricity usage) = 55 kWh used per day - 55 kWh x 170 peak days = 9,350 kWh - 9,350 kWh x $0.33/kWh (City electricity rate) = $3,085.50 (Round up to $3,500 to account for extra run time and off-peak usage)
Dishwashing Maintenance Fees (Cleaning / Repairs)	$600	N/A	Estimated flat fee for year one
To-Go Ware and Transportation Equipment			
Truck Loan	$8,400	N/A	$700 monthly payments with $15k down = $8,400 / year for 6 years
Electricity for truck	$3,400	N/A	$20 per day x 170 peak days
Truck Maintenance (repairs, etc)	$3,000	N/A	This is a general estimate of the cost of fixing any unexpected damages or truck failures that occur in the first year.
Totes & Dollies, Collection Bins and To-Go Ware Replacement / Repair	$3,179	N/A	10% of total investment cost: Total Year One Investment = 66,323 x 0.1 = $2,931
Tracking App			
Annual Subscription Fee	$14,336	N/A	Reuzzi annual fee increases by 3% each year - initial cost is ~ $11,000
Replacement QR Code Stickers and Scanning Equipment	$305	N/A	5% of total investment cost ($67, 357 x 0.05) = $610
Program Costs and Fees			
Cost Savings - Stop purchasing 2 pallets (30 cases) of Ozzi containers per year due to high turnover and container loss rates	N/A	$3,200	The cost of 15 cases of Ozzi boxes (the rough number of cases bought each semester by CPH) is about $100/case plus shipping costs = $1600 per semester. $3200 per year
Cost of purchasing 20% of disposable (compostable) items that customers choose to pay the fee for	$9,825	N/A	In the case study represented by Boston University in the Manual, 22% of orders were placed by customers who chose to pay a $2.50 fee to receive a disposable instead of a reusable. This expense represents 20% of the total # of disposables that the campus would continue buying for those who choose to continue using disposables. If possible, these items would be switched to certified compostable disposables with a robust campus-wide compost system.
Offset cost-savings of not purchasing disposables	N/A	$49,124	Represents the total cost avoided (not purchased) of 80% of all disposable purchases that have instead switched to reusables.
Fees gathered from 20% of customer orders who choose to use disposables (5¢ fee)	N/A	$2,879	This proposal calls for the elimination of 287,914 disposable products which will be switched to reusable. Assuming 20% of those will remain in circulation, and we attach a 5¢ fee to those... - 287,914 x 0.20 = 57,583 disposables - 57,583 disposables x $0.05 = $2,879
Fees gathered from 3% of orders that return items 2 weeks late or don't return at all ($5)	N/A	$34,550	80% of 287,914 disposables is 230,221 items that have been replaced with reusables. If we apply a $5 late fee per container to the 3% of those reusables, that = 6909 reusables x $5 late fee = $34549.68 This fee should be easily appealable by students (first appeal is automatically given), and students should be able to easily reach out to resolve an issue quickly. The "late" return time will be two weeks after check out of a container. Student fees will be shown on the integrated student app after two weeks and student accounts will be charged through their account at the end of the semester.
Cost of switching small disposable items that can't be switched to reusable to certified compostables	$500		Cal Poly Humboldt spent around $1,300 on 2 and 4 oz souffle cups last year. The cost to switch these items to compostable is pennies per item. Rough estimate of $500 per year.
Landfill tipping fee avoidance	N/A	$1,346	526,694 disposable containers x 0.03 pounds (average weight) = 15,800 pounds /2000 pounds (pounds in a ton) = 7.9 tons x $170.41 (landfill tipping fee per ton) = $1346
Rolls of paper towels for collection bins	$0	N/A	At the current time, we do not recommend that CPH implements custom built bins to go around container collection toters. However, this is a possibility in the future, but not a necessary investment (24 Locations - replaced 24 times a year (twice a month) = 576 paper towel rolls x $1 per roll =$576
Marketing	$1,000	N/A	Marketing can be utilized for printing costs, promotional give-aways, flyers, raffles and more.
Labor			
Dishwashing Hours	$5,440	N/A	$16/hr x 1hr per day x 2 staff x 170 peak days = $2720 (round up to $5440 to account for extra time and off-peak hours). One of these student staff members will be responsible for emptying the dishwasher and restacking clean containers in clean crates to be sent back out to dining facilities.
Dish Collection and transportation Hours	$25,000	N/A	$16/hr x 9 hrs per day x 170 peak days = $24,480 (round up to 25,000 to account for extra time and off-peak hours)
Year 1 Total Cost and Cost Savings/Revenue	**$78,510**	**$91,100**	
Total Annual Cost Savings / Revenue	**$12,589**		

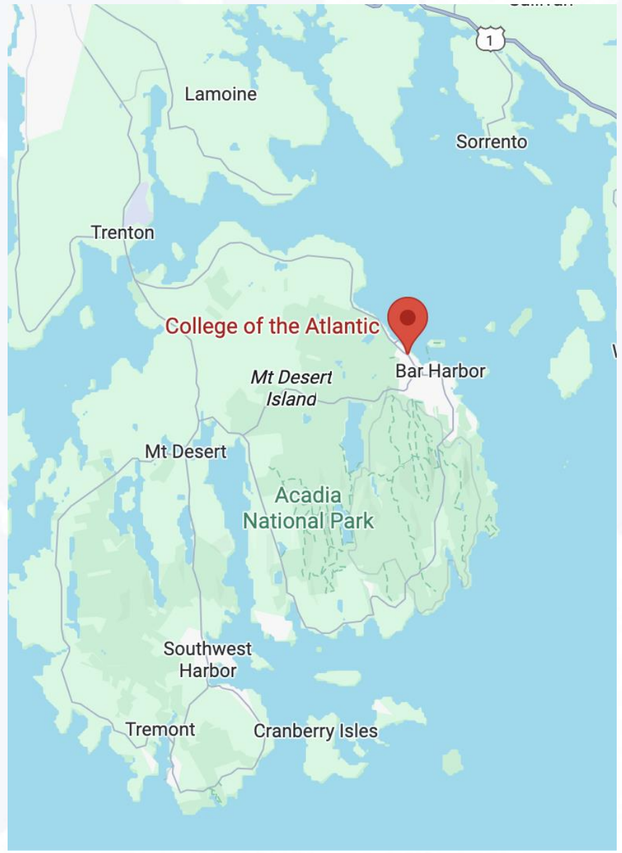
Cost Benefits & Findings

After undergoing this calculation effort on thirteen campuses over the past 2 years, we've found that the average ROI for a full-scale reusable to-go program is 14 months with some campuses recouping costs in as little as 5 months.

- Across these thirteen campuses, our ROI assessment indicates that implementing our program recommendations would **eliminate over 21 million pieces of disposable plastic annually and save more than $8.3 million in yearly expenses.**
- After the initial investment to launch reusable to-go is covered in the ROI, this translates direct annual cost savings back to the campus.

Case Study: College of the Atlantic

- Bar Harbor, Maine
- Coastal, surrounded by Acadia National Park
- Private, liberal arts college
- 350 students, 35 faculty, 60 staff members
- One undergraduate degree:
  bachelor of arts in human ecology



Case Study: College of the Atlantic

- Utilized stainless steel reusable to-go containers, insulated tumblers, and sporks
- Established an app-based checkout system for the items in partnership with Reuzzi
- 50,000+ pieces of disposable plastic kept out of the waste stream
- Estimated payback period: 3.5 years

Thanks to the leadership of PLAN's Atlas Zero Waste Fellow, Linnea Goh '25, CoA's new Reusable To-Go program includes stainless steel containers, mugs, and sporks.

CoA was the first campus to commit to the Break Free From Plastic Campus Pledge in 2019, and now, they're the first to complete it.

Any Questions?

postlandfill.org

facebook.com/postlandfill

@postlandfill

@postlandfill

RTG ROI: lisa@postlandfill.org

General: info@postlandfill.org