

Carbon Reduction Challenge 2017

In Partnership



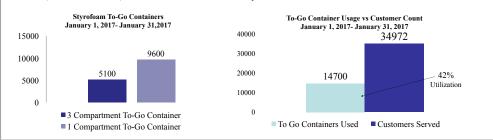
I. Problem Statement

BP's Houston Office is the home to nearly 6000 employees, 4000 in the Westlake building, and 2000 in the Helios building. A large portion of Westlake employees use Styrofoam to-go containers at the BP cafe, and this program focuses on the economic and logistic feasibility of switching from Styrofoam, disposable containers to reusable and washable to-go containers.

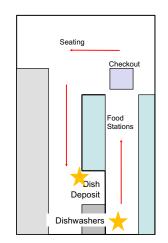
Why Care? - Houston Café Styrofoam Container Usage

BP's Westlake Cafeteria serves approximately 1500 meals a day to 4,000 employees, and the operations are contracted out by BP to Compass USA. Based off of data from January, nearly 15,000 disposable containers are used each month, provided by Compass free of charge, which creates a lot of waste.

BP's annual usage using January rates: 176,400 To-Go Containers/Year in Westlake alone. If BP can transition away from Styrofoam containers, that could leave 176,400 containers out of landfills annually!



II. Work Performed and Logistics of Program



Layout of Westlake Cafeteria with Container Drop-Off Locations

Over the 12 weeks of interning at BP, I partnered with the Head of Facilities Management (BP USA) and the Operations Controller for the Café (Compass USA) to find an economically reasonable green program in the cafeteria. In particular I proposed:

- 1. A specific reusable container to replace Styrofoam containers
- 2. Detailed logistics on operating a large-scale container washing program
- 3. Multiple economic models to best suit BP and employee needs
- 4. Estimated carbon savings to BP

Logistics:

Cafeteria orders a set of 2400 reusable containers, good for 2 years of usage

Employees buy into program online or at register (subscription model with renewal cost every year), and receive a sticker on their badge.

Employees will be entitled to a reusable container every time they order food at the Westlake Café, and will pick up container at entrance of Café.

There will be 2 drop off locations at entrance and exit of café for convenience.

- Give old, dirty container and get new, clean one
- Café employee in charge of carting dirty containers to dishwasher

A discount for having a reusable container, or penalty for using a Styrofoam container will be applied at checkout register.

Drop off

III. Economic Study

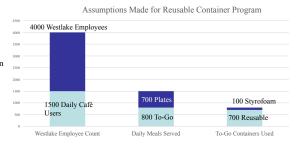
An economic study was performed to assess the viability of switching from Styrofoam to reusable Containers. In particular, the program looked at the savings related to nearly eliminating to-go Styrofoam containers, pushing employees to either use the provided plates or use a reusable container. Based off of typical Westlake Café usage, we assumed on a basis of 1500 meals per day that 700 meals would use plates, and 800 would use to-go containers. We assume that 1000 employees will participate in the reusable container program, at a subscription cost of \$5.20/year (one container at-cost).

Calculations:

1000 employees/year x \$5.20/employee = \$5200/year

100 Styrofoam/day x 240 days/year x \$0.10/Styrofoam = \$2400/year

315,000 Gals H20/Year * \$4,15/1000 Gals = \$1300



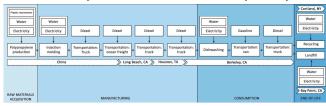
Annual Cost Breakdown of Running a Reusable To-Go Container Program with Disincentives to Use Styrofoam

Saved Styrofoam Container Savings	Reusable Container Acquisition Cost	Employee Subscription Rev.	Employee Styrofoam Charge	Water Usage	Total
\$17,640	-\$6,240	\$5,200	\$2,400	-\$1,300	+\$17,700

Additionally, BP already offers an incentive program in the coffee shop for employees who bring their own reusable cups, offering an additional discount at register. If a similar 5% discount is offered to employees who participate in the program, an additional \$47,000 subsidy cost would be incurred annually, but was attractive to BP to increase participation rate especially among Baby Boomers. With a subsidy, employees would recover their subscription cost in 8 meals!

IV. Carbon Reduction

Life Cycle of Reusable To-Go Boxes from a Berkeley Case Study



Based off of a case study run on UC Berkeley's cafeterias, it was estimated that each reusable container from cradle to grave generates 1.49Kg of CO2. Additionally, it was estimated that 100 Styrofoam containers produce 35.56Kg of CO2. Using those two assumptions we can calculate:

Annual Carbon Footprint of Disposable Containers

• $176,400 \left(\frac{Containers}{Year}\right) * 35.56 \frac{Kg\ CO2e}{100\ Containers} = 62,727 \frac{Kg\ CO2}{Year}$

Annual Carbon Footprint of Reusable Containers

• $176400 \frac{Container\ uses}{year} * \frac{1\ Container\ uses}{150\ Container\ uses} * 1.49 \frac{Kg\ CO2e}{Container} = 1752.25 \frac{Kg\ CO2}{year}$

Net Carbon Savings: **60,974** $\frac{Kg\ CO2}{Y_{eqr}}$ that's \sim **130,000** $\frac{Lb\ CO2}{Y_{eqr}}$

That's the same as keeping your crockpot cooking for 121 years nonstop!!