

Single-Use Plastic versus Reusable Recycling Bags: Environmental and Financial Analysis

Group Project Executive Summary | Spring 2022

By Karla Bonilla Cordero, Kat Cotti, Larissa Neilson, Morganne Sigismonti

Client WSP's Climate & Sustainability Sector
Faculty Advisor Dr. Matthew Potoski



The Problem

An important factor of many companies' environmental strategy is a successful recycling program. However, single-use plastic garbage bags used to line recycling bins are problematic because they are not recyclable and are the main contaminant in commercial recycling facilities.

The United States' recycling infrastructure is ill-equipped to process many plastics, including single-use plastic garbage bags. Recycling facilities are often not able to remove recyclables from single-use bags, meaning large amounts of recyclable material are sent to landfill in the bags, contributing to waste accumulation and ecosystem degradation. Single-use bags that enter recycling machinery jam the equipment and cause work stoppages—posing safety hazards for recycling facility workers who are required to climb into the machinery—and reduce the quality and value of recycled goods. Additionally, single-use bags contribute to companies' landfilled waste stream, inhibiting waste reduction goals, and can result in contamination charges.

Key Findings

1

Reusable bags are a functional alternative to single-use bags.

Reusable bags are easy to implement, functional, durable, and preferred by the janitorial staff.

2

Reusable bags have lower environmental impacts than single-use bags.

Reusable bags have a lower environmental impact in all impact categories studied, including GHG emissions, and would reduce Company X's waste by 1,170 kg in the first year.

3

Reusable bags can save Company X money in the first year.

Reusable bags would reduce Company X's annual costs by \$7,550.

Potential Solution

WSP is currently helping Company X¹ achieve zero-waste goals by developing waste reduction solutions for Company X's corporate campus, including reducing recycling contamination. WSP is considering a reusable recycling bag as a replacement for single-use bags used to line recycling receptacles. However, the reusable bags have not been publicly studied or tested in campus recycling; therefore this is the first study of its kind.

Project Approach

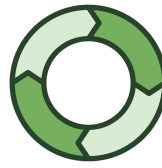
This project seeks to assess the financial and environmental tradeoffs between single-use and reusable bags used in corporate campus recycling. These tradeoffs include determining which bag costs less money, contributes less greenhouse gas emissions, and produces less plastic waste. The results were used to identify the best bag option for Company X's campus and make the results communicable to WSP's broader corporate client base through the following methodology:



Field Test

Pilot the reusable bag to assess the bag's durability, the janitorial staff's experience, and on-site logistics to effectively implement reusable bags.

¹ WSP's client cannot be disclosed at this time and will be referred to as 'Company X' for confidentiality purposes.



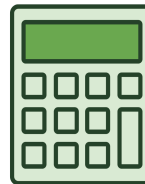
Life-Cycle Assessment

Evaluate the environmental impacts of single-use versus reusable recycling bags.



Financial Analysis

Analyze and compare the costs of implementing each type of bag.



Impact Calculator

Create a user-friendly web tool to help companies evaluate the tradeoffs between bag options.

Impact

Reusable bags are a financially and environmentally beneficial alternative to single-use bags.

However, the lifespan of the reusable bag is an important caveat of this analysis as it is not supported by data to date. Assessing the bag for a more accurate lifespan than the one provided by the manufacturer is an important area of future research. Additionally, collaboration with the reusable bag manufacturer could further reduce the environmental impacts associated with production.

Company X should implement reusable recycling bags on its corporate campus. Based on our research, WSP can make an informed recommendation to Company X. Further, other companies can use our impact calculator to assess the tradeoffs and facilitate preliminary decision-making.