

Reusable Bag Analysis

ENVS 4100: Appropriate Technology and Sustainability
Ecological Design: The campus as a Living, Learning
Laboratory

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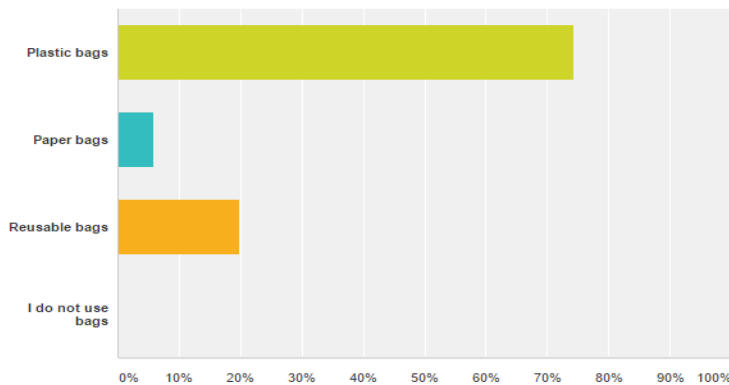
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Project Goals

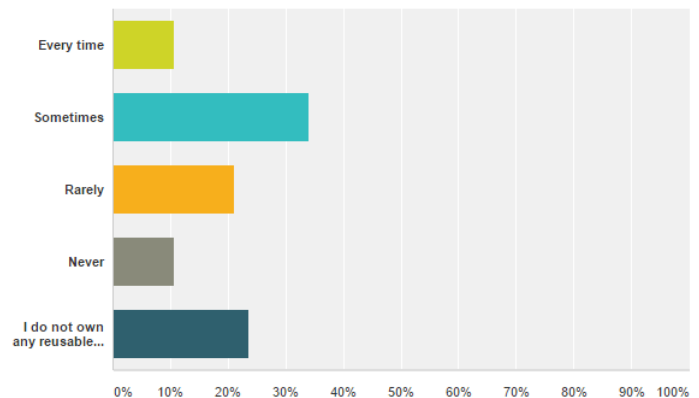
The goal of this project is to analyze various materials used in the production of reusable bags via life cycle analysis research and discover which types of reusable bags are a viably sustainable solution to plastic bag use, along with creating campus/community awareness of the positive benefits of using a reusable bag over a traditional plastic one.

The Problem

What is your most common method of bagging groceries when shopping at local stores?



If you do own and use reusable bags, how often do you actually use them when you shop?



The problem we are addressing is students' actual usage of reusable bags in lieu of reducing plastic bags on campus. Because of the poor aesthetic design and quality of these bags, students are not using them as often as they should. This combination of poor durability, lack of student connection to the bag, and lack of a sustainability-driven purpose surrounding the bag culminates in a potentially larger **GWP** (Global Warming Potential) than the traditional HDPE plastic bag.

GWP: The amount of greenhouse gas that is estimated to contribute to global warming by accumulating in the atmosphere and absorbing infrared radiation.

Methodology

The methods we followed to gather data included interviewing and discussing potential support with members of the Kalamazoo community, researching life cycle analysis data available for reusable bags versus traditional HDPE bags, and conducting best practice research for other campuses.

Our interview process included receiving insight into local stores' consumption of plastic and paper bags, the reusable bag products they sell, and how willing or interested they would be in getting involved with our reusable bag campaign. We also talked to major student organizations to obtain their opinion on the overall problem and solution. The Western Student Association (WSA) indicated strong support in following through with one of the main aspects of our project: creating a campus wide design competition. By getting the student body government involved, we will be able to reach a larger, more diverse portion of students and raise awareness and excitement in changing WMU's perspective on reusable bags. Sawall's Health Food Store and The People's Food Co-Op also expressed interest in potentially supporting a design competition and

possible discount incentive program (similar to the programs they currently offer at their stores for their own reusable bags) as well.

We conducted research on the life cycle analysis of various reusable bags, including: [NWPP \(non-woven polypropylene\)](#), [LDPE \(low-density polyethylene\)](#), and [cotton](#) bags. We need to further our research of the material that is most commonly used for the reusable bags that are passed out on campus during welcome week at Bronco Bash, in order to gain a better understanding of the current WMU reusable bag and explain which material would be optimal for our design contest.

Current Practices at WMU

The bookstore on campus now offers a reusable bag for students to purchase while buying their textbooks. As the previous 2011 WMU Reusable Bags in Bookstore project explains, the campus does have reusable bags for sale, but a very small amount of students are aware that these bags are available. The project's goal was to create more awareness of the reusable bags in the campus bookstore. Unfortunately, the problem still exists with students on campus today, in 2017, and very few know that the WMU bookstore actually has reusable bags for purchase.

Life Cycle Analysis of Various Shopping Bags vs Typical HDPE Plastic Grocery Bags

There are a variety of reusable bag materials: LDPE (Low-Density Polyethylene), NWPP (Non-woven PP), and Cotton are a few of the common alternatives to HDPE (High-Density Polyethylene) bags commonly found in grocery stores.

Table 8.1 indicates the number of times a bag would need to be reused to keep its GWP below that of HDPE bags. Other factors we are considering when looking into the life cycle analysis of these various bags include: raw material extraction, manufacture, shipping, and end-of-life disposal practices.

Table 8.1 The amount of primary use required to take reusable bags below the global warming potential of HDPE bags with and without secondary reuse.

| | HDPE bag (No secondary reuse) | HDPE bag (40.3% reused as bin liners) | HDPE bag (100% reused as bin liners) | HDPE bag (Used 3 times) |
|------------------|-------------------------------|---------------------------------------|--------------------------------------|-------------------------|
| Paper bag | 3 | 4 | 7 | 9 |
| LDPE bag | 4 | 5 | 9 | 12 |
| Non-woven PP bag | 11 | 14 | 26 | 33 |
| Cotton bag | 131 | 173 | 327 | 393 |

Potential Solutions

We recognize that a reusable bag made out of cotton is likely not the best solution to HDPE bags, as you would have to use it 131 times to have a lower GWP than an HDPE bag (assuming that bag has no secondary reuse). We are still researching whether a Non-Woven PP bag is a viable alternative to HDPE bags, as consumers would only need to use such a bag 11 times (with no HDPE secondary reuse) to have a lower GWP. The question remains as to how we could encourage WMU students to use such a bag at least 11 times (and preferably more).

We believe in order to [generate student investment in a sustainable bag](#), a design competition would help us bring an exciting opportunity to all students. While nothing is set in stone, we have received WSA's support and have set up a timeline that corresponds with the [2018 Bronco Bash](#), should a future group of students chose to follow through with this project.

WMU REUSABLE BAG DESIGN CONTEST

Are you a student at WMU?
Do you like graphic design?
Have you ever wanted to design something that would appeal to a large audience?
Do you like gift cards/cash?
Are you interested in helping the environment?

If you answered yes to any of these questions, you are invited to compete in a student-run design contest for a campus reusable bag!

Who is eligible: any current WMU student
What do I get: if your design wins, it will be featured on a campus reusable bag that is given out to students during events such as Bronco Bash, and you will receive a prize from our sponsors!
Who is judging: after the deadline, all designs will be posted on a webpage and students will choose which one they like best.
When is it: the contest begins September 12th, 2017, and ends October 12th, 2017.
What medium can I use: the design MUST be made on a computer program so that it can be easily transferred onto a reusable bag and mass produced.