February 2012

The Grocery Bag Controversy

Silverhill Institute of Environmental Research and Conservation

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This report has been developed for the Silverhill Institute of Environmental Research and Conservation by Dr. Peter Homenuck, RPP, Professor Emeritus, Faculty of Environmental Studies at York University; Ujunwa Nwachukwu, MES; and Celene A Mariano, MES. The views expressed in this report are those of the authors. The information provided in this report was compiled from a number of sources and includes survey results from Silverhill's Grocery Shopping Bags 2011 Toronto Resident Survey. This report is intended to provide information and advice to individuals concerned about plastic and reusable bag use in Toronto, Ontario.

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SUMMARY

Grocery shoppers in Toronto have a range of options for carrying their groceries home. Plastic bags and reusable bags are the common options for packing groceries. There is much written and claimed in the public debate over which is the best option. The Silverhill Institute of Environmental Research and Conservation conducted a study to provide some objective analysis of using renewable bags versus plastic one-use bags. This report is based on the analysis of journal articles and technical studies as well as 110 telephone interviews conducted in Toronto, Ontario in July 2011.

Research showed that:

- The argument to ban plastic bags to limit and reduce landfill waste cannot be logically supported as plastic bags account for less than ½% of the volume in landfills.
- The argument that it would help conserve non-renewable resources, is a hollow argument as biodegradable bags are made from renewable resources and are widely available and commonly used in many jurisdictions.
- The critical element of protecting public health has been totally ignored in promoting the use of recycled plastic bags as well as the continued use of renewable bags for carrying groceries.
- The evidence is clear – most reusable bags are contaminated with bacteria and other pathogens after only a few uses.

From the telephone interviews, we found that 58% of participants use reusable bags and 29% use plastic bags. 'Environmental concerns' and 'convenience' were the major factors that participants considered when choosing their grocery shopping bags. Additionally, survey results demonstrated information gaps on:

- The usage and handling of groceries in reusable bags
- The health effects that may result from improper care and storage of reusable bags
- The environmental impacts of different types of reusable bags resulting in uninformed consumers
- Why Toronto has placed a 5 cent levy on plastic grocery bags

A key observation from the survey results was the limited awareness that reusable bags should be regularly cleaned. Studies show that reusable bags can become a site for pathogenic organism growth. Some of these organisms include bacteria, yeast, mold, viruses, and other pathogens. They pose serious risk to public health if the renewable bags are not properly cleaned. This means that not only are the users of renewable bags at risk, but also bacteria and other pathogens can be transmitted to other individuals shopping in the same stores.

1. INTRODUCTION

The debate on the most appropriate type of shopping bag continues. For each side of the argument, a series of different considerations and reasoning lead to different positions. Those supportive of one use plastic bags note that they are re-used for other purposes. Also some are concerned about the potential risk of contaminated bags to public health. In contrast, those in favour of reusable bags believe that they are protecting non-renewable resources.

The debate sparked greater interest when the City of Toronto passed legislation in June 2009 forcing all retail merchants to charge shoppers a 5 cent levy on all plastic grocery bags. The City of Toronto argued that this would result in a significant reduction in landfill waste – even though the evidence does not support this argument. The plastic bag levy indirectly forced grocery shoppers to seek other alternatives to plastic bags such as boxes and reusable bags. It elicited mixed feelings from consumers, some supporting the law and others against it. Raised issues included the intended purpose and use of the levy. This report conveys the effects of using plastic bags versus reusable bags, and provides consumer information based on a survey of shoppers.

2. SURVEY METHODOLOGY

One hundred and ten (110) telephone surveys were conducted in July 2011. The participants were randomly selected. The survey was 3 pages in length and consisted of closed- and closed-ended questions. The telephone survey took 1-2 minutes to complete. All participants were 18 years of age or older. Please refer to Appendix A for more information on the survey questions.

3. SURVEY FINDINGS

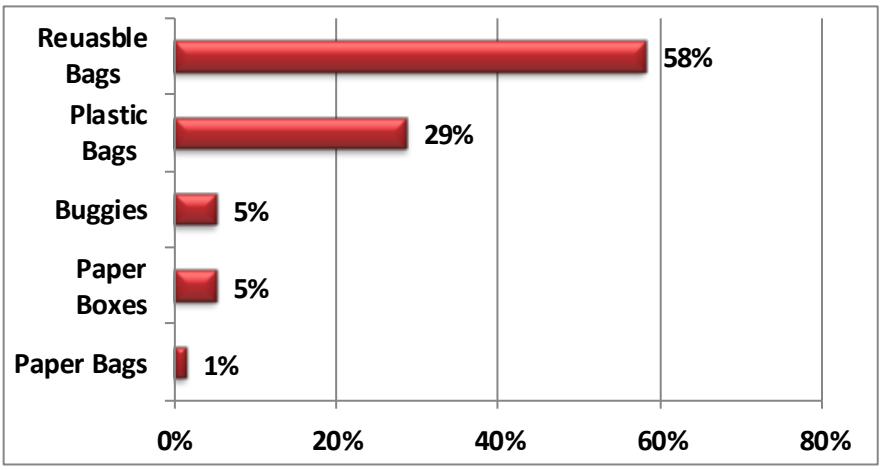
3.1 Grocery Shopping Bags

Reusable bags, plastic bags, paper boxes, buggies, and paper bags are some of the available options for packing groceries. When participants were asked what they use to carry their groceries home from the store, the received responses showed that 58%[1] (79 participants) use reusable bags and 29% (39 participants) use plastic bags (Figure 1). Some participants used other alternatives such as boxes, buggies, and delivery services.

It is important to note that some participants who use reusable bags also stated that they use more than one type of bag. For example, some participants reported using plastic or paper bags to separately package grocery items inside a renewable bag.

[1] Please note that all numerical data in the figures in this report reflect the total number of respondents who answered each individual survey question; in some cases, the data may not represent the total number of completed surveys.

Figure 1: Bags/Carriers Respondents Used for Grocery Shopping



There are many factors that influence the use of grocery shopping bags. 'Environmental concerns' and 'convenience' are the top two reasons identified by participants (Table 1). Additional comments that participants provided included:

- Availability of grocery shopping bags in stores
- Plastic bags cost money
- Forgetting to bring reusable bags when grocery shopping
- Reusable bags are easy
- Cleanliness of new plastic bags
- Use paper boxes for recycling purposes

In terms of convenience, some participants said that paper bags are rarely found at grocery stores. Stores are usually fully stocked with plastic bags. Some participants also chose to use plastic one-use bags because of their appropriateness for other uses such as packing household garbage, packing/storage of other items, packing lunches, and picking up after pets.

Table 1: Reasons for Choosing Grocery Shopping Bags

Reasons	Responses	Percentage
Environmental Concerns	44	27%
Convenience	42	25%
Cost	30	18%
Durability	20	12%
All of the Above	5	3%
Financial Incentives	4	2%

3.2 Health Effects of Reusable Bags

An estimated 11 million cases of food poisoning are reported yearly in Canada (CFIA 2011) with an average cost of $1,089 per case on the economy (Holley 2010). Experts have raised warnings about the possible contribution of reusable bags to food-borne illnesses. Recent studies on reusable bags indicate that they pose a *substantial* risk to public health. While people give 'environmental reasons' as their main concern for using reusable bags over plastic bags, most people forget that public health is a significant component of the environment.

It can be argued that there are three main components concerning reusable grocery bags:

- Human health
- Environmental factors
- Economic incentives

The singular focus on environmental concerns (more specifically, the emphasis on the use of petroleum and natural gas resources in the production of plastics) distracts the public's attention from the topic of shopping bag use and public health.

Studies have shown that the use of reusable bags without proper care and attention may result in the growth of bacteria that causes food poisoning. In a research project by Sporometrics, a Toronto based independent testing laboratory, it was discovered that reusable bags have become active microbial habitats and a breeding ground for yeast and mold (Sporometrics 2009). This study tested reusable bags for the presence of bacterial contamination and unacceptable levels of coliform (intestinal bacteria) and found significant microbial levels in 64% of the tested bags (ibid). In comparison, the tested single-use plastic bags were more hygienic. This study provides strong evidence that reusable bags pose a significant health risk to the safety of food supply when used to transport food from grocery stores to home. As such, the single-use plastic bags and other first-use carry bag options are more hygienic, and in a broader sense, more environmentally appropriate.

The results of the Sporometrics' study are significant because they highlight the health aspect of reusable bags against the claimed environmental benefits. Reusable bags, if not properly cleaned, favour the growth and survival of molds that are allergenic, and can trigger attacks in persons with asthma when they are airborne (Sporometrics 2009). This is just one of the many illnesses that may result from the improper handling of reusable bags.

Bringing contaminated reusable bags to the grocery store, and placing them in shopping carts or on the conveyor belts at checkout, can spread the contamination to other shoppers. A second study by Gerba et al. (2010) assessed the potential for cross contamination of food products by reusable bags used to carry groceries. Researchers found that large numbers of bacteria were present in the tested reusable bags including coliform bacteria being present in half of the tested bags. E. Coli was found in 12% of the tested bags (ibid). Researchers also found that bacteria grow more rapidly when reusable

bags are stored in cars. Bacteria substantially increased by 10 fold when reusable bags, containing meat juices, were stored in the trunk of a car for two hours while in-car temperatures were high. One might argue that meat products are usually sealed, and therefore, will not contaminate reusable bags. This notion was contradicted by Gerba *et al.* (2010) where it was shown that meat juices sometimes leak. Subsequently, pathogenic bacteria can occur on the **outside** of the packaged meats, and thus, can contaminate reusable bags.

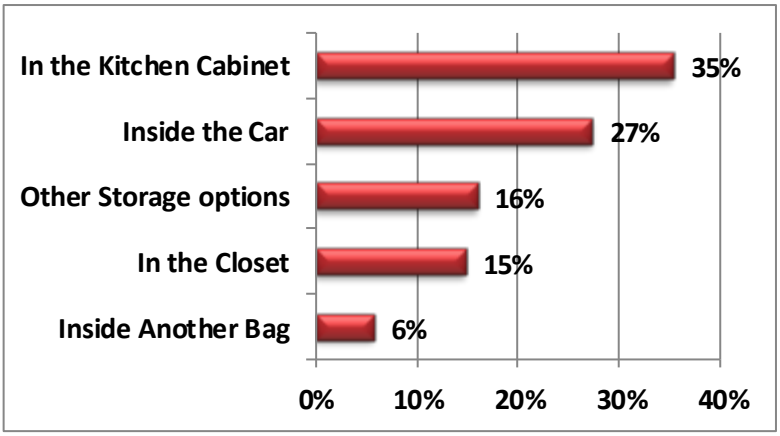
Gerba *et al.* (2010) concluded that reusable bags create a perfect environment for bacterial growth and cross-contamination of foods with potential health impacts when bags are not properly cleaned and stored. It was found that washing reusable bags with a standard detergent in a 30-minute cycle reduced the presence of bacteria by over 99% (ibid). However, very few consumers actually wash their reusable bags.

3.3 Care of Reusable Bags

In light of the evidence on public health risks associated with reusable bags, Silverhill's survey included questions on the participants' care and attention given to their reusable bags. When participants were asked where they usually stored their reusable bags, 35% (31 participants) said the kitchen cabinet, and 27% (24 participants) said inside the car (Figure 2).

Many of the participants who noted that they store their reusable bags in the car, do so in order to avoid forgetting the bags at home. Other areas of bag storage include: the balcony, front door, basement, in baskets, bins/storage containers, laundry room, and inside a purse.

Figure 2: Storing Reusable Bags

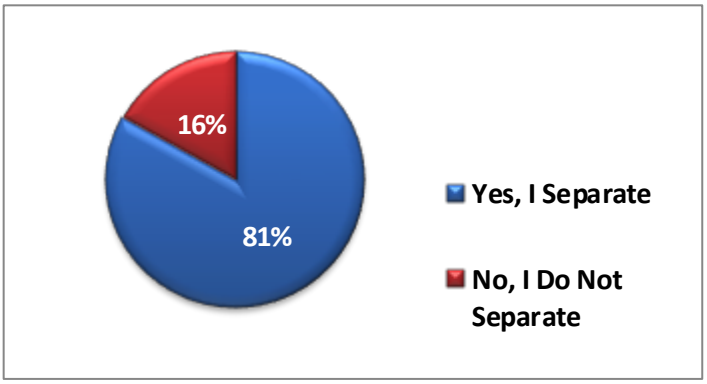


Care and attention given to reusable bags cannot be properly analyzed without examining the handling and separation of groceries placed inside the reusable bags. This is done because cross-contamination can occur during the handling and the transfer of groceries. To understand how survey

participants prevent possible contamination, we asked how they package their produce and meat products in the reusable bags (i.e. whether they separate vegetables and meat-based items from other products).

Eighty-one percent (64 participants) said that they separate vegetables from meat-based items, and 16% (13 participants) said that they do not (Figure 3). Participants indicating that they do not separate their grocery items also stated the reason for doing so: meat products are already sealed. Some participants said that they separate their grocery items only when it is convenient to do so.

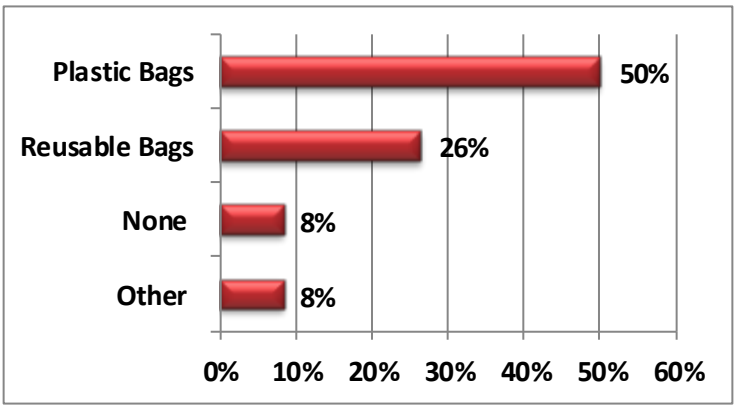
Figure 3: Separating Produce and Meat Products



When participants were asked the type of inner bags that they use to separate meat and vegetable items from other products, 50% (36 participants) stated that they use plastic bags. These bags include the clear plastic bags that are typically found in the produce section of stores or the 5-cent plastic bags. Twenty-six percent (19 participants) admitted using different reusable bags for separation purposes (Figure 4).

When asked the question on separating grocery items, some of the participants who use reusable bags were surprised to realize that plastic bags are still a major part of their everyday transport of groceries.

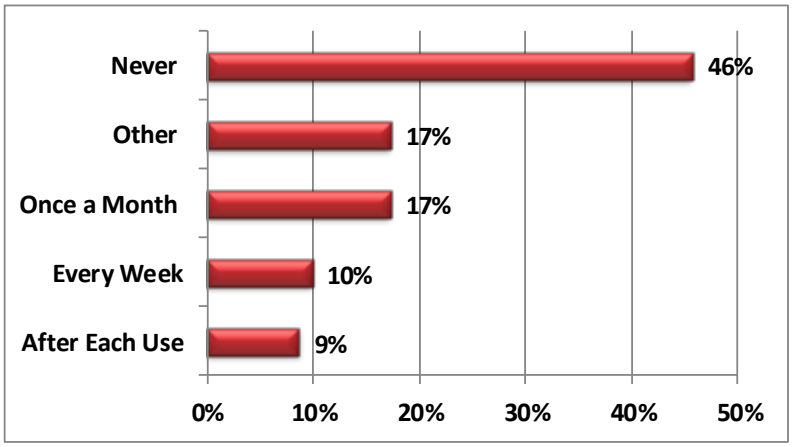
Figure 4: Separating Grocery Items



In order to understand the care given to reusable grocery bags, the participants were asked how often they wash their reusable bags. Of the 81 responses received for this question, only 9% (7 participants) indicated that they wash them after every use, whereas an overwhelming 46% (37 participants) indicated that they *never* wash their reusable bags (Figure 5).

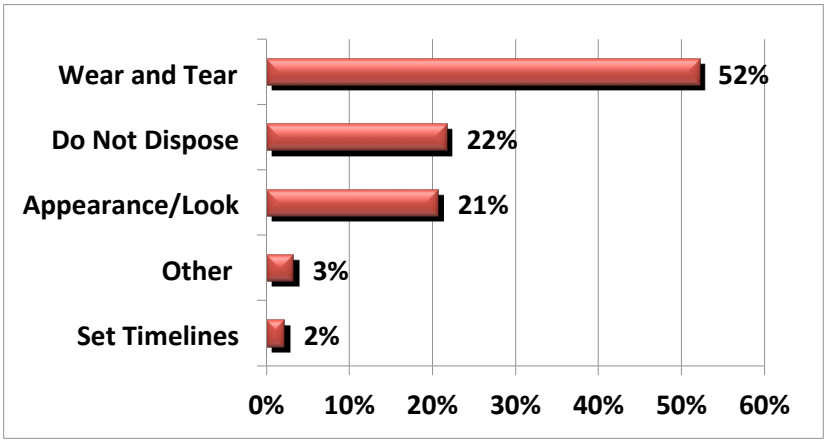
Participants commonly used words such as 'very seldom', 'infrequently', 'rarely', 'not very often', and 'not enough' to answer the question of how often they wash their reusable bags. Some participants noted that they only wash the bags when they get dirty or stained. This is particularly disturbing because microbial growth (bacteria, yeast, mold, etc.) can develop from repeated exposure to meat and vegetables without regular cleaning. The possible cross-contamination of grocery items, coupled with an enabling condition for growth and survival of bacteria, can have significant public health effects. Using contaminated bags can also spread contamination to other shoppers by contact with common areas and equipment in grocery stores.

Figure 5: Washing Reusable Bags



When asked what determines their disposal of reusable bags, 52% (48 participants) stated 'wear and tear', while 22% (20 participants) said that they do not dispose of them (Figure 6). Some survey participants stated that stains, smells, and broken handles are some of the factors that push them to dispose their reusable bags.

Figure 6: Disposing Reusable Bags

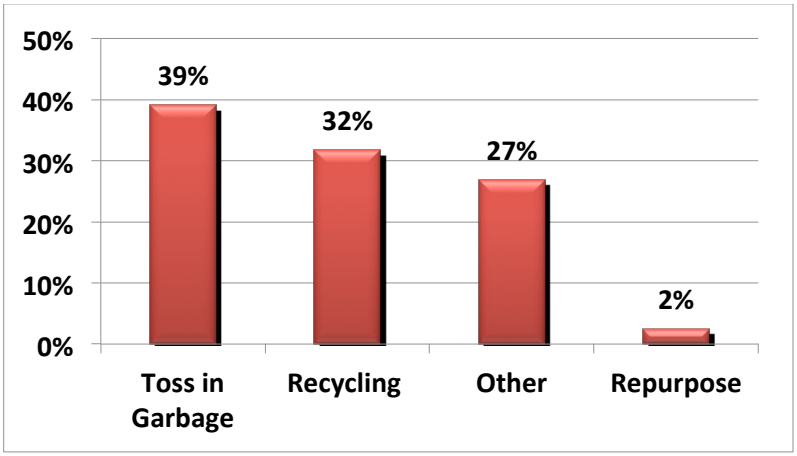


The survey participants were also questioned on their disposal methods for reusable bags. Of the 82 responses received for this question, 39% (32 participants) said that they toss them in the garbage while 32% (26 participants) recycle them (Figure 7). Some questioned whether reusable bags are actually recyclable. To illustrate, some participants said:

- I toss the bags in the garbage because I am not sure if they can be recycled.
- I toss the bags in the garbage because they are fabric.

These responses suggest that people do not know if reusable bags are made from materials that can be easily or efficiently recycled. The end result is that many of the reusable bags end-up as solid waste in landfills. This directly opposes the argument for switching from one-use bags to reusable bags in order to limit landfill waste.

Figure 7: Disposing Grocery Bags



3.4 Environmental Effects of Plastic Grocery Bags

The life span of plastic bags and the materials used for their production continue to spur debate. It has been argued that it takes a plastic bag about 10 to 20 years or more to degrade, having an enormous impact on the environment. As a result, consumers are being advised not to use plastic bags.

Some environmental advocates and certain governments view reusable bags as the only way to avoid the environmental impacts of plastic bags. They argue that the use of renewable bags reduces dependency on oil (used in making plastics), saves energy, reduces solid waste at its source, and thereby, reduces the amount of solid waste that goes into landfills. However, studies to support these claims are lacking.

Various studies have analyzed the impacts of plastic bags on the environment and their contribution to the amount of waste entering landfills. A previous report by Silverhill (2009), titled "Plastic Bag Tax Brings No Benefit", used Toronto as a case study. It was documented that of the 696, 327 metric tonnes of garbage produced in Toronto in 2006, plastic bags made up between 0.3% and 0.6% of the total weight (Silverhill 2009). The report concluded that this amount hardly warrants being called a "major contributor" to waste. Thus, the 5-cent levy on plastic bags in Toronto may be more symbolic of green washing than an environmentally-effective policy (ibid).

To evaluate the impacts of different types of bags on the environment, Boustead Consulting & Associates (2007) conducted a life cycle assessment of three different types of grocery bags. Polyethylene grocery bags, compostable plastic grocery bags, and paper bags were assessed. The study found that polyethylene grocery bags use "less energy in terms of fuels for manufacturing, less oil, and less potable water" than recycled paper bags (p.4). The authors argue that "polyethylene plastic grocery bags emit fewer global warming gases, less acid rain emissions, and less solid waste" (Boutsead Consulting & Associates 2007, pg. 4). Additionally, there is lack of sufficient evidence to support the

argument that banning (single-use) plastic bags will help reduce the amount of waste production, decrease dependency on oil, and decrease the amount of solid waste entering our landfills (ibid, p.3).

Table 2 provides comparative results in terms of energy use, municipal waste contribution, greenhouse gas emissions, and fresh-water usage for the three different types of bags assessed in the Boutsead Consulting & Associates study. The table documents that conventional plastic bags have less environmental impact than compostable plastic bags and paper bags.

Table 2: Impact Summary of Bags

	Impact Summary of Various Bag Types		
	(Carrying Capacity Equivalent to 1000 Paper Bags)		
	Paper (30% Recycled Fiber)	**Compostable Plastic**	**Polyethylene**
Total Energy Usage (MJ)	2622	2070	763
Fossil Fuel Use (kg)	23.2	41.5	14.9
Municipal Solid Waste (kg)	33.9	19.2	7
Greenhouse Gas Emissions (CO2 Equiv. Tons)	0.08	0.18	0.04
Fresh Water Usage (Gal)	1004	1017	58

Source: Boustead Consulting & Associates 2007

3.5 Why the 5-Cent Levy?

The last section of the Toronto residents' survey sought to understand participants' perceptions of the 5-cent levy, its intended purpose, and to assess its ability to change the behavior of consumers.

When participants were asked if they would continue using reusable bags if plastic bags were free, 76% (60 participants) answered yes, and 20% (16 participants) answered no (Figure 8). The participants that would continue using reusable bags had some interesting reasons:

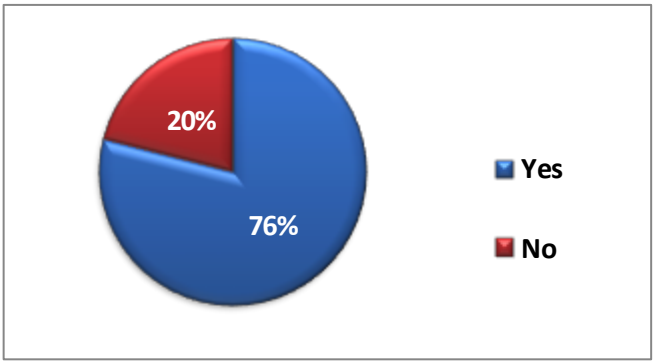
- Reusable bags are bigger
- Reusable bags are more durable
- Plastic bags rip easily
- Reusable bags are easier to use

For those that would continue using the single-use plastic bags, their comments were centered on plastic bags being useful in:

- Disposing garbage
- Cleaning-up after pets
- Wrapping dirty diapers
- Packaging items for charity drop-off
- Storing items such as Christmas decorations
- Wrapping and packaging material when moving breakable items

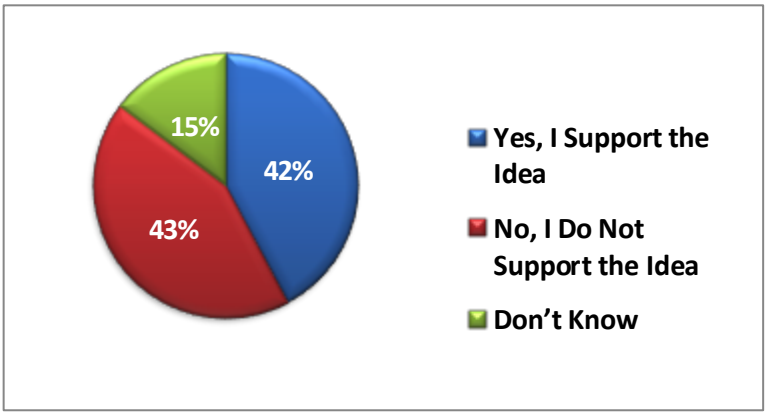
Two participants said that they were unsure if they would continue using reusable bags if plastic bags were free. Another participant said that he would use both plastic and renewable bags.

Figure 8: Reusable Bags vs. Plastic Bags



To understand participants' position regarding the 5-cent levy, participants were asked whether they support the idea of stores charging 5 cents per bag. Responses were interesting: 43 % (47 participants) did not support the idea of charging 5 cents per bag and 42% (42 participants) supported the idea (Figure 9).

Figure 9: Charging 5 Cents per Bag



Some of the participants who use only reusable bags for grocery shopping did not support the levy on plastic bags. Those against the 5-cent levy made the following comments:

- The fee is a cash grab putting money in the pockets of store owners.
- Plastic bags can be made biodegradable.
- They should be free like in USA.
- Plastic bags have been free for a long time and should remain so.

Those who support the levy stated the following:

- It is good for the environment.
- It will encourage shoppers to bring their reusable bags.
- Plastic bags are not durable and do not last.

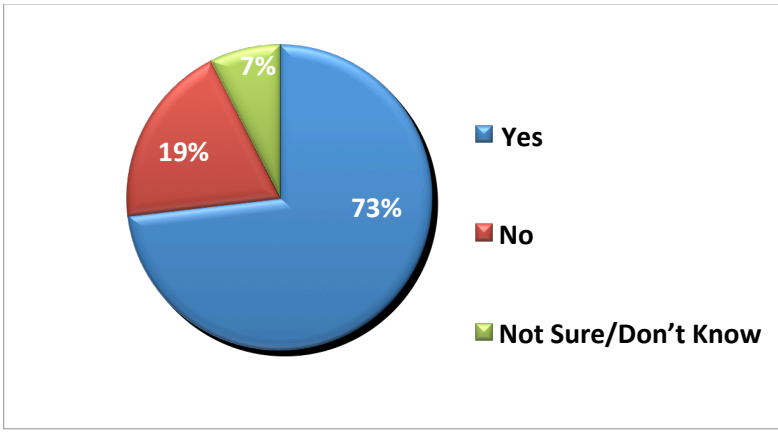
Interview participants were asked if they knew why they were being charged 5 cents per bag. The survey results show that 73% (79 participants) claimed to know, 19% (21 participants) said that they do not know, and 7% (8 participants) said that they were not sure if they know (Figure 10).

Participants who claimed to know why stores in Toronto charge the 5-cent levy had the following comments:

- Serves to deter people from using plastic bags
- Encourages people to use reusable bags
- Reduces garbage
- Used to clean up the environment
- Used for recycling of plastic bags
- Money used to make more bags
- A form of tax due to legislation passed by the government
- Money used to support charity purposes
- Profits given to assist environmental agencies

The participants that opposed the levy felt that the purpose of the levy was for stores to make more profit. This claim might have some grounding. A Silverhill report (2009) documented that major grocery stores in Toronto could profit up to $44 million dollars annually from charging the 5-cent levy.

Figure 10: Why 5 Cents per Bag

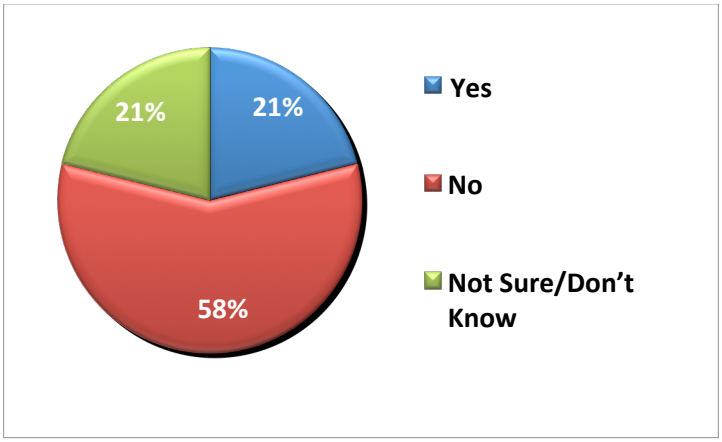


When survey participants were asked if they knew where the profit from the levy goes, 58% (63 participants) answered no, 21% (23 participants) said yes, and 21% (23 participants) said that they were not sure (Figure 11). [2] Those who answered that they knew where the money was going made the following comments:

- Maybe to charity or homeless
- Recycling depot
- To corporations and not to the environment
- Goes directly to the pocket of the store owners
- To making more plastic bags
- To the government and many others

[2] On the City of Toronto website, the official statement is that "the Funds generated from the sale of plastic retail shopping bags are not remitted to the City of Toronto. Each retailer may choose what they would like to do with the money from the sale of plastic retail shopping bags. In passing this policy in December 2008, Toronto City Council encouraged retailers to reinvest any revenue from the sale of plastic retail shopping bags into community or environmental initiatives, and encourages retailers to let their customers know what they are doing with the funds"(City of Toronto 2009). Presently, there is no documented evidence to show how the collected funds are spent.

Figure 11: Where 5 Cents Goes



4. SUMMARY

- 'Environmental concerns', 'convenience', and 'cost' are factors that consumers state are important in selecting the choice of grocery shopping bags.
- Consumers are largely unaware of the health effects of reusing reusable bags to make informed choices.
- Health issues can result as an unintended consequence if reusable bags are not properly handled, stored, and cleaned. Results from this survey show that 46% never wash or clean their reusable bags, and another 44% do so infrequently.
- Shoppers who do not properly maintain their reusable bags can cross-contaminate other shoppers.
- Some of the survey participants store their reusable bags inside the car, usually in the trunk. Studies show that car storage increases bacterial growth in reusable bags up to 10-fold within a 2 hour period during warmer weather.
- The survey results confirm that most people do not clean, handle, or store their reusable bags properly. This may cause increased cases of food poisoning and contamination in the household.
- Studies have documented that plastic bags have minimal impacts on the environment, and they currently remain as the most hygienic option for grocery shoppers.
- Many users of reusable bags are routinely using plastic bags for the separation of their groceries.
- There are serious controversies and confusion over the purpose and the actual use of the 5-cent levy on plastic bags. Many participants believe that the levy profit goes directly to store-owners' pocket rather than charity or environmental conservation projects (as it *was* intended).
- Users of reusable bags do not necessarily support the 5-cent levy.

5. Recommendations

- The health of shoppers should be a priority during the decision-making process.
- All merchants should provide single-use and biodegradable plastic bags (which are widely available).
- Grocery stores need to find ways to reduce and eliminate bacterial contamination and other pathogens brought into stores by shoppers with reusable bags.
- Users of reusable bags must be encouraged to wash bags after every second use.
- There should be proper labeling on all reusable bags describing appropriate disposal, handling, and cleaning methods.
- The 5-cent levy should be scrapped; however, if maintained, all monies collected should be payable to the municipality to support tree planting and other environmental enhancements.
- More research needs to be conducted on alternative forms of transportation of goods.
- Increased funding needs to become available for plastic, non-plastic, and biodegradable bag innovation.
- Accurate information needs to be made available to the public to enhance their decision-making abilities.

The information provided in this report was compiled from a number of sources and **from the results of the Silverhill's Grocery Shopping Bags 2011 Toronto Resident Survey**. Secondary sources are identified below.

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APPENDIX A: SURVEY QUESTIONS

SURVEY ON GROCERY SHOPPING BAGS

June 2011

Introduction: Good afternoon (evening). I am calling from the Silverhill Institute of Environmental Research and Conservation and we are doing a short (1 minute) telephone survey on shopping habits. May I ask you a few questions?

Questions:

1. When you go grocery shopping, what do you normally use to carry your purchases home from the store?
   a. Plastic bags ☐
   b. Reusable bags ☐
   c. Paper boxes ☐
   d. Buggies ☐
   e. Paper bags ☐

2. What are the reasons for your choice?
   a. Cost ☐
   b. Convenience ☐
   c. Environmental concerns ☐
   d. Durability ☐
   e. Financial incentives ☐
   f. All of the above ☐

Note: For those who do not use reusable bags, go to question 10.

3. If you have, or use, reusable bags, where do you store them?
   a. Inside the car ☐
   b. In the kitchen cabinet ☐
   c. Inside another bag ☐
   d. In the closet ☐
   e. Other _____(specify)

4. While packing your groceries in the reusable bag, do you separate vegetables and meat based items from other products?
   a. Yes ☐
   b. No ☐

   If no, go to question 6.

5. What type of inner bags do you use to separate your grocery items?
   a. Plastic bags ☐
   b. Reusable bags ☐
   c. Other _____(specify)
   d. None ☐

6. If you use reusable bags, how often do you wash them?
   a. After each use ☐
   b. Every week ☐
   c. Once a month ☐
   d. Never ☐
   e. Other _____(specify)

7. What determines when you dispose of your reusable bags?
   a. Wear and tear ☐
   b. Set timelines ☐
   c. Appearance/look ☐
   d. Other _____(specify)

8. How do you dispose of your shopping bags?
   a. By recycling ☐
   b. Toss in the garbage ☐
   c. Repurpose ☐
   d. Other _____(specify)

9. Would you still use reusable bags if plastic bags were free?

   a. Yes ☐
   b. No ☐

10. With respect to plastic grocery bags, do you support the idea of stores charging 5 cents per bag?

   a. Yes
   b. No ☐
   c. Not sure/Don't know ☐

11. Do you know why stores charge 5 cents per bag?

   a. Yes ☐
   b. No ☐
   c. Not sure/Don't know ☐

12. Do you know where your 5 cents goes?

   a. Yes ☐
   b. No ☐
   c. Not sure/Don't know ☐

THANK YOU FOR YOUR TIME.