

ACHIEVING SUSTAINABILITY

For presentation to RECYC-QUÉBEC
on plastic shopping bags

JANUARY 2015



**Association canadienne de
l'industrie des plastiques**

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**Canadian Plastics
Industry Association**

EXECUTIVE SUMMARY

This document provides Recyc-Quebec with the most recent data on the management of plastic shopping bags in Montreal. It provides an update to the 2007 Technical Report which pre-dates the introduction of the 2008 Province of Quebec 50% Bag Reduction Program.

The information contained in this report has been based on rigorous analysis and data from: Eco Enterprise Quebec (EEQ), Recyc-Quebec, the Quebec Ministry of Environment, Quebec plastic bag manufacturers as well as guidance from staff at the City of Montreal.

This update is critical because current data being used to develop policy on plastic shopping bags is seriously outdated and does not reflect the 52% reduction in the number of bags distributed as a result of the highly successful 2008 Voluntary Product Stewardship initiative. For example, it shows the recycling rate for bags at 14% when in fact, it is 33% and it shows that the number of bags generated is 2% of the waste stream when in fact is 0.27%. See appendices.

This data will establish a base data set for any go forward policy and operational decisions made related to plastic shopping bags and their alternatives.

Plastic Bag Management in Montreal

- **Landfill:** On a tonnage and volume basis, plastic shopping bags are a fraction of a percent of the waste stream in Montreal at 0.27%.
- **Zero Waste:** Only 7% of used clean bags are thrown out as waste which brings bag management very close to a zero waste target in the city.
- **Litter:** Plastic shopping bags are also a very small part of the litter stream at less than 1% of overall litter in line with litter audit data from major North American municipalities; Toronto at .8%, and San Francisco at .6%. (Appendix #5 Plastic Retail Bags In Litter)

In Montreal and across Quebec, responsible use is the underpinning of a very successful bag management strategy.

- **The 3R's:** The data shows that Montrealers are deeply committed to product stewardship and practice the 3R's diligently – reduce, reuse and recycle.
- **Reduce:** the 52% reduction in number of bags distributed achieved under the 50% Bag Reduction Program has been sustained.
- **Reuse:** the reuse rate is high with 60% of the bags reused one or more times. This is because plastic shopping bags are multi-use bags; with a significant portion of the bags being reused to manage household and pet waste.
- **Recycle:** 33% of all plastic shopping bags distributed are recycled. This means that 82% of the bags available for recycling (after bags are reused for household waste and other purposes are removed) are being recycled.
- **Zero Waste:** The number of bags being wasted – not reused or recycled is small at only 7%.

Bag Bans – Unintended Consequences

The most effective bag management strategy is an “**Enhanced 3R’s Program**” which is built around product stewardship and responsible use. It puts in place programs that deliver on ongoing reduction, higher reuse, more recycling and ultimately remanufacturing of the plastic to extend the life of the resource.

Bag bans as a bag management strategy have a number of negative unintended consequences--negative environmental, economic, and social impacts.

- **Environmental Unintended Consequence:** Bans tend to be anti-environmental because of how people use plastic bags. **The bags are a necessity.** They are not single-use, but are multi-purpose bags used not just as carry bags, but reused to manage household and pet waste.
- The question comes down to what people will substitute to replace their plastic shopping bags. While consumers may well migrate more aggressively to reusable carry bags, they will have to purchase heavier kitchen catcher type bags which contain 74% more plastic than traditional plastic shopping bags to manage their waste. The result is that a ban will actually result in **more plastic being consumed (+32%)**, not less; increase the amount of plastic in the waste stream; and lead to more GHG emissions. (See Appendix 2 For Calculations - Plastic Shopping Bags Replaced by Kitchen Catchers)
- If consumers switch to paper to manage their household waste, the amount of waste in Montreal’s waste stream will soar. Paper shopping bags weigh 56 grams vs. plastic shopping bags at 7.2 grams. That is why Taiwan in 2006 rescinded a 2001 ban on plastic bags in the food service sector. The ban had the unintended consequence of generating a “mountain of paper waste” when consumers switched to paper bags. This in turn caused a significant spike in GHG emissions. (See Appendix 3 For Calculations - Plastic Shopping Bags Replaced by Paper)
- **Economic Unintended Consequence:** One of the unexpected consequences of a bag ban will be the impact on local employment. Unlike reusable bags which are almost exclusively manufactured in Asia, the Montreal area is home to many companies involved in plastic bag manufacture. These are native-son companies – largely Quebec owned and operated and employing thousands of Montrealers and Quebecers. A ban will certainly result in significant job losses and some plant closures.
- **Social Unintended Consequences:** For poorer citizens, a ban will increase the cost of managing household waste as they have to purchase kitchen catchers to replace the banned bags. Kitchen catchers cost about 12 cents a bag. And if residents live in high rise dwellings, they will have no choice because the use of paper bags to manage waste is prohibited because of fire safety regulations. In this sense the cost of the kitchen catchers acts almost like an indirect tax, which will hit those of lower incomes hardest.

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INTRODUCTION

The purpose of this document is to provide RECYC-QUÉBEC with the latest data on plastic shopping bags – reduction, reuse, recycling. It will also provide an analysis of the plastic shopping bags as a percent of total waste stream.

The information contained in this report has been guided by research and data predominantly sourced in Quebec from: Eco Enterprise Quebec (EEQ, RECYC-QUÉBEC, Quebec Ministry of Environment, Quebec plastic bag manufacturers as well as some guidance from staff at the City of Montreal.

This document contends that the data currently being used by policymakers to develop policy on plastic shopping bags is dated. The numbers pre-date the highly successful 2008 Voluntary Product Stewardship initiative – the 50% Plastic Bag Reduction Program – that saw all Quebecers pull together to reduce the number of plastic shopping bags distributed (non-essential shopping bags) by 52%.

The data that follows is predominantly Quebec data. Key data sets are sourced and provide assumptions so that they can be clearly tracked.

ACHIEVING SUSTAINABILITY

“Sustainable development is development that meets the needs [environmental, social and economic] of the present without compromising the ability of future generations to meet their own needs.”

Our Common Future, also known as the Brundtland Report, p.43.

- The data on plastic shopping bags will show that plastic shopping bags are one of the best examples of sustainability and sustainable development with government, manufacturers/employers, retailers, and Quebecers working together to marry local employment with environmental protection.
- This document will show that plastic shopping bag management is guided by responsible use and are used wisely by Quebecers who are committed to the 3R's. Plastic shopping bags are champions of the 3 R's sustaining a strong reduction rate since the 2008 50% Bag Reduction Program, and high recycling and reuse rates – a 52% reduction in numbers since 2008; a 60% reuse rate, and a 33% recycling rate (of all plastic shopping bags distributed).
- Plastic shopping bags are not a problem environmentally. They continue to be a fraction of a percent of the waste stream in Montreal and Quebec at less than 1%. In Quebec, plastic shopping bags are a miniscule component of the municipal litter stream. Litter audit data from major North American municipalities shows that plastic shopping bags are usually less than 1% of the overall litter. (Appendix #5 Plastic Retail Bags In Litter)
- In nowadays context, plastic bags are a necessity – they are multi-purpose bags used responsibly by residents as sanitary carry bags and have multiple secondary reuses. The bags are a necessity to manage household and pet waste.
- There are many options to bag management such as “**Enhanced 3R's Programs**” which will encourage ongoing reduction, high reuse and extend the life of the resource through recycling.
- A ban on plastic shopping bags will result in a number of negative unintended consequences; negative environmental, economic and social impacts.
- **Environmental Unintended Consequence:** Because plastic shopping bags are a necessity, a bag ban in the City of Montreal will end up harming the environment and undermine sustainability goals for the City of Montreal. A ban on plastic shopping bags will not eliminate plastic from the waste stream. A ban will actually result in more plastic being consumed and an increase in the amount of plastic in the waste stream as consumers switch to heavier plastic kitchen catcher type bags (74% heavier than plastic shopping bags) to manage their household waste. (*This is a well-documented consequence internationally – see below.¹*)

¹ Taiwan: In 2006, Taiwan rescinded a 2001 ban on plastic bags in the food service sector. The ban had the unintended consequence of generating a “mountain of waste” as the food service industry switched to paper bags. Another unintended consequence was a significant spike in greenhouse gases because of the increased number of garbage trucks on the road, required to transport roughly seven times the additional waste to dumps. Also, public

- **Economic Unintended Consequence:** One of the unexpected consequences of a bag ban will be the impact on local employment. Unlike reusable bags which are almost exclusively manufactured in Asia, Montreal and area is home to 30-40+ companies involved in plastic bag manufacture. These are native son companies – Quebec owned and operated and employing thousands of Montrealers & Quebecers. A ban will certainly result in significant job losses and some plant closures. While the 2008 50% bag reduction program was a success environmentally, it did lead to job losses in the bag industry. These manufacturers, which have already lost more than 50% of their domestic revenue under the 50% Voluntary Reduction Program, will not in most cases be able to absorb the additional loss of revenue caused by losing their largest municipal market in Quebec – Montreal. It will be a throw of the dice, but a number of the 30-40 companies specializing in plastic shopping bags will not survive.
- **Social Unintended Consequences:** One of the consequences of a bag ban on the poorer citizens of the city will be increased costs to grocery shopping and managing their household waste. The average family can be expected to pay more per year buying plastic kitchen catchers to replace the banned bags to manage their household waste plus the additional cost of reusable bags at \$0.99 per bag. And because the bags are a necessity to manage household waste, there is no way that residents can avoid paying for kitchen catchers particularly if they live in high rise dwellings. In this sense the cost of the kitchen catchers acts almost like an indirect tax, which will hit those of lower incomes hardest. Kitchen catchers cost about 12 cents a bag.

polling showed that the public was very dissatisfied with the ban. So in 2006, the government rescinded the bag ban and moved to a recycling model.

Ireland: In 2002, Ireland introduced a tax on plastic bags that led to a 94% reduction in the number of bags handed out at checkout. Since 2002, the tax has been increased twice to discourage usage. One of the consequences of the tax was an increase in the use of paper bags and a 77% increase in the purchase of kitchen catchers, leading to much higher levels of plastic in the waste system (a 21%+ increase in plastic in the waste stream). Ireland is working hard to build a recycling infrastructure. Currently, most waste is exported for processing.

THE ROAD TO SUSTAINABILITY – USING THE 3 R’S

Quebecers and Montrealers are strongly committed to the 3 Rs: reduce, reuse, recycle.

REDUCTION

- The 52% reduction in plastic shopping bags during the Voluntary 50% Bag Reduction Program has been sustained according to Eco Enterprise Quebec (EEQ).

Sources:

- *Eco Enterprise Quebec (EEQ) & RECYC-QUÉBEC Voluntary Code of Best Practices for the Use of Shopping Bags* <http://www.ecoentreprises.qc.ca/innovate-and-optimize/business/voluntary-code-shopping-bags>
- *Eco Enterprise Quebec (EEQ) Study* <http://www.recyc-quebec.gouv.qc.ca/upload/Publications/Document-appoint-annonce-sacs-23-juillet-2012.pdf>
- *CBC News* <http://www.cbc.ca/news/canada/montreal/quebecers-cut-plastic-bag-use-in-half-1.1144901>

REUSE

- The reuse rate for plastic shopping bags in Quebec and Montreal is extremely high at 60%.
- This is consistent with the Paris Life Cycle Study which identified a 65% reuse rate.
- This high reuse rate is validated by the 2007 Decima Poll of Quebecers which shows that 80% of Quebecers will reuse their plastic shopping bags two or more times.

Sources :

- *Decima Televox National Telephone Omnibus - Consumer Opinions on Plastic Bag Uses - April 25th, 2007*
- *The Paris Life Cycle Study (Carrefour Ecobilan) shows a 65% reuse rate.*
- *Scottish Government Report, 2005 found high reuse rates between 59% and 75%* <http://www.scotland.gov.uk/Resource/Doc/57346/0016899.pdf> page 13

RECYCLING

- 73% of Quebecers are strongly committed to recycling. When asked in a 2007 Decima Poll about at store bag recycling, 73% of Quebecers indicated that they would take their plastic shopping bags back to retailers to be recycled if given the opportunity.
- The City of Montreal has invested in the development of a curbside plastic shopping bag recycling system that has been highly successful enjoying high participation rates among Montrealers.
- The current recycling rate is 33% of all plastic shopping bags distributed in Montreal
- Overall plastic shopping bags have a combined 93% recycling and reuse rate (33% recycling rate+ 60% reuse rate)

- Another way of looking at the recycling rate and how high it is for plastic shopping bags, is to look at the number of bags actually available for recycling after bags are reused for household waste and other purposes. Currently 82% of the clean bags available are recycled – there is room for improvement.
- See Appendix #1 For Calculations On Recycling Rates - Plastic Shopping Bag Recycling Rates

IMPACT OF A PLASTIC SHOPPING BAN ON THE AMOUNT OF PLASTIC IN THE WASTE

If there is a plastic shopping bag ban, the amount of plastics in the waste stream will increase by 32%.

Reasons:

- A ban will not eliminate the use of plastic bags. Because plastic shopping bags are a necessity to manage household and pet waste. Experience worldwide shows that Quebecers will migrate to and substitute heavy duty plastic kitchen catchers. In Ireland, it led to a 21% increase in the amount of plastic in the waste stream.
- A similar pattern of behaviour will be experienced in Montreal if a ban is put in place. This is confirmed by a Decima Poll which found that 76% of Quebecers will convert to kitchen catchers to manage their household waste if traditional plastic shopping bags are not available for use. (*Decima Televox National Telephone Omnibus - Consumer Opinions on Plastic Bag Uses - April 25th, 2007*)
- And because plastic kitchen catchers contain 74% more plastic (thicker) than traditional plastic shopping bags, it will lead to the consumption of more, not less plastic. The result will be (+1,071 tonnes more plastic in the Montreal waste stream
- See Appendix 2 For Calculations - Plastic Shopping Bags Replaced by Kitchen Catchers

IS PAPER A BETTER OPTION ENVIRONMENTALLY?

If there is plastic shopping bag ban and plastic bags are replaced with paper shopping bags, the amount of waste in the waste stream will increase +710%

- Paper shopping bags weigh 56 grams vs. plastic shopping bags 7.2 grams
- Moving to alternatives such as paper shopping bags that are at least 7 times heavier than plastic shopping bags will add over 15,958 tonnes to Montreal's waste stream.
- See Appendix 3 For Calculations - Plastic Shopping Bags Replaced by Paper
- Sustainability is negatively impacted as various life cycle studies (Paris Ecobilan LCA Study, UK & Scottish Life Cycle Studies) have shown plastic bags to be superior to paper bags in performance environmentally in all categories studied except litter risk. The Paris EcoBilan Carrefour Life Cycle Assessment shows that in their manufacture, paper bags consume 2.2 times more non-renewable energy than the manufacture of plastic bags; paper bag manufacture consumes 4.7 times more water, emits 3.1 more greenhouse gases and 2.7 times more acid gases than the manufacture of plastic bags. Each study discloses slight differences in results, but all studies agree that paper bags carry a substantial environmental impact that is not seen with plastic bags.
- Economically paper bags will cost citizens and retailers 5 – 6 times more. Plastic bags are 1 to 2 cents per bag vs. paper bags 10 – 12 cents per bag.

GENERATION: THE AMOUNT OF PLASTIC SHOPPING BAGS IN THE WASTE STREAM

- Policymakers have been using 2% as a metric to measure the amount of plastic shopping bags generated or currently present in Montreal's solid waste stream.
- This 2% number is a province-wide number developed in 2007 pre- the Voluntary 50% Reduction Program. This number suggests that plastic shopping bags are a significant portion of Montreal's waste stream which as will be seen is not the case.
- **The 2% number is not relevant to today:** It is dated, not correct (i.e. it combines trash and shopping bag generation) and does not recognize the current 52% reduction in bags which has been sustained. It should not be used as a base metric in 2014 to guide policy discussions around plastic shopping bags.
- The contention is that a better number for the amount of plastic shopping bags in the waste stream in 2007 was 0.55%, not 2%.
- **See Appendix 4 - PRE 52% BAG REDUCTION PROGRAM – where the 2% number came from.**

PLASTIC BAG GENERATION: MONTREAL TODAY – POST 50% BAG REDUCTION PROGRAM

- In July 2012, THE Quebec MINISTRY OF Environment announced achievement of a 52% reduction in plastic shopping bag use from 2.2 billion in 2007 to 1.0 billion.
- Based on the 52% bag reduction, the generation of plastic shopping bags as a percent of total solid waste stream in Quebec and Montreal, as Quebec's largest city, would be 0.27% and not 2%.

Source: CBC News <http://www.CBC.ca/News/Canada/Montreal/Quebecers-Cut-Plastic-Bag-use-in-Half-1.1144901>

Calculations

1. ASSUMPTION: Total Tonnage of Solid Waste in Montreal and the Province.

- The City generates 330 kg/capita of residential solid waste and the population of the city is 3,814,738. Therefore, the city's residential solid waste generation is 1.2 million tonnes. (Total Solid Waste Stream Montreal = 330 kg/capita x 3,814,738 Montreal population = 1,258,864 tonnes of solid waste)
- Quebec kg/capita solid waste generation is 347kg/capita. (2,853,189 tonnes/8,214,000 population)

Sources: City of Montreal Vital Signs 2010 (<http://www.fgmtl.org/en/vitalsigns2010/index.php>)
(<http://www.fgmtl.org/en/vitalsigns2010/contexte.php>)
Quebec Statscan 2010 Waste Data
<http://www.statcan.gc.ca/pub/16F0023X/2013001/T001-eng.pdf>

2. ASSUMPTION: Plastic shopping bags per capita consumption was assumed to be 122 bags per capita for both Montreal and Quebec, because of how close the kg/capita solid waste numbers are - Provincially (347kg/capita) and Montreal (330 kg/capita).

- 8,214,000 population in Quebec
- 1 billion Bags in the system in 2010 post the 50% reduction program
(Calculation: 1 billion bags/8,214,000 population Quebec = 122 bags/capita)

Sources: Statscan Population Quebec <http://www.statcan.gc.ca/tables-tableaux/sum-som/101/cst01/demo02a-eng.htm>
Eco Enterprise Quebec (EEQ) Study Bags <http://www.recyc-quebec.gouv.qc.ca/upload/Publications/Document-appoin-annonce-sacs-23-juillet-2012.pdf>
City of Montreal Vital Signs 2010 Waste Generation <http://www.fgmtl.org/en/vitalsigns2010/context.php>

3. ASSUMPTION: Plastic Shopping Bags Average Weight

- 7.2 g/sac.

4. Calculation of tonnes of plastic shopping bags in the Montreal Waste Stream is 3,343 tonnes.

- $(7.2 \text{ grams/bag} \times 122 \text{ bags/capita}) \times 3,814,738 \text{ Montreal population} = 3,343 \text{ tonnes plastic shopping bags}$

5. PERCENT OF Plastic Shopping Bags IN THE SOLID WASTE STREAM is 0.27%.

- Calculation: $(3,343 \text{ tonnes plastic shopping bags} / 1,258,864 \text{ tonnes total solid waste Montreal}) \times 100\% = 0.27\%$
- Due to bag reduction initiatives, the amount of plastic shopping bags in Montreal's solid waste system has been halved from 0.55% in 2007 to 0.27% post the 50% reduction program

SETTING THE RECORD STRAIGHT

It appears that the 2007 Recyc Report on plastic shopping bags has some outdated information. The following is intended to bring that information up to date.

Plastic shopping bags are made from Natural Gas, not oil in Canada.

- The bags are a by-product of natural gas production, and are one of the greenest bag options on the market.
- Polyethylene plastic bags are made out of ethane, a strand of waste natural gas, called ethane, which has to be burned off during the natural gas production process.
- Ethane is burned off to lower the BTU or energy value of natural gas so that it does not burn too hot when used to heat our homes and our businesses.
- Most important for the environment: Plastic bags play an important role in protecting the environment by reducing greenhouse gas emissions. They prevent waste gas from the natural gas production process from being released into the atmosphere as carbon emissions.

Reusable bags are not a silver bullet to save the environment.

- Reusable bags have their own environmental downsides in that they are not recyclable in North America and will end up in land fill at the end of their useful life.
- While reusable bags can perform well on reuse, they must be reused multiple times to justify the additional material/resources needed to make them more durable.
- The forgetting factor on reusable bags can be as high as 40%.

APPENDIX #1

Current Plastic Shopping Bag Recycling Rates Province & Montreal

CALCULATIONS

| | | |
|--|--------------|--|
| Bag Generation Units | 1 Billion | Source: EEQ & RECYC-QUÉBEC http://www.recyc-quebec.gouv.qc.ca/upload/Publications/Document-appoin-annonce-sacs-23-juillet-2012.pdf |
| Plastic Shopping Bag Weight | 7.2 grams | Source: Quebec bag manufacturers |
| Bag Generation tonnes | 7,200 tonnes | = 7.2grams x 1 Billion Bags |
| Plastic Shopping Bags Recycled | 2,365 tonnes | 2012 RECYC-QUÉBEC Recycling Data for bag & film residential & ICI 7,883** tonnes (includes all bags and film) Bale composition range 30% - 40-% range as directed by recycling industry – used conservative 30% composition estimate ** RECYC-QUÉBEC Report- Plastics sold by sorting centers in Quebec for the year 2012 (residential and ICI) |
| Plastic Shopping Bags Recycling Rate – of all bags generated | 32.8% | = 2,365 tonnes / 7,200 |
| Plastic Shopping Bags Reused – 60% reuse rate | 4,320 tonnes | <ul style="list-style-type: none"> • <i>Decima Televox National Telephone Omnibus - Consumer Opinions on Plastic Bag Uses - April 25th, 2007</i> • <i>The Paris Life Cycle Study (Carrefour Ecobilan) http://www.allaboutbags.ca/studiesstats.html shows a 65% reuse rate.</i> • Scottish Government Report, 2005 found high reuse rates between 59% and 75% http://www.scotland.gov.uk/Resource/Doc/57346/0016899.pdf page 13) |
| Plastic Shopping Bags Available “For Recycling” after bags reuse | 2,880 tonnes | = 4,320 tonnes x 60% reused |
| Recycling Rate for Plastic Bags Available for Recycling | 82.1% | = 2,365 tonnes / 2,880 tonnes |
| Combined Plastic shopping Bag Reuse & Recycling Rate | 92.8% | = 60% reused + 32.8% recycled |
| Plastic Shopping Bags Disposed | 515 tonnes | = 7,200 mt (total bags) – 2,365 mt (recycled) – 4,320 mt (reused) |

| | | |
|-----------------------------------|------|------------------------------------|
| Plastic Shopping Bags Disposed | 7.2% | = 515 tonnes / 7,200 tonnes x 100% |
|-----------------------------------|------|------------------------------------|

APPENDIX #2

Calculations – Re: Increase of Plastics in Waste Stream Following Ban

Plastic Shopping Bags Replaced by Kitchen Catchers

Decima 2007 Poll found 76% of Quebecers will immediately convert from Plastic Shopping Bags to Kitchen Catchers. Plastic shopping bags are seen as a necessity in their daily life to carry items and manage household and pet waste.

| Kitchen Catchers Increased Use Due To a Ban - Montreal | | |
|---|-----------------------|--|
| Plastic Shopping Bags | 7.2 grams | |
| Kitchen Catchers | 12.5 grams | |
| Metro Montreal Population | 3,814,738 pop. | Montreal 46.4 % of Quebec population 8,214,000 |
| 76% of Montrealers will convert to Kitchen Catcher Use | 2,899,201 | = 3,814,738 pop. of Montreal x 76% (conversion) |
| Plastic Shopping Bags Used | 122 bags per capita** | Citizens convert 122 plastic shopping bags to Kitchen Catchers for carrying items to household waste |
| Plastic Shopping Bags Generated in Montreal | 3,350 tonnes | = 122 bags/capita x 7.2 x 3,814,738 |
| Kitchen Catchers Used to replace plastic shopping bags | 4,421 tonnes | = 122 bags/capita x 12.5 grams x 2,899,201 |
| Increase Plastics Tonnes | + 1,071 tonnes | = 4,421 – 3,350 |
| Increase in Plastics % in Waste Stream – Kitchen Catchers replacing plastic shopping bags | + 32% | = 1,071 / 3,350 x 100% |

*Note: The Irish Tax led to a 21% increase in plastic consumption (Source: Her Majesty's Customs Department Importation Statistics on all bags imported in Ireland)

**Note: 122 bags/capita = 1 billion bags / 8,214,000 (QC pop.)

APPENDIX #3

Calculations Plastic Shopping Bags Replaced by Paper

| | | |
|---|---------------|--|
| Plastic Shopping Bags | 7.2 grams | |
| Total Plastic Shopping Bags Landfilled (bags reused + bags not recycled) | 2,246 tonnes | |
| Paper Bags | 56.0 grams | |
| Paper Bag Recycling Rate | 30% | Source: RECYC-QUÉBEC 2007 Technical Notice On Shopping Bags Environmental Impact Assessment p. 17 |
| Paper Bag Reuse Rate: | 0% | Source: UK Study p. 21 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/291023/scho0711buan-e-e.pdf |
| Paper bags Used if ban in effect - 122 bags per capita to replace Plastic Shopping Bags used for shopping trips | 26,007 tonnes | = 122 bags x 3,814,738 pop x 56.0 grams |
| Paper Bags Recycled | 7,803 tonnes | = 26,007 x 30% |
| Paper Bags to Landfill | 18,204 tonnes | = 26,007 x 70% |
| Increase in Solid Waste | 15,958 tonnes | = 18,204 (paper) - 2,246 (plastic bags landfilled: reuse + not recycled) |
| Increase in Solid Waste over Total Plastic Shopping Bags Landfilled (reused for garbage and not recycled) | +710% | = 15,958 / 2,246 x 100% |

APPENDIX #4

PRE 52% BAG REDUCTION PROGRAM 2007– where the 2% number came from

The purpose of this calculation is to demonstrate why the plastic shopping bags 2% of total solid waste is not correct and not relevant as it does not recognize the current 52% reduction in plastic shopping bags.

- In RECYC-QUÉBEC's 2007 Report -- "Technical Notice on Plastic Shopping Bags Environmental Impact Assessment – 2007" – plastic shopping bags were estimated to be 2% of Total Household Solid Waste Stream in Quebec prior to the Province-wide 50% Reduction Program.
- **The particular focus of this discussion is on the statement in the RECYC-QUÉBEC Report which indicates a generation rate of 42,000 tonnes of “plastic shopping bags and trash bags” or 2% in 2007.** As acknowledged by Recyc-Quebec, the 2% number and plastic bag generation rate of 42,000 tonnes includes trash bags and is not a pure plastic shopping bag number.

Sources:

RECYC-QUÉBEC Technical Notice 2007, pg. 5 <http://www.recyc-quebec.gouv.qc.ca/Upload/Publications/MICI/Avis-SacsEmplettes-anglais.pdf>

Eco Enterprise Bag Best Practices <http://www.ecoentreprises.qc.ca/innovate-and-optimize/business/voluntary-code-shopping-bags> and <http://www.recyc-quebec.gouv.qc.ca/upload/Publications/Document-appoin-annonce-sacs-23-juillet-2012.pdf>

- If accepted as purely plastic shopping bag tonnage, it leads to a significant and erroneous overstatement of the number of plastic shopping bags in the waste stream. This would mean **5.8 billion plastic shopping bags** were distributed in 2007 (42,000 tonnes plastic bags / 7.2 grams per bag = 5.8 billion bags per year). This is more than 2 times the number of plastic shopping bags (2.2 billion bags) found to be distributed by the EEQ and reported in media releases in July 2012 by the Quebec Minister of Environment.
- **The 2007 estimate of bags/tonnage in the waste stream:** There is strong evidence that the actual percent of plastic shopping bags in Quebec's solid waste stream was 0.55% in 2007; less than 1%.

How to arrive at 0.55%:

- First: This number is excludes trash bags and is purely plastic shopping bags.
- Second, according to EEQ, 2.2 billion bags were distributed in 2007; with an average weight of 7.2 grams, the tonnage of plastic shopping bags distributed in 2007 would total 15,820 tonnes. (2.2 billion bags x 7.2 grams/bag = 15,840 tonnes)
- Third, according to Statscan, Quebec's solid waste stream was 2,848,822 tonnes in 2008. So taking the plastic bag tonnage of 15,820 tonnes and dividing it by the total waste stream number, the 0.55% of the waste stream number emerges. (15,820 tonnes of plastic shopping bags / 2,848,822 tonnes solid waste Quebec x 100% = 0.55 %)
- The 0.55% is validated by a number of sources. Data from the U.S. EPA shows that Plastic shopping bags make up 0.5% of the total United States waste stream. Also similar data from other world class cities across Canada show consistently that plastic shopping bags are less than 1% of landfill; a case in point is the City of Toronto where audited data shows that plastic shopping bags are only 0.6% of the waste stream.

Sources:

Eco Enterprise Bag Best Practices <http://www.ecoentreprises.qc.ca/innovate-and-optimize/business/voluntary-code-shopping-bags> and [http://www.recyc-quebec.gouv.qc.ca/upload/Publications/ Document-appoin-annonce-sacs-23-juillet-2012.pdf](http://www.recyc-quebec.gouv.qc.ca/upload/Publications/Document-appoin-annonce-sacs-23-juillet-2012.pdf);

Quebec and Montreal plastic bag manufacturers.

Validated by the EEQ data showing 15,000 tonnes of plastic shopping bags (EEQ Report http://www.ecoentreprises.qc.ca/documents/pdf/voluntary_code_best_practices_shopping_bags.pdf)

Statscan 2008 Residential Solid Waste Quebec
<http://www.statcan.gc.ca/pub/16f0023x/2013001/t001-eng.pdf>

USEPA <http://www.epa.gov/garbage/pubs/mswchar05.pdf>

Toronto 2006 Waste Audit - All about Bags.

APPENDIX #5

Plastic Retail Bags in Litter

ER Planning Report Brief: Plastic Retail Bags in Litter

To Whom It May Concern,

I am the Principal of Environmental Resources Planning, LLC. Our firm focuses on litter-related surveys and studies. I led the design and project management of Keep America Beautiful's ("KAB") *2009 National Litter Study*. That study found that plastic bags of all types comprise only 0.6 percent of litter. Percentages for categories such as plastic bags constituted such a minute portion of roadside litter that they were not specifically addressed in the *2009 National Litter Study*.

National, state and city-wide litter surveys conducted with statistically-based scientific methodologies have clearly established that plastic retail bags continue to comprise a small percentage of litter and the waste stream. Our staff have planned and conducted a number of recent litter surveys. These statistically-based studies were conducted with scientific rigor using trained professionals. Data and methodologies were explained in detail, to allow review by interested parties and affected stakeholders.

Litter surveys showing unusually high rates of items such as plastic bags were usually conducted by volunteers rather than professional staff. These surveys typically lacked random sampling and standard statistical methods. At times, material categories were not consistent. While such studies have helped create the awareness of litter's impacts, their limitations have, in some cases, resulted in erroneous depictions of plastic retail bags as a component of the overall litter stream.

Retail Plastic Bags in Recent Litter Surveys

| # | <i>Survey</i> | <i>Year</i> | <i>Percent</i> | # | <i>Survey</i> | <i>Year</i> | <i>Percent</i> |
|----------|----------------------|--------------------|-----------------------|----------|----------------------|--------------------|-----------------------|
| 1 | Toronto | 2012 | 0.8% | 11 | Durham | 2003 | 0.3% |
| 2 | Edmonton | 2011 | 1.1% | 12 | Peel | 2003 | 0.1% |
| 3 | Alberta | 2009 | 0.0% | 13 | York | 2003 | 0.4% |
| 4 | San Francisco | 2008 | 0.6% | 14 | Toronto | 2002 | 0.6% |
| 5 | San Jose | 2008 | 0.4% | 15 | Florida | 2002 | 0.5% |
| 6 | KAB | 2008 | 0.6% | 16 | Florida | 2001 | 0.7% |
| 7 | Alberta | 2007 | 2.0% | 17 | Florida | 1997 | 0.6% |
| 8 | San Francisco | 2007 | 0.6% | 18 | Florida | 1996 | 1.0% |
| 9 | Toronto | 2006 | 0.1% | 19 | Florida | 1995 | 0.7% |
| 10 | Toronto | 2004 | 0.2% | 20 | Florida | 1994 | 0.6% |

As shown in the table above, recent science-based litter surveys using random sampling methodologies consistently found that retail plastic bags comprise a minor portion of litter, usually less than one percent.



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