FACT SHEET – LANDFILL IMPACTS

Unintended Consequences Of A Plastic Carryout Bag Ban

By Anthony van Leeuwen, 16 April 2013

Executive Summary. The Single-Use Carryout Bag Ordinance has a detrimental impact on the landfills that has not been clearly identified. While the Environmental Impact Report (EIR) identifies that plastic carryout bags currently end up in the landfill, unbeknownst to proponents of the ordinance is that the amount of material deposited in the landfill after the ban has been implemented is far greater than before the ban. Landfill impacts for both the City of Los Angeles and for Santa Barbara and Ventura Counties is presented in Tables 1 and 2 respectively.

When plastic carryout bags are banned there are direct consequences that impact the amount of material that will end up in the landfill. This includes the following material: plastic carryout bags, paper bags, reusable bags, replacement bags, and "other plastic". This material is defined in the following paragraphs:

> Plastic Carryout Bags. A plastic carryout bag is the lightweight plastic shopping bag given to the consumer at checkout to take their purchases home. The bag is made from either High Density Polyethylene (HDPE) or Low Density Polyethylene (LDPE) plastic and has built in handles that make the bag a favorite for reuse. Not all plastic carryout bags weigh the same, but for purposes of this paper we will assume that plastic carryout bags weigh 5.5 grams or 0.01213 lbs. each.
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> Paper Carryout Bags. A recyclable paper bag has at least 40% post-consumer recycled content and weighs between 45 and 90 grams and has approximately 1.5 times the volume of plastic carryout bag. A paper bag from Trader Joe's weighs 67.47 grams or 2.38 ounces each.
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> Reusable Bags. Reusable bags come in small, medium, and large sizes and can hold 10, 25, and 35 lbs. respectively when filled. The most common bags are made from non-woven polypropylene plastic and from cotton or Jute with handles and intended to be used multiple times. Reusable bags weigh between 50 and 200 grams. The weight of a reusable bags for purposes of this paper is assumed to be 6.8 ounces as weighed by Rincon Consultants on 8/10/2010.[1] The least common Reusable bags are made from LDPE or HDPE plastic which is nothing more than a thick plastic bag. Reusable bags are assumed to be used once per week for 52 weeks and have a lifespan of 1 year.

[1] Beacon Single Use Carryout Bag Ordinance Draft Environmental Report SCH #2012111093 dated February 2013. Located at:
http://www.beacon.ca.gov/assets/PDFs/Bag-Ordinance/BEACON_Single_Use_Carryout_Bag_Ordinance_DEIR.pdf

Replacement Plastic Bags. A direct effect of a plastic carryout bag ban is the purchase of replacement plastic trash bags to line small trashcans, pick up pet litter, etc. About 40% of the plastic carryout bags[2] are reused as trash bags and disposed of in the landfill and it is expected that consumers will purchase replacement plastic bags to fill this niche. For purposes of this fact sheet, a Replacement Plastic Bag is assumed to weigh the same as plastic carryout bag. The total number of replacement bags is equal to 40% of plastic carryout bags pre-ban.

"Other Plastic". The In-Store Recycling Bin is primarily for recycling of plastic carryout bags. However, an added benefit is that "other plastic" bags and wraps can also be recycled in this bin including: produce bags, bread bags, newspaper bags, dry cleaning bags, and plastic wrap from toilet paper, paper towels, diapers, etc. This "other plastic" material is not accepted in the curbside recycling bins in the City of Los Angeles and also Ventura County because it is uneconomical to recycle and the material get caught in the sorting machinery. In Santa Barbara County this material[3] can be put in the curbside recycle bins. Hence, for Ventura County, this "other plastic" can only be recycled through the In-Store Recycling Bin. In 2009, only 2.9% of plastic bags issued were recovered through the In-Store Recycling Program. However, for every ton of plastic carryout bags that were recycled, 11.6 tons of "other plastic" was recovered[4] preventing this material from ending up in the land fill.

Adverse impacts of the ordinance includes the following:

Most Reusable Bags Are Not Recyclable. The LDPE and HDPE reusable bag are fully recyclable through the In-Store Recycling Bins. The non-woven Polypropylene (PP) bag and cotton fabric bags are not recyclable since no recycling facilities exist[5] in the City of Los Angeles or in Santa Barbara and Ventura Counties; hence, disposal is in the landfill. This is another example of a negative unintended consequence of a plastic bag ban, where a recyclable plastic carryout bag is replaced by a reusable bag that cannot be recycled.

Recycle Bin Shutdown. Under California State Law AB 2449 and SB 1219, retail stores that issue plastic carryout bags at the checkout stand have to provide an In-Store Recycling Bin so that customers can bring plastic carryout bags back for recycling. The cost of this recycling program is shouldered by customers through higher prices. When a plastic carryout bag ban is implemented, retail stores will no longer be legally required to retain the recycling bin. Stores are in business of selling groceries and not in the recycling business. In San Francisco, after a

[2] UK Environment Agency, "Lifecycle assessment of supermarket carrier bags available in 2006", Report SC030148. Page 61. Located at: http://publications.environment-agency.gov.uk/dispay.php?name=SCHO0711BUAN-E-E

[3] Santa Barbara County Public Works Department, 2012-2013 Edition, "Recycling Resource Guide for Santa Barbara County", Available at: http://www.lessismore.org/system/files/54/original/SBCountyRecycleGuide_2012_English.pdf

[4] CalRecycle, "At-Store Recycling Program – 2009 Statewide Recycling Rate for Plastic Carryout Bags", Available at: http://www.calrecycle.ca.gov/plastics/AtStore/AnnualRate/2009Rate.htm

[5] Herrera Environmental Consultants, Inc. 29 January 2008. "Alternatives to Disposable Shopping Bags and Food Service Items, Volume 1". Available at: http://www.seattlebagtax.org/herrera1.pdf

plastic bag ban went into effect many retail stores[6,7] shut down their plastic bag recycling bins. An unintended consequence of a plastic carryout bag ban is that "other plastic" will end up in the landfill if retail stores shut down the In-Store Recycling Bins and the material is not accepted in the curbside recycle bin. This Fact Sheet assumes that the In-Store Recycling bins will be shut down.

Double Bagging Paper Bags. Double bagging at the checkout stand normally occurs when the customer purchases items that are heavy e.g. canned food, etc. Observations from one market shows that double bagging may occur as much as 40% to 80% of the time. While the weight of the items carried in the bag is one factor, the other factor is that the paper handles break off easily. Double bagging of paper bags in not taken into account in the analysis of landfill impacts.

Reusable Bag Proliferation. Proliferation of reusable bags is a perverse side effect of the plastic carryout bag ban. Customers purchase more reusable bags than they really need (for example, they don't have any with them on a spur of the moment shopping trip) or receive free bags during promotions. As a result, an extraordinary quantity of reusable bags will be disposed of in landfills. This occurred in Australia[8] where the reusable bag has been dubbed the "new green monster". Reusable Bag Proliferation is not taken into account in landfill impacts discussed in this Fact Sheet.

When bags reach their end of life they are disposed of either by recycling or by disposal in the landfill. Pre Ban we assume 100% use of plastic carryout bags in the Study Area with 2.9% disposed[9] of by recycling and 97.1% disposed of in the landfill. While we recognize that there are people who use paper bags and reusable bags at the current time, there are no bag usage statistics that can determine the quantity of bags presently used. Post Ban we are concerned with disposal of plastic carryout bags (the remaining 5%), paper bags, reusable bags, replacement bags, and "other plastic".

City of Los Angeles Landfill Impact. The impact to landfills is calculated using bag quantities assumed in the Draft EIR which are based upon the assumption that Californians use 20 billion plastic carryout bags per year. A total of 2,031,232,707 plastic carryout bags were assumed Pre Ban. Post Ban it was assumed that 5% of plastic carryout bags or 101,561,635 would remain; 30%, would be replaced by 609,369,812 paper bags; and 65%, would be replaced by 25,390.409 reusable bags. 79% of paper bags were assumed to be landfilled with 21% recycled.[10] 97.1% of plastic carryout bags were assumed to be landfilled with 2.9% recovered through recycling. The Post Ban "other plastic" is calculated from the

[6] Brown, Nat, 29 March 2011. "Bag the Plastic Ban". National Review Online. Located at: http://www.nationalreview.com/blogs/print/263178

[7] The ULS Report. "A Qualitative Study of Grocery Bag Use in San Francisco". Use Less Stuff. Located at: http://www.use-less-stuff.com/Field-Report-on-San-Francisco-Plastic-Bag-Ban.pdf

[8] Munro, Peter. 24 January 2010. "Bag the bag: a new green monster is on the rise." Located at: http://www.theage.com.au/national/bag-the-bag-a-new-green-monster-is-on-the-rise-20100123-mrqo.html

[9] CalRecycle, "At-Store Recycling Program – 2009 Statewide Recycling Rate for Plastic Carryout Bags", Available at: http://www.calrecycle.ca.gov/plastics/AtStore/AnnualRate/2009Rate.htm

[10] Green Cities California, "Master Environmental Assessment on Single-Use and Reusable Bags" (MEA) March 2010. Page 18. The MEA assumes that 20% of paper bags are recycled and 80% are disposed in the landfill.

2.9% of Pre Ban plastic carryout bags recycled multiplied by 11.6[11] times the weight of a single plastic carryout bag or 0.140708 lbs. per bag.

Post Ban/Pre Ban Ratio. The ratio of material deposited in the landfill Post Ban compared to the material deposited in the landfill Pre Ban is calculated as follows:

$$Post\ Ban\ /\ Pre\ Ban\ Ratio\ = \frac{Post\ Ban\ Landfill\ Weight\ Deposited}{Pre\ Ban\ Landfill\ Weight\ Deposited}$$

The Post Ban/Pre Ban Ratio as described in the above equation provides a figure of merit comparing the Post Ban verses the Pre Ban amount that is deposited in the landfill. The Post Ban/Pre Ban Ratio for City of Los Angeles is 4.25 in table 1 and for Santa Barbara and Ventura Counties is also 4.17 in Table 2.

	Quantity	Weight per bag (lbs.)	Weight (lbs.)	Weight (tons)
Pre-Ban				
Plastic Carryout Bags	1,972,326,958	0.01213	23,924,326.01	**11,962.16**
Post Ban				
Plastic Carryout Bags	101,561,635	0.01213	1,231,942.64	615.97
Reusable Bags	25,390,409	0.42500	10,790,923.76	5,395.46
Paper Bags	481,402,152	0.14875	71,608,570.04	35,804.29
Replacement Bags	812,493,083	0.01213	9,855,541.09	4,927.77
Other Plastic	58,905,749	0.140708	8,288,510.06	4,144.26
Total				**50,887.74**
Post Ban /Pre Ban Ratio				**4.25**

Table 1. City of Los Angeles Landfill Impacts

Santa Barbara and Ventura County Landfill Impacts. A total of 658,241,406 plastic carryout bags were assumed Pre Ban. Post Ban it was assumed that 5% of plastic carryout bags or 32,912,070 would remain; 30%, would be replaced by 197,472,422 paper bags; and 65%, would be replaced by 8,228,018 reusable bags. 79% of paper bags were assumed to be landfilled with 21% recycled[12]. 97.1% of plastic carryout bags were assumed to be landfilled with 2.9% recovered by recycling. The Post Ban "other plastic" is calculated from the 2.9% of Pre Ban plastic carryout bags recycled multiplied by 11.6[13] times the weight of a single plastic carryout bag or 0.140708 lbs. per bag and multiplied by 76% to account for Ventura County only based upon population.

[11] CalRecycle, "At-Store Recycling Program – 2009 Statewide Recycling Rate for Plastic Carryout Bags", Available at: http://www.calrecycle.ca.gov/plastics/AtStore/AnnualRate/2009Rate.htm

[12] Green Cities California, "Master Environmental Assessment on Single-Use and Reusable Bags" (MEA) March 2010. Page 18. The MEA assumes that 20% of paper bags are recycled and 80% are disposed in the landfill.

[13] CalRecycle, "At-Store Recycling Program – 2009 Statewide Recycling Rate for Plastic Carryout Bags", Available at: http://www.calrecycle.ca.gov/plastics/AtStore/AnnualRate/2009Rate.htm

Summary of Landfill Impacts. Both Table 1 and Table 2 show that for both for the City of Los Angeles and for Santa Barbara and Ventura counties that the amount deposited in landfill after the ban and as a direct consequence of the ban in more than four times as much as before the ban. It should be understood that the quantities in Table 1 and Table 2 have not been adjusted for loss and other factors that reduce the actual amounts that end up in the landfill. Table 1 and Table 2, clearly show that the perverse unintended consequence of the plastic carryout bag ban is more material in the landfill and not less.

	Quantity	Weight per bag (lbs.)	Weight (lbs.)	Weight (tons)
Pre-Ban				
Plastic Carryout Bags	639,152,405	0.01213	7,752,918.68	**3,876.46**
Post Ban				
Plastic Carryout Bags	32,912,070	0.01213	399,223.41	199.61
Reusable Bags	8,228,018	0.42500	3,496,907.84	1,748.45
Paper Bags	156,003,213	0.14875	23,205,477.97	11,602.74
Replacement Bags	263,296,562	0.01213	3,193,787.30	1,596.89
Other Plastic (Ventura County)	14,507,641	0.140708	2,041,341.09	1,020.67
Total				**16,168.37**
Post Ban /Pre Ban Ratio				**4.17**

Table 2. Santa Barbara and Ventura County Landfill Impacts

Even if you change some assumptions, you will still have more material in landfill Post Ban:

- Even if one were to assume that the lifespan of reusable bag is two years vice one year, the Post Ban/Pre Ban Ratio will not change substantially.
- If you ignore paper bags and consider only the remaining material, you still will have more material going into the landfill after the ban than before.
- If you consider the potential impact of double bagging paper bags and reusable bag proliferation the amount of material going to the landfill would be much more!

Since the plastic carryout bag ban intended to reduce the amount of material going to the landfill, the opposite has occurred instead. This is clearly a perverse unintended consequence.

Recommendations. While Table 1 and Table 2 contain raw numbers, these tables are instructive in they can help us to identify strategies to reduce landfill amounts and mitigate the effects of the proposed ordinance. For Example, the following strategies could be initiated:

- Set a recycling goal for paper carryout bags at 60% vice the national average of 21%. An public education program will be needed.

- Modify the ordinance so that the Reusable Bags sold by retail stores in the Study Area must have an existing recycling infrastructure.
- For Ventura County, modify the curbside recycling program to allow for collection of clean plastic bags and wraps in the curbside recycling bin (material may have to be put in a bag and secured). Requires an education program.

It should be noted that in evaluating the proposed ordinance and all of the alternatives, only Alternative #2 (Status Quo) has the lowest amount of material headed to the landfill. **Therefore, it is recommended that the Plastic Carryout Bag Ban be dropped.**