

What Will A Plastic Carryout Bag Ban Cost Your Community?

WHAT COMMUNITIES TYPICALLY FAIL TO CALCULATE BEFORE IMPLEMENTING A BAG BAN

By Anthony van Leeuwen, 15 July 2013

Communities that implement plastic carryout bag bans most often fail to take into consideration the increased costs that are passed onto residents. Not only will residents incur out-of-pocket costs to purchase bags, but depending upon the type of bag chosen, personal time will be required to manage bags and maintain bags in a sanitary condition.

Carryout Bag Costs

In a previous article¹ titled “*Plastic Bag Alternatives Much More Costly to Consumers*” the authors analyze the annual cost per household of different bag alternatives including out-of-pocket costs to purchase bags but also to place a dollar value on one’s personal time to manage bags and maintain bags in a sanitary condition. Personal time was valued at \$12 per hour or about half of the California Average Labor Rate. These costs are summarized in Table 1 below:

Table 1. Annual Cost of Carryout Bag Alternatives

Bag Type	Option	Annual Cost
plastic	Store Provided	\$ 20.80
plastic	Self-Purchased	\$ 45.80
Paper	Store Provided at 10-cents each	\$ 78.00
Paper	Store Provided at 25-cents each	\$ 195.00
Reusable	Durable Machine Washable Bags	\$ 262.00
Reusable	Cheap Hand Washable Bags	\$ 300.00

For purposes of this article, and to keep things simple, we will use \$20.80 as the annual indirect cost per household for store supplied plastic carryout bags, \$78.00 as the annual cost per household for using store provided paper bags at 10-cents each, and \$300.00 as the annual cost per household for using reusable bags.

¹ Van Leeuwen, Anthony and Williams, Don. 5 June, 2013. “*Plastic Bag Alternatives Much More Costly to Consumers*”, Located at:
<http://fighttheplasticbagban.files.wordpress.com/2013/04/plasticbagalternativesmuchmorecostlytoconsumers.pdf>

Shoppers Exempt From Paper Bag Fee

Local ordinances that implement plastic carryout bag bans are very similar from one community to the next. The ordinances ban the distribution of plastic carryout bags at checkout and impose a fee of 10 or 25 cents on paper bags to discourage paper bag use and encourage shoppers to use reusable shopping bags instead.

Most ordinances grant a permanent² exemption to families that participate in the California Special Supplemental Food Program for Women, Infants, and Children (WIC) or in the Supplemental Nutrition Assistance Program (SNAP) also known as the Food Stamp program. Participants in these programs are exempt from paying the fee for paper bags when they shop; whereas, all others must purchase paper bags or purchase and use reusable bags. The fee exemption, in effect, creates a new welfare benefit.³

Due to economic conditions in the United States, the rolls of people who are on public assistance programs have swelled. In California, there are 4.18 million Food Stamp participants and 1.46 million WIC participants. It is assumed that SNAP and WIC participant groups overlap as indicated by program brochures. Since, information about the group overlap is not available, we will assume that no overlap exists and just add the two groups together to determine the fraction of the population eligible to receive free paper bags. For the purpose of this paper we will assume that all SNAP and WIC participants will use free paper bags when they shop.

We calculate the percent of the population eligible for free paper bags as follows:

$$\text{Percent Population Eligible For Free Bags} = \frac{\text{SNAP Participants} + \text{WIC Participants}}{\text{California State Population}} \times 100\%$$

$$\text{Percent Population Eligible For Free Bags} = \frac{4,180,000 + 1,460,000}{37,966,471} \times 100\% = 14.86\%$$

Carryout Bag Usage

Only one study exists that identifies carryout bag usage statistics based upon observations of shoppers before and after implementation of a bag ban. This study⁴ was conducted by Team Marine, an environmental student group at Santa Monica High School. These high school students conducted observations of 50,400 grocery store patrons over a period of 19 months spanning from ten months prior to the Santa Monica Plastic Bag Ban to twelve months after. Team Marine subsequently published their report in March 2013 which included observations from before the ban, immediately after the ban and up to 1 year after the ban was implemented. Results of the study are summarized in Table 2 below.

² In some cases, such as the City of San Jose, the ordinance grants the exemption from the paper bag fee for one year only.

³ Van Leeuwen, Anthony, 28 April 2013. "Plastic Bag Ban Creates New Welfare Benefit", Located at: <http://fighttheplasticbagban.files.wordpress.com/2013/04/plastic-bag-ban-creates-new-welfare-benefit.pdf>

⁴ Team Marine, 8 May 2013. "The Effects of the Plastic Bag Ban on Consumer Bag Choice at Santa Monica Grocery Stores". Santa Monica High School. Located at: http://www.teammarine.org/wp-content/uploads/2013/05/Grocery-Store-Bag-Research_Press-Release-12-13.pdf

Also included in Table 2 are the Pre-ban and Post Ban assumptions from the BEACON Environmental Impact Report⁵ (EIR) for Santa Barbara and Ventura Counties for comparison.

Even though the City of Santa Monica is not necessarily representative of cities and unincorporated areas in Santa Barbara or Ventura Counties, and that actual Pre Ban and Post Ban bag usage statistics will vary, we can nevertheless use these bag usage statistics to estimate Pre Ban and Post Ban costs to area residents.

Table 2. Pre Ban and Post Ban Carryout Bag Usage

Study	Plastic Bags	Paper Bags	Reusable Bags	No Bags or Other
BEACON EIR				
Pre Ban	100%	0%	0%	0%
Post Ban	0%	30%	65%	0%
Team Marine (Santa Monica)				
Pre Ban	69%	5%	10%	15%
Post Ban	0%	23%	41%	36%
Post Ban + 1 Year	0%	29%	35%	36%

Pre Ban Cost To Area Residents

In Table 3, we calculate the cost to residents for carryout bags before the bag ban by using the percentages of bag use indicated as Pre Ban in Table 2. The cost of plastic bags and paper bags are paid for indirectly by the shoppers in the form of higher prices. For store supplied paper bags, a cost of 4-cents per paper bag (estimated store cost) was used instead of the 10-cents per bag. The cost of plastic bags is calculated at \$20.80 per household per year or 20 bags per week for 52 weeks for a total of 1040 bags per household at 2-cents each. The cost of reusable bags is calculated using the figure of \$300 per household per year.

Post Ban Cost To Area Residents

To calculate the Post Ban cost to area residents, the fraction of households who pay for paper bags compared to all households who use paper bags must be calculated. This fraction is called an adjustment factor and is used in Table 4 to compute paper bag cost. The Adjustment Factor is calculated as follows:

$$\text{Adjustment Factor} = \frac{\text{Percent Paper Bags} - \text{Percent Population Eligible For Free Bags}}{\text{Percent Paper Bags}} \times 100\%$$

⁵ BEACON, April 2013, "Single Use Carryout Bag Ordinance, Final Environmental Impact Report", Document SCH #2012111093, Appendix B Draft Ordinance. Page 552. Located at: http://www.beacon.ca.gov/assets/PDFs/Bag-Ordinance/BEACON%20Single%20Use%20Carryout%20Bag%20Ordinance%20Final%20EIR_updated%20May1.pdf

$$\text{Adjustment Factor} = \frac{29\% - 14.86\%}{29\%} \times 100\% = 48.76\%$$

The next number needed is the number of households in a given area. Shopping is performed on a household or family basis regardless of how many household members shop. In California, the average household size is 2.91 persons⁶ or three people. To calculate the number of households in an area, the area's population⁷ is divided by 3. Next we determine the number of households that use paper bags and reusable bags based upon the "Post Ban + 1 Year" percentages in Table 2. The reason for using the "Post Ban + 1 Year" percentages is that after a bag ban is implemented, area residents are very responsive, but the responsiveness wears off as they become accustomed to the ban. In both cases, for paper bags and reusable bags, we calculate the yearly cost using the following formulas:

$$\text{Paper Bag Annual Cost} = \text{Households Using Paper Bags} \times \$78 \times \text{Adjustment Factor}$$

$$\text{Reusable Bag Annual Cost} = \text{Households Using Reusable Bags} \times \$300$$

Results of our calculations for Santa Barbara and Ventura Counties and incorporated municipalities are included in Table 4 below. Table 4 also includes cost estimates for the cities of Carpinteria and Ojai (denoted by an asterisk) who have already implemented bag bans.

Factors That Affect Results

It should be noted that costs are modeled based upon carryout bag usage Pre Ban and Post Ban in Santa Monica. To our knowledge, no other bag usage studies based upon actual observations exist. Obviously, applying bag usage statistics from Santa Monica to Santa Barbara and Ventura Counties is subject to error but should be good enough for a meaningful estimate. Costs for a particular area could differ by a number of factors including:

- Prosperity of area residents
- Percent of area's residents exempt from paper bag fee
- Environmental conscientiousness of area's residents
- Specifics of a local ordinance that implements a bag ban
- How many people choose the No Bag option

Post Ban Cost Increase To Santa Barbara and Ventura Counties

Pre Ban and Post Ban Results for Santa Barbara and Ventura Counties are located in Tables 3 and 4, respectively. In Table 3, the estimated Pre Ban cost for Santa Barbara County is \$6,568,476.80 and Ventura County is \$12,785,512.54 for a total annual pre ban cost of **\$19,353,989.34**. It should be noted that the plastic bag and paper bag costs are paid for indirectly by all shoppers via higher prices. The Pre Ban cost for reusable bags is calculated in the same manner as for Post Ban which includes both the cost

⁶ United States Census. Located at: <http://quickfacts.census.gov/qfd/states/06000.html>

⁷ State of California, Department of Finance, May 2013. "E-1 Population Estimates for Cities, Counties, and the State — January 1, 2012 and 2013". Located at: <http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/>

of bags and the value of one's time for handling and sanitizing the bags. In Table 4, the estimated Post Ban cost for Santa Barbara County is \$16,599,955.52 and Ventura County is \$32,311,743.80 for a total annual Post Ban cost of **\$48,911,699.31**.

It would be tempting to subtract the **Total Pre Ban Cost** from the **Total Post Ban Cost** to determine how much more an area's residents will have to pay. However, it is highly doubtful that residents will see retail prices reduced after a bag ban; therefore, to compute the cost increase the **Pre Ban Total Reusable Bag Cost** of \$12.6 million should be subtracted from the **Post Ban Total Cost** of \$48.9 million for a **Total Post Ban Net Increase of \$36.3 million**.

Cost Per Plastic Carryout Bag Eliminated

To determine the **Cost Per Bag Eliminated** the **Pre Ban Quantity of Plastic Bags** assumed Pre Ban in Table 3 must be calculated. We do that using the following formula:

$$\text{Pre Ban Quantity of Plastic Bags} = \text{Households Using Plastic Bags} * 1040 \text{ bags per household}$$

$$\text{Pre Ban Quantity of Plastic Bags} = 290,866 \times 1040 = 302,500,640$$

To calculate the **Cost Per Bag Eliminated** we divide the **Total Post Ban Net Increase** by the **Pre Ban Quantity of Plastic Bags** using the following formula.

$$\text{Cost Per Bag Eliminated} = \frac{\text{Total Post Ban Net Increase}}{\text{Pre Ban Quantity of Plastic Bags}}$$

$$\text{Cost Per Bag Eliminated} = \frac{\$36,300,000}{302,500,640} = \$0.12$$

So the cost to eliminate each plastic carryout bag is 12 cents and that for a bag that costs less than 2 cents each in bulk. In other words, a bag ban is not a very smart economic move.

Since no one knows what percent of plastic carryout bags used each year that end up in the environment as litter, it would not be surprising that when the cost is compared only to the quantity of bags littered that the cost to remove each littered plastic carryout bag could be as high as \$10,000 per littered bag.

Conclusion

It should be noted that the net cost increases at the city and county would have been much greater had not the proportion of people using the No Bag alternative not increased from 15% to 36%. It should also be noted from Table 1, that individual families will see their costs increase from \$45.80 to \$300 annually depending upon which carryout bag alternative they choose or a factor of 2.2 to 14.4 times greater than the indirect cost of store supplied plastic bags. Hence, unless a family chooses not to use carryout bags, their costs to comply with the plastic bag ban will increase.

Since plastic carryout bags represent less than 1% of roadside litter, community and county litter cleanup budgets **cannot be reduced by one penny!** When you consider all the money that would be

spent by each jurisdiction to implement a bag ban and the **\$36.3 million** increase that Santa Barbara and Ventura County residents would have to spend annually to comply with the bag ban, and that less than 1% of roadside litter is cleaned up, it becomes obvious that the bag ban is not a wise investment of time and money! **Alternatives solutions for comprehensive litter prevention and removal deserve serious consideration.**

It would cost area residents 12 cents to eliminate each plastic carryout bag! Since plastic carryout bags cost less than 2-cents each in bulk, it is not a very good use of money.

Community and County officials should consider the economic and financial impact to their local jurisdictions including costs passed to residents by a local plastic carryout bag ban.

Table 3. Pre Ban Cost of Carryout Bags to Area Residents

Area	Population	Number of Households In Area	Households Using Plastic Bags	Plastic Bag Annual Cost	Households Using Paper Bags	Paper Bag Annual Cost	Households Using Reusable Bags	Reusable Bag Annual Cost	Total Public Annual Cost
<i>Santa Barbara County</i>									
Unincorporated Areas	136,167	45,389	31,318	\$651,422.93	2,269	\$70,806.84	4,539	\$1,361,670.00	\$2,083,899.77
Buellton	4,863	1,621	1,118	\$23,264.59	81	\$2,528.76	162	\$48,630.00	\$74,423.35
Carpenteria*	13,099	4,366	3,013	\$62,665.62	218	\$6,811.48	437	\$130,990.00	\$200,467.10
Goleta	29,962	9,987	6,891	\$143,338.21	499	\$15,580.24	999	\$299,620.00	\$458,538.45
Guadalupe	7,100	2,367	1,633	\$33,966.40	118	\$3,692.00	237	\$71,000.00	\$108,658.40
Lompoc	42,730	14,243	9,828	\$204,420.32	712	\$22,219.60	1,424	\$427,300.00	\$653,939.92
Santa Barbara	89,681	29,894	20,627	\$429,033.90	1,495	\$46,634.12	2,989	\$896,810.00	\$1,372,478.02
Santa Maria	100,306	33,435	23,070	\$479,863.90	1,672	\$52,159.12	3,344	\$1,003,060.00	\$1,535,083.02
Solvang	5,292	1,764	1,217	\$25,316.93	88	\$2,751.84	176	\$52,920.00	\$80,988.77
Total Santa Barbara County	429,200	143,067	98,716	2,053,293	7,153	\$223,184.00	14,307	\$4,292,000.00	\$6,568,476.80
<i>Ventura County</i>									
Unincorporated Areas	96,554	32,185	22,207	\$461,914.34	1,609	\$50,208.08	3,218	\$965,540.00	\$1,477,662.42
Camarillo	66,428	22,143	15,278	\$317,791.55	1,107	\$34,542.56	2,214	\$664,280.00	\$1,016,614.11
Fillmore	15,175	5,058	3,490	\$72,597.20	253	\$7,891.00	506	\$151,750.00	\$232,238.20
Moorpark	34,904	11,635	8,028	\$166,980.74	582	\$18,150.08	1,163	\$349,040.00	\$534,170.82
Ojai*	7,548	2,516	1,736	\$36,109.63	126	\$3,924.96	252	\$75,480.00	\$115,514.59
Oxnard	200,855	66,952	46,197	\$960,890.32	3,348	\$104,444.60	6,695	\$2,008,550.00	\$3,073,884.92
Port Hueneme	22,024	7,341	5,066	\$105,362.82	367	\$11,452.48	734	\$220,240.00	\$337,055.30
Santa Paula	29,953	9,984	6,889	\$143,295.15	499	\$15,575.56	998	\$299,530.00	\$458,400.71
Simi Valley	125,558	41,853	28,878	\$600,669.47	2,093	\$65,290.16	4,185	\$1,255,580.00	\$1,921,539.63
Thousand Oaks	128,143	42,714	29,473	\$613,036.11	2,136	\$66,634.36	4,271	\$1,281,430.00	\$1,961,100.47
Ventura	108,294	36,098	24,908	\$518,078.50	1,805	\$56,312.88	3,610	\$1,082,940.00	\$1,657,331.38
Total Ventura County	835,436	278,479	192,150	3,996,725.82	13,924	\$434,426.72	27,848	\$8,354,360.00	\$12,785,512.54
Total	1,264,636	421,545	290,866	\$6,050,018.62	21,077	\$657,610.72	42,155	12,646,360.00	\$19,353,989.34

Table 4. Post Ban Cost of Plastic Bag Ban to Area Residents

Area	Population	Number of Households In Area	Households Using Paper Bags	Paper Bag Annual Cost	Households Using Reusable Bags	Reusable Bag Annual Cost	Total Public Annual Cost
<i>Santa Barbara County</i>							
Unincorporated Areas	136,167	45,389	13,163	\$ 500,618.52	15,886	\$ 4,765,845.00	\$ 5,266,463.52
Buellton	4,863	1,621	470	\$ 17,878.84	567	\$ 170,205.00	\$ 188,083.84
Carpenteria*	13,099	4,366	1,266	\$ 48,158.53	1,528	\$ 458,465.00	\$ 506,623.53
Goleta	29,962	9,987	2,896	\$ 110,155.41	3,496	\$ 1,048,670.00	\$ 1,158,825.41
Guadalupe	7,100	2,367	686	\$ 26,103.18	828	\$ 248,500.00	\$ 274,603.18
Lompoc	42,730	14,243	4,131	\$ 157,097.02	4,985	\$ 1,495,550.00	\$ 1,652,647.02
Santa Barbara	89,681	29,894	8,669	\$ 329,712.56	10,463	\$ 3,138,835.00	\$ 3,468,547.56
Santa Maria	100,306	33,435	9,696	\$ 368,775.41	11,702	\$ 3,510,710.00	\$ 3,879,485.41
Solvang	5,292	1,764	512	\$ 19,456.06	617	\$ 185,220.00	\$ 204,676.06
Total Santa Barbara County	429,200	143,067	41,489	\$1,577,955.52	50,073	\$ 15,022,000.00	\$ 16,599,955.52
<i>Ventura County</i>							
Unincorporated Areas	96,554	32,185	9,334	\$ 354,981.17	11,265	\$ 3,379,390.00	\$ 3,734,371.17
Camarillo	66,428	22,143	6,421	\$ 244,222.81	7,750	\$ 2,324,980.00	\$ 2,569,202.81
Fillmore	15,175	5,058	1,467	\$ 55,790.95	1,770	\$ 531,125.00	\$ 586,915.95
Moorpark	34,904	11,635	3,374	\$ 128,324.70	4,072	\$ 1,221,640.00	\$ 1,349,964.70
Ojai*	7,548	2,516	730	\$ 27,750.25	881	\$ 264,180.00	\$ 291,930.25
Oxnard	200,855	66,952	19,416	\$ 738,444.21	23,433	\$ 7,029,925.00	\$ 7,768,369.21
Port Hueneme	22,024	7,341	2,129	\$ 80,971.32	2,569	\$ 770,840.00	\$ 851,811.32
Santa Paula	29,953	9,984	2,895	\$ 110,122.32	3,495	\$ 1,048,355.00	\$ 1,158,477.32
Simi Valley	125,558	41,853	12,137	\$ 461,614.49	14,648	\$ 4,394,530.00	\$ 4,856,144.49
Thousand Oaks	128,143	42,714	12,387	\$ 471,118.25	14,950	\$ 4,485,005.00	\$ 4,956,123.25
Ventura	108,294	36,098	10,468	\$ 398,143.32	12,634	\$ 3,790,290.00	\$ 4,188,433.32
Total Ventura County	835,436	278,479	80,759	\$3,071,483.80	97,468	\$ 29,240,260.00	\$ 32,311,743.80
Total	1,264,636	421,545	122,248	\$4,649,439.31	147,541	\$ 44,262,260.00	\$ 48,911,699.31
*** denotes community has already implemented a plastic bag ban.							