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# Potential Revenue to California Retailers from a Statewide Minimum Charge for Disposable Paper and Reusable Carryout Bags in California as Proposed in SB 270

*Prepared for*

American Progressive Bag Alliance

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## Executive Summary

This report details our analysis and findings regarding the amount of revenue that California retailers could potentially collect each year if California were to implement the provisions of SB 270 (Padilla), as amended on March 27, 2014. SB 270 would ban the use of disposable plastic bags and require a minimum price of $0.10 for disposable paper bags and reusable bags issued at grocery, pharmacy, and convenience store checkouts in California. Retailers would retain all of the revenues generated from carryout bag sales. The bill also defines minimum weight, volume, and durability standards for a bag to be sold as a reusable bag and requires manufacturers of reusable bags to have their reusable bags certified by a third-party certification entity in order for such bags to be sold at checkout stands by retailers covered by the bill.

A minimum $0.10 charge on disposable paper bags would encourage many consumers to switch to reusable bags or no bag at all, rather than merely switching from disposable plastic to disposable paper bags. Revenues from sales of disposable paper and reusable bags will depend, among other factors, on the relative costs of paper and reusable bags and the number of times reusable bags are used.

Based on data from the Department of Resources, Recycling, and Recovery (CalRecycle) on the number of plastic carryout bags used each year, and before-and-after data from jurisdictions that have implemented policies similar to SB 270 (see Table EX-1), we estimate that statewide disposable paper bag revenues under SB 270 would be $126 million per year except as noted below. For reusable bags, if the average reusable bag costs $1.00 and is used between 10 and 50 times, reusable bag revenues would be between $316 million to $63 million per year, resulting in total revenues from both paper and reusable bags ranging between $442 million and $189 million (lower reuse rates yield higher revenues). Because about one-third of California's population lives in areas that have already adopted policies similar to SB 270, including banning disposable plastic bags and adopting a minimum charge for paper and reusable bags, about two-thirds of these revenues would be "new" revenues due to implementation of SB 270.

**Table EX-1. Market Share of Carryout Bags Before and After Implementation of a Plastic Bag Ban in Three California Jurisdictions[1]**

| Bag Choice | Before | After |
|---|---|---|
| Disposable Plastic Bag | 75% | 0% |
| Disposable Paper Bag | 3% | 16% |
| Reusable Bag | 5% | 45% |
| No Bag | 17% | 40% |

[1] Data are from Equinox Center (2013). The "After" column values do not add to 100% due to rounding. The results represent an average of results from San Jose, Santa Monica, and the unincorporated areas of Los Angeles County.

The estimates above assume that reusable bags are significantly more expensive than disposable paper bags. However, at least one manufacturer produces a lightweight, reusable plastic grocery bag that it projects will meet SB 270's durability requirements and is sold for a retail price of $0.10.[2] If this style of bag is able to meet SB 270's durability requirements and gains widespread acceptance, bag revenues due to SB 270 might be higher or lower than estimated above, depending on how many times the bags are used. For example, if $0.10 reusable bags displace more expensive reusable bags and these inexpensive bags are used between 3 and 10 times (assuming a lower reuse rate because they are inexpensive and closer to the look and feel of a traditional disposable plastic grocery bag), reusable bag revenues would range from $147 million to $44 million.

In addition, at a retail price of $0.10, reusable plastic bags would likely be more attractive than paper bags for many consumers. For example, in the extreme case where a reusable bag price of $0.10 induces a switch to reusable bags for all former users of paper bags, and if the bags are used 3 to 10 times, paper bag revenues would drop to zero and be replaced by $42 million to $13 million per year in reusable bag revenues (again, lower reuse rates yield higher revenues). Total revenues from a reusable plastic bag displacing both paper bags and more expensive reusable bags would then range from $189 million to $57 million. In reality, an inexpensive reusable bag would not displace all use of paper bags or more expensive reusable bags. The scenario is intended to give some idea of the range of potential revenues, given broad adoption of an inexpensive reusable bag. Table EX-2 summarizes our revenue estimates.

Total revenues for carryout bags under SB 270 will be sensitive to the relative price for paper versus reusable bags, the perceived quality and versatility of different types of reusable bags, and the number of times consumers use reusable bags, hence the large range in our revenue estimates for the different scenarios.

**Table EX-2. Summary of Revenue Results for Two Scenarios**

| Scenario | Paper Bag Revenues (millions) | Average Uses per Reusable Bag | Reusable Bag Revenues (millions) | Total Revenues (millions) |
|---|---|---|---|---|
| Reusable bags cost substantially more than disposable paper bags. | $126 | 10 to 50 | $316 - $63 | $442 - $189 |
| Reusable bags cost the same as disposable paper bags. | $0 | 3 to 10 | $189 - $57 | $189 - $57 |

Note: Less reuse results in more reusable bag sales and higher revenues.

[2] See "Smarterbags for Grocers," http://www.smarterbags.com/features/why-smarterbags/, accessed March 28, 2014, and "Command Packaging to Make Bag Ban Compliant Plastic Reusable Bags," October 2013, http://www.smarterbags.com/wp-content/uploads/2013/10/Shelby_Report.pdf, accessed March 28, 2014.

## Introduction

SB 270 (Padilla) as amended on March 27, 2014, would ban the use of disposable plastic carryout bags in groceries, convenience stores, and pharmacies and require that retailers charge consumers at least $0.10 for each disposable paper or reusable carryout bag. Retailers would retain all of the revenue generated from carryout bag sales. The bill also defines minimum weight, volume, and durability standards for a bag to be sold as a reusable bag and requires manufacturers of reusable grocery bags to have their products certified by a third-party certification entity in order for such bags to be sold at checkout stands by retailers covered by the bill.

This report details our analysis and findings regarding the amount of revenue that California retailers could potentially collect from sales of disposable paper and reusable carryout bags each year if California were to implement the provisions of SB 270.

## Potential Revenues from a Ban on Plastic Bags Combined with a Minimum $0.10 Charge for Paper and Reusable Bags

We take the following approach in estimating potential revenues:

1. Estimate the baseline number of disposable paper and plastic carryout bags issued each year at grocery and convenience stores and pharmacies in California in the absence of bans or minimum prices for carryout bags.
2. Estimate what fraction of consumers carry out their purchases in a disposable paper or plastic bag or a reusable bag before implementation of SB 270 and predict how that is likely to change if the bill becomes law. The choice of paper versus reusable bags versus no bag at all will depend largely on the relative costs of the options (both monetary and perceived convenience). The number of reusable bags sold will also depend on how many times reusable bags are actually used.
3. To estimate revenues from paper grocery bags, apply the estimated percentage reduction in disposable bags to the baseline number of paper and plastic grocery bags used before implementation of SB 270, accounting also for the fact that a paper bag displaces, on average, 1.5 disposable plastic bags. This gives an estimate of the total number of disposable paper carryout bags consumed each year after the implementation of SB 270. Multiply the number of paper bags by $0.10 to derive an estimate of total revenue from paper bag sales.
4. To estimate revenues from reusable bags, assume any increase in reusable bags due to SB 270 displaces disposable plastic bags at a rate of 1 reusable bag per 1.5 disposable plastic bags. Add in assumptions regarding how many times, on average, a reusable bag is used in order to estimate the total number of reusable bags sold each year. Revenues will also depend on the average price of reusable bags. We present a range of scenarios for the price and reuse rate in order to place bounds on potential revenues from sales of reusable bags.

**Baseline number of disposable paper and plastic bags used annually in California.** The actual number of disposable carryout bags issued in California is not known with precision. A number of California jurisdictions have banned the use of plastic bags during

the last few years. Estimates of disposable plastic bag usage in California at the time these bans were being considered ranged from about 9 billion to 19 billion per year.[3] For the purposes of this analysis, we used the Department of Resources, Recycling, and Recovery (CalRecycle) estimate of 13 billion disposable plastic bags per year as our baseline.

The retail sectors that would be included under SB 270's provisions include grocery and convenience stores and pharmacies. This would also include superstores, such as Walmart and Costco, that sell groceries. These sectors account for an estimated 68% of plastic bag market share.[4] Assuming 13 billion disposable plastic carryout bags per year, this would mean that the retail sectors included in SB 270 account for about 8.9 billion plastic bags per year.[5]

CalRecycle has not produced an estimate of the number of paper bags issued each year in California. However, observations at checkout lines in a number of grocery stores in Santa Monica, San Jose, and the unincorporated areas of Los Angeles County suggest that about 3% of consumers chose paper bags before implementation of plastic bag bans and paper bag charges in those areas.[6] In addition, a standard paper grocery bag replaces about 1.5 standard plastic grocery bags.[7] Assuming a baseline of 8.9 billion plastic bags, this suggests a baseline of 228 million paper bags issued per year in the sectors included in SB 270.

**Consumer response to a ban on plastic bags and a minimum $0.10 charge for disposable paper bags.** A number of California jurisdictions have already implemented a ban on disposable plastic bags combined with a minimum charge (usually $0.10, but ranging from $0.05 to $0.25) on paper bags. Evaluations of the effects of this policy are available for Santa Monica, San Jose, and the unincorporated areas of Los Angeles County and average results for the three jurisdictions are displayed in Table 1.[8] These evaluations suggest that before implementation of the carryout bag policies, 78% of consumers chose

[3] See, for example, Heal the Bay, "Ban the Bag," undated (circa 2010/11) (19 billion/year); California Department of Resources, Recycling, and Recovery (CalRecycle), "Shopping? Take Reusable Bags," http://www.calrecycle.ca.gov/publiced/holidays/ReusableBags.htm (13 billion/year); A. van Leeuwen, "Do Californians Really Use 20 Billion Plastic Bags Per Year?" April 2013, http://fightttheplasticbagban.files.wordpress.com/2013/04/docaliforniansreallyuse20billionplasticbagsperyear1.pdf (9 billion to 10 billion/year); F. Barringer, "In California, A Step Toward B.Y.O.B. (Bring Your Own Bag)," *New York Times*, June 2, 2010 (19 billion/year); D. Zahniser and A. Sewell, "L.A. Makes History with Ban on Plastic Bags at Stores," *Los Angeles Times*, May 23, 2012 (12 billion/year); U.S. International Trade Commission, "Polyethylene Retail Carrier Bags from Indonesia, Taiwan, and Vietnam," April 2010 (12 billion/year (101.4 billion bags nationally in 2008 and assuming California, with 12% of the nation's population, used 12% of the bags)).

[4] Plastic bag market share by retail sector was provided by industry sources.

[5] A figure of 8.9 billion suggests that we know the number of bags consumed to the nearest 100 million. In fact, our knowledge of bag consumption (and other statistics discussed in this report) is not that precise. However, in order to avoid accumulation of rounding errors, we will carry more decimal places than are warranted by the quality of the underlying data and will discuss data uncertainties in more detail later in this report.

[6] Equinox Center, *Plastic Bag Bans: Analysis of Economic and Environmental Impacts* (October 2013).

[7] Boustead Associates, Life Cycle Assessment for Three Types of Grocery Bags - Recyclable Plastic; Compostable, Biodegradable Plastic; and Recycled, Recyclable Paper (2007).

[8] Equinox Center, *op. cit.*

to carry out their purchases in a disposable paper or plastic bag (plastic in the vast majority of cases). After implementation, this had dropped to 16% carrying their purchases in a disposable paper bag. This represents a 79% decline in disposable bag usage. As Table 1 shows, consumers switched to some combination of reusable bags or no bag at all.

**Table 1. Market Share of Carryout Bags Before and After Implementation of a Plastic Bag Ban in Three California Jurisdictions[9]**

| Bag Choice | Before | After |
|---|---|---|
| Disposable Plastic Bag | 75% | 0% |
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| Reusable Bag | 5% | 45% |
| No Bag | 17% | 40% |

The data are from just three areas and represent observations only at grocery stores, but appear to be the only data available on bag usage in California both before and after implementation of policies similar to SB 270. Another data source corroborates part of these results. Homonoff (2013) obtained several months of checkout scanner data from a large grocery chain's (unnamed, but probably Safeway/Vons) stores in Santa Monica, San Jose, and Santa Cruz.[10] The scanner data provide information on the fraction of consumers choosing to purchase at least one paper bag with which to carry out their groceries (only post-ban data were available, since there was no charge for paper bags before the ban). These data show that about 14% to 18% of consumers chose to purchase at least one paper bag.

**Revenues from Paper Bag Charges.** Revenues from a ban on plastic bags combined with a $0.10 price for paper bags depend on the number of paper bags consumed after the policy is implemented. Based on the data in Table 1, we assume that the fraction of consumers using a disposable bag would drop by 79% below the baseline level under implementation of SB 270. Since disposable plastic bags would be banned, we also assume that all disposable bags would be paper bags. Furthermore, we assume a single paper bag replaces 1.5 plastic bags. Under these assumptions, the total number of baseline disposable bags (plastic plus paper) bags drops from about 9.1 billion to 1.26 billion disposable (paper) bags after SB 270 is implemented.

At $0.10 per bag, this would result in revenues of $126 million. About one-third of California residents live in jurisdictions that have already implemented a ban on plastic grocery bags combined with a minimum price for paper bags. As a result, the "new" paper bag revenues generated by SB 270 would be two-thirds of $126 million or $83 million.

[9] Data are from Equinox Center (2013). The "After" column values do not add to 100% due to rounding. The results represent an average of results from San Jose, Santa Monica, and the unincorporated areas of Los Angeles County.

[10] T. Homonoff, "Can Small Incentives Have Large Effects? The Impact of Taxes versus Bonuses on Disposable Bag Use," Working Paper 1483, Princeton University, Department of Economics, 2013.

These estimates assume that reusable plastic bags cost substantially more (an average of $1.00 rather than $0.10) than disposable paper bags. As discussed below, if certified reusable bags are sold at a price similar to that of paper bags, revenues from paper bags would likely be substantially lower.

**Revenues from Reusable Bag Sales.** Revenues from reusable bag sales depend on the cost of reusable bags and how many times they are used. Based on the data in Table 1, we assume that reusable bags rise from 5% to 45% of carryout bag market share and we also assume that a reusable bag replaces 1.5 disposable plastic bags and 1 paper bag per shopping trip. Data from Los Angeles County indicate an average reusable bag has wholesale cost of $0.87 and a Google search for "reusable grocery bag" turned up a number of manufacturers offering reusable tote bags for wholesale prices as low as $0.50.[11] The City of San Francisco estimated the retail cost of reusable bags to be $1.15.[12] A study by Consumer Reports found a wide range of reusable shopping bags available for about $1.00 at major retailers and groceries.[13] We assume an average price of $1.00 for reusable bags for this analysis.

Under these assumptions, if reusable bags are used 10 times on average, revenue from reusable bag sales would increase by $316 million per year. If they are used 50 times, the revenue increase would be $63 million per year. As in the case of paper bags, about two-thirds of these revenues would be "new" revenues generated in areas that do not already have bans on disposable plastic bags.

The estimates above assume an average retail price of $1.00 per reusable bag. If competition, both between reusable bag manufacturers and between reusable bags and disposable paper bags, results in lower prices for reusable bags, revenues will be lower. At least one manufacturer produces a lightweight, reusable plastic grocery bag that it projects will meet SB 270's durability requirements and is sold for a retail price of $0.10.[14] If this style of bag is able to meet SB 270's durability requirements and gains widespread acceptance, bag revenues due to SB 270 might be higher or lower than estimated above, depending on how many consumers choose such bags and how many times the bags are used.

If the reusable bag market shifts entirely to these inexpensive bags, and if the bags are used 3 to 10 times on average (assuming a lower reuse rate because they are inexpensive and closer to the look and feel of a disposable plastic grocery bag), revenues would be $147 million to $44 million per year. In actuality, not all consumers would choose a cheaper,

[11] AECOM Technical Services, *Economic Impact Analysis: Proposed Ban on Plastic Carryout Bags in Los Angeles County* (November 2010).

[12] City and County of San Francisco, Office of Economic Analysis, *Checkout Bag Charge: Economic Impact Report* November 30, 2011).

[13] "Paper or Plastic? How about a Tote?" *Consumer Reports,* May 2009.

[14] See "Smarterbags for Grocers," http://www.smarterbags.com/features/why-smarterbags/, accessed March 28, 2014, and "Command Packaging to Make Bag Ban Compliant Plastic Reusable Bags," October 2013, http://www.smarterbags.com/wp-content/uploads/2013/10/Shelby_Report.pdf, accessed March 28, 2014.

possibly less durable, reusable bag over a potentially sturdier, more expensive option. Actual revenues for reusable bags will depend on the particular choices consumers make when given these options and how many times they reuse different types of reusable bags.

If consumers who would otherwise choose a paper bag instead choose an inexpensive reusable plastic bag, the $126 million in revenues from paper bags (see above) would be replaced by $42 million to $13 million in revenues from reusable bags (again assuming the bags are used between 3 and 10 times, on average). A wholesale shift to inexpensive reusable bags is probably more likely in the case of the market for paper bags, since most consumers already have a preference for plastic grocery bags and would therefore likely choose plastic over paper if they were planning to pay for a bag anyway and the price for both options were the same. Table 2 summarizes our major revenue results.

Total revenues for carryout bags under SB 270 will be sensitive to the relative price for paper versus reusable bags, the perceived quality and versatility of different types of reusable bags, and the number of times consumers use reusable bags, hence the large range in our revenue estimates for the different scenarios.

**Table 2. Summary of Revenue Results for Two Scenarios**

| Scenario | Paper Bag Revenues (millions) | Average Uses per Reusable Bag | Reusable Bag Revenues (millions) | Total Revenues (millions) |
|---|---|---|---|---|
| Reusable bags cost substantially more than disposable paper bags. | $126 | 10 to 50 | $316 - $63 | $442 - $189 |
| Reusable bags cost the same as disposable paper bags. | $0 | 3 to 10 | $189 - $57 | $189 - $57 |

Note: Less reuse results in more reusable bag sales and higher revenues.

**Sensitivity to Input Assumptions.** The estimates detailed above are uncertain due to imprecise knowledge of baseline consumption of plastic and paper bags, the plastic bag market share of the retail sectors included in SB 270, the likely cost and reuse rate of reusable bags, and consumer response to a charge for disposable paper bags.

Any decrease (increase) in predicted revenues from paper bag sales would be partially offset by increased (decreased) revenues from sales of reusable bags. The amount of the offset depends on how many people choose reusable bags versus no bag instead of paper, the cost of reusable bags, and the average number of times reusable bags are reused. If reusable bags cost an average of $1.00 and are reused about 10 times, revenues would be similar regardless of whether consumers choose paper or reusable bags. If reusable bags are used substantially more than 10 times, total revenues would decline to the extent consumers shift to reusable bags.

Alternatively, if reusable bags cost closer to $0.10, and are reused more than once, revenues would also drop relative to paper bags. In addition as already discussed, changes in the relative price of paper and reusable bags would likely cause switching between the two options, with concomitant changes in revenues.

Changes in assumptions about baseline paper and plastic bag consumption also result in changes in predicted revenues. For example, increasing (decreasing) assumed baseline paper and plastic bag consumption by 10% would result in a 10% increase (decrease) in predicted revenues.

**Conclusion**

If reusable plastic bags cost substantially more than disposable paper bags ($1.00 versus $0.10), we estimate statewide paper bag revenues under SB 270 would be about $126 million per year, of which about $83 million would be "new" revenues generated in areas of the state that do not already have bans on disposable plastic bags combined with a minimum charge for disposable paper bags. Reusable bag revenues could vary from tens of millions to hundreds of millions of dollars per year, depending on how many times they are reused.

If manufacturers develop reusable bags that are priced similarly to disposable paper bags, then reusable bags would likely outcompete disposable paper bags, resulting in lower overall revenues from carryout bag sales. For example, if reusable bags are sold for $0.10 and this causes a switch from paper to reusable bags, and the average low-priced reusable bag is used between 3 and 10 times, paper bag revenues of $126 million per year would be replaced by reusable bag revenues of between $42 million and $13 million. If inexpensive reusable bags supplant the more expensive ones, revenues from that sector would range from $147 million to $44 million (once again assuming the $0.10 reusable bags are used 3 to 10 times).

Actual revenues are uncertain and will depend on actual prices of paper and reusable bags, whether reusable bags are offered for the same price as paper bags, and the reuse rate for reusable bags.

## About the Authors

This report was authored by Joel Schwartz, with strategic advice and editorial support from Tim Gage.