AMERICAN RECYCLABLE PLASTIC BAG ALLIANCE

Freedonia® Custom Research

New Jersey Plastic Retail Bag Market Assessment

Revised Draft Report

December 27, 2023

Confidential Report Prepared on Behalf of ARPBA

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Introduction

Current Situation

- New Jersey implemented a ban on essentially all plastic film and paper retail bags, which went into effect between 2015 and 2022. According to ARPBA, the bag ban will have a significant environmental impact due to the manufacture and lifecycle of alternative bags (eg, those made from nonwoven polypropylene). Freedonia will provide a market study assessing the demand for plastic retail bags in New Jersey as well as a discussion of potential impacts caused by this ban, particularly the environmental factors.

Scope and Definitions

- **Geography:**
  - New Jersey

- **Products:** Plastic retail bags, segmented as follows:
  - Plastic film bags
  - Alternatives
    - Nonwoven polypropylene (NWPP) bags
    - Woven polypropylene (WPP) bags
    - Other bags

- **Time Series:**
  - Market Size Analysis: 2015 and 2022
  - Voice of Market: Current (2023)

- **Units:**
  - Bag demand volume (number of bags)
  - Plastic consumption (million pounds)
  - GHG emissions (kg CO_2 equivalent)

Approach and Method

- Freedonia conducted primary and secondary research in order to gather data for analysis.
  - Secondary sources were utilized to establish a set of baseline assumptions and estimates. Sources included:
    - Current Freedonia industry studies such as *US Retail Bags* and *Specialty Films*
    - Freedonia consensus economic forecasts
    - Industry and trade publications/associations
    - Local and national press
    - Marketing literature and press releases
    - Investment analyst presentations
    - Company financial filings
    - Life cycle analysis studies, including the Denmark LCA, Clemson LCA and Monmouth University polling study, among other secondary resources
  - Discussion guides were developed and employed for interviews across industry constituent groups.
    - Primary research was aimed at gathering qualitative insights as well as challenging/validating quantitative assumptions and estimates developed during the course of the study.
- Annual growth throughout this report is expressed in compounded annual growth rates (CAGR) calculated between two selected years.
- All demand figures are reported in units unless otherwise noted.
- Segmented estimates may not add to totals shown due to rounding.

Approach to Primary Research and List of Primary Research Respondents

- Freedonia interviewed 16 companies across all industry constituent groups in order to gather broad perspectives and particular data points on the New Jersey plastic retail bag market in each product category within the scope of the assessment.
- The following industry constituent groups were interviewed during the course of the project:
  - Plastic bag suppliers
  - Bag brokers and distributors
  - Retailers

- **Plastic bag suppliers:**
  - Crown Poly

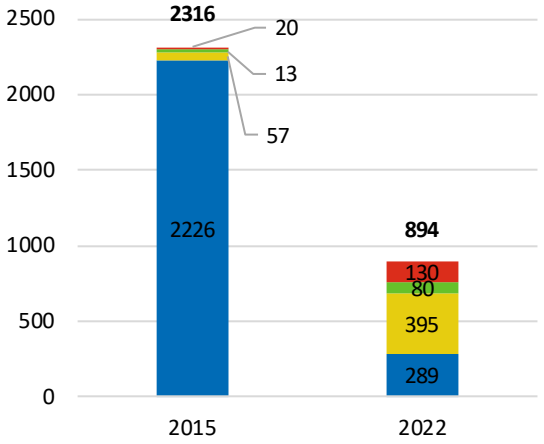
- **Bag brokers and distributors:**
  - ADCO Packaging
  - ALEF Standard Packaging
  - Diversified Sales and Marketing
  - Four Star Plastics
  - LBU, Incorporated
  - Plastic Bag Partners

- **Retailers:**
  - ACME
  - Grocery Outlet
  - The Market Basket
  - McCaffreys Food Market
  - Ravitz Family Market
  - ShopRite
  - Sprouts Market
  - Trader Joe's
  - Weis Markets

Section I: Executive Summary

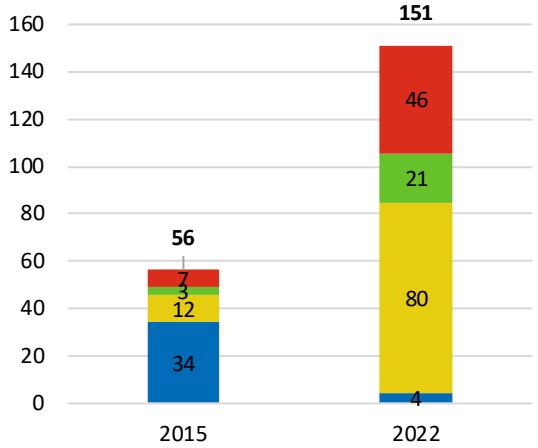
Following the NJ ban of single-use bags, the baseline 2015-2022 demand scenario shows the shift from plastic film to alternative bags resulted in a 3x increase in polypropylene plastic consumption and exponential increases in carbon emissions.

Bag Demand (million bags)



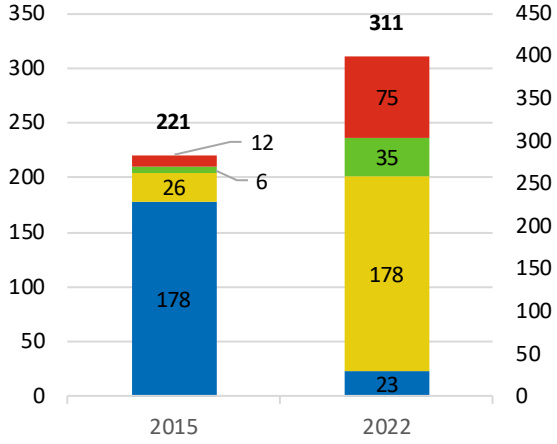
Bag Demand CAGR	22/15
Total demand	**-61%**
Other plastic bags	550%
Nonwoven polypropylene	593%
Woven polypropylene	515%
Plastic film bags	-87%

Plastic Consumption (million pounds)



Plastic Consumption CAGR	22/15
Total consumption	**169%**
Other plastic bags	550%
Nonwoven polypropylene	593%
Woven polypropylene	515%
Plastic film bags	-88%

GHG Emission from Production (million kg CO2 eq)



GHG Emissions CAGR	22/15
Total emissions	**41%**
Other plastic bags	550%
Nonwoven polypropylene	593%
Woven polypropylene	515%
Plastic film bags	-87%

- While total bag volumes declined by more than 60% by 2022, the polypropylene plastic consumed to produce NWPP and WPP bags grew by more than 6x. Furthermore, due to the larger carbon footprint of a polypropylene bag, greenhouse gas emissions (ie, CO_2) expanded more than 500%.
- The New Jersey statewide ban of single-use plastic and paper bags resulted in a complete overhaul of the plastic retail bag market. Bag volume shifted from more than 95% PE film bags in 2015 to 100% alternative bags following the ban's enforcement on May 4, 2022.

Voice of the Market – Key Findings

Business changes since 2015	▪ Retailers reported a range of sales growth between 2-3% and 25-40% from 2015 to 2022. Meanwhile, in-store shopping has declined 5-15% in favor of in-store pickup orders, third-party delivery and grocery delivery services following the pandemic. Among retailers, in-store pickup has grown 8-20% and third-party delivery 10-15%. ACME reported higher growth in in-store pickup and delivery with 70% and 300% growth, respectively. ▪ Complimentary single-use bags are no longer provided by stores due to the ban, and there has been a shift toward charging for all bags. The ban and implementation of bag charges have led to increased bag reuse and a rise in the adoption of reusable bags.
Impact of in-store pickup and delivery	▪ The impact of in-store pickup and delivery services on retailers' sales and bag-related spending varies across the industry. Some retailers have experienced increased sales attributed to these services, while others have noted declines in in-store shopping and bag-related expenditures. ▪ Charging for bags has resulted in an increase in bag reuse. ▪ The impact on total spending on bags also varies, with slight decreases, flat spending or challenges noted by different retailers.
Impact of consumer behavior on demand	▪ About 90% of all alternative reusable bags are reused only two to three times before being discarded, which falls significantly below the recommended reuse rates necessary to mitigate the greenhouse gas emissions generated during production and address climate change.

Section II: Overview of New Jersey Bag Legislation

New Jersey Bag Legislation as It Relates to Usage and Consumption of Bags

Effective November 4, 2020, the Senate and General Assembly of New Jersey implemented a law banning or limiting plastic carryout bags, polystyrene foam products, and plastic straws to combat pollution. Starting May 4, 2022, stores and foodservice businesses are prohibited from providing or selling single-use plastic carryout bags to customers. Grocery stores are similarly restricted from providing or selling single-use paper carryout bags to customers. Municipalities or counties are barred from adopting any rules or regulations regarding the regulation or prohibition of single-use plastic or paper carryout bags after the effective date of P.L.2020, c.117.

Topic	Details
Scope	▪ A “single-use plastic carryout bag” is described as a bag made of plastic that does not meet the criteria for a reusable carryout bag, emphasizing its disposability. ▪ A reusable carryout bag is defined as a bag made of materials like polypropylene, PET nonwoven fabric, nylon, cloth, hemp product, or other machine-washable fabric. It must have stitched handles and be specifically designed and manufactured for multiple reuse. ▪ A "carryout bag" is defined as a bag provided by a store or foodservice business to a customer for transporting groceries, prepared foods or retail goods. ▪ A "grocery store" is defined as a self-service retail establishment with a minimum size of 2,500 square feet, selling household foodstuffs for off-site consumption, such as fresh produce, meat, poultry, fish, deli products, dairy products, canned and dry foods, beverages, baked goods and prepared foods.
Purpose	▪ The purpose of the law is to address environmental concerns related to single-use plastic carryout bags, paper carryout bags, polystyrene foam foodservice products, and plastic straws.
Enforcement	▪ Violations incur penalties, including warnings, fines and potential injunctive relief. The Plastics Advisory Council is established to monitor implementation and effectiveness.
The Plastics Advisory Council	▪ The Plastics Advisory Council, initiated by the Department of Environmental Protection under P.L.2020, c.117 (C.13:1E-99.126 et al.), is tasked with submitting annual reports, beginning one year after the legislation's enactment, assessing the implementation and efficacy of P.L.2020, c.117. Furthermore, within two years of the law's enactment, the council delivered a comprehensive report outlining analyses and proposing strategies to diminish plastic usage, address environmental concerns, and boost plastic recycling rates.

New Jersey Department of Environmental Protection

Section III: Market Size Assessment

NWPP: Made from spunbonded nonwoven polypropylene

WPP: This type of bag is produced from woven polypropylene fibers

Plastic Film Bag: lightweight, plastic carrier bag used in almost all supermarkets; often provided free of charge

Other (PET): Plastic bags obtained from weaving molten fibers from recycled PET pellets

Overall plastic retail bag demand saw significant declines in the volume of units sold across the state from 2015 to 2022. However, alternative plastic bags saw a substantial increase in units sold through 2022.

New Jersey - Plastic Retail Bag Demand (million units)							
	Baseline Scenario			High Reuse Scenario		Low Reuse Scenario	
	2015	2022	22/15	2022	22/15	2022	22/15
Total	**2316**	**894**	-61%	**388**	-83%	**1875**	-19%
Plastic film bags	2226	289	-87%	289	-87%	289	-87%
Alternative plastic bags	90	605	572%	99	10%	1586	1663%
Nonwoven polypropylene	57	395	593%	65	14%	1036	1717%
Woven polypropylene	13	80	515%	13	1%	210	1514%
Other plastic bags	20	130	550%	21	7%	341	1604%

Source: Freedonia Custom Research

Note: Baseline demand informed by USITC trade data, Freedonia Group syndicated studies, interviews and other secondary research sources. High/low reuse scenarios incorporate presence of third-party delivery services and reuse rates from various in-depth interviews and secondary sources.

- As the consumer base transitioned from single-use plastic to alternative bag options, New Jersey's market saw an overall decline in the total number of units sold between 2015 and 2022.
  - The overall number of bags shifted from less than 5% alternative bags to nearly 70% alternative plastic bags in the examined time. Some presence of plastic film bags remained across the state as the Single Use Waste Reduction Act (SUWRA) went into effect halfway through the year, beginning in May 2022. Additional demand in New Jersey for plastic film bags was also supported by a small segment of retail stores continuing to offer the conventional product.
- Over the seven-year period, total plastic retail bag demand decreased in excess of 60% as plastic film bags lost presence.
  - Although plastic film bags saw declines, alternative plastic bags realized substantial growth – more than 500% – as consumer and retailers adjusted their habits in light of the single-use plastic bag restrictions.

Although the overall volume of bags significantly decreased across the years, plastic alternative bags exponentially grew, with polypropylene as the leading option.

- Polypropylene products are the most prominent alternatives to plastic film bags, both woven polypropylene (WPP) and nonwoven polypropylene (NWPP) seeing significant volume growth from 2015 to 2022.
  - NWPP products are the most popular alternative plastic bag product, accounting for 44% of overall demand in 2022 (up from less than 3% in 2015). The segment is not only the largest alternative bag type, but it also saw the most substantial increase over the seven-year period.
    - "We moved entirely to nonwoven coated bags, so before the ban, we did buy 50-60% t-shirt, 20-30% paper, and 20% nonwoven bags." – **Ravitz Family Market**
    - "90% of the volume is in nonwoven polypropylene, with the other 10% being alternative recycled materials." – **Weis Markets**
    - "The split of the volume of products used is 20% woven polypropylene, 65% nonwoven polypropylene, 5% other alternative bags, and another 10% being natural fiber alternative bags." – **Trader Joe's**
  - WPP options were the smaller category, comprising approximately 9% of total plastic bag demand in 2022.
- Other plastic bag alternatives, such as PET or nylon products, account for the remaining alternative plastic bag demand.

A high reuse scenario estimates a slight increase in the volume of alternative units sold from 2015 to 2022. A low reuse scenario illustrates a substantial increase in the volume of units sold, with alternative options exceeding a 1200% increase.

- Total demand for retail bags with high reuse showed a larger decrease in the overall change of volume from 2015 when compared to the base case scenario previously illustrated, where the scenario assumes a reuse rate of 16 times per alternative bag, as evidenced by the Denmark LCA, Clemson LCA and Monmouth studies.
  - Plastic film bags maintained the same overall change from 2015 to 2022, with the category assuming a similar reuse scenario to the base case for single-use plastics.
- The high reuse scenario in this study demonstrated a low double-digit decrease of 15% in the overall volume of units sold for alternative plastic bags, influenced by higher demand growth for NWPP bags.
  - WPP alternative bags also demonstrated a decrease under the high reuse scenario, achieving a 30% change in that time.
- Other plastic bags such as PET and nylon saw the slowest change in units under a high reuse scenario due to their higher average reuse per bag compared to polypropylene products.
- Regarding low reuse, demand for plastic retail bags from 2015 to 2022 saw a roughly 35% decrease in the number of units sold overall. Plastic film bags maintain a reuse rate of approximately one use per bag, consistent with the base case scenario, and therefore circulated the same volume of units for 2022.
- While a decline in volume occurred even for the low reuse scenario, the volume of units sold for alternative bags exponentially increased under the situation.
  - Polypropylene products exceeded a 1200% increase, with WPP seeing a significant jump to nearly 350 million units.
  - NWPP saw the largest growth, where the scenario assumes the product is not only the largest category of all alternative products, but also grew the most to over 565 million products due to its presumed lower reuse rate than other plastic bags, a 1300% increase.
- Other plastic bags also saw a significant increase, albeit somewhat slower than NWPP products due to a larger volume growth among the NWPP category.

Although the number of bags sold decreased over the examined years, the comprehensive weight of plastic retail bags increased in that time.

New Jersey - Plastic Retail Bag Demand (million pounds)							
	Baseline Scenario			High Reuse Scenario		Low Reuse Scenario	
	2015	2022	22/15	2022	22/15	2022	22/15
Total	**56**	**151**	169%	**28**	-50%	**389**	593%
Plastic film bags	34	4	-88%	4	-88%	4	-88%
Alternative plastic bags	22	147	567%	24	9%	385	1649%
Nonwoven polypropylene	12	80	593%	13	14%	210	1717%
Woven polypropylene	3	21	515%	3	1%	55	1514%
Other plastic bags	7	46	550%	7	7%	119	1604%

Source: Freedonia Custom Research

- Despite a reduction in the volume sold from 2015 to 2022, total weight increased in that time.
  - Plastic film bags weigh the least of any in-scope product at an average of approximately 6 grams per bag. The category decreased in that time at a commensurate rate to its overall volume decline, falling from 34 million pounds in 2015 to less than 5 million pounds sold in New Jersey in 2022.
- Although single-use plastic bag demand decreased in terms of weight, all other alternative plastic bags saw a substantial increase in pounds distributed across New Jersey.
  - Polypropylene bags weigh significantly more than single-use plastics, with WPP products weighing 92 grams per bag. NWPP bags weigh more than WPP and, given both their overall volume sold and average weight of 120 grams, the former reached 80 million pounds of demand in 2022.
- Other plastic bags also represent a significant category in terms of weight, the second largest behind NWPP due to both their volume sold and average weight of 160 grams per bag, the heaviest weight per bag of any alternative.

In both reuse scenarios, the amount of plastic consumed for alternative bags increases, illustrating that regardless of the scenario, a single-use plastic bag ban did not reduce the amount of plastic used in the production of plastic retail bags.

- As showcased in other metrics evaluated, single-use plastics decreased across the various reuse scenarios, influencing the topline number for consumed plastics.
- However, when looking at the alternative plastic bags category for high reuse, plastic consumption among sub-products increased. Even in a model where demand assumes a higher 16 reuses per bag, plastic consumption for alternative bags grew approximately 10% from 2015 to 2022.
  - NWPP bags represent the greatest increase in the time span, achieving nearly 15% due to the category's heavy average weight and imported volume. WPP also experienced slight growth in plastic consumption under the high reuse scenario, mirroring a similar average reuse to NWPP.
  - Other plastic bags also saw slight growth under the high reuse scenario, yielding nearly 10% due to the product being the heaviest alternative in-scope bag.
- While high reuse saw a decline among all plastic retail bags, the low reuse scenario found an exponential increase – nearly 600% – in plastic consumption from 2015 to 2022.
  - Among polypropylene bags, NWPP saw the fastest gains, exceeding a 1700% increase from 2015 to 2022. WPP saw a slower increase under the low reuse scenario, albeit an approximately 1510% increase.
  - Other plastic bags also saw an exponential boost in plastic consumption of over 1600%, totaling 119 million pounds in 2022.

Overall carbon emissions since 2015 have increased by 40%, with alternative plastic bag emissions exceeding a 500% increase in that time.

Estimated Greenhouse Gas Emissions from Production of New Jersey Plastic Retail Bags (million kg CO2 eq)							
	Baseline Scenario			High Reuse Scenario		Low Reuse Scenario	
	2015	2022	22/15	2022	22/15	2022	22/15
Total	**221**	**311**	41%	**70**	-68%	**778**	252%
Plastic film bags	178	23	-87%	23	-87%	23	-87%
Alternative plastic bags	43	288	571%	47	10%	755	1660%
Nonwoven polypropylene	26	178	593%	29	14%	466	1717%
Woven polypropylene	6	35	515%	6	1%	92	1514%
Other plastic bags	12	75	550%	12	7%	198	1604%

Source: Freedonia Custom Research

Note: Sources for GHG emissions and reuses include Denmark LCA study, Clemson CLA study, Monmouth polling study and other secondary information available. Emissions are evaluated at the bag production level, and other facets of the value chain, such as transit and storage, will have an upward influence on GHG emissions and overall climate impact.

- Overall carbon emissions across all retail bags saw a 40% increase in output, with an excess of 300 million kilograms of CO_2 released.
  - Although plastic film bag emissions saw a reduction of nearly 90%, released emissions from other retail bag options greatly influenced overall greenhouse gas emissions, resulting in an increase.
- Alternative plastic bags saw an overall increase of nearly 600% in emissions from 2015 to 2022, with the average carbon emissions among sub-products being significantly greater than a typical single-use plastic bag.
  - Polypropylene bags saw the most significant changes in emissions outputs, where NWPP alternative bags increased by nearly 600%. WPP options increased at a slightly slower rate, with both products significantly influencing the overall volume of greenhouse emissions, exceeding 2015 numbers despite bag ban efforts.
  - Other plastic bags also saw a large increase over the studied period, with other plastic bags like PET releasing a higher average carbon footprint than polypropylene products.

The high reuse scenario resulted in a reduction in overall greenhouse gas emissions, while the low reuse scenario exponentially increased emissions in 2022 compared to 2015 (and compared to the baseline scenario).

- Under the high reuse scenario, topline greenhouse gas emissions declined nearly 70%, and the reuse of single-use plastic remained consistent with the baseline scenario.
  - However, in the high reuse scenario, greenhouse gas emissions for 2022 within the alternative plastic retail bag segment increased slightly, releasing nearly 47 million kilograms of CO_2 in 2022 compared to the category's 43 million kilograms in 2015.
  - Despite estimating a reuse of even as much as 16 times per bag, far above the determined average uses per bag based on consumer behavior data, polypropylene and other plastic alternatives continued to release more emissions than before the bag ban.
  - Other plastic bag alternatives also saw a slight increase in the amount of emissions from 2015 to 2022, yielding just under 10% growth.
- While the high reuse scenario showcases a decrease in total carbon emissions, the low reuse scenario results in a substantial increase in carbon emissions, particularly among alternative plastic bags, where the model assumes the average reuse of alternative plastic bags is less than two uses per bag.
  - Emissions related to alternative plastic bags as a whole increase by over 1600% across the seven-year period. NWPP bags registered the most significant increase at approximately 1700%, influencing the entire alternative bag segment not only due to the segment's greater increase, but also because it is the largest alternative bag category. Under the low reuse scenario, WPP also saw a similar increase in emissions of just under 1650% – the second largest expansion among alternative bags.
  - Other alternative plastic bags also exemplified a large increase of approximately 1600% from their 2015 emissions due to the category's high emission release rating of 3.9 kg of CO_2 per bag produced.

Section IV: Retailer Business Cost Analysis

2022 Retailer Business Cost Analysis – Major Grocery Retailer

Presented below is a representative profile of a major grocery retailer. Information presented in this profile is representative of data gathered during in-depth interviews.

Topic	Estimate	Supporting information
Estimated total grocery revenue	$3 billion	"Estimated annual nonwoven polypropylene (NWPP) purchases in 2022 for one major customer were 70 million units, but a lot of those we had to ship into 2023. They actually purchased 70 million, but they purchased half of what they projected for 2022 in 2022, and the other half we had sitting here until the end of 2023." **– Diversified Sales and Marketing**
Annual alternative bag purchase volume	30-40 million bags	
Bag materials purchased	Nonwoven polypropylene	
Retailer cost per bag	$0.40-0.80	Sprouts Market and Trader Joe's reported costs of $0.80 per bag. "Our best-selling bag right now I buy for $50/case of 200 – a NWPP t-shirt bag, 80 gsm, selling for $0.40 per bag." **– Diversified Sales and Marketing**
Retailer revenue per bag	$1.25-2.00	Retailers sell bags for $1.25-2.00 per bag.
Average retailer bag profit margin	60-70%	Calculated from average revenue minus average cost
Gross profit added of total sales	1-2%	Calculated from estimated total retail sales minus bag costs
Estimated profit earned from bag sales from all NJ stores	$42 million	Total estimated profit earned from bags for all 50 stores.

2022 Retailer Cost Analysis

During 2022, retailers earned profit margins of 20-150% (60-70% on average) on sales of alternative bags, adding 1-2% to their bottom lines.

Competitor	Retailer 1	Retailer 2	Retailer 3	Retailer 4
Estimated average annual store revenue	$16 million	$24 million	$25 million	$58 million
Estimated annual bag purchase volume	230,000	330,000	350,000	815,000
Bag materials purchased	100% NWPP 70 gsm and 0.65mm thickness	90% NWPP 10% Recycled WPP NWPP: 80 gsm and 0.09-1.2 mm thickness	65% NWPP 20% WPP 15% Other	NWPP: 80 gsm
Retailer cost per bag	$0.80	NWPP: $1.00 Recycled WPP: $0.40	NWPP: $0.80 WPP: $1.35 Natural fiber: $3.60	$0.40-0.60
Retailer revenue per bag	$0.99-2.00	NWPP: $2.00 Recycled WPP: $0.50	NWPP: $1.00 WPP: $1.50 Natural fiber: $4.00	$1.25-1.99
Profit margin	20-150%	100%	10-20%	65%
Estimated revenue earned from bags	$380,000	$660,000	$540,000	$1.3 million
Estimated profit earned from bags	$200,000	$330,000	$75,000	$860,000
Gross profit added of total sales	1-2%	1-2%	<1%	1-2%

2015 Retailer Cost Analysis

Retailers reported more than 80% of bag purchase volumes were single-use plastic (SUP) bags in 2015. Because single-use plastic bags were complimentary, the bags resulted in a loss of $9,000-13,000 for a typical store. Meanwhile, alternative bags were sold at a profit.

Competitor	Retailer 1	Retailer 2	Retailer 3	Retailer 4
Estimated average annual store revenue	$13 million	$14 million	$15 million	$17 million
Total bag volume	**880,000** SUP: 84% NWPP: 4% Paper: 10% Other: 2%	**960,000** SUP: 88% NWPP: 9% Paper: 2% Other: 1%	**1 million** SUP: 80% NWPP: 10% Other: 10%	**1.2 million** SUP: 88% NWPP: 4% Other: 8%
Retailer cost per bag	SUP: $0.01 NWPP: $0.64	SUP: $0.01 NWPP: $0.80	SUP: $0.01 NWPP: $0.60	SUP: $0.01 NWPP: $0.37
Retailer revenue per bag	SUP: $0 NWPP: $1.25	SUP: $0 NWPP: $1.50	SUP: $0 NWPP: $0.67	SUP: $0 NWPP: $1.62
Retailer (loss)/ profit per bag	SUP: ($0.01) NWPP: $0.61	SUP: ($0.01) NWPP: $0.70	SUP: ($0.01) NWPP: $0.07	SUP: ($0.01) NWPP: $1.05
Total (loss)/profit	SUP: ($9,000) NWPP: $20,000-25,000	SUP: ($10,000) NWPP: $60,000	SUP: ($11,000) NWPP: $7,000	SUP: ($13,000) NWPP: $50,000

Section V: Voice of the Market

Reusability and Recyclability

Polyethylene bags are 100% recyclable, with low carbon emissions and the ability to be recycled into themselves, while polypropylene bags are not recyclable, are predominantly produced overseas with higher emissions and feature minimal use of post-consumer recycled material. Reusable nonwoven polypropylene bags need six reuses for climate change, 52 for overall environmental impact, and 14 to surpass conventional plastic bags. Woven polypropylene bags require five reuses for climate change, 45 for overall impact, and 16-98 to match thin plastic bags.

Bag type	Details
Plastic film	▪ Plastic film is 100% recyclable. ▪ "A polyethylene bag is 100% recyclable and can be recycled into itself, is produced with low carbon emissions, and the PE is made domestically from natural gas. Conversely, PP bags are produced overseas and imported, produce higher emissions than film bags, and are not recyclable. In fact, 99% of PP is virgin and does not contain post-consumer recycled material." **– General Manager, Crown Poly**
Nonwoven polypropylene	▪ Ideally, NWPP bags would be returned back to the store for recycling. Evidently, PP bags are rarely recycled. ▪ "According to Wegman's testimony, the reusable bags intended to be returned to the store for recycling were not recycled." **– General Manager, Crown Poly** ▪ According to RECYC-Quebec, "PP nonwoven bags need an equivalent number of reuses to equal the thin plastic bag ranging from 11 to 59, depending on the scenario and indicator." ▪ As mentioned by the Ministry of Environmental and Food of Denmark, "PP bags, nonwoven: Reuse for grocery shopping at least six times for climate change, at least 52 times considering all indicators." ▪ In the Life Cycle Assessment of Supermarket Carrier Bags, the Environment Agency stated that, "The nonwoven PP bag had to be used fourteen times to reduce its GWP to below that of the conventional bag."
Woven polypropylene	▪ According to the Ministry of Environmental and Food of Denmark, "PP bags, woven: Reuse for grocery shopping at least five times for climate change, at least 45 times considering all indicators. ▪ RECYC-Quebec stated that, "The PP woven bags need an equivalent number of reuses to equal the thin plastic bag ranging from 16 to 98, depending on the scenario and indicator."

Reuse Rate for Climate Impact By Country			
Woven Polypropylene	**Non-woven Polypropylene**	**PET**	**Cotton Fiber**
16-98	**11-59**	**84**	**100-7100**
➢ Quebec: 16-98	➢ Quebec: 11-59	➢ Denmark: 84	➢ Quebec: 100-2954
➢ Denmark: 45	➢ Denmark: 11-59		➢ Denmark: 7100
	➢ UK: 11		➢ UK:131

Sources:

- Environmental and Economic Highlights of the Results of the Life Cycle Assessment of Shopping Bags, RECYC-QUÉBEC, 2017
- Life cycle assessment of supermarket carrier bags: a review of the bags available in 2006, Environment Agency
- Life Cycle Assessment of grocery carrier bags, Ministry of Environment and Food of Denmark, 2018

Consumer Reuse Rates for LDPE and NWPP		
Bag Type	**Area**	**Reuse Rate**
LDPE	Average	3.1x
NWPP	Non-legislated areas	13.9x
	Legislated areas	17.3x
	Average	14.6x

Source:

- Life Cycle Assessment of Grocery Bags in Common Use in the United States, Clemson University, 2014

Grocery Bag Use Trend	Aug. 2022	April 2022
Bring own bags	89%	38%
Stores plastics bags	1%	50%
Stores paper bags	3%	10%
Don’t use bags	4%	n/a
Purchase reusable	3%	n/a
Don’t shop	0%	1%
Unknown	1%	1%

Reusable bags bought or given over 1 year	Aug. 2023
<5	17%
5-10	25%
11-25	26%
26-50	12%
>50	16%
None	2%
unknown	1%

Source:

- Majority Continues to Back Plastic Bag Ban, but at a Slightly Lower Level, Monmouth University, 2023

Retailers

Impact of In-store Pickup and Delivery on Company Business

In-store pickup and delivery services have had a varied impact on company sales for retailers. Trader Joe's and Grocery Outlet reported an increase in sales due to these services, while others such as Sprouts Market and ACME noted declines in in-store shopping and bag-related spending. However, Ravitz Family Market suggested that for certain niche markets, the impact on sales remains stable, emphasizing the importance of in-person interactions for its community of kosher buyers.

Topic	Quotations
Company sales	▪ "The bag ban has not led to a significant shift in profit margins. Since these services have led to a decline in in-store shopping, there has been a decline in alternative bags being sold at checkout. There has been a few percent decrease in retail bag purchase volumes." **– Store Manager, Sprouts Market** ▪ "In-store pickup/delivery services have led to an increase in company sales but a decrease in total bag spending and retail purchase volumes of bags. Since pickup tends to use less bags than in-store and charging for bags has increased bag reuse, bag spending has gone down." **– Store Manager, Trader Joe's** ▪ "Delivery services have led to an increase in sales of 5%." **– Store Manager, Grocery Outlet** ▪ "Pickup and delivery services have had a negligible impact on sales since it just shifted the model away from in-store." **– Store Manager, ACME** ▪ "We see company sales as stable. The community of kosher buyers wants to go to the store and talk to the grocer and check out in-person, not get anonymous delivery. So we keep a lot of bags, a lot of help loading. We do have some Uber Eats and things like that, but it is small with not a lot of impact on our company sales." **– Store Manager, Ravitz Family Market**

Impact of In-store Pickup and Delivery on Company Business

In-store pickup and delivery services have led to a notable decrease in retail bag purchase volumes across various retailers, with a shift toward using fewer bags when packaging items in-store. While some stores have seen a stable or declining trend in alternative bags sold at checkout, others, particularly in regions with varying regulations, adapt their bag purchasing strategies based on local enforcement decisions, influencing the preference for paper, woven PP or reusable bags.

Topic	Quotations
Retail bag purchase volumes	▪ "There has been a few percent decrease in retail bag purchase volumes." **– Store Manager, Sprouts** ▪ "Because of pickup and delivery services, the number of bags purchased has declined. When we package the items in the store, we use less bags." **– Store Manager, Weis Markets** ▪ "In-store pickup/delivery services have led to an increase in company sales but a decrease in total bag spending and retail purchase volumes of bags." **– Store Manager, Trader Joe's** ▪ "Our bag unit volumes have gone down vs. t-shirt bags, but we stay pretty constant in the canvas bags. We really have not seen an uptick in those since people stopped using t-shirt bags. I look at that as a no-go move. We can't offer t-shirt bags, it's illegal, I won't buy them. People either bring their own or forget, about the same amount of people forget and buy our canvas bags, so it has not really changed much in a year." **– Store Manager, The Market Basket** ▪ "Our retail bags are also stable. After the switch over a year ago, many people were already buying the nonwoven bag. For help to the car, that's what we put groceries in, the nonwoven bag, not the t-shirt bags. So, I think that kept bags from going up a lot because a lot of our shoppers already had reusable bags." **– Store Manager, Ravitz Family Market**
Alternative bags sold at checkout	▪ "No change in alternative bags sold at checkout." **– Store Manager, Sprouts** ▪ "Since these services have led to a decline in in-store shopping, there has been a decline in alternative bags being sold at checkout." **– Weis Markets** ▪ "In New Jersey, it is a city-by-city decision for when and how to enforce. If they give a long grace period (Princeton), we buy mostly paper and t-shirt bags. If they enforce, we switch to woven PP bags." **– Store Manager, McCaffreys Food Market** ▪ "In our town, paper is considered okay, so we buy a lot of paper. People don't really like to buy the reusable bags, we charge for larger paper bags, but people just use the smaller paper ones. When we run out, then they are forced to use reusable or just load them into the trunk without a bag. We run out of paper a lot because we just can't afford to buy a huge amount of paper like we did with the t-shirt bags." **– Store Manager, ShopRite**

Impact of In-store Pickup and Delivery on Company Business

In-store pickup and delivery services have diverse effects on retailers' total spending on bags, ranging from slight decreases at Sprouts to flat spending at Grocery Outlet, a noted decline at ACME, a consistent pattern with canvas bags at The Market Basket, and challenges with high spend per bag for reusable options at McCaffreys Food Market.

Topic	Quotations
Total spend on bags	▪ "There has been a few percentage decrease in total spend on bags." **– Store Manager, Sprouts** ▪ "Total spending on bags has been flat." **– Store Manager, Grocery Outlet** ▪ "Total spend on bags has declined with pickup and delivery services, as less bags tend to be used when others pack the items for them." **– Store Manager, ACME** ▪ "Our bag unit volumes have gone down vs. t-shirt bags, but we stay pretty constant in the canvas bags. We really have not seen an uptick in those since people stopped using t-shirt bags. I look at that as a no-go move. We can't offer t-shirt bags, it's illegal, I won't buy them. People either bring their own or forget, about the same amount of people forget and buy our canvas bags, so It has not really changed much in a year." **– Store Manager, The Market Basket** ▪ "Our spend per bag is very high with canvas bags compared to paper or t-shirt bags even if customers pay for it. It's viewed as extremely unprofitable to use the reusable bags. Customers buy less, they only buy what they can fit in the bags they have." **– Store Manager, McCaffreys Food Market**
Expected alternative bag growth	▪ "The growth of alternative bags will increase at the level of the increase of in-store pickup/delivery." **– Store Manager, Sprouts Market**

Bag Purchase Metrics

Nine out of 10 alternative bags are reused two to three times before being discarded, well below the reuse rates suggested to mitigate the effects of GHG emissions created during production and climate change.

Topic	Details
Total bag volumes	▪ The bag ban resulted in an overall decline in the total number of plastic retail bags purchased. ▪ However, due to increased plastic use and the emissions created during the production of alternative bags, the transition to alterative bags results in increased GHG emissions and plastic consumption.
Bag purchases per person	▪ In 2015, retailers sold 10 bags per person. ▪ During 2022, on average for the state of New Jersey, retailers sold 76 bags per person. Of alternative bag demand, NWPP bags account for 65-70%, WPP bags represent 10-15% and other bags (eg, PET) represent 20-25%. ▪ The change in bag materials purchased results in a more than 500% increase in purchases of alternative bags.
Bag purchases per $1,000 of in-store pickup and third-party delivery sales	▪ In-store pickup and third-party delivery services are estimated to account for 2-10% of retail sales. ▪ All of the bags sold for in-store pickup and delivery orders are new, alternative bags. The increase in such services decreases the average reuse of an alternative bag.
Alternative bag reuse	▪ Alternative bags are intended to be reused more than 15 times to negate their impact on environmental factors relative to equivalent single-use plastic bag consumption. ▪ Based on imports and demand for alternative bags, 90% of all alternative reusable bags are reused two to three times before being discarded. ▪ As a result of the bag ban, considering the market for retail bags in New Jersey overall, alternative bag consumption resulted in a more than 500% increase in GHG emissions and more than 150% increase in plastic consumption.

Business Changes Since 2015

Various retailers have witnessed substantial growth in total sales. Concurrently, in-store shopping has faced a decline, with differing percentages reported, while in-store pickup has significantly increased, driven by factors including the pandemic. Moreover, there has been a notable rise in the popularity of third-party delivery services.

Topic	Quotations
Total sales	▪ "The store has seen a growth of nearly 25% since 2015." **– Store Manager, Sprouts Market** ▪ "Total sales are up 40% since 2015." **– Store Manager, Weis Markets** ▪ "In the last three years, total sales are up 40%." **– Store Manager, Trader Joe's** ▪ "In the last seven years, total sales have gone up on average 2% per year." **– Store Manager, Grocery Outlet** ▪ "Since 2015, sales have been up on average 3% per year." **– Store Manager, ACME**
In-store shopping	▪ " In-store shopping has declined since pickup and delivery services began a few years ago." **– Store Manager, Sprouts Market** ▪ "In-store shopping is down 8%, mainly since 2020." **– Store Manager, Weis Markets** ▪ "In-store shopping has been down 10% since the beginning of the pandemic. Prior to the pandemic, it was constant since 2015." **– Store Manager, Grocery Outlet** ▪ "In-store shopping is down 5% (since 2020)." **– Store Manager, Trader Joe's** ▪ "In-store shopping has declined by 15% since 2020." **– Store Manager, ACME**
In-store pickup	▪ "In-store pickup is up 15% (mainly since 2020)." **– Store Manager, Weis Markets** ▪ "In-store pickup is up 8% (since 2020)." **– Store Manager, Trader Joe's** ▪ "The growth of in-store pickup was more impacted by the pandemic than the bag ban. Growth in in-store pickup was up about 20% due to the pandemic but has declined about 10% since." **–Store Manager, Grocery Outlets** ▪ In-store pickup has increased by 70% since 2020." **– Store Manager, ACME**
Third-party delivery service	▪ "Third-party delivery service is up 15% (mainly since 2020)." **– Store Manager, Weis Market** ▪ "Since the increase in popularity of food delivery services, Sprouts has noticed an increase in demand for third-party delivery services, as well as in-store pickup. In addition, forcing customers to pay for bags has led to an increase in bag reuse. Since we charge for bags, we have seen a greater number of consumers use bags that were purchased prior." **– Store Manager, Sprouts Market** ▪ "Third-party delivery service is up 10% (since 2020)." **– Store Manager Trader Joe's** ▪ "Since 2018, third-party delivery services are up 300%." **– Store Manager, ACME**

Shift in Bag Purchases

Stores do not provide complimentary single-use bags, and there has been a shift to charging for all bags following the ban.

Topic	Quotations
Store delivery sales	▪ "Store delivery sales are unavailable since it only started in 2023." **– Store Manager, Weis Markets** ▪ "Store delivery sales are not applicable." **– Store Manager, Trader Joe's**
Adjustments for cost of bags and how bags are paid for	▪ "The store does not offer delivery or complimentary single-use bags." **– Store Manager, Grocery Outlet** ▪ "There is a charge for all bags since the ban. Prior to the ban, there was no charge for plastic or paper bags." **– Store Manager, Weis Markets** ▪ "There is no change in how bags are paid for." **– Store Manager, Trader Joe's** ▪ "There is no complimentary bag service." **– Store Manager, ACME**
Fees charged per bag for in-store pickup or delivery	▪ "Pickups cost $1.99 for orders over $35 and $3.99 for orders under $35. For pickup orders, there will be no additional service charges. The customer must pay for the bags used." **– Store Manager, Sprouts Market** ▪ "There is a charge for all bags since the ban. Prior to the ban there was no charge for plastic or paper bags. There is no set per-bag charge for delivery services, but the standard $3.99 for orders greater than $35 charge can change based off the number of bags needed." **– Store Manager, Weis**

Shift in Bag Purchases (continued)

While retail bags yield higher profit margins than average store items, there is no emphasis on prioritizing bag sales, as profits from bags are not a significant contributor to overall store profits; additionally, the ban and implementation of bag charges have increased bag reuse and a rise in reusable bags.

Topic	Quotations
Retail bag profits compared to other high profit-earning products in store	▪ "Profit on bags is slightly higher than the average items in the store, but this does not mean there is a preference to sell bags more than these items. The bag ban has led to an understanding that we must offer bags for sale, but we are not relying on bags to drive our profits." **– Store Manager, Sprouts Market** ▪ "The margin on retail bags is higher than other items in the store. While per-bag margins are higher than most of our other items, we do have a problem with bag theft, which does lower the overall margin for the product." **– Store Manager, Weis Markets** ▪ "The profit from retail bags is in line with the higher-profit items in the store. There is no preference to sell bags more than other items." **–Store Manager, Trader Joe's** ▪ "Retail bags are not considered a high-profit part of the store. We do not make our money on bag sales." **– Store Manager, Grocery Outlet** ▪ "The profit on retail bags is smaller compared to the average margin of products in the store." **– Store Manager, ACME**
Change in consumer behavior around reuse, delivery preferences or in-store pickups	▪ "Forcing customers to pay for bags has led to an increase in bag reuse. Since we charge for bags, we have seen a greater number of consumers use bags that were purchased prior." **– Store Manager, Sprouts Market** ▪ "There has been an increase in delivery and in-store pickups over the last several years. Ever since the pandemic when people got used to shopping from home, we witnessed a spike in these services at our store. The use of reusable bags was on a decline prior to the ban, but the ban has caused a greater number of customers using reusable products." **– Store Manager, Weis Markets** ▪ "Delivery and in-store pickups have witnessed substantial growth, but COVID was a driver of this, not the ban on bags. COVID plus the ban on bags have led to growth of reusable bags." **– Store Manager, Grocery Outlet** ▪ "Since the ban was put in place, reuse has experienced exponential growth. Delivery and pickup services have not seen a significant difference that was a direct result of the ban. Any changes in bag use are not because of the plastic and paper ban." **– Store Manager, ACME**

Distributors

Shift in Bag Purchases

Purchase volumes have become more scattered, with smaller orders but more customers, a push for smaller promotional runs, and notable changes in the types of bags requested, including a rise in demand for biodegradable, unique and sustainable non-plastic options.

Topic	Quotations
Retail bag purchase volumes	▪ "So, purchase volumes are more scattered. We have more customers asking for bags but ordering fewer bags. I don't know if that is an impact from store pickup or not, but we have smaller buys but more customers, but no growth." **– Inside Sales, Four Star Plastics** ▪ "In the promotional category, there has been a push for much smaller runs like 100 bags or something like that. At times we do this, this causes to manufacturer at another plant in China, and the cost for bags is a lot higher." **– Sales, LBU** ▪ "Retail bag purchase volumes may have gone down 50-70%, but the prices of bags are so much more expensive than t-shirt bags." **– Inside Sales, Alef Standard Packaging**
Bag materials sold at checkout	▪ "People are asking for biodegradable bags and more unique bags now." – **Sales, Plastic Bag Partners** ▪ "The request for cotton and hemp bags has gone up. Different textures and sustainable non-plastic products have started to get some traction, not a lot of sales, but it used to be maybe 0.5% of our sales; now in New Jersey and New York, [demand for natural fiber bags is] more like 5%." **– Sales, LBU**
Total cost of bags	▪ "The price per bag has changed dramatically." **– Sales Manager, ADCO Packaging**

Shift in Bag Purchases (continued)

There is a noticeable increase in the demand for sustainable, non-plastic products with different textures, constituting around 5% of sales in the New Jersey/New York region. There is uncertainty around whether retailers are charging for bags, as some retailers absorb the cost of promotional bags by incorporating it into the prices of their products.

Topic	Quotations
Adjustments for cost of bags and how bags are paid for	▪ "Some companies would buy a lot of t-shirt bags and just a few paper bags. With that mix, they could absorb the cost of paper bags. Now it is too expensive because there are no cheap options in bags anymore and retailers hate it." **– Sales Manager, ADCO Packaging** ▪ "Typically, the retailer eats the cost of a promo bag and just puts it into the products they sell." **– Sales, LBU** ▪ "I don't know if retailers are charging for bags." **– Sales, Plastic Bag Partners**
Fees charged per bag for in-store pickup or delivery	▪ Associates performing the shopping in lieu of the consumer charge the number of alterative bags used to bag groceries to the consumer's grocery bill.
Expected alternative bag growth	▪ "Different textures and sustainable non-plastic products have started to get some traction, not a lot of sales, but it used to be maybe 0.5% of our sales; now in New Jersey and New York, it's more like 5%." **– Sales, LBU**