Department Cover Memo

Evaluating Washington State's Retail Carryout Bag Policy Report

The evaluation of Washington State's Retail Carryout Bag Policy provides an opportunity to understand the complexities of plastic waste reduction, economic feasibility, and policy priorities of a law that impacts approximately 80,000 businesses across the state. This cover memo is a response to the final report from the Department of Commerce and the Department of Ecology to the content compiled by Washington State University.

Chapter 70A.530 RCW, codified in 2021, prohibits single-use plastic carryout bags, requires the use of thicker plastic bags, and imposes a pass-through charge on carryout bags. RCW 70A.530.060 directs the Department of Commerce (Commerce), in consultation with the Department of Ecology (Ecology), to submit a report to the Legislature that examines the thickness requirements for bags, the effectiveness and sufficiency of the pass-through charge, and assesses recommendations for revisions to chapter 70A.530 RCW, if needed. Commerce contracted with a research team at Washington State University (WSU) to study the issue. Their report, Evaluating Washington State's Retail Carryout Bag Policy (WSU Report), is submitted to fulfill this statutory requirement.

Although the WSU Report offers a helpful analysis of academic literature, the contracted research team was unable to obtain sufficient data on the quantities of bags distributed, retail prices, or reuse rates within Washington to effectively evaluate the law's impact across the required categories. Commerce and Ecology find that several of the recommendations outlined in the WSU Report are based upon insufficient data from within Washington State. Moreover, the WSU Report makes several recommendations that fail to consider larger social, economic, and environmental implications. Considering these limitations, this Cover Memo examines the WSU Report's key findings, limitations, recommendations, alternatives, and possible next steps.

Looking forward, Commerce and Ecology offer the following recommendations:

- Recommend maintaining the 2.25 mil[1] requirement for plastic bags. We advise against returning to the single-use 0.5 mil plastic bags or transitioning to the thicker, 4 mil bags;
- Remain open to a ban on plastic bags provided that equity and environmental justice impacts are considered;
- Remain open to a change in the pass-through charge for carryout plastic bags, provided that the charge considers equity and consumer behavior; and
- Recommend obtaining further data on plastic and paper bag use from distributors and retail stores.

WSU Report key findings and limitations

The WSU Report finds that legislative action may be necessary to align the law's requirements with its stated intent "to reduce waste, litter, and marine pollution, conserve resources, and protect fish and wildlife" (RCW 70A.530.005). The WSU Report also includes the following findings:

- Washington saw a decrease in the quantity of bags distributed and an increase in total plastic used following the implementation of the single-use bag ban. Based on sales data from a carryout bag distributor, the number of plastic bags distributed in Washington fell by 50% between 2021 and 2022. However, during the same time, total plastic use by weight increased by 17%. The increase in plastic by weight is a result of the use of reusable 2.25 mil minimum-thickness plastic bags, which are roughly four times heavier in weight than single-use 0.5 mil thickness plastic bags. Paper bags decreased by 21% in quantity and 22% by weight.

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[1] This cover memo and the report use the plastic bag industry standard, mil, as an abbreviation for a unit of measurement that is equal to one-thousandth of an inch and is used in various industries, such as manufacturing and engineering, to measure thickness or length.

- **WSU Report limitation**: WSU based these findings on data from one distributor covering 2021 to 2022. They were limited to this data as retail scanner data could not provide bag sales information because this product is not scanned at checkout, and data from the Washington Department of Revenue on bag sales deductions did not come from enough retailers to provide insight into total bag sales. Additionally, plastic bag distributors declined to share data on bag sales. Taken together, Commerce and Ecology believe that the lack of robust available data limits the report's ability to present a comprehensive view of the change in total bag sales and distribution in Washington following the implementation of the single-use bag ban.

- The $0.08 pass-through fee is insufficient to recover the cost of bags. Retailers must pay bag distributors to obtain the bags. According to a 2024 survey conducted by the Northwest Grocery Retailers Association, paper bags have an average cost of $0.16/bag to retailers, and reusable plastic film bags have an average cost of $0.10 to $0.39/bag to retailers. With the pass-through charge of $0.08 per reusable plastic film bag, retailers are spending more acquiring their bags from distributors than they can make back.
  - **WSU Report limitation**: Some retailers and distributors dispute the cost of $0.39 for a reusable plastic bag reported by Northwest Grocery Retailers Association, suggesting reusable plastic bag costs to be closer to $0.10/bag.

- Consumer reuse of heavier plastic bags is likely insufficient to cover their higher external costs. Without sufficient reuse, reusable plastic, paper, and fabric carryout bags have higher environmental lifecycle costs than single-use bags. The WSU report found that studies indicate that consumers typically do not reuse their bags enough to compensate for the higher external costs of production and distribution (WSU Report, page 15).
  - **WSU Report limitation**: There has not been an assessment within Washington that examines the reuse rate of carryout bags by consumers in relation to the single-use plastic bag ban. Though the WSU Report was able to identify a decrease in the number of plastic bags distributed between 2021 and 2022, it was not able to assess bag reuse rates. Some data on the increase in reusable fabric bag purchases from 2019 to 2023 was noted, but the mechanism causing the increase in reusable fabric bag use was not well identified.

Report recommendations and agency perspectives

The Department of Commerce and the Department of Ecology (Commerce and Ecology) find that several of the recommendations outlined in the WSU Report are based upon insufficient data from within Washington state. Moreover, the WSU Report makes several recommendations that fail to consider larger social, economic, and environmental implications.

Below are the recommendations outlined in the WSU Report. Alongside the report recommendations, Commerce and Ecology have provided additional information describing the agencies' perspective on each recommendation.

Bag thickness recommendations

- The WSU report recommends removing the 4-mil plastic bag thickness requirement scheduled to go into effect in 2026 and retaining the current 2.25 mil thickness requirement.

  Increasing the required thickness to 4 mil bags would increase transportation emissions and environmental damage from plastic production. Chapter 312, Laws of 2025, delayed the increase in reusable film plastic bag thickness required by RCW 70A.530.020. The required thickness increase from 2.25 mils to 4 mils, which was previously set to go into effect on January 1, 2026, has been delayed until January 1, 2028.

  Commerce and Ecology supported the recently passed delay in moving to 4 mil bags. Moreover, we agree with WSU's recommendation to remove the increase to 4 mil bags altogether, as such a policy would increase plastic in our environment. Both agencies see merit in maintaining the 2.25 mil thickness requirement into the future as a viable policy option.

- The WSU report recommends removing the thickness requirement on carryout bags and allowing retailers to provide single-use, 0.5 mil plastic bags for a pass-through fee.

  This recommendation is made because the amount of plastic, by weight, has increased since the single-use plastic bag ban went into effect.

  Commerce and Ecology recommend against the return of single-use, 0.5 mil plastic bags. Single-use plastic bags pose a threat to the environment, both through the harms produced during production and the likelihood of becoming litter. Single-use plastic bags also accumulate on recyclers' screening equipment and impair a facility's ability to sort material. Additionally, returning to single-use plastic bags goes against the intent of RCW 70A.530.005, which prioritizes waste reduction and litter prevention.

- The WSU Report does not recommend prohibiting plastic carryout bags. The WSU Report recommends reducing the harms caused by carryout plastic bags through the use of a pass-through charge that changes customer behavior, rather than a carryout bag ban.

  Commerce and Ecology disagree with WSU's recommendation and remain open to a statewide ban on all plastic carryout bags, as this would be an effective policy to reduce plastic in the environment. Given the limitations of the WSU study and potential environmental benefits, we believe that a full plastic ban prohibition should remain a viable policy option. However, this policy raises potential equity and environmental justice impacts that should be further understood and mitigated in policy development.

Pass-through charge recommendations

- The WSU Report recommends increasing the pass-through charge on reusable, carryout plastic bags.

  The WSU Report recommends changing the pass-through charge to reflect the environmental costs of bag production. They recommend charging $0.08 for 0.5 mil bags, $0.28 for 2.25 mil bags, and $0.51 for 4 mil bags.

  Commerce and Ecology remain open to changing the pass-through charge for carryout plastic bags. However, further evaluation is needed to assess a pass-through charge that prioritizes price sensitivity, customer behavior change, and equity impacts rather than considering only environmental costs. However, regardless of the amount of the pass-through charge, Commerce and Ecology recommend that the pass-through fee exemption for food benefit customers be clarified to ensure that these customers are consistently not charged for bags. Additional clarity would reduce confusion on this provision with the goal of increasing compliance with this requirement.

Areas for additional information

The WSU report provided several important insights that may help refine Washington's single-use plastic bag ban policy to better align with the law's intent. However, the report was unable to gather sufficient data from bag distributors and retailers within Washington to assess the true impact of the law since its effective date in October 2021. Moreover, it makes several recommendations that fail to consider larger social, economic, and environmental implications.

More information would help to understand the impact of this law and to inform the legislature's evaluation of policy solutions moving forward. We encourage further assessment and the sharing of data from distributors and retail stores. The following information would help to more comprehensively evaluate the current law:

- The total quantities of plastic film and paper carryout bags distributed in Washington State before and after the bag ban effective date, ideally over the course of multiple years.

- The cost of plastic film and paper carryout bags to retail stores, including a comparison of large chain stores and independent, small retailers and grocers.
- The impact of plastic bag thickness on consumer behavior and perception of bag value and reusability.
- Washington customer behavior regarding disposal and reuse of plastic film bags, paper bags, and durable fabric bags.
- Customer price sensitivity to various bag fees.

Given that WSU had difficulty in obtaining data, collecting the information above may prove difficult – and it rests upon distributors and retail stores being willing to collect and share this information. Commerce and Ecology believe that the lack of additional data should not preclude legislative actions to advance policy on plastic bags.

Recycling reform act

The Recycling Reform Act (Chapter 70A.208 RCW) passed the Legislature in 2025. This new law creates an extended producer responsibility program for residential packaging and paper products. The law requires producers of these products to join and fund a nonprofit Producer Responsibility Organization (PRO).

Under this law, producers of residential packaging and paper products will be responsible for the end-of-life management of their products, which includes single-use paper or plastic bags. Under the extended producer responsibility program, producers of bags are required to register with the PRO, report on the bags they introduce into Washington, and pay fees to fund their portion of the program. The PRO is required, by 2030, to establish a program to fund the collection, management, and recycling of residential packaging and paper products.

The requirements of the Recycling Reform Act align with recommendations in this report. Bag producers must provide information to the PRO on the packaging and paper products introduced into Washington. However, while the PRO must report on the amount of covered materials introduced, it is not yet clear whether it will provide data specific to single material categories like plastic film bags that would satisfy the data needs outlined above. Although the Recycling Reform Act program will improve residential recovery and recycling opportunities for plastic and paper bags, the policy is unlikely to impact overall quantities of distribution or environmental manufacturing standards of plastic or paper carryout bags, which must contain 40 percent recycled content under current law.

Conclusion

Reducing plastic bag waste remains a priority of the law, and there are multiple policy approaches, driven by different environmental and societal goals, that carry significant, impactful tradeoffs and unintended consequences. In an evolving policy landscape, many states have enacted or revised bag ban policies in recent years. A policy approach that incentivizes bringing your own reusable bag through educational campaigns is critical to encourage sustainable actions by consumers and retailers. However, strategically applying policy tools of bag bans, bag fees, recycled content minimums, thickness standards, and other mandates may be most impactful to achieve environmental goals.

Without sufficient reuse, reusable carryout bags made of paper, plastic, or fabric have higher environmental lifecycle costs than their single-use counterparts. Increasing the reuse of carryout bags, regardless of bag type, and decreasing litter are critical to reducing environmental and societal costs. Furthermore, maintaining recycled content requirements for bags remains an important component of reducing reliance on virgin plastics.

Evaluating Washington State's Retail Carryout Bag Policy

Report required by RCW 70A.530.060 [2020 c 138 s 7.]

September 2025

Report to the Legislature

Director Joe Nguyễn

OFFICE OF ECONOMIC DEVLEOPMENT AND COMPETITIVENESS

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Introduction

Background

Washington implemented a single-use plastic bag ban in October 2021 that prohibits the sale and distribution of single-use plastic carryout bags at retail and grocery stores. The law intends to reduce plastic pollution in the environment, plastic bag contamination in Washington's recycling system, and promote consumers to reuse carryout bags (Revised Code of Washington (RCW) 70A.530.005). Washington followed similar efforts of other states and some cities across the U.S., including California, Connecticut, Delaware, Hawaii, Maine, New York, Oregon, and Vermont.

To reduce waste, litter, and marine pollution, conserve resources, and protect fish and wildlife, it is the intent of the legislature to (RCW 70A.530.005):

i. Prohibit use of single-use plastic carryout bags

ii. Require a pass-through charge on compliant paper carryout bags and reusable carryout bags made of film plastic (thicker and more durable), to encourage shoppers to bring their own reusable carryout bags

iii. Require that bags provided by retail establishment contain recycled content or derive from non-wood renewable fiber

iv. Encourage the provision of reusable and compliant paper carryout bags by retail establishments

The law requires a report to the Legislature be submitted by December 1, 2024. This report fulfills the requirements of that section of the law:

> "RCW 70A.530.060 (1) By December 1, 2024, the department of commerce, in consultation with the department, must submit a report to the appropriate committees of the legislature in order to allow an opportunity for the legislature to amend the mil thickness requirements for reusable carryout bags made of film plastic, the amount of the pass-through charges for bags, or to make other needed revisions to this chapter during the 2025 legislative session. The report required under this section must include:
>
> (a) An assessment of the effectiveness of the pass-through charge for reducing the total volume of bags purchased and encouraging the use of reusable carryout bags;
>
> (b) An assessment of the sufficiency of the amount of the pass-through charge allowed under chapter 70A.530 RCW relative to the cost of the authorized bags to retail establishments and an assessment of the pricing and availability of various types of carryout bags. For purposes of conducting this assessment, the department and the department of commerce may request, but not require, retail establishments and bag distributors to furnish information regarding the cost of various types of paper and plastic carryout bags provided to retail establishments; and
>
> (c) Recommendations for revisions to chapter 70A.530 RCW, if needed."

Washington's statewide single-use plastic bag ban went into effect on October 1, 2021. The ban prohibits restaurants, retail stores, grocery stores, and small vendors from distributing single-use plastic carryout bags. Consumers who choose to use a compliant plastic or paper bag offered by retailers are charged $0.08 (or more) per bag. This charge, mandated by law, is intended to incentivize customers to bring their own reusable bags.

Recommendations

We recommend removal of the plastic bag thickness requirement, allowing retailers to distribute single-use plastic bags. This recommendation avoids the environmental costs of thicker bags incurred without sufficient reuse.

We recommend maintenance of the current $0.08 pass-through charge, and removal of the scheduled increase to a $0.12 pass-through charge. This aligns the pass-through charge with the external costs of single-use plastic bags to the environment and human health.

Together these recommendations avoid the environmental costs of thicker bags, while continuing to discourage bag use through the pass-through charge.

Review and Evaluation

Providing the required information

To evaluate the impacts of the single-use plastic bag ban in Washington, information was solicited from carryout bag producers and distributors, retailers, and recycling and waste managers and others. Data collection included consultation, surveys, industry provided data, and retail scanner data. In some cases, data providers requested to remain anonymous.

The Washington State Department of Ecology conducted a survey of recycling coordinators and specialists in Washington in 2024. The survey included 65 responses, with representation from cities and counties across the state. The survey asked respondents about their recycling programs with a focus on recycling of plastic and paper carryout bags, and the impact of the single-use plastic bag ban in their community.

The Northwest Grocery Retail Association (NWGRA), representing 208 stores in Oregon and 275 stores in Washington, conducted a survey of members. The survey includes responses from retailers who have a presence in most counties across both states. The survey asked retailers about their purchase volumes and costs of plastic, paper and fabric bags. The data was collected in May 2024, and is aggregated across stores in both states.

Retail scanner data was collected from Nielsen IQ, who provides weekly pricing, volume and store environment information generated by point-of-sale systems from more than 90 participating retail chains across all US markets. This effort was intended to identify reusable plastic bag use at point of sale. Unfortunately, reusable plastic bags were not identified within the data. The retail scanner data does include some information on purchases of reusable fabric bags.

Data on bag sales deductions was solicited from the Washington Department of Revenue, as retailers can deduct bag sales from their business and occupation taxes. This data was provided, but too few retailers deduct bag sales from their business and occupation taxes for this data to be informative about total bag sales.

Additional findings and recommendations are derived from other studies.

Literature Review

Efforts to combat pollution by reducing the distribution of single-use plastic bags are not new. San Francisco, CA, banned single-use plastic bags in 2007. In 2010, Washington, DC, implemented legislation requiring grocery stores to charge customers for using disposable bags. Two years later, the neighboring County of Montgomery, Maryland, also passed a law requiring a $0.05 charge per disposable bag (Homonoff, 2018). In 2012, Seattle, WA, and Portland, OR, banned single-use plastic bags for carryout from large retailers. In August 2014, California became the first state to ban single-use plastic carryout grocery bags at large retail stores (Huang and Woodward, 2022). California has since implemented a ban on all carryout plastic bags. From 2007-2019, over 200 counties and municipalities implemented various policies, including charges, recycling laws, campaigns, or bag bans (Nielsen, Holmberg, and Stripple, 2019).

Prior to Washington’s statewide single-use plastic bag ban, over 37 municipalities throughout the state had implemented their own policies restricting the use of single-use plastic bags (Zero Waste Washington).

Understanding the impacts of single-use plastic bag legislation on bag use is critical, but often unreported. Using a review of public policies presented by Nielsen, Holmberg, and Stripple (2019) and other previous studies, Table 1 summarizes the estimated impacts of specific policies on carryout plastic bags within the U.S. Table 2 reports the impacts of specific carryout plastic bag policies outside of the United States. These tables are not comprehensive and are limited in scope to policy implementations that have reported impacts on bag use.

Table 1: Summary of Plastic Bag Regulations in the U.S. (Nielsen, Holmberg, and Stripple, 2019).

Year	Location	Policy	Effects
2010	Washington D.C.	Charge	80% reduction after six months (Romer and Foley, 2011)
2013	Santa Barbara, CA	Ban on plastic bags + charge on paper bags	89.3% reduction on all type of bags (Wagner, 2017)
2014	El Cerrito, Richmond, and San Pablo, CA	Ban + charge on recycled paper or reusable bag	Demand for disposable bag decreased, but paper bag consumption increased significantly (Taylor and Villas-Boas, 2016)
2017	Chicago, IL	Charge (replaced the previous ban)	42% reduction after two months

Table 2: Summary of Plastic Bag Regulations outside of the U.S. (Nielsen, Holmberg, and Stripple, 2019).

Year	Location	Policy	Effect (% reduction in consumption)
1994	Denmark	Charge	66% (Ritch et al., 2009; Dikgang et al., 2012)
2002	Bangladesh	Ban	No noticeable effect (lack of implementation) (Larsen and Venkova, 2014)
2002	Ireland	Charge	More than 90% (Convery et al., 2007)
2002	Taiwan	Phase out, ban + charge	58% (Lee, 2019)
2003	South Africa	Partial ban + charge	Initially 80%, after increased sales 44%, with further sales increases expected (Hasson et al., 2007; Dikgang et al., 2012)
2003; 2007	Belgium	Charge + voluntary fee	86% between 2003 and 2011 (Larsen and Venkova, 2014) 60-80% (Martinho et al., 2017)
2007	Botswana	Partial ban + charge	50% (Dikgang and Visser, 2012)
2008	China	Partial ban + charge	49% (He, 2012)
2009	Hong Kong	Charge	75% (Larsen and Venkova, 2014)
2011; 2013; 2014	Wales; Northern Ireland; Scotland	Charge	71-80% (Poortinga et al., 2016)
2015	England	Charge	85% (Poortinga et al., 2016)
2015	Portugal	Charge	74% (Martinho et al., 2017)

Multiple studies have found that regulations banning and taxing plastic bags have led to increases in use of reusable bags and reductions in use of plastic bags. Taylor and Villas-Boas (2016) found that about 47% of customers brought reusable bags and about 30% reused disposable bags in stores that implemented a plastic ban coupled with a fee for paper bags in several cities in California. Following the imposition of a $0.05 fee on all single-use bags in Montgomery County, MD, 40% of customers used at least one disposable bag, compared to 82% of customers before the tax (Homonoff, 2018). Outside of the United States, the plastic bag charge in England substantially increased the number of people using their own bags, independent of age, gender, or income (Poortinga et al., 2016). In Taiwan, there was a reported 58% drop in disposable plastic bag use, from 3.435 billion plastic bags to 1.43 billion annually (Lee, 2019).

Single-use plastic bag bans and related policies often have unintended consequences, especially when they are narrow in scope. Banning a specific type of plastic bag may decrease its consumption, but it may be ineffective at reducing the plastic bag use if close substitutes are left unregulated. In 2015, Chicago passed an ordinance banning all single-use plastic bags less than 2.25 mils thick while leaving other types of disposable bags unregulated. This policy was repealed in 2017 and replaced with a 7-cent tax on all disposable bags one month later. Homonoff et al. (2022) studied the policy and found that disposable bag use in Chicago remained high during the plastic bag ban, with 82% of customers using unregulated disposable bags, such as a paper bag or a thicker plastic bag. Additionally, the researchers observed no change in the proportion of customers using a disposable bag after the repeal of the ban. However, the implementation of the tax in subsequent months led to a large decrease in disposable bag use. The proportion of customers using a disposable bag decreased by 33% during the tax period compared to the ban period. This effect persisted throughout the first year of the tax policy, although there was a rebound effect equivalent to roughly one quarter of the initial effect of the tax by the end of the sample period.

Using retail scanner data, Huang and Woodward (2022) found that consumers purchase more trash bags following a ban or a tax on plastic bags as they seek alternative products for storing and disposing of trash. Both types of regulations - banning and charging for plastic bags - were associated with higher plastic trash bag sales. Trash bag purchases increased by an average of 127 pounds per store per month (Huang and Woodward, 2022). Additionally, Taylor (2019) found that California's single-use plastic bag ban caused a 40-million-pound reduction of plastic bag purchases, but these savings were offset by a 12-million-pound increase in trash bag purchases.

Homonoff (2018) investigated the impact of two similar policies aimed at reducing disposable bag use: a $0.05 tax on disposable bags and a $0.05 credit for reusable bag use. While the tax decreased disposable bag use by over 40 percentage points, the credit had no effect on behavior. These results are consistent with the literature, which suggests that consumers are more responsive to losses than gains.

We are not aware of any studies that have evaluated the impacts of the single-use plastic bag ban in Washington.

Data and Findings

To evaluate the impacts of the single-use plastic bag ban in Washington, information was solicited from carryout bag producers and distributors, retailers, and recycling and waste managers. Data collection included consultation, surveys, industry provided data, and retail scanner data. In some cases, data providers requested to remain anonymous.

The Washington State Department of Ecology conducted a survey of recycling coordinators and specialists in Washington. The survey included 65 responses, with representation from cities and counties across the state. Respondents were asked about their recycling programs, with a focus on recycling of plastic and paper carryout bags and the impact of the single-use plastic bag ban in their community.

The Northwest Grocery Retail Association (NWGRA), representing 208 stores in Oregon and 275 stores in Washington, conducted a survey of members. The survey includes responses from retailers who have a presence in most counties across both states. The survey asked retailers about their purchase volumes and costs of plastic, paper, and fabric bags.[1] The data was collected in May 2024 and is aggregated across stores in both states.

Retail scanner data was collected from Nielsen IQ, which provides weekly pricing, volume, and store environment information generated by point-of-sale systems from more than 90 participating retail chains across all US markets. This effort intended to identify reusable plastic bag use at the point of sale. Unfortunately, reusable plastic bags were not identified within the data. The retail scanner data does include some information on purchases of reusable fabric bags.

Data on bag sales deductions was solicited from the Washington Department of Revenue, as retailers can deduct bag sales from their business and occupation taxes. This data was provided, but too few retailers deduct bag sales from their business and occupation taxes for this data to be informative about total bag sales.

Effectiveness of the Single Use Plastic Bag Ban and pass-through charge

Based on data from plastic bag producers and distributors, the Washington single-use plastic bag ban and pass-through charge has reduced the number of plastic and paper bags distributed to consumers on an annual basis. The data is sparse, so the magnitude of the reduction is not well identified, but our best estimate is that the number of plastic bags distributed to customers fell approximately 50% from 2021 to 2022. The number of paper bags distributed is estimated to have fallen approximately 21% from 2021 to 2022. These estimates are derived from sales volumes aggregated across the largest carryout bag producers and distributors within the state. Plastic Bag Ban and pass-through charge[2]

Purchase of reusable fabric bags has increased since the single-use plastic bag ban. In 2023, the Northwest Grocery Retail Association reports their retail members purchased on average 18,571 reusable fabric bags for distribution. Purchases of reusable fabric bags peaked in 2021 at 31,344 bags per month/per store, up from 368 bags purchased per month/per store in 2019.

The mechanism causing the reduction in plastic and paper bag use and increase in reusable fabric bag use is not well identified. The plastic bag ban and pass-through charge had many components which together, along with outside factors, contributed to shifts in consumer and retailer behaviors.

The pass-through charge of $0.08/bag made using plastic bags, which were formerly free, more costly. This incentivizes consumers to use reusable fabric bags, which pay for themselves after approximately 12 uses (approximately $0.99/bag (Nielsen IQ Retail Scanner Data)).

The thicker plastic bags cost more to retailers, which may disincentive their use. Some stores may choose not to provide bags at all, perhaps to minimize their losses from providing bags. Other stores may pack more items per bag. The thicker plastic bags hold more items, allowing for fewer bags per trip (Kimmel et al., 2018).

The single-use plastic bag ban and pass-through charge serve as a signal to inform consumers about the environmental costs of plastic bag use. This signal, irrespective of the nominal pass-through charge, likely changed some consumers' behavior. This is evidenced by uptake of fabric in bordering states without or prior to a plastic bag ban (Figure A.1, Nielsen IQ Retail Scanner Data).

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[1] Fabric refers to all non-film, non-blown, non-paper bags, including woven or knitted reusable bags derived from plastic (e.g., polyester, polypropylene, composites).

[2] To protect proprietary information, some data providers have asked not to be named. Specific data providers are not listed, as it would compromised the confidentiality of data providers who have asked not to be named

Sufficiency of the amount of the pass-through charge

Bag costs, cost recovery and implementation of pass-through charge

The 2024 survey conducted by the Northwest Grocery Retailers Association (NWGRA) reported bag purchase costs and recoupment of pass-through charges. Based on this survey information, their retail members reported paying on average $37,678/year/store to provide plastic bags to consumers, and recoup on average $9,019/year/store through pass-through charges on plastic bags. For paper bags, retailers reported paying on average $35,962/year/store to provide paper bags to consumers, and recoup on average $13,832/year/store through pass-through charges on plastic bags.

This survey reported the average cost of a reusable plastic bag purchased by retailers to be $0.39. Some retailers and distributors dispute the cost of a reusable plastic bag reported by NWGRA, suggesting reusable plastic bag costs to be closer to $0.10/bag. The average cost of a paper bag purchased by retailers was reported by NWGRA to be $0.16/bag. On average, retailers report a $0.09 pass-through charge.

Retail establishments may not collect a pass-through charge from anyone using a voucher or electronic benefits transfer (EBT) card issued under the Women, Infants, and Children (WIC) Nutritional Program or Temporary Assistance for Needy Families (TANF) support programs, or the federal Supplemental Nutrition Assistance Program (SNAP, also known as Basic Food), or the Washington state Food Assistance Program (FAP) (FAP) (RCW 70A.530.030).[3] NWGRA reports that some large chain retailers estimate spending $4,076/year/store in Washington to provide free bags to eligible customers.

Since the effective date of the law, the Department of Ecology has received 112 reports of noncompliance where businesses charged food benefits customers the bag fee (Washington State Department of Ecology, 2024). The reports indicate some confusion and inconsistency across stores in waiving the fee for customers using food benefits.

An optimal pass-through charge

An optimal pass-through charge aligns bag costs faced by consumers with the social costs of bag use incurred through external damages to the environment and human health (Abate and Elofsson 2024). The pass-through charge per bag should approximate the monetary value of external damages per bag to discourage bag use to the socially optimal level. A pass-through charge that is too high discourages bag use beyond the socially optimal level, causing reductions in welfare caused through elevated bag costs (bag costs in excess of external environmental and health damages). A pass-through charge that is too low does not sufficiently discourage bag use, resulting in excess environmental and health damages.

[3] Businesses that charge a bag fee greater than the pass-through charge may charge the difference to customers using food benefits. (e.g. If the bag costs $0.20, a store may charge an EBT customer $0.12 for a carryout bag, after subtracting the $0.08 pass-through charge). A customer must “use” their card for purchases to be exempt from the fee, rather than simply showing their card to be exempt. Only the bags used to contain food-benefits eligible items are exempt from the pass-through charge (e.g., a customer purchasing pet food may be required to pay the pass-through charge for bags containing this product).

The monetary value of external damages from carbon emissions and marine pollution of a single-use plastic bag (7.6 grams)[4,5], is estimated to be $0.09/bag (Abate and Elofsson 2024) (2024 USD)[6]. The monetary value of external damages of a reusable plastic bag (24 grams) is not reported but can be extrapolated to be approximately $0.28/bag.[7] The monetary value of external damages from carbon emissions and marine pollution of a paper bag (45 grams) is estimated to be $0.06/bag (Abate and Elofsson 2024). These external costs per bag do not include other external damages including ozone depletion, human toxicity, particulate pollution, terrestrial acidification, terrestrial eutrophication, or resource depletion, and as such should be considered lower bounds for the socially optimal pass-through charge.

Based on estimated external damages, the optimal pass-through charge for single-use plastic bags is estimated to be $0.09/bag, and $0.28/bag for reusable 2.25 mil thick plastic bags.

The existing pass-through charge of $0.08/bag (and scheduled increase to $0.12/bag) is much lower than the estimated optimal pass-through charge of $0.28 for reusable plastic bags. Under the existing pass-through charge, consumers do not face the full external costs of reusable plastic bag use, and therefore overuse bags resulting in excess environmental and health damages.

Environmental impact

Environmental impact of the single-use plastic bag ban is evaluated for:

- Reduction in plastic use by bag count and by weight of plastic
- Impact on transportation costs and emissions
- Reduction in plastic bag litter
- Recycling programs
- Impact to recycling sorting equipment
- Lifecycle cost analysis

For the single-use plastic bag ban to be effective in reducing plastic use by weight, the number of plastic bags distributed to customers on an annual basis would have to fall by 78% relative to plastic bag use pre-ban (as noted above, the number of plastic bags distributed annually fell by 50%). This is because the reduction in the number of plastic bags distributed to customers is offset by the increased thickness of 2.25 mil reusable plastic bags (formerly 0.5 mil; new bags are 4.5 times thicker and contain 4.45 times more plastic by weight). While the number of plastic bags distributed has fallen, total plastic use by weight has increased by an estimated 17% from 2021 to 2022. The net effect may still be a reduction in virgin plastic use, as plastic bags allowed under the law must

[4] Emissions damages reported in Abate and Elofsson 2024 (Table 3) are calculated based on Binsella et al. 2018 emissions calculations of a 24 gram reusable plastic bag, estimating 0.11 kg/bag of CO_2 emissions (Binsella et al. 2018, Table 10), with estimated total damage costs of $0.13/bag. This appears to be an error. If calculated based on the 7.6 gram single-use bag reported by Civancik-Uslu et al. 2019, the estimated CO_2 emissions are 0.02 kg/bag, and the estimated total damage costs are $.087/bag.

[5] Reported bag weights vary widely, in part because bag volumes vary. Bag weights are critical to calculating total plastic use, important in calculating litter costs, environmental damages, etc. We did not have the resources to replicate many of these external costs calculations (e.g., lifecycle cost analysis) for a particular bag specification. Instead, we identified and reported impacts based on bags that most closely represent a typical single-use bag (5-10 grams) and typical reusable plastic bag (20-30 grams).

[6] Reported values in Abate and Elofsson 2024 are assumed to be 2023 USD. These are converted to 2024 USD, assuming 4% inflation.

[7] Emissions damages reported in Abate and Elofsson 2024 (Table 3) are calculated based on Binsella et al. 2018 emissions calculations of a 24 gram reusable plastic bag, estimating 0.11 kg/bag of CO_2 emissions (Binsella et al. 2018, Table 10), and thus do not need to be updated. Damage costs to marine pollution can be updated to reflect the 24 gram reusable plastic bag assuming marine damages of $108,192/ton. Damage costs to marine pollution of a 24 gram reusable plastic bag are estimated to be $0.26/bag.

contain recycled content (20% until July 1, 2022 and 40% thereafter).[8] Plastic bags provided prior to the single-use plastic bag ban did not have recycled content requirements.

Transporting 2.25 mil reusable plastic bags is also less efficient, with fewer bags fitting on each pallet (2,400 reusable bags/pallet vs 72,000 single-use bags/pallet), yielding fewer bags per truckload. For the single-use plastic bag ban to be effective in reducing plastic bag transportation costs (and emissions), plastic bag use has to fall by 66% relative to plastic bag pre-ban.

In Washington, the single-use plastic bag ban has reduced plastic bag use by an estimated 50% and thereby has likely reduced the number of plastic bags littered in the environment.[9] However, the plastic bags that end up being littered are thicker, yielding more plastic by volume in the environment.

The impact of the single-use plastic bag ban on the number of bags in the waste stream is unclear. Clark County reports no meaningful change in the amount of film plastic bags in their waste stream (West Vancouver MRF Residuals Characterization Study 2023). King County reports 3,533 tons of recyclable plastic bags in their waste stream in 2019 (2019 Waste Characterization and Customer Survey, Table 43), and 1,025 tons of Grocery and Merchandise Bags in their waste stream in 2022 (2022 Waste Characterization and Customer Survey, Table 45). King County reports a 223% increase in tonnage of plastic bags recycled at their transfer stations from 2019 to 2023 (19.51 tons in 2019; 63 tons in 2023) (Washington State Department of Ecology, Single-Use Plastic Bag Ban Survey, 2024)

Recycling opportunities for plastic bags remain a challenge. The Washington State Department of Ecology conducted a survey of recycling coordinators and specialists in Washington. While 71% of respondents report offering curbside recycling for paper bags, only 3% offer curbside recycling opportunities for plastic carryout bags. To supplement the lack of curbside recycling, 57% of respondents indicate the availability of grocery or retail drop-off collection boxes for recycling plastic carryout bags.

Single-use (0.5 mil film) plastic bags accumulate on recyclers' screening equipment, yielding the screening equipment ineffective (Recology). Plastic bags of 2.25 mil thickness do not wrap around and jam recycling facility equipment, and thereby do not impact the recycler's ability to sort material. 2.25 mil plastic bags make recycling operations more effective and less costly.

Lifecycle costs analyses (Appendix A.2) indicate that reusable bags must be reused many times to have lower lifecycle costs (emissions, pollution, toxicity, resource utilization) than their single-use or reusable plastic alternatives. Early work by Edelman Berlander (2014), and more recently by CALPIRG (2024), indicate that consumers typically don't reuse their bags enough to compensate for the higher external costs of production and distribution.

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[8] The net impact of virgin plastic use depends on recycled content of single-use plastic bags prior to the bag ban, and the recycled content of reusable plastic bags post bag ban. If single-use plastic bags prior to the bag ban used 0% recycled content, and reusable plastic bags post ban use 20% recycle content then we estimate a 7% reduction in virgin plastic use since the ban (assuming a 50% reduction in total bags distributed).

[9] The reduction in the number of bags littered in the environment is likely to be less than the total reduction in bag use. Single-use plastic bag bans in California reduced the number of plastic bags provided to consumers by 85%, and the number of paper bags provided to consumers by 61%. However, the prevalence of plastic and paper bags in marine litter cleanups fell by only 50-60% (CalRecycle 2019).

Recommendations

Recommendations are based on findings reported, including findings from other studies.

Bag Thickness

The current single-use plastic bag ban legislation is scheduled to increase the thickness requirement for the reusable plastic bags from 2.25 mil to 4 mil thickness in 2026. We recommend removing the increased thickness requirement, leaving the current 2.25 mil thickness unchanged. The proposed increase in thickness of plastic bags to 4 mil is unlikely to increase reuse, and will likely increase plastic production, transportation costs, plastic pollution in the environment, and greenhouse gas emissions.

We recommend consideration of the removal of a thickness requirement on carryout bags. Reusable plastic bags of 2.25 mil thickness must be reused 7-12 times for them to have lower lifecycle costs than the banned thin single-use plastic bag (Appendix A.2, Kimmel 2014). Consumers typically don't reuse their reusable plastic bags enough to compensate for the higher external costs of production and distribution of reusable plastic bags (Edelman and Berlander 2014; CALPIRG 2024).

Limitations and additional considerations

Removal of the bag thickness requirement yields challenges for recycling facilities as single-use plastic bags accumulate on recyclers' screening equipment, yielding the screening equipment ineffective (Recology).

Removal of a plastic bag thickness requirement may marginally increase bag use, due to the reduction of reuse of 2.25 mil reusable plastic bags if they are no longer provided by retailers.

Additional information on litter rates would also be useful, however the relative differences in litter impacts across carryout bag alternatives appears small (Corella-Puertas et al. 2023). Current and local data on reuse rates would better inform lifecycle costs.

Pass-Through Charge

The current plastic bag ban law is scheduled to increase the pass-through charge from $0.08 per bag to $0.12 per bag in 2026.

If the bag thickness requirement is removed (allowing single-use plastic bags), we recommend removing the scheduled increase to a $0.12/bag pass-through charge. The scheduled increase exceeds the estimated external damage costs of single-use plastic bags. Removing the scheduled increase in the pass-through charge aligns the pass-through charge with the estimated external damage costs of emissions and marine pollution of single-use plastic bags.

If the 2.25 mil thickness requirement is maintained and the scheduled increased thickness requirement to 4 mil is foregone, we recommend increasing the pass-through charge to $0.28/bag. This aligns the pass-through charge with the estimated external damage costs of emissions and marine pollution of 2.25 mil (24 gram) reusable plastic bags.

If the scheduled 4 mil thickness requirement is maintained, we recommend increasing the pass-through charge to $0.51/bag.[10] This aligns the pass-through charge with the estimated external damage costs of emissions and marine pollution of 4 mil (43 gram) reusable plastic bags.

Limitations and additional considerations

A higher pass-through charge will likely incentivize more customers to use reusable fabric bags (or reuse their plastic bags more often). Reusable fabric bags also generate external environmental and health damages that consumers do not face. As such, these bags will also be overused as they are underpriced relative to social costs. Encouraging reuse of these bags, to minimize total bags purchased, is critical.

A higher pass-through charge yields additional challenges for people using a voucher or electronic benefits card who are eligible for free bags, but may be charged for reusable plastic or paper bags. It is important that retailers comply with waiving the pass-through charge for eligible customers. Additional clarity on customer eligibility may be useful. Penalties for non-compliance may also be useful.

A higher pass-through charge would allow retailers to recover more of their costs of providing bags.

Additional data on the relative impacts of different pass-through charges would be useful but was unavailable.

Additional data on the external damages costs for other external damages including ozone depletion, human toxicity, particulate pollution, terrestrial acidification, terrestrial eutrophication, or resource depletion, would be useful and would allow for the pass-through charge to account for all external costs.

Overall

We recommend removal of the plastic bag thickness requirement, allowing retailers to distribute single-use plastic bags. This recommendation avoids the environmental costs of thicker bags incurred without sufficient reuse. This recommendation may marginally increase bag use from current levels, due to the elimination of reuse of 2.25 mil reusable plastic bags; marginal increases in bag use from current levels are offset by the reduction in bag thickness.

We recommend maintenance of the current $0.08 pass-through charge, and removal of the scheduled increase to a $0.12 pass-through charge. This aligns the pass-through charge with the external costs of single-use plastic bags to the environment and human health.

Together these recommendations avoid the environmental costs of thicker bags, while continuing to discourage bag use through the pass-through charge.

If the 2.25 mil thickness requirement is maintained, we recommend removal of the scheduled increase in thickness to 4 mil, and an increase in the pass-through charge to $0.28/bag. This aligns the pass-through charge with the social costs of 2.25 mil reusable plastic bags, further discouraging use.

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10 Calculated based on the 43.2 gram reusable bag reported by Civancik-Uslu et al. 2019, following the damage cost estimations of Abate and Elofsson 2024 the estimated CO_2 emissions are 0.19 kg/bag, and the estimated total damage costs are $0.51/bag. Emissions damage costs are $0.227/kg*0.19kg/bag = $0.043/bag. Marine pollution damage costs are $108,192/ton*0.000432 tons/bag*10% litter rate = $0.47/bag.

If the scheduled 4 mil thickness requirement is maintained, we recommend an increase in the pass-through charge to $0.51/bag. This aligns the pass-through charge with the social costs of 4 mil reusable plastic bags, further discouraging use.

We recommend removal of the preemption clause, particularly in the case that substantive changes to the law are being considered. While state law can be effective in unifying policy, preemption limits local municipalities' ability to best respond to their local environment and needs. We recommend state law being implemented as a minimum requirement, giving local municipalities the ability to implement more stringent regulation (stricter requirements, higher pass-through charge).

We do not recommend a ban on all carryout plastic bags. Current data on external costs of carryout plastic bags does not indicate they causes sufficient damages to warrant a ban. The optimal reduction in plastic bag use can be achieved through the pass-through charge. A ban on all carryout plastic bags is more costly to consumers (inconvenience and switching costs), than it is beneficial to the public through reductions in environmental and health (particularly when litter rates are low) (Abate and Elofsson 2024). A carryout plastic bag ban forces switching to alternative bags, which without sufficient reuse (beyond current customer behavior, Edelman Berland 2014) incur more costs to the environment and human health. We recommend additional efforts to better understand external costs of carryout plastic bags not accounted for herein (ozone depletion, human toxicity, particulate pollution, terrestrial acidification, terrestrial eutrophication, resource depletion).

Recycled content requirements are effective in reducing lifecycle costs of carryout bags (Binsella et al. 2018). We recommend maintaining recycled content requirements regardless of changes in bag thickness requirements.

Limitations and additional considerations

Removal of the preemption clause, allowing for variation in policy across municipalities, may cause confusion for retailers and consumers.

Pass-through charges should be benchmarked to inflation, or regularly updated to account for inflation. Otherwise they will become less effective as prices and wages rise.

A carryout plastic bag ban risks marginalizing people who may not have access to a car, who may have to carry their bags long distances in inclement weather, or who may complete a shopping trip on the way home and are unable to carry bags with them throughout the day.

A carryout plastic bag ban presents unique challenges for non-grocery retailers, whose customers may have not developed habits around bringing reusable carryout bags.

Reuse of carryout bags among Washington consumers may be higher today than reported in other locations at other points in time (Edelman Berland 2014; CALPIRG 2024). In that case, a plastic bag ban may be more justified as higher reuse rates reduce total lifecycle costs of fabric carryout bags.

For further discussion

The intent of the single-use plastic bag ban prioritizes the reduction of waste, litter, pollution, and conservation of resources, and protection of fish and wildlife. The intent of the law omits consideration of greenhouse gas emissions, other important external costs (ozone depletion, human toxicity, particulate pollution, terrestrial acidification, terrestrial eutrophication), and the costs of regulation to consumer welfare. The recommendations provided herein balance the benefits of reductions in bag use achieved through regulation, against the costs to consumer welfare.

Legislation that requires thicker plastic bags for reuse may not be effective at reducing environmental impacts, as the bags are often not reused, and certainly not reused enough to offset their higher contribution to plastic waste and litter and increased lifecycle costs (Edelman Berland 2014; CALPIRG 2024).

Without sufficient reuse, reusable carryout bags (plastic, paper, or fabric[11]) have higher lifecycle costs (emissions, pollution, health toxicity, etc.), are more resource intensive, and are more detrimental to fish and wildlife (terrestrial acidification, ecotoxicity of freshwater, global warming, etc.), than their single-use counterparts (UN Environment Programme 2020).

Ultimately, increasing the reuse of carryout bags regardless of bag type, and decreasing litter are critical to reducing lifecycle costs and damages to the environment and human health. To that end, education and incentive programs may be effective in changing consumers behavior to increase reuse and decrease litter (e.g., businesses may be encouraged to eliminate carryout bags and offer reused produce boxes, or customers may be encouraged to "Bring Your Own Bag").

[11] Fabric refers to all non-film, non-blown, non-paper bags, including woven or knitted reusable bags derived from plastic (e.g., polyester, polypropylene, composites).

Appendix A: References

Bisinella, V., Albizzati, P. F., Astrup, T. F., & Damgaard, A. (Eds.) (2018). Life Cycle Assessment of grocery carrier bags. Danish Environmental Protection Agency. Miljoeprojekter No. 1985 https://www2.mst.dk/Udgiv/publications/2018/02/978-87-93614-73-4.pdf

CalRecycle, "SB 270 Report to the Legislature: Implementation Updated and Policy Considerations for Management of Reusable Grocery Bags in California" (2019)

Convery, Frank, Simon McDonnell, and Susana Ferreira. "The most popular tax in Europe? Lessons from the Irish plastic bags levy." Environmental and resource economics 38 (2007): 1-11.

Corella-Puertas, E., Hajjar, C., Lavoie, J. & Boulay, A.-M. (2023). MarILCA characterization factors for microplastic impacts in LCA: physical effects on biota from emissions to aquatic environments. Journal of Cleaner Production.

Dikgang, Johane, Anthony Leiman, and Martine Visser. "Analysis of the plastic-bag levy in South Africa." Resources, Conservation and Recycling 66 (2012): 59-65.

Dikgang, Johane, and Martine Visser. "Behavioural response to plastic bag legislation in Botswana." South African Journal of Economics 80.1 (2012): 123-133.

Hasson, Reviva, Anthony Leiman, and Martine Visser. "The economics of plastic bag legislation in South Africa 1." South African Journal of Economics 75.1 (2007): 66-83.

He, Haoran. "Effects of environmental policy on consumption: lessons from the Chinese plastic bag regulation." Environment and Development Economics 17.4 (2012): 407-431.

Homonoff, Tatiana, et al. "Skipping the bag: the intended and unintended consequences of disposable bag regulation." Journal of Policy Analysis and Management 41.1 (2022): 226-251.

Homonoff, Tatiana A. "Can small incentives have large effects? The impact of taxes versus bonuses on disposable bag use." American Economic Journal: Economic Policy 10.4 (2018): 177-210.

Huang, Yu-Kai, and Richard T. Woodward. "Spillover effects of grocery bag legislation: Evidence of bag bans and bag fees." Environmental and Resource Economics 81.4 (2022): 711-741.

Kimmel, Sc.D., Robert M., "Life Cycle Assessment of Grocery Bags in Common Use in the United States" (2014). Environmental Studies. 6

Larsen, Janet, and Savina Venkova. "The downfall of the plastic bag: A global picture." Earth Policy Institute 1 (2014).

Lee, Chung-Hsien. "Taiwanese Plastics Versus Sustainability-From the Perspective of Glocalization of Sustainable Development and Circular Economy." Law Env't & Dev. J. 15 (2019): 154.

Martinho, Graça, Natacha Balaia, and Ana Pires. "The Portuguese plastic carrier bag tax: The effects on consumers' behavior." Waste management 61 (2017): 3-12.

Poortinga, Wouter, et al. "The English plastic bag charge: Changes in attitudes and behaviour." (2016).

Ritch, Elaine, Carol Brennan, and Calum MacLeod. "Plastic bag politics: modifying consumer behaviour for sustainable development." International Journal of Consumer Studies 33.2 (2009): 168-174.

Romer, Jennie R., and Shanna Foley. "A wolf in sheep's clothing: The plastics industry's public interest role in legislation and litigation of plastic bag laws in California." Golden Gate U. Envtl. LJ 5 (2011): 377.

Taylor, Rebecca LC. "Bag leakage: The effect of disposable carryout bag regulations on unregulated bags." Journal of Environmental Economics and Management 93 (2019): 254-271.

Taylor, Rebecca L., and Sofia B. Villas-Boas. "Bans vs. fees: Disposable carryout bag policies and bag usage." Applied Economic Perspectives and Policy 38.2 (2016): 351-372.

United Nations Environment Programme. “Single-use plastic bags and their alternatives - Recommendations from Life Cycle Assessments.” (2020)

Wagner, Travis P. "Reducing single-use plastic shopping bags in the USA." Waste Management 70 (2017): 3-12.

Appendix B: Tables

B.1 - Figures

Figure 1: A1

B.2 – Lifecycle Cost Analysis

Lifecycle costs analyses are used to compare impacts of consumer products. Lifecycle cost analysis measure the external costs of production, distribution, use, and disposal of products. The lifecycle cost of a retail carryout bag depends on the external costs of production, use, and disposal for each bag type, including impacts to climate, pollution, toxicity, and resource utilization (see UN Environment Programme, 2020 for review).

The lifecycle costs of reusable bags when used only once are higher than single-use plastic bags, mostly due to the more durable and resource-intensive manufacturing specifications required of bags designed for reuse. As reusable bags are reused, the lifecycle costs of reusable bags approach the lifecycle costs of single-use plastic bags. Table 1, from Kimmel (2014), shows the number of times a bag must be reused to have equivalent lifecycle costs of a single-use plastic bag (6.2 g). The lifecycle cost analysis considers outcomes with and without a secondary use (typically as a trash bag), which contributes to the range presented in Table 1.

Table 1

Bag Type	# of times of reuse to have the same lifecycle costs of single-use plastic bags
Single-Use Plastic (6.2 g)	-
2.25 mil (35.6 g) Reusable Plastic	7-12
Paper (40% recycled, unbleached)	8-10
Paper (100% recycled, unbleached)	4-6
Non-Woven Polypropylene	32-50

Source: Kimmel (2014) (reference bag: 6.2g, HDPE, 30% recycled) (Tables X.3, X.5; PRB bags/trip*trip equivalency/LDPE bags/trip)

A 2.25 mil reusable plastic bag must be reused 7-12 times to have a lower lifecycle cost.

Table 2, from Bisnella et al. (2018), shows the number of times a bag must be reused to have equivalent lifecycle costs of a 4 mil (24.2 g) reusable plastic bag. The 4 mil (24.2 g) reusable plastic bag specified in Bisnella et al. (2018) is approximately the same by weight of a typical 2.25 mil plastic bag distributed in Washington. This lifecycle cost analysis considers three end uses: incineration, recycling, and reuse prior to incineration. These end uses contribute to the range presented in Table 2, with different end uses having different lifecycle costs.

Table 2

Bag Type	# of times of reuse to have the same lifecycle costs of reusable plastic bag
4 mil (24.2 g) Reusable Plastic	-
Paper (unbleached)	42-77
Non-Woven Polypropylene	37-52
Woven Polypropylene	32-45
Polyethylene Terephthalate (PET)	84-96
Polyester	28-35
Cotton	7,100
Composite	870

Source: Bisnella et al. (2018) (reference bag: 22.4 L, 24.2 g, 4 mil, LDPE, virgin plastic) (Table 24)

A reusable woven polypropylene bag must be reused at least 32 times to have a lower lifecycle cost than a thick reusable plastic bag.

Together, these lifecycle cost analyses indicate that reusable bags must be reused many times to have lower lifecycle costs (emissions, pollution, toxicity, resource utilization) than their single-use or reusable plastic alternatives. Early work by Edelman Berlander (2014), and more recently by CALPIRG (2024), indicate that consumers typically don't reuse their bags enough to compensate for the higher external costs of production and distribution.

Importantly, these lifecycle cost analyses do not consider littering as an end use cost, which is often a primary motivation for the implementation of single-use plastic bag bans (and related policies).