

BUILDING BETTER BAG BEHAVIORS

**Reducing the Charlottesville
Area's Reliance on Plastic Bags**

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Applied Policy Project

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**Piedmont
Environmental
Council**

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With much gratitude -

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Client Overview -

The Piedmont Environmental Council (PEC) is a non-profit organization headquartered in Warrenton, Virginia. For nearly 50 years, PEC has worked to protect natural resources and conserve land in the Piedmont region of Virginia. They collaborate with citizens in Albemarle, Clarke, Culpeper, Fauquier, Greene, Loudoun, Madison, Orange, and Rappahannock counties to “create thriving communities, strengthen rural economies, celebrate historic resources, protect air and water quality, build smart transportation networks, promote sustainable energy choices, restore wildlife habitat, and improve people’s access to nature” (PEC, n.d.).

As part of their mission, PEC sees the reduction of plastic use as an essential component to nature preservation and a sustainable use of natural resources. Given their dedication to the environment, the PEC decided to spearhead a collaborative effort to lobby the local Charlottesville and Albemarle County governments to act on the plastic bag problem. PEC is helping to organize a group of environmental organizations and individuals who want to advocate for a plastic bag tax in the Charlottesville area. As such, they are devoted to finding the best solution to address the current use of plastic bags. PEC is taking on the leadership role in this collective action problem to get the myriad of local interest groups organized, so there is a greater chance for their advocacy efforts to make an impactful change.

Executive Summary

The following paper introduces the problem with plastic bags and how it pertains to the City of Charlottesville and Albemarle County in Virginia. There is a high reliance on plastic bags in the United States and especially in the Charlottesville area. The excessive use of plastic bags has many consequences and costs to society. Plastic production releases chemicals into the air that damage lung function and creates greenhouse gas emissions which contribute to global warming. The improper disposal of plastic bags adds to plastic pollution that litters the streets and devastates marine ecosystems. Globally the use of plastic bags costs society billions of dollars each year. Since these costs are incurred to society as a whole, the individual is not incentivized to reduce their personal plastic bag use. An individual sees the whole benefit of using a plastic bag without the incurring the entire cost.

To lower the societal costs of plastic bags, it may be necessary to reduce individuals' use of plastic bags. A common way to discourage the use of goods that impose a negative externality on society is to use a tax. Taxes add an additional charge to each individual's consumption of a good to internalize the cost to society. Plastic bag taxes haven been proven effective at reducing plastic bag use in Chicago, IL and Washington, D.C., among many other localities in the United States. Local governments in Virginia now have the option of taxing plastic bags with the *Virginia 58.1 -1745 Disposable Plastic Bag Tax*.

Despite the effectiveness of plastic bag taxes, these policies are accompanied by three unintended consequences: (1) increasing the use of plastic, (2) increasing the use of paper bags, and (3) shifting consumers' shopping location. An ideal policy would counteract these shifts in consumer behavior. Successful policies have clearly specified which types of plastic bags are taxed, implemented a tax on paper bags as well, and applied the policy at the county level. Additionally, good policies included principles of psychology such as reference dependence, salience, and habit formation. Lastly, changing consumer behavior to use fewer plastic bags was further reinforced with time and repeated reassurance as to why action is necessary.

Incorporating these lessons into an ideal policy should sustain the desired reduction in plastic bag use. Accordingly three alternative policies to reduce plastic bag are analyzed along these lines. The first option is to advocate for the local implementation of a plastic

bag tax. This would entail the City of Charlottesville and Albemarle County jointly adopting *Virginia 58.1 -1745 Disposable Plastic Bag Tax*. The second option is to advocate for a paper bag tax to be added to the state's current option of taxing plastic bags. This would entail amending or introducing a new bill to allow a tax on paper bags. The third option is to develop an educational campaign. This would entail disseminating persuasive letters and signs through emails and in-store posters to encourage customers to skip plastic bags and instead bring their own reusable bags.

These alternatives are compared based on each's likelihood to maximize coverage, administrative feasibility, plastic bag reduction, and environmental improvement. Out of these options, PEC should first start with an educational campaign. The low administrative feasibility of implementing or altering a tax excludes these options as viable short-term solutions. Instead an educational campaign will offer small improvements in the current plastic bag use while PEC begins advocating for a holistic, statewide policy that allows for taxes on both paper and plastic. This two-step approach allows the Charlottesville area and the Commonwealth of Virginia to reduce its reliance on plastic bags and develop more sustainable shopping behaviors.

Problem Statement Overview

Annually the average American family uses over 1,500 plastic bags which contributes to the unsustainable use of natural resources and proliferates plastic pollution (Powers, 2008). Starting in January 2021, in accordance with *Virginia 58.1 -1745 Disposable Plastic Bag Tax*, any county or city in Virginia can impose a 5-cent tax on plastic bags to reduce plastic bag use and pollution. Nevertheless, there are several unintended consequences that accompany plastic bag taxes, such as a shift from using plastic to paper bags and consumers changing their shopping locations. The upcoming possibility to enact a plastic bag tax presents the Piedmont Environmental Council the opportunity to advocate for a socially and environmentally conscious policy that can reduce the use of plastic bags and deter unwanted shifts in consumer behavior.

The Problem with Plastic

The following section introduces the use and associated problems of plastic bags. It covers the cost that plastic bags have on society and in particular the Charlottesville, Virginia area. The high usage and associated cost of plastic bags gives reason to reduce plastic bag use. Possible actions to reduce plastic bag use include taxes and bans. Studies of these policies provides the framework for actions that the Charlottesville area can take to reduce its reliance on harmful plastic bags.

Plastic Bag Use

In America, plastic bag use is pervasive as evidenced by the fact that annually, the average family uses 1,500 plastic bags (Powers, 2008). Assuming the average family contains three people (Statista, 2021), this means that each American uses about 500 plastic bags per year. As for the city of Charlottesville, more than 28 million plastic bags were recycled in 2018 (Rivanna Authorities, 2018). Since recycled plastic bags constitute roughly 3% of single-use plastic bags used, the city's reliance on single-use plastic bags is most likely well above 28 million bags (Rivanna Authorities, 2018). Given the city's population of around 47,000 individuals, this roughly equates to each person recycling 600 plastic bags per year (U.S. Census Bureau, 2019). This suggests a high reliance on plastic bags in the Charlottesville area.

The Consequence of Plastic Bag Use

Unfortunately, plastic bags have a slew of negative environmental consequences. The refineries that make plastics run on crude oil and emit greenhouse gases. In 2019, plastic production contributed about 850 million metric tons of greenhouse gases to the atmosphere, which is roughly the output of 200 coal power plants (Hamilton & Feit, 2019). These greenhouse gases contribute to global warming and threaten the hospitableness of Earth.

More immediately, there are several negative health impacts associated with plastic bags. Plastic production requires the use of fossil fuels, which can be obtained through hydraulic fracking. Retrieving fossil fuels from hydraulic fracking involves over 170 chemicals that have been linked to cancer, as well as neurological, reproductive, and developmental toxicity. Similar health impacts are evident in the plastic refinement stage which uses chemicals, like Benzene, PAHs, and styrene (Azoula et.al., 2019). Due

to the use of these chemicals and air pollutants, workers in plastic factories tend to have impaired lung function (Khaliq et al., 2011).

In terms of pollution, discarded plastic bags add to the 8 million tons of plastic that end up in the oceans each year (Major, 2019). This discarded plastic can negatively impact marine ecosystems. Aquatic life tends to mistake plastic bags for something edible, and most of these animals die from starvation or suffocation after ingesting the plastic. Although, not as well researched, land animals are also at risk of ingesting littered plastic bags (Parker, 2019). Wildlife that does not die from plastic pollution can still experience adverse effects. For example, plastics disrupt the lifecycle of mollusks. Within the Chesapeake Bay, the estuary to which the waterways in the Charlottesville area ultimately flow, researchers have found that plastic alters oyster larvae respiration rates (Murphy, 2019). Researchers are continuing to investigate the various negative impacts that plastic pollution has on wildlife.

Overall an excessive reliance on single-use plastic bags contributes to the unsustainable extraction of fossil fuels and proliferates plastic pollution. Worse still is that plastic bags exacerbate socioeconomic disparities. Plastic bags worsen inequities related to health outcomes and finances. Poorer areas are more likely to be near production plants and exposed to worse air quality from the pollutants emitted from these plants (Failey, 2016). Therefore, the negative air quality effects of plastic production, incineration, and pollution will have a greater burden on poor communities (Bauman, 2019).

The Cost of Plastic Bag Use

Given these negative consequences, it is helpful to use monetary terms to better assess the damage. Most analyses have assessed the social cost of plastic bags on a national or global scale. The U.S. International Trade Commission estimated that annually U.S. retailers spend over \$4 billion on plastic bags (Sierra Club, 2017). Besides the purchase cost, there are cleanup costs as well. Annually across the nation, it costs over \$9 billion to clean up litter like plastic bags (Cole, 2019). In an EPA study, some cities pay as much as \$1 million per year to remove plastic bag pollution (Philippe, 2020).

Plastic bags also impact air quality by contributing greenhouse gases to the atmosphere during the production, refinement, and incineration processes. The social cost of carbon is estimated to be over \$50 per ton (Howard, 2015), and plastic production and

incineration created about 850 million tons of greenhouse gases in 2019 alone (Major, 2019). Converting this to the social cost of carbon, places the global atmospheric impact associated with plastic to be over \$42 billion.

There is also the opportunity cost of using scarce fossil fuel resources to create plastic bags. These costs are more difficult to quantify, so the costs enumerated above are just a fraction of the costs that plastics bags have on society. There are not specific studies of the cost incurred by the Charlottesville area; nevertheless, given the great externalities of plastic bags, national costs must be considered when tackling this problem at a local scale.

Correcting the Externalities of Plastic Bags through Taxation

A common way to decrease the use of plastic bags and the cost of their negative environmental effects is to impose a tax. A tax is designed so that for each bag used there is an associated fee which the shop collects from the consumer and gives to the government.¹ Taxes are a monetary incentive to curb the use of plastic bags. Due to the loss adverse nature of humans, individuals dislike parting with their money to pay for a product that was once free (Giangreco, 2019). The bag tax typically applies to the thin-film plastic bags available at the checkout of groceries or pharmacies. It does not apply to the thicker plastic bags such as reusable bags or the very thin film bags that are used to bag produce.

The use of plastic bag taxes is prevalent around the world. Denmark created the world's first plastic bag tax in 1993, and their residents now use roughly 1% of the plastic bags that Americans do (Parker, 2019). There are several examples of bag taxes in the United

¹ Taxes and fees can be difficult to distinguish. At times the terms are used interchangeably, but there is a slight difference. A tax is levied to provide funds for general government services while a fee is used to provide a service that benefits the group of people from which the fee is taken (Rinehart, 2013). Both fees and taxes can work towards the same end. There are examples of taxes that operate similarly to a fee system, yet individuals tend to harbor negative emotions with additional charges labeled as a tax.

States. Plastic bag taxes have been proven effective in cities such as Chicago, Illinois and Washington, D.C. The city of Chicago implemented a 7-cent tax on plastic bags in 2017, which lowered the plastic bag use rate by 28 percentage points. (Hoffman, 2018). Washington, D.C. implemented a 5-cent fee on plastic bags in 2010, and since then D.C. has seen a decrease of plastic bag use by 50 percent (Bayly, 2016).

A major benefit of levying an additional charge is that the revenues can be redirected to meet a similar goal or improve the community. Successful examples of this include Washington, D.C. which uses its 5-cent bag fee to improve water quality in the Anacostia River and provide educational experiences for community members (Wells, 2020). Over the past 10 years, the bag fee has generated more than \$19 million in revenue and removed over 70,000 pounds of trash from the waterways (DOEE, 2020).

Despite the clear benefits, it is difficult to establish an optimal taxation level. For the tax to be effective it must be large enough to change consumer behavior without posing a large burden on low-income individuals. This can be a complicated task given the economic and political complexities of policy making (Hoffman, 2018).

Although the use of plastic bags and traditional plastic alternatives favor wealthy, well-educated individuals, some plastic bag taxes have addressed current inequities. Washington, D.C. uses its bag fees to revitalize poor neighborhoods around the Anacostia River. Decreasing the use of plastic bags would also reduce the plastic litter that accumulates in poor areas (Mock, 2016). In that regard, reducing plastic bags could rectify the disproportionate burden that plastic bags have on low income areas.

On the other hand, addressing the reliance on plastic bags with a tax could unfairly impact small businesses and low-income customers. Traditionally plastics have been the cheapest option for packaging, and small businesses may not be able to afford other materials or pass on the additional cost to the customer (Gray, 2018). Low-income individuals may not be able to afford the additional cost or have the means to purchase plastic bag alternatives like a reusable tote bag. Implementing a plastic bag tax could pose too great of a cost for businesses and customers who are already struggling to make a profit or purchase goods. Therefore, before acting, it is important to consider these intertwined aspects of a tax and whether a tax is feasible to implement in Charlottesville, Virginia.

Limited Tax Options in Virginia

Given its unique legislative and feasibility restraints Charlottesville and the surrounding Albemarle County are limited in the possible actions they can take against plastic bags (Lofton, 2019). In Virginia, the Dillon Rule prevents local governments from enacting laws that are not expressly given to them by the state (Appendix A; Williamson, 2020). Since the state of Virginia did not authorize more local government control over plastic bag use, the city and county have not been able to implement a plastic bag tax. However, earlier this year the Virginia state government passed a law allowing for a 5-cent tax on single-use plastic bags (Va LIS, 2020).

Starting in January 2021, in accordance with *Virginia 58.1 -1745 Disposable Plastic Bag Tax*, any county or city in Virginia can impose a 5-cent tax on plastic bags to reduce plastic bag use and pollution (Appendix B). Given the new-found option of implementing a bag tax, it is important to consider the possible consequences of implementing such a tax in the Charlottesville area. There are several unintended consequences that accompany plastic bag taxes, such as a shift from using plastic to paper bags and consumers changing their shopping locations. Presently, the Piedmont Environmental Council has the opportunity to advocate for a social and environmentally conscious policy that can reduce the use of plastic bags and deter unwanted shifts in consumer behavior to prevent further degradation to the environment.

Unintended Consequences of Plastic Bag Policies

The following section highlights the three major unintended consequences that accompany a plastic bag policy. These consequences are an increased use of plastic, a shift to consuming more paper bags, and shoppers changing their shopping location (Figure 1). Each of these consequences is explored in depth and assessed for transferable insights. The most prevalent studies of plastic bag policies have focused on plastic bag bans, so many of the lessons derived from these consequences emerge from studies done on plastic bag bans. Bans can be viewed as a more extreme course of action in terms of altering and/or constraining consumer behavior. Comparatively, a tax would be a far less constraining measure. The additional cost of a tax deters individuals from using a plastic bag, but a tax policy does not forbid the use. Both bans and taxes offer valuable lessons on how consumer behavior changes with plastic bag policies.



Figure 1: Unintended Consequences of Plastic Bag Policies

Increased Use of Plastic

Counterintuitively a policy aimed to reduce the use of plastic bags can result in an increased use of plastic. This most commonly occurs through the following mechanisms: single-use thin bags are replaced with thicker bags (be they single-use or reusable), or more plastic is used through increased garbage bag sales.

Bans on specific types of plastic bags have resulted in greater consumption of different types of plastic. For instance, thin film plastic bags can be replaced with thicker plastic to bypass legislation enacted on plastic bags. For example, in New England about 70% of customers switched from thin to thick bags when a ban on thin plastic bags was

implemented (ScAAN, 2019). Although still technically following the ban, the switch to thicker plastic is counter to the goal of reducing plastic bags. Likewise, when Chicago originally banned thin plastic bags in 2015, this led to shoppers using thicker plastic bags instead. The ban did not curtail the use of plastic bags, so the city abandoned the plastic bag ban and instead implemented a tax on plastic bags in 2017 (Zeitlin, 2019).

Additionally, limiting the use of single-use plastic bags and switching to thicker reusable bags can result in more plastic being used. The switch to more durable reusable bags could decrease the use of disposable bags, but significantly more plastic is used to create reusable bags. For the reusable bags to have less of an environmental impact than disposable bags, the reusable bag must be used a significant number of times. Currently, there is no single agreed upon number of times that a reusable bag must be used for it to have less of an impact than a single-use bag. The number of uses required depends on the metric under investigation. There are different usage rates required for bags to have an equal impact based on water usage, carbon emissions, etc. (Kimmel, 2014). Therefore, one must be careful that the reduction in disposable plastic is not undone by the acquisition and insufficient use of reusable plastic bags.

Lastly, in regards to increased plastic consumption, a policy designed to reduce plastic bag use can result in more plastic being used for garbage bags. A study conducted by the University of Sydney found that plastic bag bans tended to increase the number of plastic garbage bags that were purchased (Giangreco, 2019). In California, areas that implemented a plastic bag ban saw a reduction of 40 million pounds of plastic waste. However, at the same time the number of four-gallon plastic garbage bags that were purchased increased by 12 million pounds. The plastic bag ban eliminated a possible reuse of carryout bags as garbage bags. Consequently, the ban of plastic bags resulted in a decrease of single-use plastic bags but increased the use of thicker plastic garbage bags (Taylor, 2019). To that point, the reduction in the number of single-use plastic bags used is key, but it must also be met with an overall reduction in plastic to reach the ultimate goal of reducing the impact of plastic bags.

Increased Use of Paper Bags

Alternatively, the shift away from plastic bags can result in an increased use of paper bags. At first glance this is a successful shift. It meets the desired reduction of plastic bags. However, the reduction of plastic bag use is only desired if it can mitigate negative

environmental impacts. Unfortunately, paper bags may not be a viable alternative for meeting the decrease in environmental consequences. Looking at the product's impact on the environment from start to finish through a life cycle analysis suggests that paper bags may do more harm to the environment than plastic bags.

A life cycle analysis chronicles the effects of a product from the production to its final end use. One study by the Boustead Consulting & Associates Ltd investigated the energy use, raw material use, water use, air emissions, water effluents, and solid wastes of paper versus plastic bags. They found that polyethylene plastic grocery bags emit fewer global warming gases, less acid rain emissions, and less solid wastes than their paper bag counterparts. On these metrics, paper bags appear to do more harm to the environment (Chaffee & Yaros, 2014). However, there are conflicting results from life cycle analyses depending on what environmental factors are investigated and how they are measured (Edgington, 2019).

Interestingly, looking at the reuse rate of bags, plastic is more favorable than paper. Since plastic has more readily available reuse options, such as lining a garbage bag, plastic bags may have less of an environmental impact per use than paper bags (Bell & Cave, 2011). If the ultimate goal is to reduce environmental impacts switching from plastic to paper is not an easy solution.

Nevertheless, this behavioral shift is evident once a plastic bag policy is put in place. In Richmond, California, their ban on plastic bags resulted in more shoppers using paper bags. A decrease in paper bag use was not seen until a 5-cent tax on paper was added to the ban on plastic bags (Homonoff et al., 2018). Therefore, the risk of moving to a worse bag product is possible when policies on only plastic bags are put into place.

Change of Shopping Location

Lastly, it should be noted that a policy on plastic bags can change not only what the shopper uses, but also where they source the product. An unintended consequence of plastic bag policies is that the same number of plastic bags would be used but just in a different location. In some extreme cases, cartels have formed to work around policies that were implemented to limit plastic bag use. When Kenya put its ban on plastic bags into effect, cartels smuggled plastic bags in from neighboring countries (Parker, 2019).

This scale of behavioral change is not expected to be as dramatic with a tax since a tax is less severe than a ban; however, it is still a factor to consider.

Some scaled down and reasonable behavioral changes that would be more applicable to the current setting would be shoppers changing their shopping location. Shoppers could travel to a neighboring city without the bag tax to do their shopping and avoid the extra cost. Interestingly, on the county level this does not appear to be the case. After a tax was implemented in Montgomery County, Maryland there was not a discernible decrease in the number of transactions at the stores under investigation. This suggests that the tax did not dramatically shift the shoppers' purchasing locations (Homonoff, 2018). Individuals did not opt to travel to avoid the additional bag charge. Since the study of Montgomery County did not investigate the tax on a smaller level it is possible that a purchasing shift at the town or city level may have gone undetected. With that in mind, a bag policy should consider to what extent it applies to individuals living in certain areas and how those individuals would respond.

Researched Actions on Controlling Unwanted Substitutes

The following section lists some steps that have been taken to address the unintended consequences associated with plastic bag policies. The actions included below have been well researched and successfully prevented switches to readily available plastic bag alternatives. As such, these actions of specifying clear laws, taxing paper bags, and implementing policies on the county level may be useful to apply to the Charlottesville area. Additional measures like focusing on potential losses, increasing the salience of the policy, and allowing for longer adjustment times have been successful as well.

Preventing Unwanted Switches to Plastic Bag Alternatives

There are several approaches to address the unintended consequences associated with a plastic bag policy. The ultimate lesson is to control for readily available substitutes. The goal is to limit the possible avenues of use for similarly unsustainable alternatives, be it through variations of materials or location, to plastic bags.

To address the shift of using more plastic, the policy should be clear and holistic as to what type of plastic bag is being affected (Romer, 2019). The drafted policy should specify all types of plastic that are under consideration to avoid easy circumvention of the policy (i.e. thin film plastic being replaced with thick film).

Similarly, it would be essential to address any unwanted shift to paper bags. Policies that have been effective in reducing a major shift to paper have implemented a paper bag tax in addition to the policy on plastic bags. Increasing the price of the paper bag makes it a less attractive option, so fewer people use paper bags.

A successful example of this is Chicago, which implemented a 7-cent tax on all bags and finally saw a reduction in paper bags use as compared to their earlier policy of just banning plastic bags (Homonoff et al., 2018). Likewise, Montgomery County in Maryland implemented a 5-cent tax on paper and plastic bags which lead to a 40-percentage point reduction in disposable bag use (Homonoff et al., 2018). Ergo, to mitigate a shift to paper bags, paper bags must appear to be an equally unattractive option.

Finally, to address the concern of shifting consumer behavior to other stores, an appropriate level of implementation must be selected. When all stores in the county face the same tax, individuals are less likely to travel outside the county to avoid the additional charge. If the implementation level is too small (i.e. individual town or store by store) there is a greater chance of shoppers easily being able to adjust their shopping behavior to avoid the tax. As the study of Montgomery County suggests, the county level is an appropriate level to implement the tax (Homonoff, 2018). It is local enough to avoid the complications of large scale coordination and enforcement, but it is expansive enough to capture any noticeable leakage.

Therefore, the key lessons from the unintended consequences is to control for the readily available substitutes. This can be done by limiting or discouraging access to alternative types of plastic or paper bags as well as ensuring all local establishments are covered by the same policy.

Psychological Principles for an Effective Policy

Beyond these lessons, it is important to note general implications and overall good guidelines for implementing a plastic bag tax. Many cities and counties have implemented plastic bag taxes. It proves prudent to incorporate some of the lessons they have learned into the proposed policy for the Charlottesville area to make the plastic bag tax as effective as possible.

Based on Homonoff's extensive research and expertise with plastic bag policies, there are three additional elements that enhance plastic bag policies. These include emphasizing loss, educating the public, and giving the public time to adjust to the policy. The technical psychology terms for these concepts are respectively reference dependence, salience, and habit formation. These elements were highlighted in the study conducted by Homonoff and *ideas42* on Chicago's bag tax. Homonoff and colleagues did not separate the individual effects, yet they note the importance of all of them to the tax's success (Homonoff et al., 2018).

Firstly, humans are loss averse, so they want to avoid a tax. Going from something that cost them nothing to now costing 5-7 cents seems like a bigger loss than going from 5 cents to 10 cents. Individuals are more likely to respond when the tax is imposed on something that was once free. Adding the extra charge to a previously free plastic bag through a tax keeps people from indulging and buying a bag.

Secondly, salience is another key factor, for shoppers need to be aware of the tax. If they are aware that they will be charged an additional amount at the register, they are more likely to incorporate this information into their decision making and react accordingly. If shoppers are unaware of the tax, they are less likely to change their behavior. The more obvious the tax is, the greater likelihood individuals would respond to it.

Thirdly, people need time to get accustomed to the change. It is unlikely to see a dramatic drop in plastic bag use overnight. Individuals need time to pick up new habits and no longer be reliant on the plastic bags. Breaking old habits and forming new ones takes time to adjust.

A study in England showed that over time shoppers became more responsive to the bag tax and supportive of the tax a month after the tax's enactment. That is, it took shoppers

about one month to become accustomed with the 6-cent tax on plastic bags and decrease their use of plastic bags. After this time shoppers also held a more favorable view of the plastic bag tax and were more likely to support similar initiatives (Thomas et al., 2019). As for the case bag tax in D.C., a majority of shoppers and business owners supported the tax. Typically, individuals were more supportive of the cause when they knew the stated purpose of the tax and what the revenue was used for (OpinionWorks, 2013).

Altogether this suggests that for a policy to work shoppers should be given the information on potential gains and losses and the time necessary to adjust accordingly. This leads to the next section which focuses on alternatives, their evaluation, and a recommendation for the Piedmont Environmental Council.

Alternatives to Reduce the Charlottesville Area's Reliance on Plastic Bags

The following section highlights three alternatives to improve the environment by reducing plastic bag use in the Charlottesville area. These alternatives include a plastic bag tax, a paper bag tax, and educational outreach. Each alternative, based on PEC's values, is evaluated on coverage, feasibility, and effectiveness in terms of bag reduction and environmental impact. A recommendation as to the best course of action is made based on the analysis of the evaluation. Given present findings, it is recommended that PEC first develops an educational outreach program and then advocates for a state level paper bag tax to be added to the current plastic bag tax.

Possible Alternatives:

It is well known that plastic bags negatively impact the environment. As such, a policy to reduce plastic bag use is required to prevent further environmental degradation. Starting in January 2021, in accordance with *Virginia 58.1 -1745 Disposable Plastic Bag Tax*, any city or county in Virginia can impose a 5-cent tax on plastic bags to reduce plastic bag use and pollution. Nevertheless, there are several unintended consequences

that accompany plastic bag taxes, such as a shift from using plastic to paper bags and shoppers changing their shopping locations. Presently, the Piedmont Environmental Council has the opportunity to advocate for a socially and environmentally conscious policy that can reduce the use of plastic bags and deter unwanted shifts in consumer behavior. Current alternatives for PEC to consider are advocating for a plastic bag tax on both the city and county level, advocating for a state level paper bag tax, and developing a local educational outreach campaign.

Alternative 1 - Advocate for a Plastic Bag Tax on both the City and County Level

This option calls for a plastic bag tax to be implemented on both the city and county level. It would require proposing a joint venture between the City of Charlottesville and Albemarle County. The two governing bodies must mutually agree to enact the *Virginia 58.1 -1745 Disposable Plastic Bag Tax*. If passed the tax would apply to 47,000 individuals who live in the City of Charlottesville, and the slightly more than 106,000 individuals who live in the surrounding Albemarle County (DataUSA, 2019).

In terms of the city level, this alternative requires placing a request to speak at the City Council's monthly meetings. Doing so would put the plastic bag tax on the agenda. From there the council would vote to implement the tax or not. PEC should cite the *Virginia 58.1 -1745 Disposable Plastic Bag Tax* as an option for the city to adopt and frame it in a manner that is congruent with the city's "Vision for a Green City" ("A Green City", 2020). After that the proposal might be delegated to a subcommittee for further consideration before being brought to a vote by the council members. While in a subcommittee, PEC can further encourage support for the tax by informing the members of how the tax could reduce the use of harmful plastic bags.

In terms of the county level, PEC should further advocate for Albemarle County to adopt the *Virginia 58.1 -1745 Disposable Plastic Bag Tax*. In their Fall 2020 meeting, Albemarle County's Solid Waste Alternatives Advisory Committee (SWAAC) stated their interest in such a tax (SWAAC, 2020). After gaining more support from the SWAAC, the proposed plastic bag tax can be brought to the Albemarle County Board of Supervisors for a vote. The County Board of Supervisors holds biweekly meetings for the public to provide comments. PEC can use this time to raise how the plastic bag tax could reduce plastic bag use and supports the country's Climate Action Plan ("Climate Protection", 2020).

As part of the persuasion process to inspire coordination between the city and county, an additional measure can be taken to showcase current collaborations. Examples such as the Charlottesville-Albemarle Airport Authority and Albemarle-Charlottesville Regional Jail Authority demonstrate the success of when the city and county collaborate (“Boards & Commissions”, n.d.).

Alternative 2 - Advocate for a State Level Paper Bag Tax to be added to the Current Plastic Bag Tax

The second option is for PEC to advocate for a paper bag tax to supplement Virginia’s current plastic bag tax. A paper and plastic bag tax for Virginia would cover the 8.5 million individuals that live in the state (U.S. Census Bureau, 2019). As research has found a key factor to addressing unwanted shifts from plastic to paper bag use is to implement a paper bag tax. Having the alternative paper bag option appear as equally unattractive in terms of cost deters individuals from using paper bags (Homonoff et al., 2018).

Unfortunately, because of Virginia’s Dillon Rule, municipalities must first be granted permission by the state before enacting a tax on paper bags. Consequently, the state legislature must be targeted to introduce and pass a bill on taxing paper bags. This can be done by working with state Delegates Betsy Carr (69th-D) and Kaye Kory (38th- D). These individuals were responsible for introducing and passing Virginia’s optional tax on plastic bags (Va LIS, 2020).

Showing the importance of a paper bag tax to dissuade individuals from switching their plastic bags to more environmentally harmful paper bags may convince the delegates to propose a bill. Like the tax on plastic bags, if the state passes a law to allow a tax on paper bags, there is then the option to enact the tax on the city, county, or combined level.

Alternative 3 - Develop a Local Educational Campaign (through Emails and In-store Signs to Reduce Disposable Bag Use)

The final option is for PEC to develop an educational campaign to convince individuals to change their shopping behavior. Sharing information about the impacts of plastic bags and how reusable bags may be better for the environment could help change people’s behavior.

Individuals are more receptive to change their behavior if they know why the change must be made (Harvard, 2012). Motivating this “why” can be achieved through an email newsletter and in-store signs that encourage individuals to skip single-use bags. Educational signage is an important and inexpensive method for changing behavior (Meis et al., 2017). PEC could send emails to their 15,000 subscribers encouraging them to use reusable bags. These emails could highlight the costs of using plastic bags and underscore the potential losses to society if a reduction in plastic bag use is not sustained. Disseminating this information now gives consumers the necessary time to adjust their behaviors.

Likewise, PEC could work with local grocery stores to encourage the use of reusable bags by prominently displaying signs that remind customers to bring their own bags. Making the signage clear and visible to customers at checkout increases the chances of the message influencing the customers’ behavior (Homonoff et al., 2018). Supplying pertinent information, emphasizing the losses, and giving time to adjust will help consumers reduce their use of plastic bags. These reminders and small interventions through emails and signs as part of an educational campaign could subtly change the way people perceive and use plastic bags in the community.

Criteria:

Since PEC is an environmentally focused organization, an ideal course of action would improve the environment through a reduction in the number of plastic bags used across the greatest number of people. Accordingly, the following criteria were selected to evaluate each alternative: coverage, administrative feasibility, and effectiveness based on plastic bag reduction and environmental impact.

Coverage - *Will the proposed policy affect a small or large portion of the community?*

Coverage is a quantitative measure of the policy’s influence. It will capture the number of individuals that would be impacted by the policy. This can be calculated based on the geographic extent to which the policy would apply. Specific population numbers for impacted areas can be obtained from Census Data updated in 2019.

Administrative Feasibility - *Will the proposed policy be readily enacted?*

Administrative feasibility is a qualitative measure of the ease of passing the policy. It will be scored from high to low feasibility and will take stock of any hurdles in the way of enacting the policy. These hurdles could include any organizational approvals (at PEC or legislatively) that need to be met. The greater the feasibility, the less costly and time-intensive the policy would be. An ideal policy will have few administrative obstacles and be highly feasible.

Effectiveness (Bag Reduction) - *Will the proposed policy reduce the number of plastic bags used?*

This aspect of effectiveness captures whether the policy will reduce the number of plastic bags used. Ideally, effectiveness would be quantitatively measured by surveying the number of bags used in local stores. However, as seen in empirical studies, it is difficult and costly to obtain an exact and accurate measurement (Homonoff et al., 2018). For the purposes of this evaluation, effectiveness will be assessed on a qualitative scale ranging from high to low. Projections as to the effectiveness of each policy can be estimated from extrapolating lessons drawn from the available literature. An ideal policy would have the greatest anticipated decrease in plastic bag use and thus a high projected effectiveness.

Effectiveness (Environmental Impact) - *Will the proposed policy lessen the impact that shopping bags have on the environment?*

This aspect of effectiveness will analyze the environmental benefits of the policy on a qualitative scale from high to low. Ex-ante assessments of the environmental impact can be formulated from analyzing the policy's proposed methods to tackle the negative environmental effects of shopping bags. For instance, this criterion will consider if there is any unwanted increase in paper bag use associated with the policy. It will also note if the policy includes elements like pollution cleanup services to remediate the current environmental impacts of plastic bags. An ideal policy would curtail unwanted shifts to paper bags and offer solutions to improve current environmental conditions. Such a policy would have a high score for environmental impact.

Evaluation of Alternatives

Alternative Evaluation - Comparing Alternatives Based on Criteria:

The following section showcases an evaluation of the three alternatives (advocating for a plastic bag tax on both the city and county level, advocating for a state level paper bag tax, and developing a local educational outreach campaign) based on the policy's projected ability to perform on coverage, administrative feasibility, and effectiveness in terms of plastic bag reduction and environmental impact. An outcomes matrix (Figure 2) synthesizes the evaluation and highlights the best option.

Alternative 1 - Advocate for a Plastic Bag Tax to apply to both the City of Charlottesville & Albemarle County

Coverage - As of 2018, just over 47,000 individuals lived in Charlottesville, and slightly more than 106,000 individuals lived in the surrounding Albemarle County (DataUSA, 2019). This policy would apply to a geographical area expanding the 10 square miles of the city plus the 726 square miles of the county (City of Charlottesville, 2018). Together a plastic bag tax in this region covers **153,000+ individuals**. This includes adults and children since the use of plastic bags is not just delineated by age group.

Administrative Feasibility - The administrative feasibility of this policy is **low**. There are several hurdles that need to be cleared to have this policy take effect. The first hurdle would be to organize a coordinated effort between the City of Charlottesville and Albemarle County. In conversations with individuals from the city's Commissioner of Revenue and the county's Finance and Budget department, neither local government has prioritized a plastic bag tax. The City of Charlottesville has not raised the prospect, yet the commissioner assured that if given adequate staff and resources, the city's tax office should be able to implement a plastic bag tax.

As for Albemarle County, the Board of Supervisors is aware of the county's interest in a plastic bag tax. However, in their December 2020 meeting the motion to implement a plastic bag tax was tabled until after the coronavirus pandemic subsides (Albemarle County, 2020). The county was concerned with the equity implications of issuing a new tax while many small businesses are struggling to operate. Instead, the county government decided to focus on issuing one new tax policy at a time, and they decided

to start with a cigarette tax. Given the need for additional coordination and present lack of attention, the administrative feasibility for a pursuing a plastic bag tax to apply to both the City of Charlottesville and Albemarle County is low.

Effectiveness (Bag Reduction) - The projected effectiveness of a tax on both the City of Charlottesville and Albemarle County to reduce the number of plastic bags used is ***high***. Studies have shown that a tax persuades individuals to curb their plastic bag use. It is difficult to project the exact impact given the lack of publically available data on plastic bag usage; however, pulling information from the literature suggests that a plastic bag tax would be effective. When the equivalent of a couple cents tax was added to plastic bags in Turkey, the use of plastic bags went down 33.6 percentage points (Senturk & Dumludag, 2020). In England, a 6-cent tax on plastic bags resulted in a 34 percentage point decrease in plastic bag use within a year (Thomas et al., 2019), and in the U.S. when the city of Chicago implemented a 7-cent tax on plastic bags in 2017, by 2018 the plastic bag use rate lowered by nearly 28 percentage points (Hoffman, 2018).

Moreover, the joint city and county level implementation should be effective for capturing any spillovers. After a tax was implemented in Montgomery County, Maryland, individuals did not opt to travel to the next county over to shop at stores without the bag tax (Homonoff, 2018). This leads to the conclusion that the plastic bag reduction should be sustained within the city and county, and there would not be a shift of plastic bag usage in neighboring localities. The proven effectiveness of taxes and implementing on the county level, leads this alternative to have a high level of projected effectiveness.

Effectiveness (Environmental Impact) - A plastic bag tax that applies to both the City of Charlottesville and Albemarle County will have a ***medium*** level of effectiveness for environmental impact. As it is presently written the *Virginia 58.1 -1745 Disposable Plastic Bag Tax* includes a provision for “environmental cleanup, providing education programs designed to reduce environmental waste, [and] mitigating pollution and litter”. The revenue from the tax is used to improve the local environment. This mirrors the program put in place in Washington, D.C. with the Anacostia River, which over 10 years has generated more than \$19 million in revenue and removed over 70,000 pounds of trash from the waterways (DOEE, 2020). In that regard, there is the potential for environmental improvement associated with a plastic bag tax.

Nevertheless, at present the tax does not control for a shift to using paper bags. As seen through the most studied instance of a plastic bag tax in Chicago, if a tax is only put on plastic bags, it is likely that shoppers will shift to using paper bags instead (Homonoff et al., 2018). Unfortunately, paper bags have a greater negative impact on the environment (Chaffee & Yaros, 2014). Since there is the potential for environmental improvement from increased funding in environmental cleanup programs, yet also the potential for an increased use of paper bags, this alternative has a medium rating for environmental effectiveness.

Alternative 2 - Advocate for a State Level Paper Bag Tax to be added to the Current Plastic Bag Tax

Coverage - A paper and plastic bag tax for Virginia would cover the **8.5 million individuals** that live in the state (U.S. Census Bureau, 2019). This includes adults and children since the use of plastic bags is not restricted by age. This tax would be available to the 95 counties and 38 independent cities within the 42,775 square miles of the Commonwealth (VAoC, n.d.).

Administrative Feasibility - The administrative feasibility of a paper and plastic bag tax for the state is **low**. For this option to occur, a new bill would have to be proposed or an amendment would have to be made to the *Virginia 58.1 -1745 Disposable Plastic Bag Tax*. In conversations with delegates, this seems unlikely. The original bill was proposed to include paper bags; however, it only gained approval to be a law if paper bags were omitted. It took consistent, concerted effort over a year to pass the plastic bag tax. Currently a paper bag tax is an unpopular option given the economic stress from the pandemic and the influence of the forestry industry in Virginia (Conversation with Delegate Carr). Given the previous and current resistance to taxing paper bags, the administrative feasibility of this option is low.

Effectiveness (Bag Reduction) - The projected effectiveness of a tax to reduce the number of plastic bags used is **high**. This alternative keeps the plastic bag tax in place while adding a paper bag tax. As such the effectiveness on plastic bag reduction remains the same as just a plastic bag tax. If implemented a tax will dissuade individuals from using plastic or paper bags (Homonoff, 2018). Given the proven effectiveness of taxes as compared to other alternatives such as refunds for reusable bags, a tax on shopping bags has a high level of projected effectiveness for bag reduction.

Effectiveness (Environmental Impact) - Restructuring the state law to include a tax on both paper and plastic bags has a **high** level of effectiveness for environmental impact. As it is written now the *Virginia 58.1 -1745 Disposable Plastic Bag Tax* includes a provision for “environmental cleanup, providing education programs designed to reduce environmental waste, [and] mitigating pollution and litter”. The revenue collected from the bag tax can improve the environment. Additionally, taxing paper bags would prevent a shift to using plastic bags. When paper is taxed in addition to plastic bags, both bag options appear equally unattractive. For instance, Chicago saw a reduction in paper bag use when a tax was placed on both paper and plastic bags (Homonoff et al., 2018). Having a decrease in paper bag use, decreases the impact paper bags have on the environment. Given the potential for environmental improvement from increased funding in environmental cleanup programs, and the potential for decreased paper bag use, this alternative has a high level of effectiveness for environmental impact.

Alternative 3 - Develop a Local Educational Campaign (through Emails and In-store Signs to Reduce Disposable Bag Use)

Coverage - An educational campaign spearheaded by PEC has the capability to reach at least the **15,000 individuals** across 9 counties in Virginia that are on their email list (Conversation with PEC). More individuals could be reached by partnering with local grocery stores. However, estimates on the number of participating stores and their customer base are unavailable at the moment. The individuals already on PEC’s contact list are environmentally conscious adults who have taken the initiative and have shown interest in local environmental issues. As such it is possible that these individuals have already opted out of using plastic bags. To that regard, it is a small but devoted subsection of the population that is already in contact with PEC and could be easily reached with an educational campaign.

Administrative Feasibility - The administrative feasibility of an educational campaign for PEC is **medium**. PEC has successfully taken on previous educational campaigns. Two examples of their success have been the organization’s effort to stop the Western Bypass around Charlottesville and the prevention of building a pipeline to the James River (PEC, n.d.). As such PEC is prepared to take on more advocacy initiatives and disseminate vital information.

However, a greater difficulty would be coordinating and gaining buy-in from local stores. The educational component is more salient when it is present in the location of use (Homonoff et al., 2018). That means the information is more impactful when it is available to customers in the stores, yet there is a lack of transparency on plastic bag purchasing trends which makes partnering with stores difficult. In preliminary conversations with grocery store chains like *Wegmans* and *Food Lion*, store managers are unable to share information about their store's plastic bag operations. These stores reach more individuals and have greater resources to devote to an educational campaign program, but they are reluctant to partake.

Some stores are unable to join and display signage without corporate approval. Even stores like *Trader Joe's* and *Whole Foods*, which only offer paper bags at checkout, are unable to change their policies without corporate approval. Having to gain approval from each store adds another layer of complexity to implementing the program. Consequently, a more feasible option would be to target smaller independent stores in Charlottesville like *Foods of All Nations* and *Rebecca's Natural Food* store. These stores reach a smaller number of individuals, but they do not have the corporate red tape of the bigger stores. Overall, while PEC is prepared to share information via email, coordinating with stores to display educational signs makes the administrative feasibility of the program medium.

Effectiveness (Bag Reduction) - The effectiveness in terms of bag reduction for an educational/signage campaign would be **medium**. Educational campaigns on plastic bag reduction have not been studied in isolation (Homonoff et al., 2018), so there is little literature to pull from to provide support for the effectiveness of this option. Nevertheless, there is some support that shows the effectiveness of online communications like emails/newsletters and signage campaigns in general (Hudak et al., 2017; Meis et al., 2017). As for newsletters, studies of email communications have found that newsletters are an inexpensive means to communicate with individuals without time or location barriers (Hudak et al., 2017; Haq, 2009). Furthermore, online information can translate into behavioral changes. At least in the context of improving eating behaviors, study participants who were exposed to online ads encouraging them to eat healthier foods, lost more weight compared to participants that did not receive this information (Wakefield et al., 2014). As such, it is possible that an email/newsletter

would be a convenient way to share information in an online format that has the potential to impact individuals' actions.

Moreover, physical signs in stores can be an effective tool to inspire behavioral changes (Meis et al., 2017). The importance of these signs is that they are salient. This would mean having the sign visible to the customers at the checkout when they have to make the decision as to what type of bag they are going to use (Homonoff et al., 2018). Although not studied specifically for shopping bag behavior, signs that have a simple, clear message and utilize social norms inspire greater change (Meis et al., 2017). These messages can be further reinforced if there is greater exposure to the signs and other programs or policies that support the desired change (Wakefield et al., 2014). Albeit, an individual's actions are still voluntary, so it is expected to see less of a reduction in plastic bag use with informational signs than a tax (Giangreco, 2019). For the potential but uncertain impacts of an educational outreach and signage campaign, the projected effectiveness for bag reduction is medium.

Effectiveness (Environmental Impact) - The effectiveness for the environmental impact of an educational outreach and signage campaign is ***medium***. If the program can inspire individuals to skip paper as well as plastic bags, that would decrease the environmental impact of single-use bags. The downside of this program is that it is not creating any revenue to help support environmental cleanup. It is relying upon changing the attitudes of individuals to willingly skip plastic and paper bags. With this alternative, there is the opportunity to inspire individuals to make environmentally conscious decisions while shopping and in general be more cognoscente about the environment, yet there is no financial backing to ensure this change. With that being the case, the effectiveness for environmental impact is medium.

OUTCOMES MATRIX

ALTERNATIVES TO
REDUCE THE
IMPACTS OF
SHOPPING BAGS

	COVERAGE	FEASIBILITY	PLASTIC BAG REDUCTION	IMPACT ON ENVIRONMENT
CITY & COUNTY TAX ON PLASTIC BAGS	156,000 INDIVIDUALS	LOW	HIGH	MEDIUM
STATE LEVEL PAPER BAG TAX	8.5 MILLION INDIVIDUALS	LOW	HIGH	HIGH
EDUCATIONAL CAMPAIGN	15,000 INDIVIDUALS	MEDIUM	MEDIUM	MEDIUM

Figure 2: Outcomes Matrix Evaluating Possible Alternatives

Recommended Actions

From the outcome matrix (Figure 2) two recommendations are offered based on the short-term and long-term goals of PEC. Respectively, PEC should initiate an educational campaign for reducing the use of single-use bags. Then PEC should advocate for a state law that allows for a tax on both plastic and paper bags. This recommendation is made based on the research presented above and is reflective of the situation in the spring of 2021.

Short-Term: Develop an Educational Outreach Campaign to Reduce Disposable Bag Use

Based on the outcomes matrix in the short-term the best course of action is for PEC to start an educational campaign. Initially PEC should concentrate their efforts on informing the public of actions individuals can take to reduce the area's plastic bag use. This option ranked lowest for coverage but medium for administrative feasibility and effectiveness. Given the barriers to implementing a plastic bag tax or amending the tax to incorporate paper bags, the most immediate course of action would be to educate the public. There are some downsides to this option. First, information is not as persuasive as a tax. Although there are not studies to support or disprove this statement, it is highly unlikely for an educational campaign to dissuade plastic bag use as much as the financial influence of a tax. Second, if PEC stays within its current email list, their newsletter will reach only a small portion of the population. The people already on PEC's email distribution are probably aware of this plastic bag problem, so the education is not reaching those who most need to be informed. Ideally PEC would be able to send out a more public newsletter as long as they do not breach the CAN-SPAM Act for sending out mass unsolicited emails (FTC, 2009).

Long-Term: Advocate for a State Law Allowing for Taxes on Plastic & Paper Bags

Both advocating for the implementation of a plastic bag tax and advocating for the creation of paper bag tax are long term options given their current low levels of feasibility. However, the next step is to advocate for a state law allowing for a tax on both plastic and paper bags. A tax on paper bags is favorable to implementing just a tax on plastic bags, for it has a greater potential coverage and environmental effectiveness. The main concern of PEC is to make sure that when a tax is implemented it has the intended effect of improving the environment. Given the great and realistic concern that implementing only a plastic bag tax would result in an undesired increase in paper bag use, eliminates just a plastic bag tax from being an optimal solution.

Once Virginia has passed a tax on both plastic and paper bags, then it would be time to try implementation on a local level. Unfortunately, this process may take years to complete. The coronavirus pandemic has made many government officials wary of implementing new taxes that could become a financial burden for producers and consumers alike. As such, it is better to have patience and implement a policy that can

fully anticipate unwanted behavioral changes instead of implementing a tax that allows for a shift to a more troublesome bag problem.

Using the information presented in this report can be a good starting point to inform delegates of the need to be wary of unintended consequence of plastic bag taxes and highlight the need for the state to address this problem. Until Virginia is ready to take a more serious, wide-spread approach to tackling the problems with plastic bags and more broadly the environmental impacts of shopping bags, smaller more conservative steps should be taken. Therefore, PEC can inform individuals of the actions each shopper can personally take to decrease the community's reliance on plastic bags.



Figure 3: Stages of Short-Term Implementation

Considerations for Implementation

Upon the evaluation of several alternatives it is recommended that the PEC first develops a local educational campaign through emails and in-store signs to reduce disposable bag use. After that the PEC should advocate for a state level paper bag tax to be added the current option of taxing plastic bags. In regards to implementing these recommendations, considerations must be made to gathering the necessary materials and support from relevant stakeholders.

Short-Term - Message Development & Soliciting Stores' Support

The first step towards implementing the educational campaign is to develop a clear mission and message (Figure 3). A member of the Outreach & Communications group at PEC take on this task and develop the materials in the next couple of months.

As part of this process it should be decided if the primary goal is to discourage individuals from using single-use disposable bags, like paper and plastic, and/or encourage the use of reusable bags. From there the development of email newsletters and informational signage, which have been showed to be effective modes of communication, can begin (Hudak et al., 2017; Meis et al., 2017). Further research into memorable educational outreach slogans and simple ways of conveying information through signs would be helpful in the design process. Referencing the lessons about making messages simple, unexpected, concrete, credible, emotional, and story-based from *Made to Stick: Why Some Ideas Survive and Others Die* by Heath and Heath could increase the customers' engagement with the educational material.

After completing those steps, within a few months it would be important to reach out to local grocery stores to secure partnerships. Grocery stores are likely to display some resistance to joining the campaign. Some stores may be unwilling to display signage that runs counter to their current operations, or they may not even be able to partake in the campaign due to corporate restraints.

Smaller stores may still show reluctance but could be more easily persuaded. If informed of the benefits of partaking in an environmental campaign, store owners may be more willing to participate. For instance, PEC could highlight the possibility to appeal to greener shoppers or decrease the purchasing cost of bags by encouraging patrons to skip plastic bags. Currently, the best piece of evidence to show may be that *Kroger*, the nation's largest grocer, will phase out the use of plastic bags by 2025 (Borunda, 2019). Emphasizing the need to make the transition to going without plastic bags while still ahead of the curve may be enough to secure the involvement of some grocery stores.

In the worst-case scenario, zero individuals are inspired by the emails to change their bag use behavior and zero grocery stores join the campaign. This is a possibility that PEC should be prepared for. It is disheartening but realistic. If PEC is fully committed to an

educational campaign, they could consider more out-of-the-box incentives, such as contests and prizes, to encourage more individuals and stores to join the cause.

Nevertheless, it is difficult to change individuals' behavior and decrease the use of disposable bags. That is why PEC should have a long-term strategy to advocate for a paper bag tax to be added to the current option of taxing plastic bags. This law would allow for greater enforcement to discourage the use of single-use, disposable bags.

Long-Term - Prepare Evidence & Present to State Delegates

In the long term the initial step is to organize materials to present to state delegates on why a paper bag tax is necessary. There is not as much material prepared for paper bag taxes as there is for plastic bag taxes, so it may take a couple of weeks to gather this information. Gathering the evidence can take place in conjunction with the development of the educational campaign. Good evidence to cite can be pulled from life cycle analyses as to the environmental impact of paper bags as well as successful case studies like the plastic and paper bag tax in Chicago, Illinois (Homonoff et al., 2018).

After developing the material, PEC can use their advocacy channels to promote the cause. Within the year, PEC should contact state government officials, so that the idea of a paper bag tax can be considered by legislators. This process may take a while since it took the original plastic bag tax over a year from first being introduced to becoming an enacted law. PEC can reach out to the original drafters of the *Virginia 58.1 -1745 Disposable Plastic Bag Tax*, Delegates Carr and Kory, to push this issue further up the agenda (Va LIS, 2020).

At the state level, stakeholders are no longer limited to the concerns of shoppers and store owners. Working on the state level brings a greater range of stakeholders into the picture. The increased coverage makes the forestry and paper bag industry in Virginia relevant stakeholders. The forestry industry is likely to oppose a tax on their product because they do not want the quantity of paper bags consumed to decrease (Riley & Murphy, 2019). Overcoming this opposition may be difficult since the original bill for *Virginia 58.1 -1745* only passed once it excluded a tax on paper bags (Va LIS, 2020).

However, there is still the possibility to persuade some individuals to make a change. Despite the greater range of stakeholders and increased resistance, fewer individuals

need to be persuaded at the state level. Only two-thirds of state senators and delegates need to be convinced that a paper bag tax is a good idea for the bill to pass (Nardo, n.d.). Essentially, it is possible for a few individuals in government to pass a law that could then extend to all the residents and result in a greater change. As such, the persuasive efforts can be concentrated to the select few in office that hold influential power. Gaining the support of constituents may help pressure the delegates to act on the bill, yet full support from all residents is not necessary.

Presently, this is where the PEC stands for their next steps. The goal is to implement the two-step recommendation. There is the potential for slow progress during the first step with the educational campaign from little buy-in from grocery stores. Nevertheless, a more impactful, lasting change could come about from advocating for a more holistic disposable bag tax to be available to the entire commonwealth of Virginia.

Conclusion

Overall, there are lots of options to reduce plastic bag use. Most studies have focused on taxing plastic bags; however, caution is still necessary before proceeding down this path. Just because the perfect solution is not readily available does not mean action should not be taken. Nor does this suggest that hasty action is warranted. Instead caution should be taken while addressing the problem. A half-baked policy has the chance to back fire or cause one bag problem to turn into another. A perfect solution may not come immediately, and even with a tax, the heavy reliance on plastic bags is unlikely to disappear overnight. It will take time and effort. The work done here to build better bag behaviors will help serve and protect the planet. Have patience and tackle this problem one step at a time. Lastly, remember the wise words of Margaret Mead:

“Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it is the only thing that ever has.”

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Appendices:

Appendix A

The Dillon Rule:

“A municipal corporation possesses and can exercise the following power and no others: First, those granted in express words (from the state); second, those necessarily implied or necessarily incident to the powers expressly granted; third, those absolutely essential to the declared objects and purposes of the corporation—not simply convenient, but indispensable; and fourth, any fair doubt as to the existence of a power is resolved by the courts against the corporation.”²

² Russel & Bostrom, 2016

Appendix B

58.1-1745. Disposable plastic bag tax:

- A. Any county or city may, by duly adopted ordinance, impose a tax in the amount of five cents (\$0.05) for each disposable plastic bag provided, whether or not provided free of charge, to a consumer of tangible personal property by retailers in grocery stores, convenience stores, or drugstores.
- B. Any tax imposed under this section shall be collected by the retailer, along with the purchase price and all other fees and taxes, at the time the consumer pays for such personal property. All revenue accruing to the county or city from a tax imposed under the provisions of this article shall be appropriated for the purposes of environmental cleanup, providing education programs designed to reduce environmental waste, mitigating pollution and litter, or providing reusable bags to recipients of Supplemental Nutrition Assistance Program (SNAP) or Women, Infants, and Children Program (WIC) benefits.
- C. Each local ordinance imposing the tax shall provide for the tax to become effective on the first day of any calendar quarter; however, in no event shall any tax imposed pursuant to this article become effective before January 1, 2021. The county or city shall, at least three months prior to the date the tax is to become effective, provide a certified copy of such ordinance to the Tax Commissioner.³

³ Va LIS, 2020