

Fiscal Impacts of Prohibiting Expanded Polystyrene Food Service Products in Maryland

SB 186 & HB 229

Preliminary Estimates

January 2017

Prepared By:

mb PUBLIC AFFAIRS, INC.

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Summary, January 2017

This study has been conducted to quantify the potential effects of restrictions on expanded polystyrene food service products in Maryland. As specified in the proposed legislation, the restrictions would apply to use by food service businesses and others as well as to the retail sale of these products, while exempting certain food trays. The proposed legislation would also apply to sales of loose fill expanded polystyrene packaging, but only the food service applications are addressed in this report.

Expanded Polystyrene Food Service Products, Estimated Purchases & Cost Impacts by End Users Subject to Proposed Restrictions (\$ million)

	Limited-Service Restaurants	Full-Service Restaurants	Convenience Stores	Grocery Stores/Wholesalers	Non-Commercial	Total
Estimated Purchases, 2015	\$17.5	\$5.4	\$2.6	\$6.6	\$8.9	\$41.0
Estimated Cost Impacts	\$16.3	\$5.4	\$2.8	\$2.2	\$8.3	\$34.9

As shown in the table above, 2015 sales in Maryland (other than Montgomery and Prince George’s Counties) of expanded polystyrene food service ware is estimated at \$41.0 million. The additional cost impacts from the proposed expanded polystyrene restrictions:

- More restrictive regulation would result in the affected businesses, organizations, and consumers spending an additional \$34.9 million annually to replace the restricted products.
- Based on the numbers in the table, for every \$1 now spent on expanded polystyrene food service products, replacement alternatives on average would cost \$1.85.
- In all cases, these cost premiums are conservative estimates based on the lowest cost pricing for both expanded polystyrene and complying alternative materials. In practice, the cost premiums are likely to be higher, due to the high variability in the cost, supply availability, and performance characteristics required in individual applications.

As shown in the table, the cost impacts vary by end user, with the largest share likely affecting restaurants. New restrictions on disposable food service ware would add further cost pressures at a time the state restaurant industry is already coping with rising costs, and consumers are pulling back in the face of the compensating rising prices.

As shown by state sales tax data, the Maryland restaurant industry has experienced significant sales recovery from the recession in only the last two years, but with growth in the number of establishments in the limited-service component essentially tapering off beginning in 2013.

As shown in regional price data, the ability of the local restaurant industry—as in the rest of the US—to absorb further price increases is limited. Existing cost pressures have already seen prices rise 3.3% over the past year, while prices for competing food at home have dropped by 1.8%.

Additional indirect impacts are likely to occur. Because of their characteristics, expanded polystyrene products are produced near their end user markets, while contracting information from the states of Pennsylvania and Oregon show that most of the alternatives are produced generally elsewhere in the US and overseas.

Shifts in local spending associated with the higher prices will also result in some level of a substitution effect. While a detailed analysis was not performed, rough estimates using factors from earlier studies suggests just over 800 jobs could be lost when including the direct, indirect, and induced effects.

State fiscal impacts will come from two sources. Based on preliminary estimates, state agencies and schools spent an estimated \$3.0 million on expanded polystyrene products in 2016. Their associated disposable food service ware costs will also rise if expanded polystyrene is restricted. In addition, state tax revenues will change, although the actual effect will vary depending on how the affected businesses respond to these higher regulatory costs, due to local business tax structure. The combined effect of these two factors is summarized in the following table.

	Costs Absorbed	Price Increases
State Revenues	-\$1.6	\$1.3
State Costs	-0.9	-0.9
Total	-\$2.5	\$0.4

The potential state fiscal impacts range from a revenue gain of \$0.4 million if affected businesses are able to pass on the full cost of compliance to consumers in the form of higher prices, to an annual loss of \$2.5 million if the affected businesses find they are limited in passing on further costs in the current price environment. Note that under the Price Increases scenario, however, the potential gain to state revenues comes from higher sales and use tax receipts. While this component would be an addition to state revenues, this also represents an additional cost increase of \$1.3 million to consumers, which likely will offset other purchases rather than providing an actual gain to the state.

Background

Study Scope and Purpose

Beginning with Berkeley, California in 1988, a number of local governments and states have considered restrictions and outright bans on the use of expanded polystyrene (EPS) food service ware. As compiled from various websites,¹ at least 128 cities and counties, but no states, have adopted some form of ordinance, ranging widely from restrictions only on local government purchases, to limits on the types of takeout food containers food vendors may use, to broader prohibitions on individual consumer purchases as well. Of these 128 measures, 99 have been adopted by local governments in California, primarily in the San Francisco Bay Area and other coastal areas.

Two bills have been introduced for this purpose in the Maryland General Assembly. Senate Bill 186 and House Bill 229 would enact the following provisions:

- By January 1, 2018, food service businesses would be prohibited from providing food in an expanded polystyrene food service product.
- Sales of expanded food service products and expanded polystyrene loose fill packaging would be prohibited after the same date.
- These prohibitions would not apply to prepackaged foods sourced by a food service business from other vendors or from outside the state, and to packaging for raw, uncooked, or butchered meat, fish, poultry, or seafood.

This study measures the direct impacts of restricting expanded polystyrene food service products and thereby requiring their replacement with generally more costly alternatives. Costs from the proposed ban on loose fill packaging are not addressed, and would be in addition to the impacts identified in this report.

The analysis considers the following factors:

- Fiscal impacts are estimated from: (1) the additional costs from replacing expanded polystyrene food service product purchases by state agencies and by local programs funded by state subventions and pass-through federal subventions and (2) effects on state revenues from restricting purchase and use of these food service ware items by commercial vendors and consumers as well.

¹ (1) Groundswell, Map: Which Cities Have Banned Plastic Foam? (<http://groundswell.org/map-which-cities-have-banned-plastic-foam/>); (2) California Restaurant Association, Local Polystyrene Bans, http://www.calrest.org/uploads/2/6/1/5/26153474/list_of_polystyrene_ordinances_master_020812.pdf; (3) Californians Against Waste, Polystyrene: Local Ordinances (<http://www.cawrecycles.org/polystyrene-local-ordinances/?rq=polystyrene>).

- Direct economic impacts are estimated from the cost differences facing consumers and businesses from requiring replacement alternatives to existing expanded polystyrene food service product purchases. These economic impacts are used to estimate the revenue fiscal impacts above.

The distribution of these cost increases--which would be assumed by the affected businesses through lower profits or passed on to consumers as higher costs--are shown by affected end user sector using available public data from US Bureau of Labor Statistics and US Bureau of the Census.

The estimates contained in this report focus on the direct impacts in order to provide more easily replicable numbers. The intent is to provide more transparent calculations to help inform the policy debates over this issue. While this study does not estimate the additional indirect and induced economic impacts through modeling, the potential scale of these effects are addressed through a review of earlier studies conducted on this issue for other states.

All of the analysis is done from a lowest-cost perspective in order to provide conservative estimates of current product use and the impacts of placing restrictions on these products. Existing purchases by end user are estimated based on the lowest cost prices as determined from a survey of current pricing. Cost impacts from any potential restrictions similarly are calculated from the lowest cost, allowable alternatives.

As such, the conclusions of the analysis should be considered in terms of “at least” amounts. The actual cost impacts are likely to be higher for a number of reasons. Not all end users will make purchases at the lowest cost prices used in the analysis. Many of the alternatives, especially compostable and recyclable products, are produced by smaller companies with less capacity, and prices are likely to fluctuate in face of significantly expanded demand. Many end users are likely to be forced to use higher cost alternatives in order to secure specific performance characteristics required by their offerings that are now available more cost effectively through EPS products (e.g., insulation, sanitary requirements).

On an individual purchase level, the impacts of any proposed restrictions are likely to be experienced as a matter of a few cents. Considered from a broader geographic area such as Maryland as a whole and from the cumulative purchases of an individual or a local business over the course of a year, these added costs will sum up to a more significant level with defined impacts on jobs, incomes, spending, and public revenues.

Note that throughout this study, data sources and reports cited with a date refer to the references listed in the Bibliography.

Expanded Polystyrene Food Service Products

EPS applications for food containers and other disposable food service ware have been in widespread use for more than five decades. Their selection as a preferred food service ware option is driven in many cases by a combination of factors including low cost, availability, and a range of performance characteristics that generally are more costly to duplicate. These features have led to use in a number of situations, as summarized in an earlier study (Keybridge Research, 2009):

PS [polystyrene] foam cups are significantly sturdier and more heat-resistant than either paper or hard plastic alternatives, and they do not conduct heat or lose their shape when holding hot beverages. This prevents the need to “double-cup” or use paperboard or corrugated sleeves, reducing waste and reducing costs.

Food trays made from foam are light but sufficiently sturdy to hold heavy and even oily food products without tearing or leaking.

Prepared hot and cold foods for sale by many food vendors are stored and sold in lidded foam containers that insure insulation and block air exposure, prolonging the life of foods and eliminating spoilage and waste.

PS foam is inert and very stable, which are critical requirements in sanitary applications. Also, PS foam’s chemical composition is not conducive to bacterial growth, which provides hygienic benefits to perishable foods stored in PS foam containers. These benefits are a major reason why PS foam food service products are so frequently used in hospitals, schools, nursing homes, cafeterias and restaurants where it is critical that the food service ware in contact with food be clean and hygienic.

Polystyrene foam products are more affordable than both competing disposable food packaging materials and reusable dishes. Polystyrene foam cuts costs and increases operating efficiency when factoring in the additional resources required by “permanent ware”, including equipment, labor, detergents, water and electricity resources to run dishwashers, and wastewater management.

Keybridge Research, Quantifying the Potential Economic Impacts of a Ban on Polystyrene Foam Food service Products in California, November 18, 2009, p. 4

Beginning with the Maryland Recycling Act and Pennsylvania’s Act 101 in 1988, the states have adopted a range of other methods for waste management in conjunction with traditional practices such as landfills and incineration. With this increased focus, the same characteristics that have made expanded polystyrene food service products the preferred and most cost-effective product in numerous applications have also made them the target of regulatory proposals in some areas. The durability of the products produces a visual impact in the environment when released as litter. Differences among municipal recycling capabilities along with historically limited but now growing markets for recycled plastics have made these products more challenging for waste diversion programs in the past.

At the same time, there are no current perfect replacements because of the unique properties found only in expanded polystyrene food service products. Food service wares from various other materials are currently available in the market, but differ widely in providing comparable product characteristics, generally are available at higher cost and for some biodegradables in more limited supply, and often present their own challenges to litter abatement and to existing and future waste diversion efforts.

There is little data on the contribution of expanded polystyrene food service products to Maryland’s total solid waste stream or on the amounts of polystyrene foam that are currently recycled. However, previous local studies indicate that these products comprise about 1% of the total solid waste stream, with the products covered by the proposed bill making up some subset of that amount.

- A recent waste characterization study for Prince George’s County Brown Station Road Sanitary Landfill (SCS Engineers, 2016) estimated all polystyrene (both expanded and other forms) materials at 1.9% of both residential and commercial waste streams and 2.4% for public schools.
- An earlier study of the Montgomery County Transfer Station (SCS Engineers, 2013) estimated similar results: expanded polystyrene products were 1.1% of the overall waste stream, ranging from 0.9% to 1.1% for residential and 1.2% for nonresidential.

Current recycling rates remain very low, as local programs generally do not accept these materials for curbside recycling. Existing polystyrene foam recycling within Maryland focuses more on packaging materials, although the Earth911 website indicates at least one recycler within the state accepting food service products.²

Definitions Used in the Analysis

The products and affected end users addressed in the analysis are those defined in the proposed legislation:

- The affected end user groups are: (1) Food Service Businesses, including restaurants, fast food style restaurants, cafes, delicatessens, coffee shops, supermarkets or grocery stores, vending trucks or carts, food trucks, movie theater, dinner theaters, and business or institutional cafeterias, including those operated by or on behalf of the state; and (2) others purchasing these products for personal or incidental use. For the purposes of the analysis, the assumption is that all such purchases by this second category would be affected by the legislation, although many would have readily available out-of-state options.
- The affected products would be food service ware used for selling or providing food, including food containers, plates, hot and cold beverage cups, meat and vegetable trays, and egg cartons. As defined in the bills, not included are: “prepackaged soup or other food that a food service business sells or otherwise provides to its customers in expanded polystyrene containers that have been filled and sealed before receipt by the food service business; food or beverages that have been filled and sealed in expanded polystyrene containers outside the state before receipt by the food service business; and materials used to package raw, uncooked, or butchered meat, fish, poultry, or seafood for off-premises consumption.”

Analysis Framework

The basic approach to the analysis is to estimate existing expenditures for EPS food service products that would be affected by the proposed legislation, and compare to the costs for businesses and consumers to buy alternative replacements. The calculations are done through the following steps.

² http://search.earth911.com/?utm_source=earth911-header&utm_medium=top-navigation-menu&utm_campaign=top-nav-recycle-search-button&what=%236+Plastic+-+Expanded.

- Base Case. Existing costs for end user sectors are first estimated assuming no further state-level regulation of food service products. The Base Case is used to compare the cost of requiring a switch to alternative products, and to estimate the potential direct impacts of the proposed legislative restrictions.

Note that even under this case, the relative market share of expanded polystyrene food service products is expected to decline as a result of current market trends. While the overall market projections used for the analysis in this report (Freedonia Group, 2015) show some continued growth in total expanded polystyrene applications, the growth rates for most expanded polystyrene product categories are lower—up to one-half to one-third lower—than for other material types. The Freedonia market projections show absolute growth for expanded polystyrene food service products over the next 10 years, but their relative share is expected to decline as the use of other materials grows faster.

This market share slowing is likely the result of two general trends. First, material substitution is already occurring within some end user sectors, particularly those dealing with higher end consumers and larger chains more able to accommodate the added costs through higher prices or by having available a broader range of potential offsetting cost savings such as greater use of automation to reduce labor costs. Second, other end users have already made changes in their product offerings (e.g., menu changes or serving size reductions) to minimize the cost impact from using alternative food container products.

The key example in this second regard from our surveys of government procurement was the finding that school districts in general have reduced their purchases of expanded polystyrene trays in recent years. Some have moved away from only offering hot entrées requiring rigid trays, to more limited menus or periodic menu replacements with sandwiches and single-item servings such as chicken that can be served in paper boat trays. Others have moved entirely to other alternatives while absorbing the additional costs. For example, Montgomery County Public Schools has shifted to paperboard trays³ at—based on purchasing data obtained from Montgomery and from other school agencies—an additional cost of about \$135,000 annually.

- Lowest Cost Alternatives Case. Costs to end user sectors are then estimated based on the restrictions in the proposed legislation. This case assumes restrictions prohibiting the use of expanded polystyrene food service products but without provisions requiring specific alternatives such containers made from biodegradable/compostable or recyclable materials. Polystyrene foam products would be restricted under this option, but end users would be allowed to use any alternative available in the market. To develop a conservative estimate of the potential direct impacts, this scenario assumes that the lowest cost alternative will be used regardless of whether it is recyclable or biodegradable/compostable.
- Sectors Affected. Both the Base Case and Alternatives Case contain estimates broken down by the core end user sectors, defined as follows:

³ Montgomery Schools Ending the Era of the Foam Lunch Tray, Washington Post, May 18, 2014.

- ✓ Limited-Service Restaurants includes NAICS 7223 (Special Food Services), 722513 (Limited-Service Restaurants), 722514 (Cafeterias, Grill Buffets, and Buffets), and 722515 (Snack and Nonalcoholic Beverage Bars).
- ✓ Full-Service Restaurants includes NAICS 722511 (Full-service Restaurants).
- ✓ Convenience Stores includes NAICS 44512 (Convenience Stores) and 44711 (Gasoline Stations with Convenience Stores).
- ✓ Grocery Stores/Wholesalers includes NAICS 4244 (Grocery Product Merchant Wholesalers), 4452 (Specialty Food Stores), 44511 (Supermarkets and Other Grocery Stores), and 45291 (Warehouse Clubs and Superstores).
- ✓ Non-Commercial includes consumers, government agencies, institutions, non-profits, and others purchasing containers for personal, organizational, or incidental use and not as a component of retail sales.

Existing Sales & Cost of Complying Alternatives

The general approach to this study is: (1) identify existing uses of expanded polystyrene food service products by state agencies, businesses, and the public within Maryland; (2) estimate the cost to replace these items with the lowest cost alternative for a low impact case; and (3) estimate the cost to replace these items with the lowest cost, fully compostable/recyclable alternative for a high impact case. The steps and data used in this approach are described in this section.

Current Expanded Polystyrene Food Service Products Market

Table 1: Base Case: Expanded Polystyrene Food Service Products, Estimated Purchases by End Users Subject to Proposed Restrictions in 2015 (\$ million)

Limited-Service Restaurants	Full-Service Restaurants	Convenience Stores	Grocery Stores/Wholesalers	Non-Commercial	Total
\$17.5	\$5.4	\$2.6	\$6.6	\$8.9	\$41.0

Existing purchases of expanded polystyrene food service products within Maryland were estimated as follows:

- Core data was taken from national sales estimates and projections (Freedonia Group, 2015), which are broken out by product class and material.
- The national figures were then distributed by region using confidential industry market data, broken down by product class and end user sector. This data allowed for taking into account regional differences in consumption patterns and cost structure differences among the core end user sectors.
- The regional estimates for the Middle Atlantic States were then used to develop the Maryland estimates, apportioned by an appropriate proxy which in general was population for non-commercial sales and employment or wages for business sales.
- Prices by product class were estimated from surveys of current price information and government sourcing to determine the cost differences for alternative products. The specifics of this data step are detailed further below.
- The Maryland estimates were adjusted to account for local restrictions previously adopted in Montgomery and Prince George’s Counties. The results in Table 1 incorporate these measures as if they were in effect in 2015, in order to provide a consistent base option for development of the impact estimates. These adjustments assume these local measures are fully effective with minimal nonconforming purchases from outside the localities. Similarly,

the state estimates assume full effectiveness of the proposed restrictions, with minimal nonconforming purchases from outside the state.

The results of this analysis are summarized in Table 1. Total Maryland sales in 2015 are estimated to be at least \$41.0 million, but likely somewhat higher given that the estimates are based on lowest unit cost, generally government prices. This monetary total is down from a comparable estimate for 2011. Although the estimated number of units sold in Maryland in 2015 was higher than in 2011, lower prices in some of the product classes and shifts between product classes produced the total dollar decline.

Range of Disposable Food Container Alternatives

The potential universe of food service alternatives falls within the following general categories:

- Paperboard is a readily available alternative, but for almost all food service applications, paper products include some form of lining such as wax or PE (polyethylene). These linings can present challenges to recycling and composting of these materials. Bioplastic lined products such as PLA are available which can be handled in industrial but generally not home composting facilities, and these products generally carry a considerably higher cost.
- Molded pulp is used for several food service items such as plates, bowls, trays, and clamshells. These products may or may not include a lining, and generally are made from paper. The lined products present the same recycling and composting challenges of lined paperboard, but items with more costly bioplastic linings are also available.
- Bagasse products are made from a sugarcane by-product that is pulped and then pressure formed into the final product. These items are generally made abroad (typically in Asia) and must be shipped to the US. Often marketed as fully compostable, a number of applications include a bioplastic lining or layer which will pose problems for all but industrial composting operations. Similar products are also produced from bamboo and wheat straw.
- Other plastic materials such as non-bottle thermoformed PET (polyethylene terephthalate), OPS (oriented polystyrene), and polypropylene are used in food service applications. Their use as an acceptable alternative will be limited in those cases where insulation is not one of the required product characteristics.
- Most existing plant-based bioplastic alternatives rely on PLA (polylactic acid). PLA can be made from a variety of plant starches, but in the US is made primarily from corn. PLA is biodegradable over different periods depending on the additives used. Its main disadvantage is that it is designed to begin to biodegrade under the same temperature and moisture conditions associated with hot food and liquids. Many suppliers also provide warnings about the temperature and moisture conditions under which these products must be stored, making their use more problematic for smaller operations especially small restaurants, trucks, and carts with limited storage space.

- Aluminum products are available for some applications, such as replacements for some trays, clamshells, and other food containers. The high cost relative to polystyrene foam, paper, and other plastics will limit the use of aluminum in other applications. Aluminum containers also require an associated lid made of a different materials—generally clear polystyrene or a lined paperboard—which must be handled differently if recycling is the waste management option. Although it is already used within the food service industries, broader use is limited by cost.

Because the proposed legislation is modeled more on the Prince George’s County provisions, there are no further restrictions proposed on what type of alternatives may be used, such as Montgomery County’s requirements to use recyclable or compostable products. Consequently, the impact calculations focus on the lowest cost alternatives regardless of their other attributes and marketing claims.

Cost of Disposable Food Container Alternatives

Cost factors for the base case and the cost impact options were determined from the following sources:

- Core unit costs were taken from current low-cost bid contracts issued by various government agencies, using as a base current pricing contained in the current applicable blanket purchase orders (BPO) under the Maryland Department of General Services (DGS): BPO 001B5400500 (Statewide Contract for Disposable and Compostable Food Service Products), BPO 001B5400501 (Statewide Contract for Disposable and Compostable Food Service Products), and BPO 001B64007-1 (Statewide Contract for Disposable and Replacement Food Service Products for Insulated Meal Tray Systems). These contracts cover most product classes with polystyrene foam items, along with pricing for a number of product alternatives as well.
- Additional core unit costs for alternatives were taken from another recently issued contract by the Oregon Department of Administrative Services, Procurement Services, specifically for compostable food service ware (Contract No. 6443, Revision No. 1.1, Food Service Products: Grocery-Disposable, June 27, 2016).
- These prices were then compared to procurement data obtained under the Maryland Public Information Act (PIA) requests to various state and school agencies along with comparable requests to public agencies in other states. Responses were received from over 40 agencies providing detailed procurement data along with current low-bid pricing. Most responders provided data from both FY15 and FY16 to enable the analysis to determine any significant price movements.
- Some local governments which have adopted restrictions on expanded polystyrene food service products also compile information on available sources of complying alternatives. San Jose, CA and Montgomery County, MD include some pricing information which was used to check the price comparisons developed as above. The San Jose data includes pricing both for bulk and retail purchases. Not all items listed in these two information sources, however, are currently available.

- Finally, costs were reviewed on various restaurant supply and other internet sources.

The base pricing in most cases is taken from the public agency procurement document. The result of low bid pricing, this data comes from a market test of generally available low prices in the region. Where the products offered are also generally available on similar terms in the Maryland region, appropriate adjustments are made from the other sources listed above.

For all products, only the main item is considered and not lids. Most of the local ordinances adopted to date do not cover lid materials, and while some of the expanded polystyrene alternatives require same-manufacture lids, the most commonly used items such as hot and cold cups generally accommodate standard sizes.

Alternative costs are determined based on how they are used in practice. For example, stand-alone paper cups are one of the more cost-effective alternatives, but in practice, this cost level applies only to cold cups. Their use as hot cups involves some sort of protection and stabilization such as double cupping or sleeves. Their cost as an alternative is adjusted accordingly and compared to other options that incorporate these features into their design or apply other components such as built-in handles. While the use of sleeves is more common, double cupping produces a more conservative replacement cost estimate for most cup sizes, and consequently is used as the basis for the analysis.

Table 2 summarizes the low cost unit prices identified from the data sources, both for expanded polystyrene products and those made from alternative materials. In Table 2, “Fiber” products include paper, molded pulp, bagasse, and similar materials.

The unit prices of Table 2 were then used to determine the lowest cost alternative product under each of the product categories. The results are contained in Table 3. The average cost premium for each product class was then weighted by total estimated sales to determine the overall average cost premium under each scenario.

Food tray use is analyzed separately. Comparable cost premiums were taken from previous impact studies that conducted a more detailed review of this component of the market, showing the cost premiums ranged from 19% for coated paper to just over 200% for PLA. These factors were adjusted to current pricing through the data analysis described above.

As shown in Tables 2 and 3:

- Base Case: Table 2, Polystyrene Foam column was applied to estimated unit volumes to calculate the estimated sales values in Table 1. For comparison, a 2011 sales estimate was calculated from a comparable price survey conducted in 2012.
- Lowest Cost Alternatives Case: The averages in Table 3 were used to estimate cost impacts from the proposed restrictions where general rather than detailed procurement data is available, including where applicable the product class averages and the overall weighted average.

In all cases, these cost premiums are conservative estimates based on the lowest cost pricing for both polystyrene foam and complying alternative materials. In practice, the cost premiums are likely to be higher, due to the high variability in the cost, supply availability, and performance characteristics required in individual applications. As an indication of the potential range, a number of the public records responses also provided the related MSRP pricing for most items. Based on this data, the actual impacts could be as much as 20% higher than the conservative, low cost estimates on which the analysis is based.

While the analysis is based on current cost differentials, a frequent assumption in government regulations mandating specific material replacements, in particular with “green” materials, is that over time as use increases, economies of scale will produce cheaper prices. For example:

**What is the price difference between compostable products and traditional ones?
Depending on the product, compostables can be two to four times more expensive than traditional products. The price difference has the potential to decrease over time through economies of scale and increased petroleum-plastic prices.**

BSI Biodegradable Solutions, <http://www.biodegradablesolutions.com/faqs.php>

Restaurants also have a concern/perception that switching to compostables will cost more money. This concern may prove to be short-lived if more local distributors participate and the cost of compostables drops.

Seattle Public Utilities (2008), Vol. I, p. 3-11

This assumption requires at least two underlying conditions. First, that there are significant economies of scale that can be achieved. While no means a definitive analysis of the full trends, prices for many of the alternatives considered in this report have not changed significantly over the past 5 years. For example, a similar survey of government procurement in 2010 found the lowest cost for a 12 oz. PLA-lined compostable hot cup at 7.0 cents. Applying the same government discount rates offered in 2010, the same cup from the same source would be priced at 7.8 cents today. In this same period, the lowest cost paper/PLA-lined alternative identified through surveys of government sources was unchanged at 5.5 cents each. Prices for some other alternatives have moderated to some degree since our surveys began in 2005, but not enough to narrow significantly the large price gap that remains for these products.

Second, this assumption also assumes that all other technology will stand still, and that there are no further economies to be achieved in the production of existing products. As indicated above, total dollar sales for Maryland are estimated to be lower than they were in 2011 while sales measured by unit volume have increased. This result is due in part to price decreases for some product classes while prices in others have remained the same, an outcome coming largely from the significant drop in oil and natural gas prices during this period.

Table 2: Unit Cost for Expanded Polystyrene Food Service Products & Low Cost Alternatives by Material Type (\$)

	Expanded Polystyrene	Fiber	With Sleeve/ Double	Fiber/ compostable	With Sleeve/ Double	Plastic (PS, PET, PP)	PLA
Clamshell - 6" 1 compartment	\$0.037	\$0.176		\$0.087		\$0.059	\$0.206
Clamshell - 8" 1 compartment	0.069			0.150		0.121	0.379
Clamshell -8" 3 compartment	0.067			0.150		0.178	
Clamshell - 9" 1 compartment	0.064	0.281		0.159		0.163	
Clamshell - 9" 3 compartment	0.064			0.162		0.178	
Average, Clamshells	\$0.060	\$0.228		\$0.141		\$0.140	\$0.293
Cold Cup - 8 oz	0.017	0.030		0.058		0.019	0.053
Cold Cup - 12 oz	0.021	0.028		0.069		0.025	0.069
Cold Cup - 16 oz	0.037	0.043		0.075		0.046	0.075
Average, Cold Cups	\$0.025	\$0.033		\$0.067		\$0.030	\$0.066
Hot Cup - 8 oz	0.017	0.024	0.048	0.051	0.099		
Hot Cup - 12 oz	0.021	0.032	0.063	0.042	0.090		
Hot Cup - 16 oz	0.037	0.037	0.075	0.050	0.098		
Average, Hot Cups	\$0.025	\$0.031	\$0.062	\$0.048	\$0.096		
Plate - 7 inch	0.013	0.044		0.027		0.127	
Plate - 9 inch	0.019	0.054		0.054		0.240	
Bowl - 8 oz	0.014	0.029		0.029		0.108	
Bowl - 12 oz	0.013	0.036		0.028		0.099	
Average, Plates & Bowls	\$0.015	\$0.041		\$0.035		\$0.144	
Serving Tray - 5 compartment	0.032	0.046					
Serving Tray - 6 compartment	0.043	0.095					
Average, Serving Tray	\$0.038	\$0.071					



 PLA lining
 PE lining

Table 3: Cost Premium for Expanded Polystyrene Food Service Alternatives (\$ per unit)

	Lowest Cost Alternatives	
	<i>Difference (\$)</i>	<i>% Increase</i>
Clamshell - 6" 1 compartment	0.022	61%
Clamshell - 8" 1 compartment	0.052	75%
Clamshell - 8" 3 compartment	0.083	123%
Clamshell - 9" 1 compartment	0.095	148%
Clamshell - 9" 3 compartment	0.098	154%
Average, Clamshells	0.070	112%
Cold Cup - 8 oz	0.002	12%
Cold Cup - 12 oz	0.004	19%
Cold Cup - 16 oz	0.006	16%
Average, Cold Cups	0.004	16%
Hot Cup - 8 oz	0.031	182%
Hot Cup - 12 oz	0.042	201%
Hot Cup - 16 oz	0.038	102%
Average, Hot Cups	0.037	162%
Plate - 7 inch	0.014	108%
Plate - 9 inch	0.035	184%
Bowl - 8 oz	0.016	114%
Bowl - 12 oz	0.015	115%
Average, Plates & Bowls	0.020	130%
Serving Tray - 5 compartment	0.014	44%
Serving Tray - 6 compartment	0.052	121%
Average, Serving Tray	0.033	82%
Weighted Average		95%

Economic Impacts

Total Cost Impacts

Table 4: Summary Cost Impacts (\$ million) to End Users Subject to Proposed Restrictions

Limited-Service Restaurants	Full-Service Restaurants	Convenience Stores	Grocery Stores/Wholesalers	Non-Commercial	Total
\$16.3	\$5.4	\$2.8	\$2.2	\$8.3	\$34.9

Note: Columns may not sum due to rounding

Using the existing sales and cost premium estimates developed in the previous sections, the total additional costs stemming from potential restrictions are summarized in Table 4. Again, these are conservative estimates based on the lowest unit costs, and likely would be larger in actual practice.

The consequences of these cost impacts will vary by individual business and economic conditions existing at the time any restrictions would become effective. Grocery stores have more control over immediate price changes, but also operate within an industry that currently is increasingly constrained by price competition. Restaurants tend to restrict price changes to their schedules for printing new menus. The other end users range somewhere in between.

Table 4 also does not incorporate any assumptions about the price elasticities of demand. In the short term as price increases are introduced, there likely will be at least some reduced demand for the affected businesses at the margin. Over the longer term, any such effects are likely to be reduced as consumers adjust to any higher prices. The end result, however, will in essence be an “environmental tax” of at least \$34.9 million on the affected food sales that will first be imposed on local businesses, but eventually is likely to be transferred to consumers through price increases.

Indirect Impacts

The analysis of this study relies on the direct cost changes as estimated above, and does not include a detailed consideration of indirect and induced impacts as would be done in full economic analysis. However, these further impacts are likely to occur.

First, the immediate adjustments in response to any restrictions on food service ware are likely to see at least some level of substitution. The affected businesses, especially small businesses, are likely to first seek compensating cost savings in other areas such as ingredient use, portion size, or paid labor and the associated labor costs. Consumers faced with higher costs will at least at the margin continue to reduce related food expenditures or substitute other personal cost savings depending on their demand elasticities. These changes in purchases and consumption will be felt in different areas of the regional economy.

Second, because it is relatively light-weight (95% air) product, expanded polystyrene food service products and other expanded applications tend to be manufactured near the end user markets in

order to reduce transportation and warehousing costs. Most of the alternative products available to replace expanded polystyrene tend to be produced in more centralized US facilities due to their manufacturing profile, or are imported due to their raw materials source.

Table 5: Food service Ware Manufacturer Locations

Product	Material	Reference	Manufacturing
Clamshell - 6" 1 compartment	bagasse	OR DAS	China, Thailand
Clamshell - 8" 1 compartment	bagasse	OR DAS	China, Thailand
Clamshell - 9" 1 compartment	bagasse	OR DAS	China, Thailand
Clamshell - 9" 3 compartment	bagasse	OR DAS	China, Thailand
Clamshell - 9" 3 compartment	foam	PA DGS	NY, IL
Cold Cup - 7 oz	paper/waxed	PA DGS	PA, MD, MI
Cold Cup - 7 oz	pla	OR DAS	PA, MI, SC, ID
Cold Cup - 7 oz	ps	PA DGS	PA, MD, MI
Cold Cup - 16 oz	pla	OR DAS	PA, MI, SC, ID
Hot Cup - 8 oz	foam	PA DGS	PA, MD, MI
Hot Cup - 8 oz	paper/pe	PA DGS	PA, TN
Hot Cup - 12 oz	foam	PA DGS	PA, MD, MI
Hot Cup - 16 oz	foam	PA DGS	PA, MD, MI
Plate - 7 inch	bagasse	OR DAS	China, Thailand
Plate - 9 inch	bagasse	PA DGS	China, IL
Plate - 9 inch	bagasse	OR DAS	China, Thailand
Plate - 9 inch	foam	PA DGS	NY, IL
Plate - 9 inch	paper	OR DAS	US
Bowl - 8 oz	foam	PA DGS	PA, MD, MI
Bowl - 12 oz	bagasse	OR DAS	China, Thailand
Bowl - 12 oz	bagasse/bamboo	PA DGS	NY, IL
Bowl - 12 oz	foam	PA DGS	PA, MD, MI
Serving Tray - 5 compartment	foam	PA DGS	NY, IL
Serving Tray - 6 compartment	foam	PA DGS	NY, IL

Source: Pennsylvania Department of General Services, Contract No. 4400015922, Disposable Food Service Products Lot 1, August 29, 2016;
 Contract No. 4400015923, Disposable Food Service Products Lot 2, August 29, 2016;
 Oregon Department of Administrative Services, Contract No. 6443, Revision No. 1.1,
 Food Service Products: Grocery-Disposable, June 27, 2016

To illustrate this point, both the Pennsylvania Department of General Services (PA DGS) and Oregon Department of Administrative Services (OR DAS) procurement contracts used in the cost data survey also include identification of the manufacturing location for many of the expanded polystyrene and alternative material products available through these general contracts. As summarized in Table 5, of the core food service products used in this analysis, expanded polystyrene and some alternative products are manufactured in Maryland or in neighboring/nearby states. PLA is more dispersed. The generally less costly bagasse alternatives are manufactured in Asia, although some domestic production in the Midwest is beginning to develop similar products from wheat straw.

Similarly, Biodegradable Products Institute maintains a list of alternative disposable food service ware producers with products that have been certified as biodegradable or compostable in accordance with ASTM D6400 or D6868.⁴ Of the 88 providers listed, 47 are located in other countries, and none are in Maryland. Even for some the US providers such as World Centric, the US location shown on the Institute list serves primarily as a distribution operation, with the company’s manufacturing currently located in Asia.⁵

Expanded polystyrene, however, is produced regionally, and a primary source of indirect/induced impacts will be from reduced sales/employment/income from the existing regional sources for the Maryland market. Within Maryland in 2015, there were 3 establishments classified under NAICS 32614 (Polystyrene Foam Product Manufacturing) with an estimated more than 200 employees and paying an average annual salary of over \$50,000 (based on comparable regional data). Within the broader region of the Middle Atlantic States (Census Bureau definition), there were a total of 66 establishments with an average employment of 50 and average annual salary of \$47,000. Expanded polystyrene products sold into the Maryland market will generally come from a subset of these facilities.

Proponents for restrictions on food service ware also often maintain that some of the polystyrene jobs lost will be replaced by jobs manufacturing new products from recycling the alternative materials. First, this claim assumes the alternatives are amenable to recycling when, as discussed later in this report, many of these materials will become contaminated with food residue and therefore ineligible for recycling.

Second, even under current recycling programs, a significant portion of the materials collected are exported for recycling overseas, further reducing potential indirect benefits within the region. For example, studies by the California Department of Resources Recycling and Recovery (February 2016; November 2016) show that over one-fifth of recycled materials collected in that state were shipped by sea to Asia in 2015, with just under another 1% shipped out of the state by rail and truck. Such shipments were higher in previous years but have softened as a result of slowing in the China economy and low oil prices (and therefore low prices for recycled plastic resin).

Table 6: Estimates of Direct & Indirect Impacts from Potential Restrictions on Expanded Polystyrene Food Service Products (dollars in millions)

	Lowest Cost Alternatives	
	Output	Employment
Negative impacts associated with decreased final demand for expanded polystyrene food service products	-\$119.6	-554
Positive impacts associated with increased final demand for expanded polystyrene food service products substitutes	\$26.8	125
Negative impacts associated with increased cost of disposal food service ware	-\$55.5	-405
Net impacts	-\$148.3	-834

⁴ http://products.bpiworld.org/companies/category/food_service.

⁵ <http://worldcentric.org/about-us/faq#general10>.

An indication of the potential indirect and induced impacts can be shown through the detailed input-output modeling done by Keybridge Research (2009) for California. Scaling the Keybridge multipliers and applying the estimated direct impacts from Table 5 results in the estimates shown in Table 6. Incorporating direct, indirect, and induced effects, Table 7 indicates total regional economic output would be reduced roughly by \$148 million and employment by over 800.

Note that Table 7 only gives rough estimates of the likely direct and indirect impacts for the Maryland region, as the input/output coefficients and inputs would differ from those used in the Keybridge model and would depend on the extent of the region being modeled. However, the important conclusion from this analysis is that the overall net impact is negative due to the fact that expanded polystyrene food service products are produced within the region, and the available substitutes primarily would be imported from other regions and countries.

Restaurants

Table 7: Full-Service Restaurants Subject to Proposed Restrictions

	Establishments	Employment	Ave. Annual Wage
2007	2,135	60,308	\$16,493
2015	2,531	68,762	\$19,530
Change	18.5%	14.0%	18.4%

Source: US Bureau of Labor Statistics

Table 8: Limited-Service Restaurants Subject to Proposed Restrictions

	Establishments	Employment	Ave. Annual Wage
2007	4,512	63,215	\$14,912
2015	4,951	70,657	\$16,615
Change	9.7%	11.8%	11.4%

Source: US Bureau of Labor Statistics

While the restaurant industry has recovered and grown beyond its pre-recession levels, the proposed restrictions would have the greatest effect on that portion of the industry—limited-service restaurants—where growth has already tapered off. Tables 7 and 8 contain baseline data on Maryland restaurants potentially subject to the proposed restrictions, those located in the state other than in Montgomery and Prince George’s Counties. Full-service restaurants have shown significant growth, with the number of establishments expanding by 18.5% compared to the pre-recession levels in 2007, and total employment growing by 14.0%. Limited-service restaurants have grown at about half this rate, but still with significant employment growth at 11.8%. However, after experiencing most of this growth between 2010 and 2012, the number of limited-service restaurants essentially remained level between 2013 and 2015.

Note that in the tables, average annual wages is a composite statistic that reflects both hourly wages and average number of hours worked. As such, the data shown here and in the following tables do not necessarily indicate the average salary for a full-time worker, but instead address both general wage levels and splits between full-time and part-time workers in each industry.

Sales tax data indicates that the bulk of financial strengthening for the industry has come primarily in the last two years. For Maryland as a whole, sales tax revenue data from the Maryland Comptroller can be used as a proxy measure of overall sales trends, although the Food and Beverage Group data may be affected in specific years by shifts between purchases of food and of alcoholic beverages, which are currently taxed at different rates. As taken from the Sales and Use Tax Industry Tables, taxable sales for Restaurants, Lunchrooms, Delicatessens and for Restaurants and Nightclubs grew at an average combined rate of 3.9% from FY 2012 to FY 2016, with most of the growth occurring only in the last two years consistent with projections from National Restaurant Association for Maryland.

One of the significant effects of the proposed restrictions would be on self-employed and unpaid family workers, especially in smaller restaurants where family income is derived from profits rather than wages. The employment numbers in Tables 8 and 9 cover only wage and salary workers. Not included are self-employed workers and non-wage family workers who derive their incomes from the available profits. In 2015, the American Community Survey shows that self-employed and unpaid family workers in the Maryland Accommodation & Food Services industry were equivalent to 4% of total wage and salary workers. The true scale of restaurant employment would be shown by adding this factor to the employment numbers shown below, or roughly another 5,200 self-employed and unpaid family workers whose income relies on the available profits from their businesses.

Restaurant profit margins are already low, with little room to absorb additional costs. Restaurant profit margin estimates vary by year, but generally average around 4-5% of sales. Analysis of privately held restaurant financial statements by Sageworks show national margins going from a low of 0.4% in 2008 to 4.6% in 2015. National Restaurant Association (2010) broke out the estimates at 5.9% for Limited-Service Restaurants to 2.8% for Full-Service Restaurants.

Doubling the costs of disposable food service products used by restaurants likely will have a low effect on total costs, but will result in a significant reduction on already low profit margins. Previous analysis by Economic & Planning Systems (2012) pegged the cost of “to go” service ware at 1.57% of sales for Limited-Service Restaurants and 0.34% for Full-Service Restaurants. These items cover the same disposable service ware products analyzed in this report. Viewed from this perspective, relatively large movements in the cost of food service ware can have a significant impact on already low profit margins. While the absolute cost of food service ware alternatives may affect the equivalent of only about 1% of total sales, this cost factor represents 27% of Limited-Service profit and 12% of Full-Service profit. Significant increases in the costs of these service ware products—if not passed on directly to consumers in the form of higher costs—thereby can have significant effects on the profitability and continued operations of these businesses, along with related fiscal impacts to state tax revenues.

Restaurants are already having to absorb other major cost increases from government requirements, especially for the labor costs that account for about a third of their total expenses. In general, restaurant prices have already been increasing in response to cost rises faced in several prime components of their cost structures, including labor, rent, and energy. For example, labor costs have been rising with the tightening labor markets, regulatory requirements such as insurance coverage under the federal Affordable Care Act for full-time employees in firms with over 50 employees, and Maryland’s action to raise minimum wage from \$7.25 an hour at the beginning of 2015 to \$10.10 by 2018. Cost increases as contained in the proposed legislation will not be felt in

isolation, but would come at a time when these low margin businesses are already coping with significant increases in their other major costs.

Restaurants have already been forced to make significant price increases in recent years, and may be limited in their ability to pursue this strategy further without reducing market share. The extent of these existing price changes locally are reflected in Table 9, which compares growth in the latest data for the Washington-Baltimore, DC-MD-VA-WV CPI for food away from home (restaurant purchases) vs. food at home (grocery store purchases), along with the comparable US data. Looking at these components shows that while basic food costs are in decline, other growing costs have seen restaurants react with higher prices. This trend is even more pronounced looking at a longer time frame. Looking at the comparable data since 2011, Maryland prices for food consumed at home have increased only 1.2%, while prices for food consumed away from home have leapt 13.9%.

Table 9: Change in Food Prices, November 2016 vs. November 2015

	Maryland	US
Food at Home	-1.8%	-2.2%
Food away from Home	3.3%	2.3%

Source: US Bureau of Labor Statistics,
Consumer Price Index, not seasonally adjusted

The latest Food Price Outlook issued by the US Department of Agriculture expects these trends to continue:

Food-away-from-home prices have been rising consistently month-over-month due, in part, to differences in the cost structure of restaurants versus supermarkets or grocery stores. Restaurant prices primarily comprise labor and rental costs with only a small portion going toward food. For this reason, decreasing farm-level and wholesale food prices have had less of an impact on restaurant menu prices. . . In 2016, ERS predicts food-at-home (supermarket) prices to decrease between 1.25 and 0.25 percent, marking the first year since 1967 that retail food prices could reflect annual deflation.

USDA (2016)

This growing disparity between restaurant and grocery store prices, however, has already had an impact on restaurant traffic and revenues. The latest reports from NPD Group show that nationally, total restaurant visits were flat in both the first and second quarters of 2016, and declined 1% in the third quarter. Quick service restaurant traffic—accounting for 80% of total restaurant visits—declined for the first time in 5 years.⁶

Under these conditions, new restrictions on disposable food service ware would add further cost pressures at a time the local restaurant industry is already coping with rising costs, and consumers are pulling back in the face of the compensating rising prices.

⁶ NPD Group, After Two Consecutive Quarters of Stalled Traffic Growth, Restaurant Visits Decline in Third Quarter, December 6, 2016; Dining Out Falls Victim to Economy, *Wall Street Journal*, June 26, 2016.

Grocery Stores/Wholesalers

Table 10: Estimated Grocery Stores/Wholesalers Subject to Proposed Restrictions

	Establishments	Employment	Ave. Annual Wage
2007	1,671	47,855	\$28,964
2015	1,756	50,678	\$31,127
Change	5.1%	5.9%	7.5%

Source: US Bureau of Labor Statistics

As shown in Table 10, the Maryland grocery industry (outside Montgomery and Prince George's Counties) has seen some growth compared to conditions prior to the recession. The number of establishments has grown 5.9%, and employment nearly kept pace at 5.1%. Note that in Table 10, employment and wage data was estimated for NAICS 45291 from available Middle Atlantic state averages due to non-disclosure limitations. Table 10 also incorporates only the portions of NAICS 45291 related to food sales, as estimated from confidential industry data.

Sales tax data indicates that sales for the state as a whole have largely been flat in recent years. As with restaurants, sales tax revenue data from the Maryland Comptroller can be used as a proxy measure of overall sales trends. As taken from the Sales and Use Tax Industry Tables, taxable sales for Supermarkets and for Independent Grocery grew at an average combined rate of only 0.8% from FY 2012 to FY 2016, with most of the growth occurring only in 2014 and the other years showing lower or negative growth.

Operating data for this industry is more variable given the wide range of enterprise types, but is generally lower for operations more likely to use expanded polystyrene products. Independent Grocers Association (2015) reports the average profit margin for independent grocers ranged between 0.9% to 1.9% between 2007 and 2014. Ahold Delhaize (Giant Food) reported operating earnings of 3.4% and net earnings of 2.2% in 2015. For examples of nontraditional chains, Whole Foods recently has averaged 4.0% and Wal-Mart 3.4%.

These profit margins particularly for independent grocers leave little room for additional cost increases, especially at a time many also are experiencing downward pressure on revenues and profits as core food prices decline. As reported recently in the *Wall Street Journal*:

At least six national food retailers, including Costco Wholesale Corp. and Whole Foods Market Inc., and four of the five largest publicly traded food distributors, including Sysco Corp. and US Foods Holding Corp., have reported that their margins suffered in the last quarter because of food deflation, the first time analysts can recall so many grocers singling out deflation as a big problem.

. . . Grocers such as Supervalu Inc. and Smart & Final Stores Inc. have been hit particularly hard. Even when the volume of products increased, profits have decreased in some categories because the price declines were so steep. Smart & Final's division catering to restaurants sold 42% more packages of eggs during its most recent quarter but recorded a 34% drop in egg revenue because of the lower prices, Chief Executive David Hirz told investors.

*Food Price Deflation Cheers Consumers, Hurts Farmers, Grocers and Restaurants,
Wall Street Journal, August 29, 2016*

The extent of competitive pressures on grocery stores is reflected in the discussion of this issue for restaurants above. As indicated in Table 9, the price component of the regional CPI for Food Away from Home has dropped 1.8% in the last year. Since 2011, this price component has increased a total of only 1.2%, a deflationary situation that has already made many traditional grocery outlets vulnerable to lower cost competition.

Similarly, the grocery industry faces many of the same general cost increases affecting restaurants. Labor costs have been rising with the tightening labor markets and regulatory requirements such as insurance coverage under the federal Affordable Care Act for full-time employees in firms with over 50 employees. With relatively fewer minimum wage employees, this industry will not be as immediately affected by Maryland’s action to raise minimum wage are restaurants, but will be as the rate reaches \$10.10 in 2018 both directly and indirectly as wage compaction forces wage increases in other classifications.

Convenience Stores

Table 11: Convenience Stores Subject to Proposed Restrictions

	Establishments	Employment	Ave. Annual Wage
2007	1,432	11,297	\$17,810
2015	1,579	13,453	\$18,686
Change	10.3%	19.1%	4.9%

Source: US Bureau of Labor Statistics

Convenience stores outside Montgomery and Prince George’s Counties have expanded 10.3% compared to pre-recession levels in 2007, but employment has grown almost twice as fast. The data in Table 11 covers both stand-alone stores and gasoline stations with convenience stores. For the gasoline station segment, fuel constitutes about 75% of sales, with the remainder consisting of groceries, cigarettes, alcoholic beverages, prepared foods, and other items (First Research 2012). Convenience stores with no fuel sales generate about 35% of sales from groceries, 25% from tobacco products, and the remainder from other items including prepared foods and lottery tickets. Nationally, the industry is split between larger operations, and single-store operators that comprise over 60% of the total stores. Similar to independent grocery stores, profit margins are fairly low, in the 1.5% range.

Overall, potential cost impacts to this industry are about 30% higher than the broader grocery industry, and average costs will be higher given the smaller number of affected establishments.

Although convenience stores concentrate more on a smaller number of higher volume products, they still face many of the same price and cost factors currently impacting the restaurant and grocery industries. The high incidence of single-store operators, however, suggests that impacts to net incomes will likely be higher in an industry that has less room for price increases that would increase their competitive disadvantages with the previous industries.

Non-Commercial

The primary components of this sector that would be affected include local government agencies, nonprofit organizations, retail sales of the affected products, and various institutions such as hospitals, colleges and universities, and churches. City agencies are described in detail in the following Fiscal Impact section.

Fiscal Impacts

Fiscal Impacts: State Tax Revenues

Table 12: Summary Fiscal Impacts: Annual State Revenues (\$ million)

	Costs Absorbed	Price Increases
Changes in revenues	-\$1.6	\$1.3

The primary Maryland business taxes cover the following items:

- 6% sales and use tax.
- 9% alcohol tax.
- 8.25% corporation income tax rate.
- Personal income tax rate of 2% to 5.75% for pass-through business types taxed at personal rates.

The exact effect on local revenues will depend on how the affected businesses react to the higher costs. Initially, businesses may be forced to absorb some or all of the costs, especially restaurants who have already gone through a period of price increases and grocery stores facing increasing price competition from low-cost operators in a period of food price deflation. The affected businesses may also seek offsetting costs savings, such as reduced labor costs through additional automation or in the case of family-owned firms, reduction of paid labor and greater use of owner and unpaid family worker labor. Other cost reduction strategies may include reducing menu or product offerings, portion reduction, ingredient substitution, or shifting business models (e.g., replacing table service with counter service operation). However, cost reduction strategies are likely to be limited as most of the affected businesses have likely already adopted most of these strategies in response to other rising costs, especially federal health care insurance requirements and Maryland's increasing minimum wage. Over time, the costs are likely to be shifted to consumers in the form of higher prices, although as indicated in the previous section, most of the affected end users have already gone through a period of price increases or have limited competitive options for pursuing this approach.

The effects of these strategies are summarized in Table 12. In each instance, the revenue effects shown are only those directly related to the increased service ware product costs. Changes in tax revenues due to reduced sales as a result of demand elasticities as prices rise are likely, but are not incorporated into the calculations.

- In the case of Cost Absorbed, state revenues would decline at least \$1.6 million through lower corporate and personal income tax receipts (from pass through entities) but somewhat higher sales and use tax from retail sales of the alternative products. As with the previous

cost impact analysis, this estimate assumes one-for-one replacement of current expanded polystyrene product use with alternatives, although the significantly higher costs are also likely to result in fewer purchases. In addition, the full effects that would be triggered by these additional costs in concert with other cost pressures on these industries likely would be larger. As discussed previously, the analysis is based on businesses and consumers purchasing the lowest cost alternative, while higher priced substitutes are likely in many cases for a variety of reasons.

- In the case that prices are raised to match the additional costs, state revenues would rise by at least \$1.3 million as a result of additional sales and use tax charged on the higher prices. Again, this amount is likely to be larger as product substitution will not always be at the lowest cost alternative. More importantly, while this amount would represent an increase to state revenues, it would fall as an additional cost of the proposed restrictions on the public and businesses.
- The case where state businesses are able to obtain other cost reductions is not analyzed in the table, as cost savings would be expected to net out the additional cost for alternative products. The primary effect would be an increase of sales tax from retail sales of the alternative products of \$100,000 or less. However, additional effects are possible. Once a decision is made to put cost strategies into effect, some may lead to additional economic changes. For example, to the extent these costs combined with other pending costs increases lead to greater automation by the affected businesses, a greater number of existing jobs would be affected given the required investment levels to achieve an efficient level of automation. Such changes would have a broader effect on the cost structure of the affected businesses, along with additional but unknown changes on state revenues from both business taxes and a drop in income from the jobs affected by such a move.
- Indirect effects, such as those suggested by the rough estimates in Table 7, will also affect state revenues, although these factors are not incorporated into the estimates above.

As shown in Table 12, the potential fiscal impacts on local revenues range from a loss of \$1.6 million if the affected businesses absorb the costs, to a gain of \$1.3 million annually if the costs are fully passed on to consumers. These additional tax payments of \$1.3 million—stemming primarily from the local sales and gross receipts taxes—would also likely be shifted to consumers.

Fiscal Impacts: State Costs

As providers of meals under various programs, state agencies would face additional costs similar to those imposed on other food providers subject to the proposed restrictions. Fiscal impacts from state costs are estimated based on FY 2016 expenditure and cost data. We have requested purchasing data from the relevant agencies under the Maryland Public Information Act, and a number have already provided usable data. However, given the legislative deadlines, the following section contains preliminary estimates of the full state purchases based on the responses received to date, previous information on Maryland purchases obtained for a prior study of similar proposals, comparable data obtained from agencies in other states, and state budget data. The information presented below, however, consists of preliminary estimates and will be updated as additional procurement data is received.

The primary state-funded food programs potentially affected by expanded polystyrene food service product restrictions are summarized in Table 13. Where available, the total cost figures cover food, personnel, and other expenses from the FY 2016 appropriations. In addition to these budgeted programs, various agencies may also purchase disposable food service ware for incidental use or other program purposes.

Table 13: Primary State Food Provider Programs (\$ million)

Agency	Program	Total Cost, FY 16
Aging	Older Americans Act Nutrition Services	\$ 11.0
Education	Food Services Program	354.9
Health & Mental Hygiene	Various	n/a
Higher Education Institutions	Student meal plans	n/a
Juvenile Justice	Food services	n/a
Hospitals	Meals Program, children of parents w/ illnesses/diseases	n/a
Maryland School for the Deaf	Food services	n/a
Public Safety & Correctional Services	Food services	n/a

Source: State of Maryland Budget Documents

Table 14: Estimated Expanded Polystyrene Food Service Products Purchases (\$)

	FY 16 Purchases
State Agencies	\$ 429,000
Schools	2,587,000
Total	\$3,016,000

Current use by these programs was estimated from the following factors:

- Data for Public Safety, Juvenile Justice, and School for the Deaf was estimated based on their reported purchases from the DGS blanket purchase orders. The reported figures cover all material types, however. The expanded polystyrene component was estimated using average factors obtained from comparable agencies in other states.
- Data for Education was based on the current procurement data responses provided by Montgomery County Schools and Anne Arundel County Schools, applied to K-12 public enrollment numbers. The major component, trays, was estimated based on the unit data provided in these responses rather than the general factors of Table 3. Although we have not yet received their MPIA response, the estimates assume that Prince George’s County Schools use the same alternative material trays as Montgomery County Schools.
- Data for Aging and Hospitals was estimated using average factors obtained from comparable agencies in other states.
- Data was not estimated for Higher Education as student meals are mixed as to whether they are provided by outside contractors or the school operations. Some data is being obtained from contractors in both Maryland and other states that will be used in the update to address this component.

In Table 14, because the information is primarily estimated at this point, the numbers given should be considered as reasonable upper bounds, and could range to over \$3 million depending on the delivery methods, selected vendors, and foods served in any given year.

Applying the cost premiums developed in Table 3 (applied by product class for the schools), the additional costs to state costs are summarized in Table 15. The overall impact ratio is smaller than for the broader economic impacts developed previously as the costs are dominated by estimated tray purchases by the schools.

Table 15: Summary Fiscal Impacts: Annual Procurement Costs (\$ million)

	FY 16
State Agencies	\$408,000
Schools	488,000
Total	\$896,000

Combining Tables 14 and 15, total annual Fiscal Impacts to the state are summarized in Table 16. As indicated, total state fiscal costs could range from a net cost of \$2.5 million to a gain of \$400,000 depending on how businesses react to these additional costs. However, the potential gain incorporates the additional sales tax cost of \$1.3 million to consumers, which likely will offset other purchases rather than providing an actual gain to the state.

Table 17: Summary Fiscal Impacts: Total Annual Local Costs (\$ million)

	Costs Absorbed	Price Increases
State Revenues	-\$1.6	\$1.3
State Costs	-0.9	-0.9
Total	-\$2.5	\$0.4

Fiscal Impacts: Local Costs

While local fiscal impacts are not included in the analysis of this report, a frequent claim of restrictions such as those proposed in the legislation is that local solid waste management programs will be able to obtain cost savings as one component of the solid waste stream—expanded polystyrene—that has challenges for diversion purposes will be replaced with materials more amenable to recycling and composting. Strictly applied, however, the end result is generally more likely to be the replacement of one form of lighter weight solid waste with another heavier one. This outcome is even more likely to occur in the absence of companion efforts—and substantial additional public and consumer costs—to develop local capabilities to divert either the existing waste stream through more recycling or a new stream through changes to local recycling and composting infrastructure.

Many of the product alternatives are promoted as recyclable, and in their original or cleaned state many technically are. But in practical applications, the least costly alternative in most cases is a paper, pulp, or paperboard application. Most local recycling programs do not accept these materials if they become contaminated with food or grease, making them unacceptable for recycling but more critically potentially contaminating other larger amounts of otherwise recyclable paper products. In

addition, most local programs allow containers to be recycled only if they have been rinsed or cleaned, meaning a recycling requirement for disposable food containers can be effective only if the public is willing to take the time to clean more of their garbage.

The effectiveness of recycling attributes also assumes the public is willing to recycle more, while the most recent data shows the opposite is happening. Even incorporating the source reduction credit, data from Maryland Department of the Environment shows the state waste diversion rate went from a high of 48.9% in 2011 and 2012, to 47.6% in 2014.⁷ Several other states have experienced similar or steeper downturns in recent years.⁸

Similarly, a number of food service product alternatives are marketed as “compostable” or “biodegradable,” but many also contain limitations in this regard. Disposable food containers designed for hot food and liquids necessarily are designed to withstand the conditions found in many composting operations. Others such as paper or molded pulp may contain a PE, wax, PLA, or other lining that can complicate or contaminate the compost process. Many of these products are also designed for industrial compost facilities, and not home composting operations, with many including warning labels such as the following:

- **In order for solid products to biodegrade, they must be broken into small pieces and left uncovered in the sunlight. Disposing of a biodegradable product in your normal trash, where it will eventually be disposed of in a landfill, will not allow the product to biodegrade.**
- **Due to the variability in conditions, we do not recommend Greenware® products for use in home composting. Greenware® products are certified by the Biodegradable Products Institute (BPI) to meet international standard ASTM 6400 for compostability in industrial compost facilities, which carefully regulate temperature, moisture and turning.**
- **Our PLA products are compostable in commercial compost facilities, but unfortunately not in your home compost.**
- **Our sugarcane products are compostable in commercial compost facilities, but unfortunately not in your home compost.**

The desirability of compostable products also relies heavily on the availability of appropriate composting facilities. Few localities have invested in this required infrastructure. For example, Montgomery County adopted a ban on expanded polystyrene food service products but also incorporated a requirement that replacements be recyclable or compostable. Yet, their information materials on the ban include the following warning:

Compostable means the material will break down into, or otherwise become part of usable compost soil-conditioning material in a safe and timely manner in an appropriate composting program or facility. *Currently, there is a very limited number of compost facilities*

⁷ Maryland Department of the Environment, Maryland State, County and City Recycling, <http://mde.maryland.gov/programs/Land/RecyclingandOperationsprogram/StateCountyandCityContactInfo/Pages/programs/landprograms/recycling/local/recyclingrates.aspx>.

⁸ Washington Post, American Recycling is Stalling, and the Big Blue Bin is One Reason Why, June 20, 2015.

*accepting food scraps and compostable food service ware in their composting operations in existence serving the region.*⁹ [emphasis in original]

These same characteristics also limit the applicability of many disposable food container alternatives as a litter solution. Degradability within the natural environment occurs only when the necessary moisture, temperature, and microbial conditions are met, and several studies (California Integrated Waste Management Board, 2007; Innocenti, 2005; Nolan-ITTU, 2002) have identified and measured the persistence of these materials when littered.

The promotion of biodegradable attributes to the public may also run counter to anti-litter efforts, by fostering the mistaken belief that the products will degrade naturally if discarded. For example, prior to its most recent action, San Francisco enacted a requirement in 2007 that food vendors use compostable or recyclable rather than expanded polystyrene food service products. Litter audits conducted before the restrictions and for two years after, however, showed (Table 17) that while the incidence of polystyrene in litter dropped 41% overall, the relative share represented by the categories containing food service ware for all materials generally increased (except for boxes).

Table 17: Percent of Total Large Litter from Food service Ware Categories, San Francisco Litter Audits

	2007	2008	2009
Cups	6.4%	6.4%	8.9%
Take-Out Extras	3.0%	3.8%	4.1%
Wraps	1.8%	3.6%	3.4%
Boxes	1.2%	3.4%	1.9%
Trays	0.2%	0.1%	0.5%
Total	12.6%	17.3%	18.8%

Source: San Francisco Environment Department, The City of San Francisco Streets Litter Re-Audit, 2009

Consequently, simply replacing one component of the solid waste stream has yet to demonstrate actual savings on the local level, taking into account costs saved from handling expanded polystyrene, the extent to which alternatives can be properly recycled or composted, and the comparative costs of local investments/local rate increases required for facilities to divert either the existing materials or their eventual replacements.

⁹ Montgomery County, Department of Environmental Protection, Q&A: Ban on the Use and Sale of Expanded Polystyrene Food Service Ware in Montgomery County, Maryland.

About the Author

This report was prepared by Michael Kahoe, who serves as a strategic partner at MB Public Affairs, Inc. Founded in 1997, MB Public Affairs, Inc. provides clients a unique combination of research capabilities, public policy issue expertise, strategic analysis, and communications skills. MB Public Affairs, Inc. provides research consulting services to trade associations, private business interests, non-profits, and government organizations. With offices in Sacramento, CA and Austin, TX, the firm has worked for clients across the country on federal, state, and local issues.

The principals at MB Public Affairs, Inc. have worked in the public policy arena for decades. Mr. Kahoe is a recognized public policy expert who specializes in state and national regulatory matters and government relations. He has nearly 40 years of experience working on environmental, regulatory, and natural resource issues in California and other states, including Assistant Secretary of the former Environmental Affairs Agency, Deputy Secretary and part of the original team that created the California Environmental Protection Agency, and Deputy Cabinet Secretary over the State's environmental, energy, natural resources, regulatory, and agricultural agencies.

Prior to service with the State of California, Mr. Kahoe was an environmental consultant with Bay Area consulting firms and worked for the Fresno County-City Economic Development Program. He holds an MBA in Finance from University of California, Berkeley, MA in Economics from University of California, Santa Barbara, and BA in Social Relations from Immaculate Heart College.

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