

The Economics of Land Use



Final Report

Economic Impact Analysis of EPS Foodware Costs

Prepared for:

City of San José

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1. INTRODUCTION AND FINDINGS

This economic impact study has been developed to inform policy makers on the anticipated impacts of a proposed ban on Expanded Polystyrene (EPS) Foodware. The City of San José seeks to restrict the use of EPS due to the disproportionately negative impacts of EPS on local streams and waterways. A proposed ban would affect all food service establishments in the San José city limits and would be part of a growing trend where over 60 California local governments have prohibited the use of EPS take-out foodware. As of the date of this report, the Cities of Sunnyvale, Mountain View, Morgan Hill, and Cupertino are also proposing citywide bans of EPS foodware.

The City of San José is considering banning the use of EPS foodware ("to go" ware). The central purpose of the ban is to eliminate this key pollutant to improve water quality. Secondary reasons for prohibiting the use of EPS foodware are to reduce landfill trash, improve material recycling, and help the City meet its National Pollutant Discharge Elimination Systems (NPDES) requirements. As part of the City of San José's consideration of a proposed ban, the City is concerned about the potential, unintended impacts of the proposed ban on the City's restaurant industry and on its small, independent restaurants in particular. The purpose of this report is to inform the City's policy decisions concerning EPS by assessing the potential impacts of the proposed ban on the City's restaurant industry.

This assessment takes an independent look at the available information on the City of San José's restaurant industry and the broader context of restaurant industry operations as well as available literature on industry responses to cost increases and consumer responses to menu price increases. The assessment has been informed by the work of Cascadia Consulting Group on differences in packaging costs by product type (see Cascadia Consulting Group, "EPS Food Service Ware Alternative Products: An Evaluation of Costs and Landfill Diversion Potential," August 2012 [the Cascadia Report]). It should be noted that this analysis was conducted using an earlier version of the Cascadia Report that included more conservative (higher) estimates of the cost differential between EPS and alternative products (as well as the lower, expected differentials presented in the current Cascadia Report). As a result, this economic analysis presents conservatively high estimates of cost differentials and associated impacts.

The assessment has also been informed by the input of independent advisor and packaging expert, Dr. Fritz Yambrach, Director of the Packaging Department at San José State University (see **Appendix A**) and input from restaurant operators based in the Bay Area and elsewhere.

In addition, this report presents an analysis of potential customer responses to restaurant price changes (see **Appendix B**) as well as a brief synopsis of the experiences of other Bay Area cities that have implemented ordinances restricting EPS (see **Appendix C**).

There is limited information available on the actual use of EPS by restaurants in San José, and inevitable uncertainty on the specific responses of different restaurants to the ban. As a result, different scenarios and sensitivity analyses were conducted to evaluate potential impacts on restaurants of different types and circumstances.

Most foam foodware is made from EPS foam beads, while some (including plates, trays, and some clamshells) are made from extruded polystyrene foam sheets (which the industry abbreviates as "XPS"). All such products are referred to in this document as EPS.¹

Summary of Findings

- 1. The City of San José includes a diverse variety of restaurants as measured by sales, employment, independents/chains, full-service/limited-service, menu prices, and food offerings.** Even in the aftermath of the Great Recession, the City of San José has a substantial restaurant industry. Sources of information on restaurants place the number of eating places/ restaurants in the City at between 1,650 and 2,000 establishments.² Based on the detailed Dunn and Bradstreet information on restaurants in San José, about 63 percent of these restaurants are full-service restaurants and 37 percent limited service.³ Single-site restaurants represent about 73 percent of San José restaurants. Within the single-site classification, about 78 percent are full-service and 22 percent are limited service restaurants.
- 2. The restaurant industry is highly competitive and restaurants are continuously dealing with changes to input costs.** The long historical upward trend in U.S. consumer demand for "food away from home" and the scale of overall demand continues to attract new restaurants to the City of San José. Existing and new restaurants face significant competition based on quality, prices, convenience, and experience; the failure rates among new U.S. restaurants are especially high in the first five years of operation. At the same time, restaurants must continuously adjust to cost variations. Many food and other costs vary monthly and these fluctuations can often be quite significant.
- 3. The proposed ban on EPS will increase packaging costs for restaurants currently using EPS.** The Cascadia Report provides detailed documentation on current price points of a range of "to go" ware products – cups, clamshells, bowls, and plates – for EPS and alternative products. On average, unit costs for suitable alternative packaging (paper/fiber or plastic) are currently twice those of EPS. For example, the average cost for a 7-inch plate

¹ "Styrofoam" is a trademark of The Dow Chemical Company for extruded foam products used as building materials and craft supplies. Although foam cups, bowls, clamshells, and trays made from EPS foam beads or from extruded polystyrene foam sheets (XPS) are commonly referred to as "Styrofoam" by the public and in the media, Dow's Styrofoam products are not used to make foam cups or any other food service products.

² This includes estimates from Dunn and Bradstreet and InfoUSA, the two leading private providers of business information. It also encompasses information from the City of San José business tax database sorted to identify restaurants/ private eating places.

³ Full-service restaurants are defined as those establishments with waiter/waitress service and where an order is taken while the patron is seated. Limited service restaurants are defined as those establishments in which patrons order at a cash register, use a drive-thru or select items from a food bar. The term limited service café is a term used by Economic & Planning Systems, Inc. in this report to refer to cafes/ coffee shops.

increases from \$0.03 for EPS to \$0.05 for a fiber plate, a 8-inch 1-compartment clamshell increases from \$0.12 to \$0.24, and a 12-oz hot cup increases from \$0.03 to \$0.09. Average unit cost increases by product type generally ranged from 40 to 100 percent, with the exception of hot cups, which averaged a three-fold increase. It should be noted that neither the Cascadia Report nor this report considers additional effects of an EPS ban on restaurant operating costs, such as reduced storage costs due to the more compact storage qualities of alternative materials.

- 4. The San José restaurant industry as a whole will not be substantially affected by an EPS ban.** While varied in nature, the academic research and professional analysis reviewed regarding restaurant responses to cost increases as well as customer responses to price increases indicate that the demand for restaurant offerings (food away from home) is generally inelastic and remains strong even if the menu price increases. Cost increases associated with the proposed EPS ban will be more restaurant-specific, and to the extent that individual restaurants cannot adjust to or absorb the cost increases, a substitution away from affected (heavier EPS users) restaurants to unaffected restaurants (lighter/non-EPS users) would be expected. As a result, overall sales at San José restaurants as a whole are not likely to be affected.
- 5. The impact on individual restaurants currently using EPS will vary based on a number of factors.** Interviews with restaurateurs and available cost data indicated that restaurants are continuously dealing with changes in costs. There are a number of strategic responses employed by restaurants in the face of increasing costs that first seek to adjust costs/pass-on costs before accepting a reduction in profits or a noticeable increase in menu prices (and associated loss of sales). These strategies include reducing other costs, re-envisioning use of the more costly material, and increasing menu prices in the least noticeable manner. They are also often implemented over time, lessening the longer-term impacts of the cost increases. The sensitivity analyses conducted in this report identified: (1) current profit margin relative to industry average, (2) proportionate expenditure on "to go" ware, (3) proportionate use of EPS among "to go" ware expenditures, and (4) restaurant opportunity/ability to manage cost changes without reducing profit or losing customers.
- 6. Full-service restaurants will be the least affected.** "To go" ware expenditures are a substantially lower proportion of sales revenues for full-service restaurants – estimated to average 0.3 percent. Even with a significant use of EPS among "to go" ware materials, the overall impact of the proposed ban is unlikely to be significant for the large majority of full-service restaurants.
- 7. The impact of the proposed ban on limited-service restaurants will range from none to substantial.** On average, limited-service restaurants are estimated to spend about 1.6 percent of sales revenues on "to go" ware. In cases where no EPS "to go" ware is used, there will be no impact from the ban. In cases where limited service restaurants are making average industry pre-tax profits (about 6 percent), the impacts will only be substantial under the most conservative scenario. Such a scenario assumes the large majority of "to go ware" expenditures to be on EPS and restaurants being unable to offset the cost increases (and so primarily fund the cost increases out of their profit margins). In cases where profit margins are well below the average, the impacts on heavy EPS users will be more substantial as a proportion of lost profit.

- 8. Particular types of limited service restaurants are more likely to be affected by the cost increases, though these cost increases will rarely be the sole cause of a market exit (restaurant closure).** More substantial impacts will be experienced by restaurants with heavy use of EPS cups for hot liquids; for smaller, lower revenue restaurants with less capacity to gather, analyze, and respond to cost data and changes; and restaurants with minimal profit margins. Coffee shops/cafes may be more affected as the packaging cost increases are proportionally higher for heavy users of EPS hot cups than for other product types (clamshells, bowls etc.). The cost increase associated with the proposed ban is only likely to result in a market exit where profit margins were already very low and restaurants were already vulnerable to fluctuations in other costs.
- 9. If the proposed ban is adopted, the implementing approach of other communities provides some useful guidance.** Interviews with staff at other Bay Area cities enacting a similar ban (see **Appendix C**) as well as in other geographic regions provided important conclusions on practices for effective ban implementation, including: (1) providing sufficient notice that restaurants are able to use their existing inventory; (2) providing sufficient information on alternative products so restaurants can start to explore alternatives and make strategic changes prior to the ban enactment; (3) supporting the transition by providing clear information to restaurants on acceptable alternatives; and, (4) having a clear and transparent enforcement process. Several of the Bay Area cities interviewed offered hardship exemptions though there were no recorded cases of exemption application. There are three primary approaches to hardship exemption that the City of San José could consider: (1) providing no hardship exemptions to avoid the administrative complexity and different approaches for different types of restaurants; (2) providing a general opportunity for hardship exemption, similar to other cities, where the restaurant must come forward and explain its unique circumstances that make an exemption important; (3) establishing hardship exemptions for the types of restaurants that might be most affected (e.g. small, single-site, limited service restaurants with modest annual gross sales revenues). Similarly, distinctions in the timing of phase-in for the ban could be made between different types of restaurants.

Report Organization

In addition to this chapter, this report includes four additional chapters. **Chapter 2** provides a brief overview of restaurant industry market dynamics and the City of San José restaurant industry. **Chapter 3** provides estimates of potential cost impacts of the proposed EPS ban, based on the Cascadia Report and additional research. **Chapter 4** characterizes the uncertain cost environment of restaurant operations and describes the potential responses of restaurants to cost increases, including findings on customer response to menu prices increases. Building from the research in the preceding chapters, **Chapter 5** develops and analyses a series of impact scenarios designed to assess the potential level of ban impact on different types of restaurants operating under different types of conditions.

2. SAN JOSÉ RESTAURANT INDUSTRY OVERVIEW

The City of San José has a large, vibrant, and varied restaurant industry. This chapter provides a brief overview of both the broader restaurant industry context and the composition of the City of San José's existing restaurant industry based on available information.

Industry Context

The U.S. restaurant industry is a highly competitive industry with particularly high rates of failure in the early years of operation. A study conducted by Cornell University and Michigan State University observed restaurants in three local markets over a ten year period. They concluded that after the first year 27 percent of restaurant startups failed; after three years 50 percent failed; after five years 60 percent failed; and after 10 years 70 percent of restaurants startups had failed⁴. Average profit margins are modest, contributing to the low survival rates and making the restaurant industry especially susceptible to the effects of economic downturns and associated reductions in spending. The 2010 National Restaurant Association's (NRA) Restaurant Industry Operations Report, a nationwide study conducted in conjunction with Deloitte, found that the average profit before taxes was 5.9 percent for limited service restaurants and 3.0 percent for full-service restaurants.⁵

The restaurant industry as a whole has grown substantially over time, driven by increasing household expenditures at restaurants. U.S. households today spend a larger percentage of their total food expenditures on food away from home (FAFH) than ever before.⁶ Since the 1920s, U.S. food expenditures have continued to shift away from food at home (FAH), resulting in an almost even distribution between FAH and FAFH (see **Figure 1**). In 1984, the average U.S. household spent \$1,320 on FAFH (or 29 percent of total food expenditures) whereas in 2009, the average U.S. household spent \$2,619 on FAFH (or 41 percent of total food expenditures).⁷

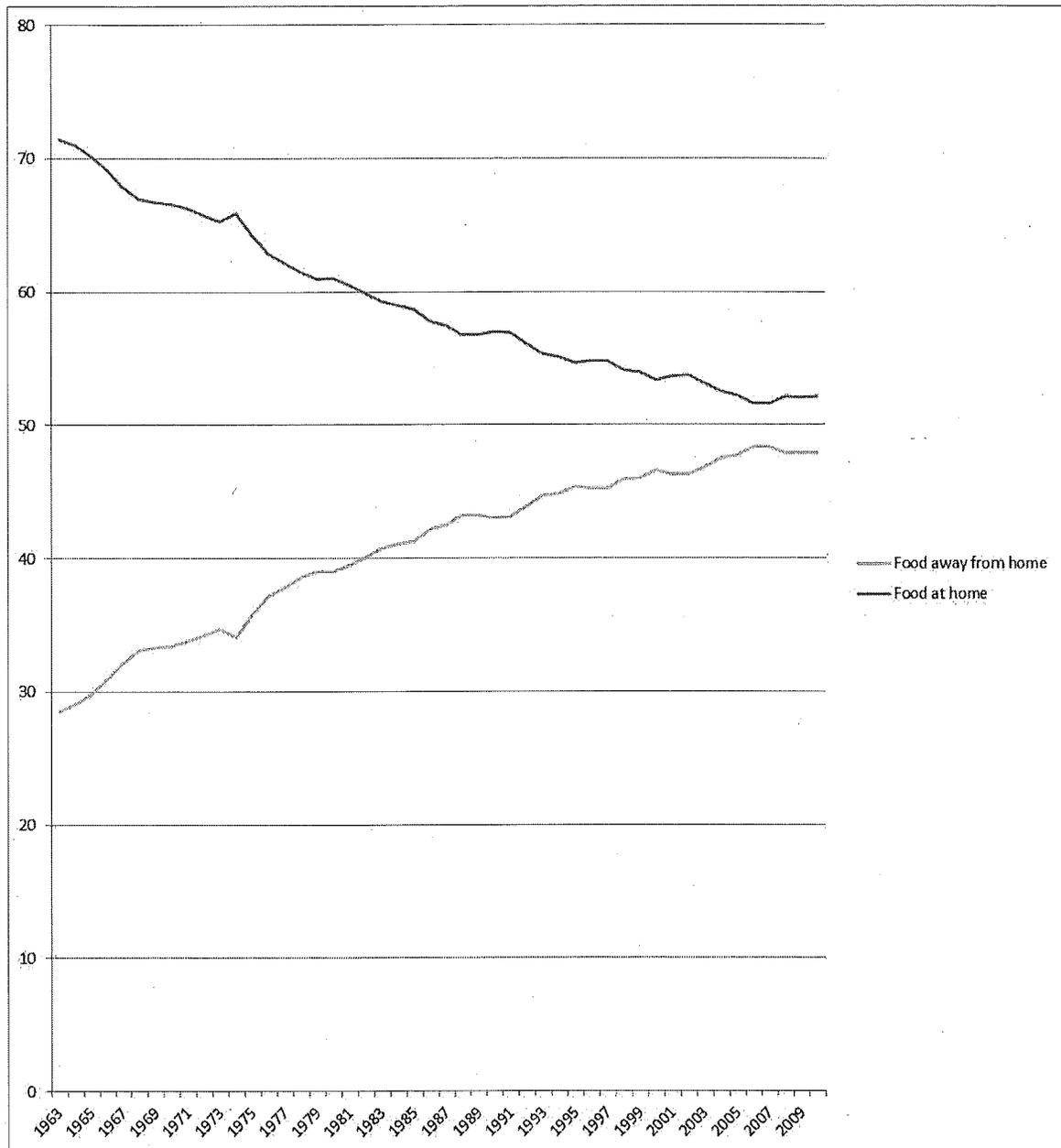
⁴ Parsa, H.G., Self, John T., Njite, David, King, Tiffany (2005) Why Restaurants Fail. *Cornell Hotel and Restaurant Administration Quarterly*, volume 46, number 3.

⁵ According to the NRA, this difference can be attributed to lower cost of food and beverages and lower staffing costs for limited service restaurants (despite higher paper supplies and packaging costs).

⁶ Food away from home (FAFH) includes full and limited service restaurants.

⁷ U.S. Department of Labor, BLS Consumer Expenditure Survey.

Figure 1 Shares of Total Food Expenditures



San José Restaurant Industry

The City of San José has a substantial numbers of eating places. According to detailed information on City businesses compiled by Dun and Bradstreet, there are 1,665 eating places within San José's city limits. Based on available data (self-reported by businesses) from Dun and Bradstreet, the following additional observations can be made about the restaurant industry:

- **Restaurant Types.** Among San José restaurants, about 64 percent can be classified as full-service restaurants and 36 percent as limited-service restaurants. About 73 percent of all restaurants are single-operation restaurants, while 27 percent are multi-site restaurant operations/chains. Of single-site restaurants, about 78 percent are full-service and 22 percent are limited service. About three-quarters of multi-site restaurants are classified as limited-service and one-quarter as full-service.
- **Employment.** In terms of number of employees, about 50 percent of single-site restaurants reported five employees or less and 70 percent nine employees or less in the City of San José. Employment at individual San José sites for restaurants with multiple sites were considerably larger with 40 percent reporting between 10 and 19 employees and 29 percent between 20 and 49 employees.
- **Restaurants Sales.** Full-service, single-site restaurants reported average sales of about \$305,000 each year and limited-service, single-site restaurants reported average sales of about \$265,000 each year. This is considerably below the medians reported by the 2009/2010 National Restaurant Association survey of \$830,000 for limited service restaurants and between \$1.13 and \$1.85 million for full-service restaurants (depending on menu price point), though this survey included single-site and multi-site/chain restaurants.
- **Restaurant Date of Establishment.** About one-quarter of current restaurants in the City of San José were established after 2009, with a total of 40 percent of restaurants established since 2007. The other 60 percent were established more than five years ago (when failure rates start to drop significantly), including 18 percent established between six and ten years ago, 24 percent between eleven and twenty years, and 18 percent over twenty years. The age distribution of restaurants was relatively similar across types.
- **Small, Limited Service, Independent Restaurants.** Assuming a total of 2,000 restaurants and applying the ratios above, there are a total of about 320 single-site, limited-service restaurants currently in the City of San José.⁸ Of these restaurants, about 50 percent have reported fewer than five employees and more than half have sales of less than \$300,000.

⁸ As discussed above, the number of restaurants in San José is estimated to be between 1,650 and 2,000 establishments depending on source.

3. PACKAGING COST IMPACTS

EPS is one of several primary materials from which "to go" ware is manufactured. A ban on the use of EPS will require existing users of EPS "to go" ware to shift to products made from alternative materials. This chapter estimates current and potential increases in "to go" ware packaging costs as a proportion of total restaurant sales revenues based on: (a) the results of a recent unit cost study by the Cascadia Report, and (b) available information on restaurant expenditures on "to go" ware.

Differences in Packaging Unit Costs

Cascadia Consulting Group conducted an in-depth study comparing EPS product costs to those made with alternative materials, including fiber, plastic, and Polylactic Acid (PLA). As described in **Appendix A**, while no two different materials provide precisely the same features, fiber and plastic material foodware can provide comparable effectiveness to EPS. The Cascadia Report's findings, summarized in **Table 1**, show that the current pricing for the next most cost effective alternative material to EPS, generally plastic or fiber, is more expensive across a range of product types by widely divergent levels.

As shown in **Table 1**, observed differences ranged from an additional \$0.01 per 16oz Cold Cup when shifting from EPS to fiber to an additional \$0.15 when shifting from an EPS, 9-inch, three compartment clamshell to an equivalent fiber clamshell. The proportionate increase in unit costs varied from 22.2 percent to 237.8 percent for individual products⁹. Considering the different product types, plates and bowls had the lowest average increases of about 48 percent and 70 percent respectively, cold cups and clamshells effectively doubled in price (average increases of between 94 percent and 102 percent respectively), and hot cups showed the most substantial average increase of 212 percent, or more than a three times increase in cost.

The Cascadia research, as shown in **Table 1**, demonstrates that a doubling in unit costs is a reasonable average at current packaging pricing. This general ratio was confirmed in interviews conducted by Dr. Fritz Yambrack where suppliers indicated paper/fiber prices of about twice the price of EPS.

Restaurant Expenditures on "To Go" Ware

The proportion of total restaurant costs attributed to "to go" or "carry-out" packaging varies depending on a number of factors such as type of service and price-point. Economic & Planning Systems, Inc. used a combination of nationwide studies, case studies, and industry expert findings to estimate the restaurant "to go" ware cost as a proportion of total restaurant sales.

⁹ 16-oz Cold Cups had the smallest proportionate cost increase (22.2 percent) and 16-oz Hot Cups show the largest proportionate cost increase (237.8 percent).

Table 1
Unit Cost Comparison by Material from Cascadia Report
Economic Impact Analysis of EPS Foodware Costs; EPS #121095

Product Type	Average Unit Cost				Most Cost Efficient Alternative Material	Cost Differential to EPS (Most Cost Efficient Alternative)	% Increase from EPS
	EPS	Fiber	PLA	Plastic			
Bowls							
12oz Bowl	\$0.03	\$0.06	\$0.08	\$0.04	Plastic	\$0.01	34.1%
8oz Bowl	<u>\$0.03</u>	<u>\$0.08</u>	<u>\$0.11</u>	<u>\$0.06</u>	Plastic	<u>\$0.03</u>	<u>100.4%</u>
Average	\$0.03	\$0.07	\$0.10	\$0.05		\$0.02	67.2%
Clamshell							
6in Clamshell	\$0.05	\$0.12	\$0.26	\$0.16	Fiber	\$0.07	146.0%
8in 1 Compartment	\$0.12	\$0.24	\$0.42	\$0.25	Fiber	\$0.13	109.3%
8in 3 Compartment	\$0.10	\$0.22	\$0.46	\$0.23	Fiber	\$0.12	118.9%
9in Clamshell	\$0.16	\$0.19	\$0.33	\$0.16	Plastic	\$0.01	4.0%
9in 3 Compartment	\$0.14	\$0.29	-	\$0.34	Fiber	\$0.15	108.6%
Hoagie	<u>\$0.09</u>	<u>\$0.18</u>	<u>\$0.25</u>	<u>\$0.24</u>	Fiber	<u>\$0.09</u>	<u>97.4%</u>
Average	\$0.12	\$0.24	\$0.25	\$0.29		\$0.09	97.4%
Cold Cup							
8oz Cold Cup	\$0.02	\$0.06	\$0.07	\$0.05	Plastic	\$0.03	153.5%
12oz Cold Cup	\$0.03	\$0.07	\$0.09	\$0.06	Plastic	\$0.03	105.6%
16oz Cold Cup	<u>\$0.03</u>	<u>\$0.04</u>	<u>\$0.11</u>	<u>\$0.07</u>	Fiber	<u>\$0.01</u>	<u>22.2%</u>
Average	\$0.03	\$0.05	\$0.10	\$0.07		\$0.02	93.8%
Hot Cup							
8oz Hot Cup	\$0.02	\$0.05	-	-	Fiber	\$0.03	160.3%
12oz Hot Cup	\$0.03	\$0.09	-	-	Fiber	\$0.06	237.6%
16oz Hot Cup	<u>\$0.03</u>	<u>\$0.10</u>	-	-	Fiber	<u>\$0.07</u>	<u>237.8%</u>
Average	\$0.03	\$0.09				\$0.05	211.9%
Plate							
7in Plate	\$0.03	\$0.05	\$0.08	\$0.06	Fiber	\$0.02	51.1%
9in Plate	<u>\$0.04</u>	<u>\$0.06</u>	<u>\$0.17</u>	<u>\$0.12</u>	Fiber	<u>\$0.02</u>	<u>43.6%</u>
Average	\$0.04	\$0.05	\$0.12	\$0.09		\$0.02	47.4%
Total Product Average [1]	\$0.06	\$0.12	\$0.20	\$0.14		\$0.05	103.5%

[1] As discussed in the *Introduction and Findings* section, the analysis presented in this table was conducted using an earlier version of the Cascadia Report that included more conservative (higher) estimates of the cost differential between EPS and alternative products (as well as the lower, expected differentials presented in the current Cascadia Report). As a result, the table above presents conservatively high estimates of cost differentials between EPS and alternative products.

Sources: Cascadia Consulting Group; Economic & Planning Systems, Inc.

The 2010 National Restaurant Association's Restaurant Industry Operations Report breaks restaurants into two major categories: full-service and limited service.¹⁰ For each restaurant type, the report lists the average percentage of total sales for each categorical expense. These expenses include food, beverage, and salaries and wages as well as a number of other operating expenses such as utilities, repairs and maintenance, marketing, and general administration.

Although the NRA report does not allocate a separate expense line item specifically for paper supplies or packaging, it does include a line item for "direct operating costs," which is defined as encompassing all costs associated with uniforms, laundry, linen, china, cleaning supplies, paper supplies, utensils, kitchen fuel, menus and drink lists, flowers and decorations, contract cleaning, auto or truck expense, parking, and licenses and permits. The NRA finds that in 2010, direct operating expenses make up an average of 5.7 percent of total sales in full-service restaurants and 5.5 percent of total sales in limited service restaurants. The NRA also estimates that "paper supplies" (which includes all packaging and "to go" ware) constitute 18 percent of direct operating costs for full-service restaurants and 57 percent of direct operating costs for limited service restaurants.¹¹

As shown in **Table 2**, combining these NRA estimates indicates an average expenditure of 1.0 percent of total sales revenues for paper supplies at full-service restaurants and an average expenditure of 3.1 percent of total sales revenues for paper supplies at limited service restaurants. The "paper supplies" category includes a number of products, such as napkins, butcher paper, and paper towels, as well as "to go" ware that could potentially be made from EPS. Economic & Planning Systems, Inc. interviewed restaurateurs and industry experts to obtain an estimate of the proportion of paper supply expenditures allocated to "to go" ware (clamshells, cups, lids, bowls, plates etc.).¹² Based on these interviews, it is assumed that the average full-service restaurant spends about one-third of its paper supplies budget on "to go" ware, while the average limited service restaurant about 50 percent of its paper supplies budget on "to go" ware. As shown in **Table 2**, applying these proportions results in an estimate of "to go" ware expenditures at 0.33 percent of total full-service restaurant sales and at 1.6 percent of total limited service restaurant sales.¹³

¹⁰ The study also breaks full-service restaurants into three categories based upon average check size (below \$15, \$15-24.99, and \$25 and above). However, due to the commonalities in applicable findings to this report between these three categories for the purposes of this report the full-service category will be compared as a single entity.

¹¹ Article written by Robert Ebbin in 2000 to clarify terms used in the NRA's *Restaurant Industry Operations Report*.

¹² Industry case studies include interviews with representatives of limited and full-service restaurants located in the Bay Area as well as Washington, DC.

¹³ These are conservatively high estimates with many restaurants showing "to go" ware expenditures as a lower proportion of total sales.

Table 2
"To Go" Ware Expenditures as Percentage of Total Sales
Economic Impact Analysis of EPS Foodware Costs; EPS #121095

Item	Full Service	Limited Service
Direct Operating Expenses [1]	5.7%	5.5%
Paper Supplies as Percentage of Direct Operating Expenses [2]	18%	57%
Paper Supplies as Percentage of Total Sales	1.0%	3.1%
"To Go" Ware Percent of All Paper Supplies [3]	33.0%	50.0%
Percent of Total Sales Attributable to "To Go" Ware	0.34%	1.57%

[1] 2010 National Restaurant Association *Restaurant Industry Operations Report*.

[2] The National Restaurant Association article, *Adding Up The Cost of Linens and Things* (2000), which was published to help clarify terms in the annual *Restaurant Industry Operations Report*. The article states that 18 percent of direct operating costs for full service restaurants can be attributed to paper supplies and that 57 percent of direct operating costs for limited service restaurant can be attributed to paper supplies.

[3] Based upon interview with industry professionals from both full service and limited service restaurants, EPS has concluded that one third of "paper supplies" costs can be attributed to "to go" ware for full service restaurants and one half of all "paper supplies" costs can be attributed to "to go" ware for limited service restaurants. "Paper supplies" refers to packaging materials of all types, including plastic and polystyrene.

Sources: Cascadia Consulting Group; Economic & Planning Systems, Inc.

Potential Cost Increases under EPS Ban

It is common for restaurants of all types to source products made from more than one material and from more than one supplier. Many restaurants may use a combination of disposable products, including EPS, as product decisions are made based upon cost, type of use, volume, presentation, marketing, and other considerations. It should also be noted that many restaurants currently do not use any EPS and would thus not incur any additional costs due to the proposed ban.

The specific cost increases associated with the proposed EPS ban will be directly driven by the level of current use of EPS. **Chapter 5** of this report assesses potential impacts on the proposed ban based on restaurant profit margins. As part of that assessment, impact scenarios are developed that include varying levels of EPS use from 25 percent of "to go" ware expenditures to 100 percent of "to go" ware expenditures. As shown in **Table 1**, on average the increase in packaging costs when shifting from EPS to alternative materials is a 100 percent increase in costs. However, for certain kinds of limited service restaurants whose packaging use is weighted towards hot cups the proportionate increase would be higher because of the higher cost differentials.

4. RESTAURANT RESPONSES TO COST INCREASES

The restaurant industry faces frequent and uncertain changes in costs. While this adds challenges to an all already competitive industry, the strength of overall demand for restaurants offerings (food away from home) means that overall industry growth and sales remain relatively robust against changes in costs and any associated price changes. Numerous academic studies have found that, as a whole, the demand for food-away from home is inelastic. Similarly, overall sales in the food-away-from-home/restaurant industry in San José as a whole are expected to remain robust against an EPS ban, which itself will only affect a subset of restaurants in the City.

A range of studies have also shown that menu prices are generally stable over long periods and are "sticky," meaning that prices do not respond immediately or proportionately to cost shocks and may not respond at all to small cost changes (MacDonald and Aaronson, 2006; Bils and Klenow, 2004; Hobijn, et al., 2004). While studies have shown that significant industry-wide cost increases can result in consistent increases in restaurant pricing over time, academic studies on price elasticities of demand, and substitution effects in particular, at the sub-industry level have found high price elasticities of demand at the restaurant subgroup level when noticeable menu price changes occur. As a result, as indicated by a number of restaurant operators, restaurants typically consider and employ a number of strategic responses to cost increases other than menu price increases and, when menu price increases are necessary, make strategic pricing decisions that minimize the transparency of the price changes.

Cost Environment

Restaurants face consistent and significant fluctuations in a variety of costs on a monthly basis. As a result, restaurants are in a constant state of operations management, responding to a range of costs changes as well as other critical factors like fluctuations in demand.

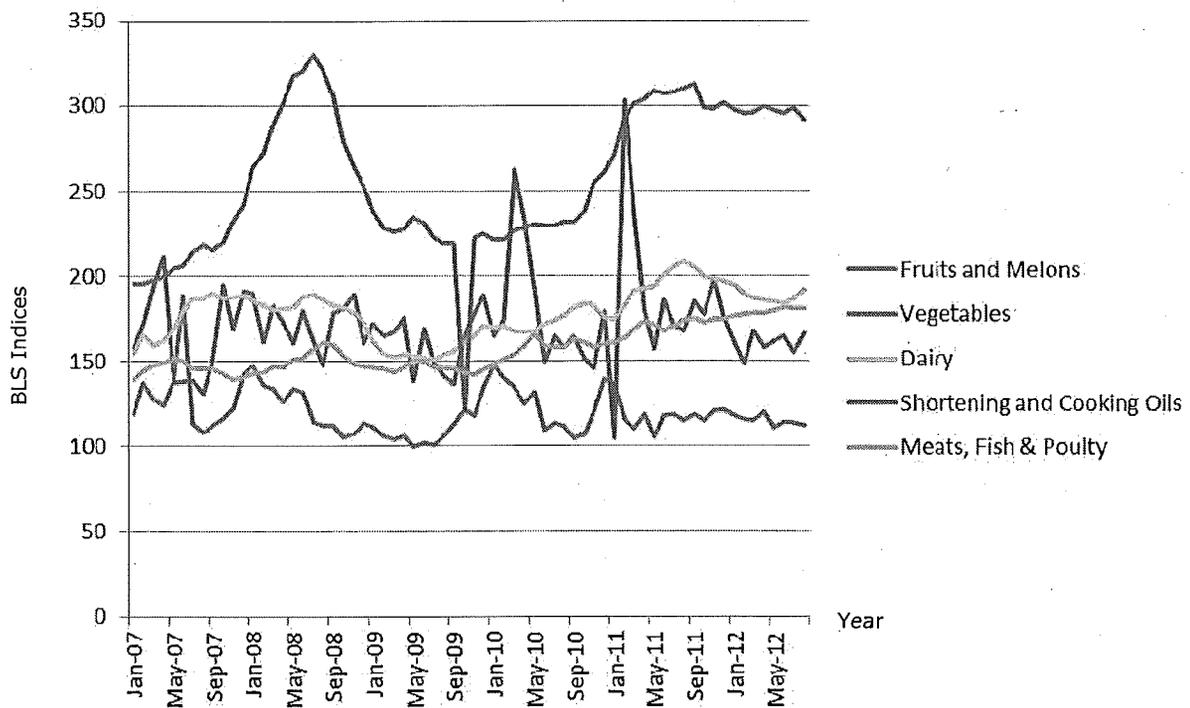
The array of expenses faced by the average restaurant include food and beverage, labor, utility costs, rent, repairs and maintenance, marketing, direct operating expenses (which includes all linens, tableware, "to go" packaging, cleaning supplies, etc.), as well as all administrative and corporate (if applicable) costs. Although some of these categories are relatively stable, food costs are particularly volatile, affecting restaurant costs, economics, and strategic decision-making on a monthly basis.

Using the U.S. Department of Labor Consumer Expenditure Survey and Consumer Price Index and a U.S. Department of Agriculture study by Abigail M. Okrent and Julian M. Alston in 2012, EPS has found that common food products fluctuate significantly in price over a relatively short period of time. For instance, while dairy prices in the United States have changed modestly since 1998, they have consistently fluctuated by 5 to 10 percent from year to year over that same period. Similarly, vegetable prices in the United States are relatively unchanged since 1998 yet price fluctuations every six months average approximately 5 to 7 percent.

The study also finds that cereals and bakery products increased in price by approximately five percent since 1998 but experienced a price increase from a low in 2006 to a high in 2009 of nearly 15 percent. Meat and egg prices experienced a price increase of over 10 percent between 2003 and 2004 and a price decrease of approximately 7 percent between 2009 and 2010.

Figure 2 shows monthly food prices have fluctuated significantly. Over the past five years, the Bureau of Labor Statistics (BLS) finds that price indices of various food commodities can increase as much as 190 percent in a given month (vegetables between January and February of 2011) but remain relatively constant across nearly five years (vegetables increased in price by only 5 percent from January 2007 to August 2012).

Figure 2 BLS Selected Food Commodity Indices by Month (1/2007 to 8/2012)



Source: BLS Commodity Indices data 2007-2012

Menu Price Adjustments

The literature reviewed for this study indicates that menu prices are sticky and tend to cluster around certain price points.¹⁴ When menu price changes do occur, they are typically strategic and do not reflect a mechanical response to cost changes. As such, when restaurants do increase prices they do not raise all menu prices by amounts reflecting the cost increase. Rather they raise prices on a few items by greater amounts, while keeping certain prices constant.

¹⁴ With respect to clustered prices, MacDonald and Aaronson (2006) found that 12.5 percent of limited-service (LS) restaurant menu prices ended in 99, while over 30 percent ended in 9. For full-

Several factors influence the degree to which a restaurant will choose which menu prices to increase following a significant cost increase, including perceptions of demand elasticities and the degree to which inputs can be substituted for one another among others (MacDonald and Aaronson, 2006).

In "Can Restaurants Increase Their Menu Prices in Response to the Rising Food Cost?" (Ryan, 2011, KNG), Ryan describes the various ways in which restaurant owners transmitted rising food costs to menu prices while minimizing the ability of customers to identify the price increase and thus reduce consumption.¹⁵ Ryan observed that different restaurants restructured their menu pricing in a variety of ways: "One restaurant used to charge \$12.50 for three bowls of nachos, and since they needed to take measures to increase their profit margin, they changed the price to \$9 per two bowls. The 7 percent increase in price was not evident at a glance and most customers did not notice at all. A few restaurants focused on pricing architecture, including Starbucks and Wendy's, where only a number of items on some branches underwent price increases. Several restaurants, like McDonald's, planned to come up with new food items. The customers don't have a point of reference to compare the price of the new items and will take it as it is."

In choosing which menu prices to increase to cover increased costs, literature suggests that restaurants consider the expected demand elasticities of various menu items, choosing those items that are least likely to elicit a negative customer response. MacDonald and Aaronson (2006) found that prices that were recently increased were less likely to be increased and prices at cluster points were less likely to be changed. Research has identified such psychological price points and that consumers are unusually sensitive to price increases at cluster points.

Menu Price Adjustment Impacts

In general, when the price of a product goes up, consumers respond by reducing their consumption of the product. The concept of elasticity of demand is used to quantify the size of a drop in demand relative to a price increase. In the case of a restaurant, if the drop in sales (demand) is relatively larger than the increase in menu prices, then its total revenues will fall. Such demand response is referred to as elastic demand. On the other hand, if demand is inelastic, then an increase in menu prices will result in a relatively smaller decrease in sales, in which case total revenues for the restaurant will increase.

Several academic research studies have been conducted to estimate demand elasticities for the restaurant industry and for different restaurant types, including fast food, limited service, and full-service restaurants. The variations in study methodologies and conclusions do not make it possible to derive specific price elasticities of demand for application to San José restaurants,

service (FS) restaurant menu prices, one in five ended in 00, 25, or 95. Price changes are also strikingly clustered: 25 percent of all LS price changes are 10 cents, while 5, 10, 20, and 30 cents account for half. Those four, plus 25 cents, 50 cents, and a dollar, account for half of all FS price changes.

¹⁵ KNG is one of the largest manufacturers and suppliers of restaurant goods in the world, including menu covers. Source: KNG.com.

though they do provide pertinent general conclusions for this study. **Appendix B** provides a detailed overview of the methodologies, results, and implications of these academic studies.

- **Restaurant Industry as a Whole.** A number of academic studies have considered the price elasticity of demand for the food-away-from-home (FAFH) industry as a whole (without distinction between the different types of restaurants).¹⁶ For the industry as a whole, these studies indicated elasticities in a relatively narrow range of between -0.49 to -1.02 with an average of -0.72 (see **Table B-1** in **Appendix B**). This means that when average industry-wide prices for food-away-from-home rise by a certain percentage, the percentage decrease in quantities sold averages less than the percentage increase in price. As such, overall sales in the food-away-from-home/restaurant industry as a whole are expected to remain robust against price increases over time.
- **Restaurant Industry Types.** The literature on elasticities by restaurant type shows significantly more variability in estimated price elasticities of demand. They do, however, provide a clear indication that the substitution effect – the shift away from restaurants when a menu price increase is observed – is substantial, particularly at limited service and less expensive full-service restaurants. In other words, because of the ease with which a consumer can substitute food from one restaurant with food from another, demand response to a price changes by one type of restaurant is generally elastic. This means that if one restaurant increases its prices while other restaurants do not, such a restaurant will, more likely than not, see a decrease in sales. For example, studies of compensated price elasticities of demand (not including income effects)¹⁷ showed a range of between -1.77 and -3.96 percent for limited serve and less expensive full-service restaurants. The level of this substitution effect could be even higher when considering a subset of these restaurant types, such as the subset that might be affected by an EPS ban, though other factors such as location, reputation, cultural factors, or meal quality will also affect consumer response to price changes at particular restaurants.

Overall, the studies of price elasticities of demand indicate a generally inelastic demand to price increases for the restaurant industry as a whole and a generally elastic demand, reflecting substitution effects, for different restaurant types. As a result, while individual restaurant types may face losses in sales due to price increases, the industry as a whole is not expected to be affected as most consumers will shift from one restaurant to another rather than shift away from eating out altogether.

¹⁶ "Food-away-from-home" is a catch-all phrase used in scientific research and public databases (BLS and the Bureau of Economic Analysis or BEA) to represent all establishments that prepare food for sale to consumers onsite: cafeterias, restaurants, buffets, grills, snack bars, and mobile food trucks.

¹⁷ Compensated price elasticities estimate the substitution between products without including any effects on a consumer's overall budget resulting from price changes. In contrast, uncompensated elasticities take into account the overall budget of the consumer. In uncompensated elasticities, response to food prices at different restaurant types is generally shown to be inelastic, except at full-service restaurants where there exists a wider range of menu prices.

Expected Responses to Cost Increases

Restaurants are consistently facing new challenges, including changing costs, changing consumer preferences and demands, and changing levels of competition. As described above, cost changes are frequent and restaurants must determine the most effective responses. Discussions with restaurant operators and a review of industry, academic, and policy studies indicate the different strategies that restaurants use to respond to cost changes and seek to soften their impact. Restaurants will often adjust to cost increases by trimming what they can through efficiency or product choice as well as opting to adjust menu prices strategically.¹⁸ Cost responses can be divided into six primary categories:

- a. No Adjustment.** In cases of modest or temporary cost changes, no adjustment may be necessary. Restaurants will typically only go through the process of responding to cost changes if they are expected to last and/or are expected to have a noticeable impact on the bottom line.
- b. Offsetting Cost Adjustments.** If a restaurant faces a cost increase and decides their product and price cannot change due to fear of decreased sales, restaurants can opt to alter store hours, cut labor costs, reduce energy costs, negotiate with suppliers, or employ other cost savings measures. Oftentimes, restaurants will vary menu offerings based upon expected (or unexpected) price changes. For many limited service restaurants with a few staple menu items, this strategy may not be available, but for restaurants that vary offerings by day, week, or season, such a strategy can be effective.
- c. Non-Price Adjustments in Offerings.** If the restaurant chooses to pass along new costs to customers, there are a number of strategies besides increases in menu pricing. For instance, portion sizes of some or all of certain products might be reduced or a certain menu item's ingredient mix might be altered altogether.
- d. Menu Price Adjustments.** Menu price adjustments can be the most noticeable changes to customers. As a result, restaurants are careful to adjust menu prices selectively and infrequently. Price adjustment strategies tend to mean avoiding increasing prices above psychological tipping points, avoiding increasing prices on recently increased items, and avoiding increasing costs to the most popular main dishes.
- e. Absorbing Costs.** For cost increases (or the portion of cost increases) restaurants believe they cannot offset or pass on due to the likelihood of lost business and a worse net effect on profit margins, the restaurant will absorb costs, at least temporarily, until costs adjust or opportunities for menu price or menu offering adjustments become possible.
- f. Packaging Cost Separation.** Certain restaurants (as well as many caterers) choose to pass along all packaging costs directly to customers in a surcharge, delivery fee, or takeout

¹⁸ Furthermore, the degree to the alterations made by a restaurant may reflect the severity of the cost change as well as the expected time length of higher prices. For instance, a restaurant may be able to absorb a sudden spike in the price of a specific product by decreasing profits until prices are reduced to a level acceptable to the menu item's margins; however, if prices are expected to remain high for a significant amount of time, more fundamental changes may be necessary.

fee. In this method cost increases for packaging would not be reflected in menu prices but rather as a separate expense. While this approach makes clear the source of the cost increase and often passes the full cost on to the customer, it may also draw attention to the cost increase.

5. POTENTIAL OUTCOMES

Prior report chapters described the scale and nature of the San José restaurant industry, the potential increase in packaging costs for restaurants using expanding PS under the proposed ban, and the potential restaurants' responses to increases in costs. As noted in **Chapter 4**, cost increases associated with the proposed ban on the restaurant industry are not expected to affect the overall size or sales of the restaurant industry in San José as a whole. Rather, these cost increases will affect by a subset of the City's restaurant sector. This chapter assesses the relative impact of the proposed ban on different types of restaurants under different circumstances.

Impact Scenarios

There are a number of factors that determine the relative cost burden of the proposed ban. As discussed in **Chapter 4**, restaurants are continuously facing fluctuations in costs, making the adaptation to potential changes in packaging costs part of a normal process of cost adjustment. On the other hand, any restaurant currently using EPS is expected to experience a cost increase whatever the circumstances of the restaurant. In order to evaluate the potential impacts of the proposed ban, this chapter considers a number of scenarios that combine available information on average/expected restaurant expenditures along with a number of assumptions concerning the primary uncertainties: (1) the existing level of profit relative to the industry-wide averages; (2) the proportional use of EPS relative to all "to go" ware on expenditures; and (3) the degree of "pass-through" of cost increases onto customers without engendering lower levels of sales. Each of these scenarios was applied to full-service and limited service restaurants. Limited service restaurants were divided into two categories: restaurants and cafes. Cafes were separated as their more concentrated use of hot cups makes them more vulnerable to higher costs increases due to the higher cost differential between EPS hot cups and cups of alternative materials.

Impact Measurement

For each scenario and restaurant type, the expected level of packaging cost increase was estimated along with the expected reduction in profit margins and the proportionate reduction in profit margin. These measures indicated, under the different scenario assumptions, the significance of the cost increase relative to existing profit margin. These profit impact measures provide insights into the implications of the cost increases for different types of restaurants in different types of situations.

In reality, restaurant operations, experiences, and responses lie on a broad spectrum. As noted above, restaurants are continuously adjusting to cost changes of various kinds and are therefore well-suited to adapt to those changes. At the same time, many restaurants operate on modest margins and some may operate at well below the restaurant industry average. For these restaurants, substantial cost increases could make a critical difference in sustainability. There are no specific rules for measuring the level of significance of these profit losses, though the following evaluation system was used to consider relative impacts:

- **Market Exit.** An absorbed cost increase that is greater than the existing gross profit margin would render the restaurant unprofitable. While some restaurants may start making additional cost adjustments at that point, including paying themselves a lower salary in cases where they are operating their own restaurant, a negative profit margin would suggest the potential for substantial market exits.
- **Percentage Point Reduction in Profit Margin.** With average pre-tax profit margins reported to be 6 percent for limited service restaurants and 3 percent for full-service restaurants, a loss of one percentage point in profit margin could be considered significant. With restaurants operating at a range of profit margins through time, the impact of a one percentage reduction in profit margin will be even more significant for restaurants with margins well below the industry average.
- **Proportionate Reduction in Profit Margin.** Because of the different profit margins at different restaurants, a specified profit loss (e.g., 1 percent) will have larger impact on restaurants with lower profit margins. Consideration can be given to the expected proportionate reduction in profit margin as an alternative measure of impact. A profit reduction of 100 percent would be equivalent to the market exit scenario. For the purposes of this analysis, proportionate reductions in profit margins of 25 percent or greater are considered particularly substantive. Given the continuum of current profit margins, the scenario analyses presented consider profit losses relative to average profit margins by restaurant types as well as for a reduced profit scenario.

Impact Analysis

While **Table 3** includes the conclusions and information from the prior analysis, **Tables 4** and **5** show a series of sensitivity analyses of the potential impacts of the proposed EPS ban on profit margins. It should be noted that, for restaurants that do not currently use EPS or for restaurants that will be able to pass on all costs, there will be no impact from the proposed ban. For other restaurants, the key differentiators will be existing profit level, the proportion of "to go" ware expenditures on EPS products, and the proportion of costs that can be integrated/passed on without losing customers/profits. The five scenarios provided in **Table 4** and **5** consider the profit margin implications for three restaurant types (full-service restaurant, limited-service restaurant, limited service café) under five different assumption sets. **Scenario 1** tests the implications under most EPS use; **Scenarios 2** and **3** test the implications of substantial EPS use, but also successful strategic adjustment to cost increases; **Scenario 4** considers a high EPS use scenario with modest opportunities to adjust to the cost increases; and, **Scenario 5** is the most conservative in that it assumes all "to go" ware purchases are of EPS and all cost increases directly affect profits.

Table 3
Key Data/Assumptions Informing Impact Analyses
Economic Impact Analysis of Expanded Polystyrene Foodware Costs; EPS #121095

Item	Full-Service Restaurant	Limited-Service Restaurant (1)	Limited-Service Café (1)	Source
Average Profit Margin	3.0%	6.0%	6.0%	NRA (2010)
Low Profit Margin	1.5%	3.0%	3.0%	Assumed to be 50% of average
"To Go" Ware Packaging Cost as % of Total Sales	0.3%	1.6%	1.6%	See Table 2
Add'l Cost Multiplier between EPS and Alt. Materials	100%	100%	125%	Based on Table 1 with different product mixes

(1) Most data is available for limited-service restaurants as a whole. For the purposes of this analysis, limited-service cafes have been assumed to include similar information as the limited-service restaurant category with the exception of the cost impact of an EPS ban. This impact is assumed to be larger due to a varied product mix, which includes an assumed higher concentration of hot and cold cups than the limited service restaurant category as a whole.

Sources: Cascadia Consulting Group; NRA; Economic & Planning Systems, Inc.

Key findings are as follows:

- **Full-Service Restaurants will be least affected by the EPS ban due to the lower proportions of expenditures on "to go" ware.** With an estimated average expenditure of 0.3 percent of sales revenues on "to go" ware, the proportionate loss of profits never increases above 10 percent for restaurants with average profit margins (even under Scenario 5, the most conservative scenario) (see **Table 4**). Even for restaurants with profit margins 50 percent below the industry average, the proportionate loss of profit never increases above 25 percent (see **Table 5**).
- **The effects on Limited Service Restaurants will very much depend on circumstances.** For limited service restaurants making industry-average profit margins, the impacts could be considered modest except under Scenario 5, where the full cost increase of 1.6 percent of sales revenues must be absorbed by the current profit margin. For limited service restaurants with lower profit margins, the impacts of profit margin losses of between 0.9 and 1.6 percent under Scenarios 4 and 5 are more substantial. This may apply to some smaller "mom-and-pop" limited service restaurants that are primarily using EPS and are not able to make any cushioning adjustments to the new cost structure either initially or over time.
- **Limited service cafes will be most affected.** Limited service cafes that use a substantial proportion of EPS "to go" ware and are relatively unable to adjust cost structures will be most affected. As shown in **Tables 4 and 5**, limited service cafes will experience a significant proportionate decline in the profits associated with the need to cover between 1.1 and 2.0 percent of new costs out of profits (see Scenarios 3 and 4). The impact of the proposed ban is greater on limited service cafes than restaurants as their proportionate increase in "to go" ware is greater due to their heavier concentration on hot cups which show the higher cost differential under alternative materials.
- **Market exits would only occur as a singular result of the increased packaging costs in cases where profit margins are currently well below the average, where use of EPS is prevalent, and there are only limited opportunities to adjust other operating costs/approaches.** None of the scenarios show a post-ban profit margin below zero, indicating that while the packaging cost increase will be real for many restaurants using EPS, the impact does not come close to rendering profits negative for restaurants operating at 50 percent of industry-standard margins. Restaurants operating with minimal profit margins will be at risk of closure from any number of cost increases, including the potential the EPS ban.

If the proposed ban is adopted, these findings can inform the development of implementation strategies.

Table 4
Impact Scenarios and Analysis: Average Profit Margins
Economic Impact Analysis of Expanded Polystyrene Foodware Costs; EPS #121095

Scenario/Restaurant Type	Current Profit Margin	EPS Use	Cost Increase as % of Sales	Ability to Adjust/Pass-On	Cost Increase out of Profit	Post-Ban Profit Margin	Absolute % Reduction in Profit (1)	Proportionate %
Scenario 1: Limited EPS Use, No Pass Through Scenario								
Full Service Restaurant	3.0%	25%	0.08%	0%	0.08%	2.9%	0.1%	2.5%
Limited Service Restaurant	6.0%	25%	0.4%	0%	0.40%	5.6%	0.4%	6.7%
Limited Service Café	6.0%	25%	0.5%	0%	0.50%	5.5%	0.5%	8.3%
Scenario 2: Majority EPS Use, Significant Pass Through Scenario								
Full Service Restaurant	3.0%	67%	0.20%	67%	0.07%	2.9%	0.1%	2.2%
Limited Service Restaurant	6.0%	67%	1.1%	67%	0.35%	5.6%	0.4%	5.9%
Limited Service Café	6.0%	67%	1.3%	67%	0.44%	5.6%	0.4%	7.3%
Scenario 3: 50% EPS Use, 50% Pass Through Scenario								
Full Service Restaurant	3.0%	50%	0.15%	50%	0.08%	2.9%	0.1%	2.5%
Limited Service Restaurant	6.0%	50%	0.8%	50%	0.40%	5.6%	0.4%	6.7%
Limited Service Café	6.0%	50%	1.0%	50%	0.50%	5.5%	0.5%	8.3%
Scenario 4: Majority EPS Use, Some Pass Through Scenario								
Full Service Restaurant	3.0%	75%	0.23%	25%	0.17%	2.8%	0.2%	5.6%
Limited Service Restaurant	6.0%	75%	1.2%	25%	0.90%	5.1%	0.9%	15.0%
Limited Service Café	6.0%	75%	1.5%	25%	1.13%	4.9%	1.1%	18.8%
Scenario 5: Complete EPS Use, No Pass-Through Scenario								
Full Service Restaurant	3.0%	100%	0.3%	0%	0.30%	2.7%	0.3%	10.0%
Limited Service Restaurant	6.0%	100%	1.6%	0%	1.60%	4.4%	1.6%	26.7%
Limited Service Café	6.0%	100%	2.0%	0%	2.00%	4.0%	2.0%	33.3%

(1) Absolute reduction in profit refers to the decrease in profit as a percentage of total sales. Proportionate reduction refers to the percentage decrease in total profit.

Source: Economic & Planning Systems, Inc.

Table 5
Impact Scenarios and Analysis: Reduced Profit Margins (1)
Economic Impact Analysis of Expanded Polystyrene Foodware Costs; EPS #121095

	Current Profit Margin	EPS Use	Cost Increase as % of Sales	Ability to Adjust/Pass-On	Cost Increase out of Profit	Post-Ban Profit Margin	Reduction in Profit (2) Absolute %	Proportionate %
Scenario 1: Limited EPS Use, No Pass Through Scenario								
Full Service Restaurant	1.5%	25%	0.08%	0%	0.08%	1.4%	0.1%	5.00%
Limited Service Restaurant	3.0%	25%	0.4%	0%	0.40%	2.6%	0.4%	13.3%
Limited Service Café	3.0%	25%	0.5%	0%	0.50%	2.5%	0.5%	16.7%
Scenario 2: Majority EPS Use, Significant Pass Through Scenario								
Full Service Restaurant	1.5%	67%	0.20%	67%	0.07%	1.4%	0.1%	4.4%
Limited Service Restaurant	3.0%	67%	1.1%	67%	0.35%	2.6%	0.4%	11.7%
Limited Service Café	3.0%	67%	1.3%	67%	0.44%	2.6%	0.4%	14.7%
Scenario 3: 50% EPS Use, 50% Pass Through Scenario								
Full Service Restaurant	1.5%	50%	0.15%	50%	0.08%	1.4%	0.1%	5.0%
Limited Service Restaurant	3.0%	50%	0.8%	50%	0.40%	2.6%	0.4%	13.3%
Limited Service Café	3.0%	50%	1.0%	50%	0.50%	2.5%	0.5%	16.7%
Scenario 4: Majority EPS Use, Some Pass Through Scenario								
Full Service Restaurant	1.5%	75%	0.23%	25%	0.17%	1.3%	0.2%	11.3%
Limited Service Restaurant	3.0%	75%	1.2%	25%	0.90%	2.1%	0.9%	30.0%
Limited Service Café	3.0%	75%	1.5%	25%	1.13%	1.9%	1.1%	37.5%
Scenario 5: Complete EPS Use, No Pass-Through Scenario								
Full Service Restaurant	1.5%	100%	0.3%	0%	0.30%	1.2%	0.3%	20.0%
Limited Service Restaurant	3.0%	100%	1.6%	0%	1.60%	1.4%	1.6%	53.3%
Limited Service Café	3.0%	100%	2.0%	0%	2.00%	1.0%	2.0%	66.7%

(1) Differences between Table 5 and Table 4 are in the "Current Profit Margin" column (with half the starting profit margin assumed) and, as a result, in the "Reduction in Profit: Proportionate %" column.
(2) Absolute reduction in profit refers to the decrease in profit as a percentage of total sales. Proportionate reduction refers to the percentage decrease in total profit.

Source: Economic & Planning Systems, Inc.

APPENDIX A:

Take-Out Packaging - Functional Evaluation



APPENDIX A: TAKE-OUT PACKAGING - FUNCTIONAL EVALUATION

Packaging in general is considered a temporary item with a short use-life and food take-out packaging is an extreme example of this concept. The purpose of food take out-packaging is to simply contain the food item for a day or so or in most cases an hour or so until consumed. Given these functional needs many of the requirements of normal food packages are not necessary. Take-out food packages are very rudimentary containers in the scope of packaging technology.

The capacity of containment is the basic function we will use to compare the items in our discussion. The property of hermetic integrity is a higher function property not necessary for short-term packages. The basic function of holding a product so it does not spill during hand transport will be a feature.

This overview will discuss the basic functions of specific container styles, advantages and disadvantages viewed within the context of that particular product group. It is understood that the discussion and evaluations are subjective and qualitative as a quantitative evaluation is beyond the scope of this investigation.

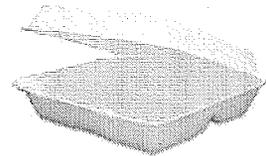
Scope

Previous work by the Cascadia Group¹⁹ identified five take-out items and four materials, which will be discussed in this analysis. The Cascadia group identified Polylactic acid (PLA) as an alternative but the resin price is still very high as it is a new material and there are serious questions about the future of the resin because of using corn as a feedstock. The scope of this discussion is to compare EPS Carry-out food containers with suitable substitutes.

1) EPS Clamshells and Fold-pak cartons

EPS Clamshells

EPS is a foamed material so the amount of resin used in an item is very small, which is the reason for the current low price. EPS offers a moisture barrier and rigidity. They offer support and containment for products that are dry or contain liquids. EPS offers a very good thermal barrier. EPS is a plastic and the feedstock is petrochemical based making the price is subject to market conditions. The clamshell does not offer a secure closure system but is comparable to other containers with a lid or a paperboard tuck-lock system. They can be fairly unstable as they have little weight themselves

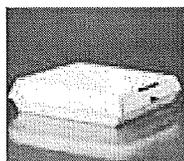
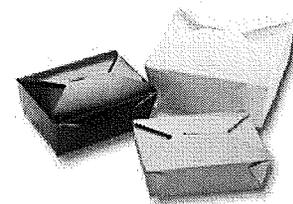


¹⁹ It should be noted that this analysis was conducted using an earlier version of the Cascadia Report that included more conservative (higher) estimates of the cost differential between EPS and alternative products (as well as the lower, expected differentials presented in the current Cascadia Report). As a result, this economic analysis presents conservatively high estimates of cost differentials and associated impacts.

and rely on product for support. The item is 3-dimensional so storage, even when nested together, takes space. The EPS trays can be designed to offer several compartments to separate products but in use minor movement in transportation tends to eliminate the separation.

Paperboard carton – Fold-Pak

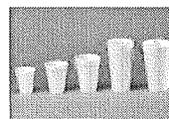
Paperboard cartons and EPS clamshells are used for take-out entrees and other hot or cold food items. The Fold-Pak paperboard carton is designed with locking top flaps. They are more stable than the EPS clamshells, although not significantly. Their moisture barrier comes from coatings used on the paperboard and can be modified for particular food groups. They are equal in their ability to contain products with viscous liquids, spaghetti, and salads with dressings. They can be stored virtually two dimensionally and set-up before use reducing storage. If there are multiple items in a carry-out meal, smaller sizes can be used to contain the different products. This design exceeds the functionality of an EPS container in that the lock is much more secure.



Another design in paperboard is the clamshell which differs in design by offering a lid that folds over like an EPS clamshell but the performance of coated paperboard. This is an item that has essentially the functional properties of an EPS clamshell but made from paperboard. Like the EPS clamshell the design does not provide a secure closure (Spill Proof).

2) Cups – EPS, Solid Plastic and Paperboard

Cups for liquids are similar to plates in that they are more a consumption use item than a transport package moving product to the point of consumption. EPS cups are rigid and good thermal barriers which are good



functional traits for coffee cups. Paperboard is a suitable replacement for the EPS clamshell as it provides an equal liquid barrier but a comparatively less, although suitable, thermal barrier. Solid plastic cups are functionally very good for liquids but only cold beverages because the plastic has little thermal barrier qualities. A plastic cup, with a tight lid similar to a "Tupperware" container is probably the best choice for liquids but much more expensive and not really a take-out option. When a less expensive plastic is used for take-out applications all three are equally adequate. These lids can be made from plastic or paperboard materials.

3) Plates - EPS, Solid Plastic and Paperboard

The two lowest cost plates were EPS and paperboard. These can be viewed as equal in containment functionality. EPS is little more rigid than the basic paperboard but a formed paperboard is very near the rigidity of an EPS plate. All are suitable for liquid products, EPS and the solid plastic have an excellent water barrier and the paperboard is coated with a waterproof material providing very near the same barrier, although plates by design are not used for free flowing liquids. Plates are a very short term item for food containment and functionality is more for dining than containment for transportation. All three materials provide adequate functionality for this application.

4) Bowls

The bowls follow the plate evaluation as they are similar in type of use. Their use is as a foodware rather than package for transportation. The lidding for bowls can also be made from plastic or paperboard materials and is adequate for reasonable use. All three materials, plastic, EPS and paperboard provide adequate functionality for this application.

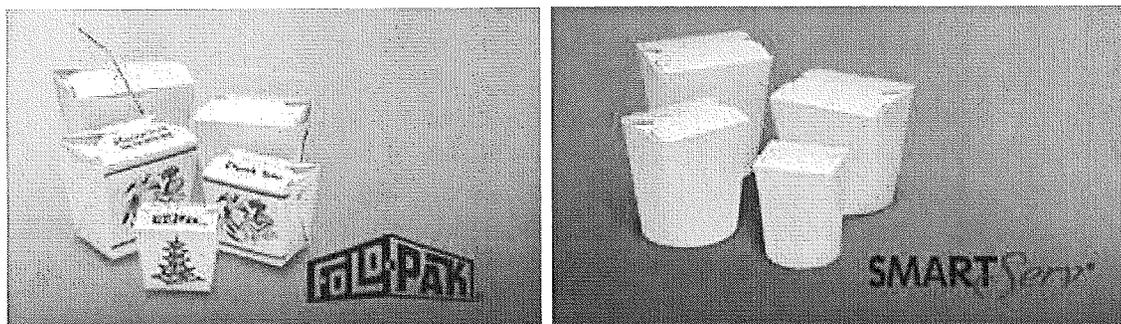
Summary

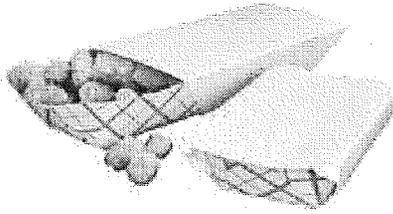
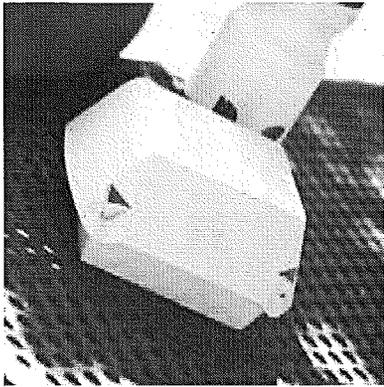
The package designs that have been reviewed and used for carry-out packaging in this study are relatively equal in performance. This is true because of the rather limited functional requirements of the application. It can be argued that while there exist functional differences there are no real significant differences in the use as food take-out containers.

The replacement of one package design with another is common in the packaging industry and occurs fairly frequently. When the replacement occurs the consumer reacts in rational ways and becomes very innovative in their ability of finding and using substitutes for replacement. In this particular application of take-out food packages simple substitutes such as inexpensive plastic bags could be used in many applications as a very simple inexpensive substitute.

Conclusion

This review has only selected a few possible selections for food take-out packaging available in the market. There are quite a few different types of take-out food packages and the current trend is in using paperboard as a replacement of plastic items. The advantage of plastic in this application has been plastic's ability to be a water barrier. Design and material selection has created an emerging product category of coated paper items with equal water barrier properties. The availability of these paperboard take-out products is through distributors and in some cases direct sale from the manufacturer. Images of various packaging containers are included below illustrating the variability in design of these currently available items for discussion.





These are a few paperboard items that are available to the restaurant industry to satisfy their carry-out needs. Meadwestvaco and Rockten are two of the larger firms providing innovative take-out containers from renewable paperboard feedstocks. (www.meadwestvaco.com, www.rockten.com.) The future of paperboard prices will be stable because of the use of recycled fibre and the management of forest feedstocks relative to other materials.

APPENDIX B:

Customer Response to Menu Prices Increases



APPENDIX B: CUSTOMER RESPONSE TO MENU PRICES INCREASES

In general, when the price of a product goes up, consumers respond by reducing their consumption of the product. The concept of elasticity of demand is used to quantify the size of a drop in demand relative to a price increase. In the case of a restaurant, if the drop in sales (demand) is relatively larger than the increase in menu prices, then its total revenues will fall. Such demand response is referred to as elastic demand. On the other hand, if demand is inelastic, then an increase in menu prices will result in a relatively smaller decrease in sales, in which case total revenues for the restaurant will increase.

Several academic research studies have been conducted to estimate demand elasticities for the restaurant industry and for different restaurant types, including fast food, limited service, and full-service restaurants. These estimated elasticities give a general indication of how consumer demand may change in response to changes in prices at particular types of restaurants or in response to restaurant prices in general. Because of the variability in their methodologies and their results, it is not, however, possible to quantify specific price elasticities of demand for San José restaurants.

Limitations in Applying Demand Elasticities to Estimate Changes in Restaurant Sales

Caution should be exercised in how estimated elasticities are applied in forecasting real world changes in consumer demand. In estimating elasticities, researchers make a number of assumptions or simplifications to real world dynamics in order to make the estimation problem manageable. These assumptions diminish the external validity of most studies, that is, the degree to which the conclusions in a study can hold for other persons in other places and at other times. Some of these simplifications or assumptions are discussed below:

- Econometric models used to estimate elasticities are constructed on the principle of *ceteris paribus*.²⁰ The models artificially hold constant all other factors, except price, that affect customers' decisions on whether to eat-out or not over the period of observation. In reality, consumers' decisions are affected by an array of evolving circumstances, including psychological, social, and economic factors of which price is only one.
- Elasticity estimates are based on observations over relatively long periods or cross-sectional datasets that capture large populations in which consumer behavior with respect to prices can be discerned. Over short-periods consumers are relatively insensitive to food price increases (Huang et. al., 2009).

²⁰ *Ceteris paribus* means all other factors are fixed and only the variable in question, price, changes.

- While elasticities are presented as point estimates in literature, they are observed over periods of time²¹ – periods long enough for consumers to observe significant price changes and change habits or tastes which may have locked them in with specific restaurants. It's possible that a one-time price change to select menu items may not result in an observable change in quantity demanded.
- Certain elasticity estimates are “compensated elasticities,” that is, they assume that consumer budgets for restaurant dining are fixed and that changes in the prices of other goods and services do not affect a consumer’s restaurant dining budget.
- Some studies do not account for the density of restaurants within neighborhoods. The ease with which consumers can access a group of competing restaurants will affect how they respond to the change in price of one or some of them.

Caveats notwithstanding, elasticity estimates are still valuable in informing likely changes in consumer demand in response to price changes. This section discusses research findings on how consumer demand for restaurant meals (restaurant sales) responds to changes in menu prices and the implications on the viability of the restaurant industry.

Food-Away-From Home Industry as a Whole

A number of academic studies have considered the price elasticity of demand for the food-away from home (FAFH) industry as a whole (without distinction between the different types of restaurants).²² For the industry as a whole, these studies indicated elasticities in a relatively narrow range of between 0.49 and 1.02, with an average of 0.72 (see **Table B-1**). This implies that that a 1 percent increase in the general price level of restaurant dining would lead to a 0.72 percent fall in restaurant sales. This result is also consistent with the findings of a survey that reviewed 160 research studies in the United States between 1938 and 2007 and found that demand response to price changes of “food-away-from-home” is inelastic (less than 1.0), with an average elasticity of 0.8. This means that when average industry-wide prices for food-away-from-home rise by a certain percentage, the percentage decrease in sales averages less than the percentage increase in price. As such, overall sales in the food-away-from-home/restaurant industry as a whole remain robust against price increases over time.

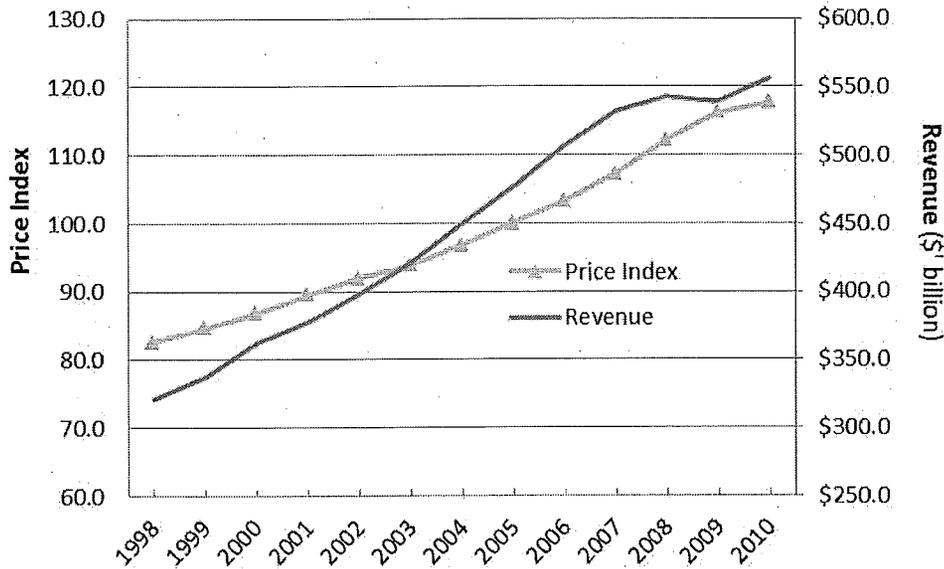
Huang and Huang (2009), using data from 1960 to 2006, found that food demand is relatively inelastic to price changes in the short run and that it takes a large price increase to significantly reduce demand. They conclude that such inelastic demand response may well explain the soaring prices in food [and energy] around 2008-09. **Figure B-1** shows a comparison of U.S. Bureau of Economic Analysis data on price and revenue data for U.S. food services and drinking places over

²¹ Sometimes elasticities are based on cross-sectional data of consumers observed at one point in time. Such elasticity estimates may not be suitably applied to forecast change in consumer demand over time.

²² “Food-away-from-home” is a catch-all phrase used in scientific research and public databases (BLS, BEA) to represent all establishments that prepare food for sale to consumers onsite: cafeterias, restaurants, buffets, grills, snack bars, and mobile food trucks.

time. Revenues have continued to increase as prices have increased for a number of reasons (including expanding demand), though the prices increases do not appear to have reduced restaurant revenues.

Figure B-1 U.S. Food Services & Drinking Places Industry



Source: Bureau of Economic Analysis, Industry Economic Accounts.

Restaurant Types

Evidence from literature on price elasticities of demand by type of restaurant/facility is mixed, in part because of the following factors: 1) differences in how researchers classify restaurant types, 2) whether convenience of access, as measured by restaurant density and speed of service, is accounted for, and 3) whether the elasticities are compensated or uncompensated.

Our review found several variations in restaurant typologies used in the literature, including fast food, quick service, casual dining, mid-range, mid-scale, mid-price, inexpensive, limited service, full-service, expensive, and fine dining. As shown in **Table B-1**, we have aggregated the restaurant types as identified by the authors that we believe are similar in order to obtain likely ranges within the broad typologies of fast food, limited service, limited/full-service, and full-service. The ranges of values at the bottom of **Table B-1** exemplify the wide variations in elasticities from different studies.

- **Inclusion of Access.** With respect to convenience of access, only two studies in our review accounted for that variable (Jekanowski, et. al., 1997 and 2001). By including ease of access, these studies show a higher elasticity for fast food restaurants because consumers can easily substitute one type of fast food with another within close proximity, and a lower elasticity for expensive restaurants which tend to be far and fewer and thus switching from one restaurant to another is not as easy as is the case of fast food restaurants.

Table B-1
Summary of Own Price Elasticities of Demand from Existing Literature
Economic Impact Analysis of EPS Foodware Costs; EPS #121095

Study Authors and Year	Food Away From Home by Restaurant Type				Total FAFH	Type of Elasticity
	Fast Food	Limited Service	Limited/ Full-Svc	Full Service		
Richards and Mancino, 2012	<i>Fast food</i> -1.21	<i>Cosual</i> -1.77	<i>Mid-range</i> -1.92	<i>Fine dining</i> -3.31	-	Compensated
Okrent and Alston, 2012	<i>Other FAFH</i> ¹ -0.43	<i>Limited Svc</i> -0.13	-	<i>Full Service</i> -1.96	-0.71	Uncompensated
Levedahl, 2011	<i>Quick service</i> -0.11	<i>Cosual dining</i> -3.96	<i>Mid-scale</i> -3.12	-	-	Compensated
Jekanowski, Binkley, and Eales, 1997	<i>Fast food</i> -0.93	<i>Inexpensive</i> -3.87	<i>Mid-price</i> -2.66	<i>Expensive</i> -0.74	-	Compensated
Jekanowski, Binkley, and Eales, 2001	<i>Fast food</i> -1.88	-	-	-	-	Compensated
Reed, Levedahl, Hallahan, 2005 ²	-	-	-	-	-0.69	Uncompensated
Park et. al., 1996 ²	-	-	-	-	-0.96	Uncompensated
Okrent and Alston, 2011 ^{2,3}	-	-	-	-	-1.02	Uncompensated
Nayga and Capps, 1992	-	-	-	-	-0.75	Uncompensated
Craven and Haldacher, 1987 ⁴	-	-	-	-	-0.49	Uncompensated
Lamm, 1982 ⁴	-	-	-	-	-0.70	Uncompensated
Huang and Huang, 2009	-	-	-	-	-0.40	Uncompensated
Average Elasticities	-1.03	-2.43	-2.57	-2.00	-0.72	
Range:						
Low	-0.11	-0.13	-1.92	-0.74	-0.49	
High	-1.88	-3.96	-3.12	-3.31	-1.02	
Andreyeva, Long, and Brownell, 2010 ⁵					-0.81	

[1] Includes food from vending machines and mobile food vendors, and school and employee sites.

[2] Cited in Okrent and Alston, 2012.

[3] Averages for up to 11 other studies.

[4] Cited in Nayga and Capps, 1992.

[5] Average based on a review of 160 U.S. studies from 1938 to 2007

- **Inclusion of Substitution/Income Effects.** Compensated elasticities assume no relative change in income when prices change and reflect more the substitution effect rather than the income effect. Uncompensated elasticities are based on models that attempt to reflect the actual household budgeting process in which consumers may change their budgetary allocations for certain commodities in response to a change in prices. These elasticities reflect both the income and substitution effect. Only one study in our review estimated uncompensated elasticities by type of restaurant (Okrent and Alston, 2012). These elasticities show that when households take into account the change in their purchasing power due to food and non-food price changes, their response to food prices within different restaurant types is generally more inelastic (except at full-service restaurants) than when only substitution effects are considered.

Overall, the literature on elasticities by restaurant type does provide a clear indication that the substitution effect—the shift away from restaurants when a menu price increase is observed—is substantial, particularly at limited service and less expensive full-service restaurants. Because of the ease with which a consumer can substitute food from one restaurant with food from another, demand response to a price change by one type of restaurant is generally elastic. This means that if one restaurant increases its prices while other restaurants do not, such a restaurant will more likely than not, see a decrease in sales. For example, Richards and Mancino (2012) find compensated price elasticities of demand of -1.77 and -1.92, Levedahl (2011) finds elasticities of -3.96 and -3.12, and Jakanowski, Binkley, and Eales (1997) find elasticities of -3.87 and -2.66 for these types of restaurant (i.e. reductions in quantities demanded of between -1.77 and -3.96 percent for a 1 percent increase in observed prices when income effects are not taken into account).

The level of this substitution effect could be even higher when considering a subset of these restaurant types, such as the subset that might be affected by an EPS ban. As such, the strategic response of restaurants to cost increases, as discussed in the body of the report, is to avoid menu price increases where possible and, where necessary, to implement price increases in the least noticeable way possible. It should also be noted that, for any one restaurant or groups of restaurants, other factors such as location, reputation, cultural factors, or meal quality will also affect the consumer response to price changes.

Conclusion on Elasticities

The studies of price elasticities of demand indicate a generally inelastic demand to price increases for the restaurant industry as a whole and a generally elastic demand, reflecting substitution effects, for different restaurant types. As a result, while individual restaurant types may face losses in sales due to price increases, the industry as a whole is not expected to be affected as most consumers will shift from one restaurant to another rather than shift away from eating out.



APPENDIX C:
Experiences of Other Bay Area Jurisdictions

APPENDIX C: EXPERIENCES OF OTHER BAY AREA JURISDICTIONS

This section of the report summarizes eight informal interviews conducted in October 2012 with current representatives of Bay Area city governments who have implemented EPS bans. This appendix provides overall findings followed by summary information from the interviews.

Key Findings

- In the eight municipalities interviewed, there were no reported instances of any type of food service establishment going out of business because of the ban.
- Although most of the surveyed bans offer some form of a hardship exemption, there have been no reported applications.
- The businesses community's largest concern regarding the ban is ensuring it affects all businesses equally so that a level playing field is maintained within the local restaurant industry. Secondly, the price of, and access to, alternative material products is a consistent concern.
- Ensuring the ordinance clearly articulates how enforcement of the ban will be implemented, which includes identified funding sources, is a common issue for a number of the representatives interviewed.

Interviews with Municipalities

City and County of San Francisco (ban enacted 2006)

The interviewee began working for the City of San Francisco in 2007, the year after the EPS ban was enacted. There was no commentary or issues raised regarding the ban as other types of regulation, such as the smoking ban, were of much greater concern to the restaurant industry. The restaurant industry in San Francisco was, and continues to be, one of the fastest growing sectors in the City and has not been hampered by the EPS ban.

City of Fremont (ban enacted 2011)

During preparation of the proposed EPS ban, the interviewee worked closely with the Fremont restaurant community. There were some initial concerns regarding the increased cost of moving from polystyrene products to alternative materials (alternative being non-EPS packaging). However, in the opinion of the interviewee, the cost increases do not appear to have been significant. Most businesses recognized similar bans were happening elsewhere and were prepared to comply. Many product alternatives were, and continue to be, readily available.

There was some mention of the modest cost of re-printing menus due to menu price changes resulting from packaging price increases, but there is no evidence of any restaurant closures due to the ban. Although a hardship exemption is offered, no one has come forward. Businesses were most concerned with having a level playing field so all would be affected at the same time.

City of Palo Alto (ban enacted 2010)

Throughout the outreach process and during implementation of the ban, the interviewee worked closely with the Palo Alto restaurant community and reported initial concern over access to EPS alternatives. However, following the ban, there were neither any official complaints filed nor in-person complaints during door-to-door compliance checks. The interviewee is unaware of anyone going out business and citing the ban as a reason. Palo Alto does offer an economic hardship exemption but no one has applied.

City of Richmond (ban enacted 2009)

The interviewee estimates speaking directly with 30 percent of all restaurants in Richmond as part of public outreach during preparation of the ban. In addition to direct contact, fliers, mailers and other forms of community outreach were conducted. Initially, there was substantial concerns expressed by food service providers, the American Chemical Council, as well as internally (at the City), with some City staff expressing hesitation about the ban.

The ban was initially going to allow a hardship exemption, but the City Council decided to do away with any exemption in favor of extending the compliance time frame from six months to one year. Most businesses are now in compliance but there have been issues stemming from a small number of individual businesses. The interviewee suggests an elimination of all warning citations as, in her experience, businesses are well aware of the implementation of the ban but utilize the warning to wait another 30 days to comply.

City of Hayward (ban enacted 2010)

The interviewee was in charge of producing an initial impact study, conducting community outreach, and implementation of the Hayward EPS ban in 2010. The ban went into effect on July 1, 2011 and so far there has been one notice of non-compliance resulting in a fee of \$100. Like most other models, Hayward's ban is enforced through a complaint-based arrangement. In addition, although there is a hardship exemption offered, no one has yet to apply. No businesses have reported closing due to the ban.

In preliminary research, Hayward staff spoke to roughly one-half to two-thirds of Hayward's approximately 500 potentially affected businesses. The interviewee estimates that over half the businesses visited were using EPS before the ban.

Businesses were most concerned about potential product price increases and whether the ban would apply to all businesses equally. City staff provided alternative product mailers multiple times and reassured businesses that everyone would be affected equally and simultaneously. There was a nine month grace period given to businesses from when the ban was implemented, which followed six months of outreach and education before the ban.

City of Oakland (ban enacted 2006)

The Oakland ban went into effect on January 1, 2007. Since the ordinance went into effect, City officials have struggled with enforcement. The ordinance was not explicit in designating who would be responsible for enforcement of the ban nor did it allocate sufficient funds for enforcement. In addition, the City's process for fine collection involves both the fine itself (\$100

for first-time EPS offenders) as well as a larger fee to pay for "cost recovery", or the actual personnel sent to enforce and collect the fine (the interviewee estimates this fee to be upwards of \$500). Due to the combination of these issues, there is little to no enforcement in the City of Oakland and therefore the ban may not have significant effect.

Leading up to the ban's implementation, there was considerable outreach to the restaurant community. This included fliers and face-to-face conversations with businesses across the City. There was very little resistance from business associations such as the Chamber of Commerce and the Chinatown Chamber of Commerce. The California Restaurant Association expressed the strongest concerns (though also limited), although it was unclear how many businesses they represent(ed) in the City of Oakland.

There is a hardship exemption offered for those who can demonstrate financial difficulties from the ban, though no one has applied. However, this lack of applicants may be due to the limited enforcement of the ban.

City of San Bruno (ban enacted 2010)

The interviewee indicated that the ban has been successful in that a number of companies have complied and removed EPS from their inventory. However, there is only anecdotal evidence of this success as the City does not conduct any tracking and has no enforcement. Compliance is entirely voluntary. Though there is a hardship exemption offered, no one has applied.

All businesses were affected at the same time. There was no phasing in of the ordinance for different businesses. All businesses were given one year from implementation to comply with the ordinance.

City of San Leandro (ban enacted 2012)

The San Leandro ban went into effect on November 1, 2012. However, this interview was conducted before November 1 and therefore does not reflect the first week following implementation of the ban.

The ordinance was passed on November 1, 2011 and provided a 12-month grace period for all existing restaurants to become compliant. There are a number of exemptions included in the ordinance such as polystyrene producers and wholesalers located within City limits, prepared foods packaged outside of the City that are sold within City limits (in addition to packaged foods produced in the City for consumption outside of City limits), or any businesses that are found to experience undue hardship as found by the City Manager on a case-by-case basis. No business has applied for a hardship exemption (businesses were encouraged to apply for an exemption during the 12-month grace period).

City staff took into account implemented ordinances in Hayward, Livermore, Oakland and Fremont when crafting the ordinance.

The City did not provide funding for face-to-face interviews with City restaurants (City staff did not have adequate staffing or funding to do so), but a survey was sent around to local businesses, resulting in three businesses expressing concern over adaptation to alternatives. It should be noted that all of the businesses that expressed concern were already using alternatives

and their concern stemmed from competing retailers receiving unfair treatment (businesses that sell pre-packaged foods can use polystyrene under the ordinance). The San Leandro City Council was strongly in favor of the ban.