

The Abell Report

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Uncapping the Pros and Cons of a Bottle Deposit Program

Will a beverage-container deposit program reduce litter in Maryland? And at what cost? An examination of this issue—along with potential impacts on recycling rates, employment, beverage sales, and greenhouse gas emissions.

ABELL SALUTES:

“Year-Up”: Teaching IT skills, opening doors, changing lives.

Gary Barnes Sutton, an 18-year old African American and 2009 graduate of Mergenthaler (high school) was hustling pizzas at \$3.00 an hour plus tips and making maybe \$15,000 a year in the culture of the working poor, when he connected with a program called Year Up; some 14 months later he is making \$15.00 an hour and \$30,000 a year as an information technician working in the white-collar corporate world (T. Rowe Price, Domino Sugar, Morgan Stanley), with prospects of rising income and the wholly different life that accompanies. For Gary and hundreds of other young men and women struggling in an unforgiving workplace where jobs of any kind are hard to come by, Year Up is transformative--changing young people's workplace skills, income, lifestyle and aspirations. Of his Year-Up experience, Gary says in wonderment, “What an eye opener!”

Year Up is a nonprofit organiza-

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By the University of Maryland Environmental Finance Center, in partnership with the Center for Integrative Environmental Research and ECONorthwest

Beverage-container deposit programs currently exist in 10 states across the country and are under consideration in several others. These programs add a refundable deposit (generally 5 or 10 cents) to the purchase price of a beverage container. When the consumer returns the beverage container for recycling, the deposit is returned. The unique nature of disposable beverage containers provides the opportunity to use a market-based system to incentivize the proper handling and disposal of these items.

However, deposit programs remain highly debated, with strong supporters and detractors. The goal of the University of Maryland Environmental Finance Center (EFC) project team is to provide an objective analysis that informs the decision-making process within the state of Maryland as it considers legislation in the future. This executive summary summarizes the team's key findings associated with extended research. A copy of the full report is available from The Abell Foundation at www.abell.org.

The Effect on Litter Reduction

Litter is a universal problem with negative impacts that reach far beyond the community of origin. It not only decreases the aesthetic appeal of communities, which depresses business and local property values, but litter also travels via wind and water to pollute critical waterways and ecosystems. Traditional stormwater systems, which tend to result in high-velocity flows of rainwater, exacerbate the problem. As a result, local and state governments and communities across the country continue to invest in surveys, cleanups, and litter-reducing technologies in an attempt to reduce these negative impacts.

Litter also adversely affects tourism, and it degrades the ecology of land and water systems. But litter is costly to clean up. A 2009 Keep America Beautiful report estimated that the U.S. spends nearly \$10.8 billion annually on litter cleanup and prevention alone, with state and local governments picking up 11.5 percent of the cost, or about \$1.3 billion. Businesses reportedly pay the brunt of litter cleanup—\$9.1 billion, or about 80 percent of the total cost.¹ The City of Baltimore spends approximately \$10 million per year on litter cleanup, including litter pickup in business districts (\$2.3 million) and

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mechanical street sweeping (\$3.8 million).² These services are critical to residents and businesses and to maintaining a competitive hub for the city’s \$3 billion tourism industry.³

Although many attempts have been made to quantify the beverage-container component of litter, estimates vary widely because the variability in methodology makes it difficult to ascertain a precise percentage. This report cites data from numerous studies that indicate beverage containers make up between 4.4 percent and 21 percent of the litter stream throughout the country.

One of the most comprehensive surveys is from the Ocean Conservancy. In 2009, it reported that beverage containers were among the top 10 of marine debris collected, and were recorded at more than 6,000 sites around the world on a single day during the International Coastal Cleanup. In fact, 9 percent of the debris collected on that day were plastic beverage bottles (883,737 bottles), 4 percent were glass beverage bottles (459,531 bottles), and 4 percent were aluminum beverage cans (457,631 cans)—totaling 17 percent.⁴

Though data for Maryland are fragmented and largely incomplete, a series of litter surveys and clean-ups provides insight into the scope and composition of litter in the state. Using the estimate suggested in proposed House Bill 839⁵—that between 9 percent and 24 percent of Maryland’s litter (by weight) is made up of

Source/Location	Total Material Collected	Estimated Lower Bound (9% Beverage Containers)	Estimated Upper Bound (24% Beverage Containers)
Maryland SHA (2010) ⁷	24,092 lbs of debris	2,168.2 lbs	5,782.1 lbs
Assateague Coast (2010) ⁸	11,162 units plastic 3,207 units glass	312.5 lbs (actual) 1,343.3 lbs (actual)	
Baltimore Inner Harbor (2006-2007) ⁹	16 tons of debris	2,880 lbs	7,680 lbs
Baltimore Community Cleanup (2011) ¹⁰	144 tons of debris	25,920 lbs	69,120 lbs
Anacostia Bandalong Trap (2010) ¹¹	6,000 lbs annually	540 lbs	1,440 lbs
Potomac Spring Cleanup (2011) ¹²	228 tons of debris	41,040 lbs	109,440 lbs
Patapsco Cleanup (2007) ¹³	71,272 lbs of debris	6,415 lbs	17,105 lbs

Table 1: Litter collected at recent cleanup events in Maryland

bottles—and using a plastic PET bottle weight as a proxy,⁶ we can calculate how much of the total litter collected at recent cleanups can be attributed to beverage containers alone.

One of the most comprehensive and current data sets available for Maryland comes from the 2011 Potomac River Watershed Cleanup sponsored by the Alice Ferguson Foundation. The 23rd annual cleanup cleared 48.4 tons (193,600 individual containers) of recyclable aluminum, glass, and plastic bottles from the watershed at 613 sites located in Maryland, Virginia, West Virginia, Pennsylvania, and the District of Columbia.¹⁴ This tonnage represents about 21 percent of all waste collected, marking the upper bound of the national range discussed above.

So how can a state address this litter problem? There are a number of practices and programs that may be

used, including Adopt-a-Highway programs, paid litter pickup, comprehensive litter-control programs, litter fees or taxes, paid targeted advertising, extended producer responsibility programs, and, of course, beverage-container deposit programs.

In fact, a review of the available literature shows that beverage-container deposit programs have proven to be the most effective method for reducing litter. Beverage deposits, in essence, create an incentive to dispose of a container properly instead of leaving the container to pollute the environment as trash. States that have enacted deposit programs report significant reductions in beverage containers in the litter stream. Hawaii, for example, saw a 60 percent reduction in beverage containers as a percentage of total litter between 2005 (the year the beverage deposit program was implemented) and 2008.¹⁵ (This

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trend reversed slightly in subsequent years with 2010 data showing a 1.5 percent increase in beverage containers as a percentage of total litter.)¹⁶ There is some literature that indicates that other forms of litter are reduced as a result of deposit programs as well (see Table 2 below).¹⁷ While this may be the case, the EFC’s research indicates that litter-reduction benefits of deposit programs can only be quantified to any degree of certainty with regard to beverage-container litter.

Table 2, below, shows self-reported litter data to the U.S. Senate Committee on Environment and Public Works in 2002 from seven states that have enacted bottle-deposit legislation. These pre- and post-litter surveys indicate a reduction in beverage-container litter by a range of 69 percent to 84 percent, with an overall litter reduction by 30 percent to 64 percent.¹⁸ Although these data suggest a correlation between deposit programs and overall litter reduction, this conclusion is based on studies conducted between 1977 and 1987. To our knowledge no recent data have been collected to further substantiate this connection.

In summary, the EFC’s findings indicate that litter is a significant and costly problem in the state of Maryland, and that litter reduction would be a primary benefit of a beverage-container deposit program. Ultimately, the impact on litter will be determined by two factors: 1) the redemption rate; and 2) the number of container types addressed by the deposit system.

General Mechanics of a Bottle Bill

Though deposit programs are rela-

State	Beverage Container Litter Reduction	Total Litter Reduction
Iowa	76% ¹⁹	39% ²⁰
Maine	69-77% ²¹	34-64% ²²
Massachusetts	N/A	30-35% ²³
Michigan	84% ²⁴	41% ²⁵
New York	70-80% ²⁶	30% ²⁷
Oregon	83% ²⁸	47% ²⁹
Vermont	83% ³⁰	35% ³¹

Table 2: Litter reductions after implementation of a beverage-container deposit bill³²

tively simple in concept, the revenue flows and transaction costs associated with these programs can be complex. Further, how these costs and revenue flows are accounted for will determine the long-term sustainability of the program and the responsibilities of each participant in the marketplace.

The deposit system: To encourage proper disposal of beverage containers, a refundable deposit is placed on each container. In most cases, this is a 5 cent charge, and although there is variation from one program to the next, the fee is typically applied to a variety of carbonated and noncarbon-

ated beverages sold in glass, plastic, or aluminum containers typically with the exception of dairy products.^{33,34}

Figure 1, below, shows the flow of deposits (solid lines) and bottles (dotted lines) in a bottle-deposit program. First, consider a bottle that is purchased and then redeemed. In most states, the process begins with the distributor. The distributor ships beverages to retailers, and includes the deposit—5 cents, for example—in the price it charges the retailer. When a consumer buys the beverage, he or she is charged the retail price plus the 5 cent deposit. The consumer takes

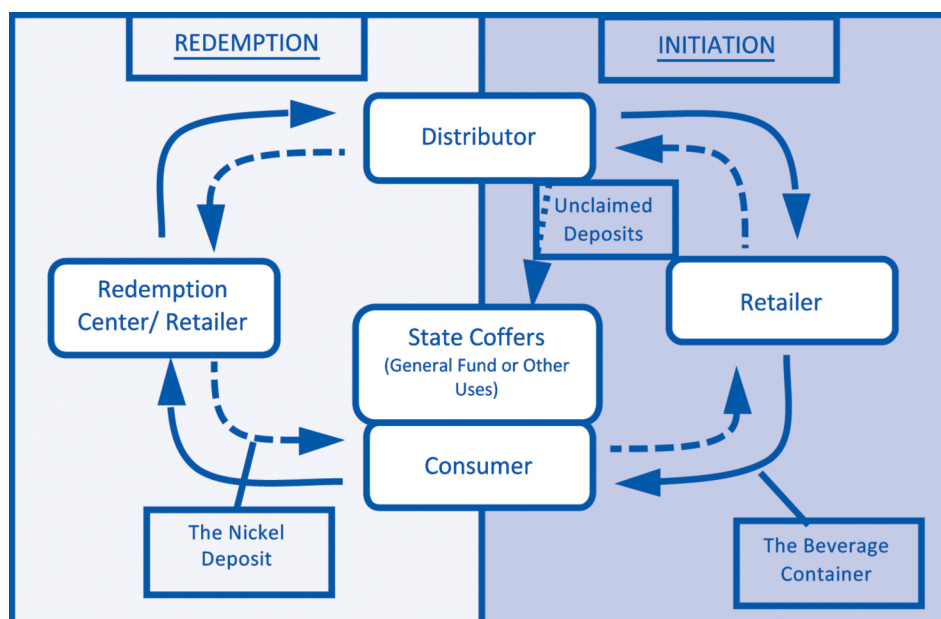


Figure 1: The flow of deposits and containers in a typical deposit program

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the empty bottle to a collection center (oftentimes a retail establishment, but not exclusively) to redeem the bottle and retrieve the 5 cent deposit. The redemption center then ships the empty bottle to the distributor in return for the 5 cent deposit.

Now consider a bottle that is purchased but not redeemed. In either case, the distributor ships the beverage to the retailer and charges the 5 cent deposit. The retailer sells the beverage to the consumer and charges the retail price plus the 5 cent deposit amount. At this point, if the bottle is not redeemed, it either is thrown into the trash and sent to a landfill (or incinerated), ends up as litter, or is recycled curbside. As a result, the distributor now has an extra 5 cents, which he or she received when the retailer was charged for the shipped beverage. The distributor either keeps the 5 cents, or in the case of most existing programs, returns the unclaimed deposit to the state.

Program costs: Even with an effective redemption process, the deposit program is not without cost. There is a transaction every time a beverage container or deposit changes hands, and each of these transactions comes with its own cost. The combined average cost for retailers, redemption centers, and recyclers is an additional 4.1 cents,³⁵ which must be passed to the consumer; supported through government revenue and/or sales of scrap materials; or internalized by manufacturers, retailers, or distributors. Regardless of how the program is structured, there are also upfront costs associated with establishing bottle-deposit programs, as well as the long-term expense of oper-

ating the program.

Upfront costs: Upfront costs include the capital costs to set up redemption centers, to purchase and install reverse vending machines, and to acquire all necessary equipment. There are also upfront administrative costs, primarily associated with establishing the necessary capacity to run the program. The extent to which these costs fall on the public or private sector is dependent on the structure of the program.



***Beverage container
deposit programs have
proven to be the most
effective method for
reducing litter.***



Under the structure proposed in Maryland in 2007, Prince George's County reported that construction and operation of a redemption facility at the Brown Station Road Landfill was approximately \$5,000, with an additional \$25,000 to staff it.³⁶ While these costs seem relatively low, extrapolating this to other local governments assumes appropriate facilities exist to either add on to or repurpose. By comparison, when considering a deposit program of its own, Rhode Island estimated that to lease the space for 50 centers, make any necessary renovations, and employ

the 12 staff members to manage program start-up activities would cost \$3.6 million.³⁷

Operating costs: As with almost any business enterprise, the primary costs associated with beverage-container deposit programs are related to program operation. For deposit programs these costs tend to span three areas: (1) the handling cost of collecting and transporting redeemed bottles to recycling centers, which have been reported to average 3.3 cents per container;³⁸ (2) processing costs, which are the subsequent costs of recycling the materials; and (3) administrative costs, which are the expenses associated with running the program, such as administrative staff for bookkeeping and information flow, enforcement personnel to ensure compliance, and program staff to manage outreach, education, and community engagement efforts.

According to a 2008 report, the annual cost of operating 90 independent, industry-run centers in Oregon was approximately \$156,000 per site, with an additional \$27,000 in administrative costs.³⁹ In the proposed Rhode Island program, annual operating costs for each redemption center were estimated at \$165,000.⁴⁰

Montgomery County, in response to Maryland's 2007 proposed legislation, suggested that it would cost an estimated \$300,000 for the county to hire a contractor to facilitate redemption-center processes. In addition, the county anticipated hiring fiscal assistants to handle reimbursements to customers, which would cost approximately \$150,000.⁴¹

Program revenue: Because of the popularity of bottled beverages in the U.S., hundreds of millions of dollars flow through deposit programs every

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year. Accounting for this revenue, and structuring programs to ensure that surplus revenue is invested appropriately, is essential for maintaining sustainable systems.

Deposit revenue: The primary source of revenue in a beverage-container deposit program is the deposit itself, which in theory is enough of an incentive for every consumer to return the empty bottle to a redemption center. In reality, however, large portions of containers are never redeemed. They either end up in landfills, as litter, or finding an alternate route to a recycling center. In these cases, the unredeemed deposits become a source of revenue for the community.

Redemption rates and unclaimed revenue: Across the 10 states with existing programs, the average redemption rate is 76 percent, with a low of 60 percent in Connecticut and a high of 97 percent in Michigan. Not surprisingly, there is a strong correlation between the value of the deposit and the redemption rate. Michigan has the highest deposit at 10 cents, which results in its high redemption rate. In the six months that followed California's 2007 increase of its refund values—5 cents for containers under 24 oz and 10 cents for containers over 24 oz—the redemption rate increased 6 percent from the same time period in the previous year.

Redemption rates are also impacted by the convenience of return processes and facilities, as well as the types of materials collected. Some redemption processes rely heavily on reverse vending machines (RVM), automated devices that collect used beverage containers and return a con-

sumer's deposit. RVM systems have lower operating costs than staffed, manual redemption centers; provide the opportunity to reduce fraud through state-specific barcoding; treat containers more gently, resulting in a higher-quality scrap end-product; and can relieve some of the burden that falls on retailers and distributors. Perhaps most importantly, RVMs are highly convenient, making the redemption process simpler.

Revenue from unredeemed containers can reach the tens of millions of dollars, ranging from \$1.2 million in Maine to approximately \$200 million in California. Obviously, the level of unredeemed deposits is directly associated with the number of beverages purchased in the state; therefore, large states like California will have higher revenue levels. As stated previously, this revenue is impacted by the redemption rate itself. Therefore, states that provide less incentive for container return and have lower deposit levels will likely experience lower redemption rates and have

higher unclaimed deposit revenue.

In most cases, these unclaimed funds that revert to the state are added to the general fund or are used to cover programmatic expenses. Michigan, for example, diverts 75 percent of unclaimed deposits to a Cleanup and Redevelopment Fund, which is spent on state environmental programs. Funds totaled \$17.5 million in 2001, and more than \$12 million in 2010.⁴² Having a specific funding mechanism in place has enabled the state to not only define how these dollars will be spent, but to also establish a nexus between what activities these funds are collected from and the purpose they serve when reinvested in the community.

Although on the surface beverage-container deposit programs seem to operate as revenue-generating tools, there are a host of handling, administrative, and programmatic costs at play, as well as market forces, that often tip the balance sheets in the other direction. Closing a budget gap should not be the driver for institut-

State	Deposit Amount	Redemption Rate	Unclaimed Deposit Revenue
California ¹	5 cents	84%	\$200 million
Connecticut	5 cents	70%	\$23 million
Hawaii ² (2009)	5 cents	79%	\$21.5 million
Iowa	5 cents	86%	\$23 million
Massachusetts	5 cents	71%	\$39.2 million
Maine ³	5 cents	90%	\$1.2 million
Michigan	10 cents	97%	\$12 million
New York	5 cents	67%	\$120 million
Oregon ⁴	5 cents	75%	\$16 million
Vermont ⁵	5 cents	85%	\$2 million

1. 10 cents for bottles over 24 oz. 2. Plus 1 cent to 1.5 cents nonrefundable fee. 3. 15 cents for some wine bottles. 4. Reverts to distributors; Oregon Department of Environmental Quality estimate. 5. 15 cents for some liquor bottles.

Table 3: Unclaimed deposit revenue in existing deposit program states

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ing such a program, nor should it be the sole financing mechanism to support the program. As redemption rates improve, unredeemed deposits shrink leaving a state with an expanded program and fewer funds to run it. This is the paradox of revenue generation.

Revenue from the sale of scrap materials: In the long term, the foundation of sustainable, self-supporting beverage-container deposit programs is the recycling process and the sale of scrap materials. Without the possibility of recycling, collected containers would be disposed of in landfills—not a desirable outcome.⁴³ Further, the price that recyclers can earn for scrap materials is directly associated with the price of virgin materials. As the price of virgin materials rises, the price that a recycler can earn also rises. When the price for scrap materials is sufficiently high, the revenue from sales is sufficient to cover handling, administrative, and transaction costs associated with running the deposit programs. When scrap values decline, revenues decrease, therefore requiring the establishment of handling fees.

The global recession that began in 2008 had a significant depressive effect on commodities' prices, which resulted in the collapse in the value of recycled scrap materials. Prices for recycled commodities such as cardboard, newsprint, paper, and film plastic dropped dramatically. And the export market, principally China, essentially closed in terms of buying certain commodities.⁴⁴ As states like Maryland are pushing to expand waste-diversion programs through the use of policies like deposit programs, the price for recycled scrap materials is

still struggling to recover. However, collection and processing costs have stayed relatively stable. As a result, local governments are often required to subsidize curbside collection programs through other revenue sources.

Revenue generated by handling fees: Several existing container deposit programs generate an additional source of revenue to cover handling costs through a nonrefundable handling fee. These fees, which generally range from 1 to 3 cents, are primarily assessed on beverages and help cover the cost of handling the containers.⁴⁵

▲

States that have enacted deposit programs report significant reductions in beverage containers in the litter stream.

▼

Other Benefits and Drawbacks

The EFC team also assessed other effects typically cited as support for or in opposition to beverage-container deposit programs. These include impacts on recycling rates and local recycling programs, jobs, beverage sales, and greenhouse gas emissions. The team also considered what is called “the paradox of revenue generation” through unclaimed deposits. Though many warrant further exploration, none of these issues weighs

more heavily than the litter-reduction benefit discussed above.

Recycling Rates and Local Recycling Programs

States that have implemented deposit programs have experienced improved recycling rates, which benefit both society as a whole and local communities specifically. Currently, there are four ways that waste in Maryland is managed at permitted solid-waste acceptance facilities. In 2009, the Maryland Department of the Environment (MDE) collected the following data:⁴⁶

- **Exportation:** Collected refuse can be transported out of state for recycling processing or landfilling—35.9 percent.⁴⁷
- **Landfilling:** Collected refuse can be landfilled in one of Maryland's 24 landfill facilities—27.2 percent.
- **Incineration:** Collected refuse can be incinerated at one of Maryland's five incinerator landfill sites (three are medical waste-specific, two are for municipal solid waste)—17.3 percent.
- **Recycle/Reuse:** Collected recyclables can be sorted, bundled, and sold on the open recycling market at one of Maryland's recycling facilities—19.6 percent.⁴⁸

In addition to the environmental, financial, and public-health impacts of landfill and incineration facilities, according to the MDE, the state will meet total landfill capacity in 34 years if waste continues at its current rate.⁴⁹ So although increasing the percentage of waste shipped out of state could prove to be more economical, bottle-deposit legislation may also be a way to extend the life of current landfills.

A related issue worth mentioning

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is the impact of bottle-deposit programs on local recycling efforts. Specifically, local recycling programs may see a reduction in the number of beverage containers collected curbside. And because aluminum, in particular, represents one of the more valuable scrap materials, local recycling systems could see a reduction in revenue. Therefore, though recycling rates and efficiencies will almost certainly improve statewide, there is uncertainty as to whether this improvement will come at a cost to local programs.

Both the Maryland Association of Counties and the Maryland Municipal League have expressed their concern that a beverage-deposit program would pull the most valuable part of the recycling stream—aluminum—out of local programs, and that the resulting loss of scrap value would force municipalities to subsidize recycling even more than they already do, meaning an additional burden to the local taxpayer served by curbside and/or drop-off services.⁵⁰ Montgomery County, for example, has indicated that the resale of recyclable materials processed at the county's recycling center generated more than \$3.3 million in revenue for the county in 2006.⁵¹

Massachusetts municipalities had similar concerns, but a survey conducted by the state found reduced collection costs to municipalities across the state totaled \$1 million, primarily due to the removal of low-value glass and plastics from the municipal recycling stream. Now nearly 200 cities and towns in the state support expansion of the program.⁵² Another study conducted in

Washington state (with funding from the City of Tacoma Environmental Services Division) also indicated savings to local governments in terms of reduced litter and waste-collection costs.⁵³

Reductions in collection and disposal costs, however, do not address the fluctuating value of recycled scrap materials.⁵⁴ Although a deposit program could be expected to improve litter-control efforts and recycling rates, it is likely to come with a cost borne by local governments to operate waste-management systems. Some current and proposed programs



Because of the popularity of bottled beverages in the U.S., hundreds of millions of dollars flow through deposit programs every year.



attempt to address this. California and Hawaii both use a portion of unredeemed deposits to support local-level recycling programs, and in Minnesota, the proposed legislation recommends that 90 percent of unclaimed deposits go to a state environmental fund while the remaining 10 percent be set aside to help support county-level recycling programs.

Jobs

There is little evidence to suggest

that beverage-container deposit programs have any significant impact on job creation and the economy, and thus, job creation is not a sound rationale for passing bottle-deposit legislation. In fact, the most efficient programs employ technologies such as reverse vending machines, which ultimately reduce the labor needed to administer the program. That said, research does show that the recycling industry may experience significant job growth in the future. Therefore, in so far as deposit programs contribute to the expansion of recycling programs, they may have a positive impact on the economy in the future.

According to the nonprofit organization Waste to Wealth, on a per-ton basis, sorting and processing recyclables alone sustains 10 times more jobs than landfilling or incineration. In addition, making new products from recycled scrap materials offers the largest economic pay-off in the recycling loop. New recycling-based manufacturers employ even more people and at higher wages than does sorting recyclables. Some recycling-based paper mills and plastic-product manufacturers, for instance, employ on a per-ton basis 60 times more workers than do landfills.^{55,56}

Beverage Sales

A major concern often expressed in the debate over beverage-container deposit programs is whether these programs cause an increase in the price of the included beverages. Earlier this year, in response to Real Recycling Massachusetts' claim that an "expanded bottle bill would cost consumers almost \$120 million per year at a grocery store,"⁵⁷ the Massachusetts Department of Environmental Protection conducted a survey exam-

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ining beverage pricing, consumer choice, and redemption system performance in Massachusetts and neighboring states. Its findings showed no discernible difference in price between beverages in deposit states versus non-deposit states. The survey also found that there was no difference in consumer choice, demonstrating that despite the fact that water drinks are included in the Maine program, product diversity still exceeded that of Massachusetts where these beverages are not included in the program.⁵⁸

Further, a University of Florida study by the Economic Analysis Program found that the impact of a deposit program on beverage consumption is essentially zero. The study maintains that such a deposit is low relative to the price of the beverage, and that consumers cannot easily avoid a price increase by substituting one beverage for another, particularly when the majority of beverage containers are covered under the deposit program.⁵⁹ A California study also found no evidence of a decline in the sale of noncarbonated beverages after those drinks were added to the state's deposit program in 2000.⁶⁰

Handling costs appear to be one of the most contentious issues associated with beverage-deposit programs. They are associated with collecting containers that are redeemed by consumers, and these costs are the most significant of all the costs associated with running a deposit program. Even the most effective and efficient systems incur operational costs, and the ability to control handling costs, in particular, will impact the long-term sustainability of the program.

The average handling cost in the 10 states with deposit programs is 3.3 cents per container. Keeping costs low, however, must be balanced with the need to provide consumers with convenient access to redemption centers and opportunities.



*[Massachusetts
Department of
Environmental
Protection survey]
findings showed no
discernible difference
in price between
beverages in
deposit states vs.
non-deposit states.*



With the exception of Oregon, which simply does not allow handling costs, states have employed two basic approaches to these costs: 1) cover them with unclaimed deposit revenue; or 2) assess a nonrefundable fee on each beverage sold. There are administrative costs and barriers associated with each approach, and each can be implemented in a variety of ways thereby impacting different stakeholder interests. Regardless of how these costs are addressed, because the demand for beverages is relatively inelastic, there is little evidence that the costs associated with

deposit programs negatively impacts beverage sales, especially if the program applies to multiple container and beverage types.

Greenhouse Gases (GHG)

Maryland has made reducing greenhouse gas emissions a critical environmental priority. To that end, beverage-container deposit programs are looked to as a possible integral component of the state's GHG reduction strategy. Though there are some reductions in GHG emissions associated with deposit programs, for Maryland, they are relatively modest and will almost certainly not be a major contributor to the state's GHG program. That said, there are genuine GHG benefits associated with the increased collection of beverage containers and potential for expanded use of recycling scrap materials. Therefore, as the market for scrap materials increases in the future, the GHG impact of deposit programs will increase.

The Paradox of Revenue Generation

One of the more popular selling points of deposit programs is the creation of revenue through unclaimed deposits. Deposit programs create market incentives that encourage the appropriate disposal of empty beverage containers. When the deposit rate is set high enough (around 10 cents per container), redemption rates increase to around 90 percent. This means that the program is achieving its primary goal of maximizing litter-reduction rates. However, the lower the deposit charged, the lower the redemption rates—and thus, lower reductions in litter and higher unclaimed deposit revenue.

A deposit rate of 5 cents per bot-

tle—the most common deposit amount among existing deposit programs—results in redemption rates of around 75 percent. As a result, there is a significant amount of revenue that goes unclaimed. This revenue is often used to address program costs including handling fees and other litter-reduction and recycling programs. In some cases, the revenue is used to support other unrelated social and environmental programs. This, of course, creates tension among competing community priorities. For those that view the role of deposit programs as a tool to reduce litter, unclaimed deposits can result in lower litter-reduction rates (though it is likely that many of the containers that go unclaimed do not end up as litter). For those who are relying on unclaimed deposits to fund other programs, more success in litter reduction means less revenue. As a result, these two motivations for implementing beverage-deposit programs—litter reduction and revenue generation—are at odds. In other words, a community cannot reasonably expect to maximize both litter reduction and revenue generation with a deposit program.

Recommendations

Should Maryland choose to move in the direction of a deposit program, there are a number of characteristics and lessons learned from other states that would likely improve the potential for an efficient and effective program.

Establish the most effective deposit rate. Given that the litter-reduction benefits of deposit programs outweigh all others, the deposit

rate should be set at a level that maximizes this benefit. Empirical and statistical evidence suggest that a deposit level of 10 cents per container will lead to redemption rates greater than 90 percent, thereby achieving the highest litter-reduction rates. Reductions in GHG emissions can also be expected to rise in parallel to redemption rates.

Do not rely on unclaimed deposit revenue to support unrelated programs. States that rely on unclaimed deposit revenue run the risk of reducing the impact of deposit programs on litter-reduction rates or jeopardizing programs that are supported by deposit-program revenue. If Maryland implements a deposit program, it should limit the use of unclaimed deposit revenue to covering container handling and administrative costs, supporting complementary litter-reduction programs, and/or supporting local recycling programs. It is strongly recommended that the state not use the revenue to support unrelated funding needs.

Implement the deposit on multiple beverage types. The long-term effectiveness of beverage-deposit programs at reducing litter rates relies on applying the deposit to as many different container types as possible. Maryland should be as comprehensive as possible regarding which beverage containers are included in a deposit program.

Mandate convenience and efficiency into the system. The more convenient the system, the more likely consumers will be to return bottles, which in turn increases litter-reduction rates. Therefore, it is essential that programs are designed and legislated with convenience in mind. That said, it is also important that the pro-

grams are efficient and cost-effective. Programs that rely on reverse vending machines rather than labor-intensive redemption centers are more cost-effective (as measured by costs per redeemed beverage container), have lower incidences of fraud, and produce a higher-quality, more readily used scrap end-product because the machines tend to be gentler than manual or curbside collection.

Establish clear program goals and requirements from the beginning. As with any other regulated environment, lack of clarity from the public sector creates transaction costs within an industry sector, and will almost certainly lead to program inefficiencies. Therefore, the state should clearly spell out responsibilities for collecting deposits, establish redemption centers, define penalties for fraud, and create program exemptions. In addition, the responsibility for administering the program should reside within the agency with the greatest capacity to reduce these transaction costs. In the state of Maryland, that would most likely be the MDE.

Use the marketplace to reduce handling and administrative costs. If Maryland implements a deposit program, the industry—either bottlers and distributors, or retailers—should absorb all handling and administrative costs in lieu of a nonrefundable handling fee. Beverage-container deposit programs are by definition market-based tools designed to incentivize litter reduction and improve recycling rates, correcting an existing failure in the beverage market to properly account for the costs associated with litter and the improper disposal of beverage containers. And as a market-based tool, deposit programs are extremely efficient and effective at

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achieving the desired community outcome. By requiring the industry to absorb the costs of the program, the costs are put into the marketplace, incentivizing industry participants to aggressively pursue reducing costs to the greatest extent possible.

Link unclaimed deposit revenue to program performance. In addition to implementing a market approach to reducing costs, the state should consider using the unclaimed deposit revenue as an incentive to improve program performance. Specifically, the industry should be allowed to keep most, if not all, of the unclaimed deposit revenue if it meets particular goals such as maintaining redemption rates at a particular level.⁶¹ In addition, the state should consider linking the unclaimed deposit revenue to the ultimate goal of the program: reducing litter. The state should also investigate using a “pay for success” type program that allows the industry to keep unclaimed revenue if overall litter rates are significantly reduced. In addition to incentivizing the reduction in program and handling costs, this would create a powerful market-based system for improving the environment through reduced litter.

There is no question that there will be industry opposition to the market approach recommended here. There is also no question that the industry is best positioned to understand what actions are necessary to reduce program costs and improve the effectiveness of deposit programs. In fact, the very premise of beverage-container deposit programs is that they use market incentives to encourage appropriate disposal of beverage containers, and by all accounts, these programs

are highly effective in this regard. It is reasonable to assume that the same sort of market incentives would result in the most efficient administration of these programs.

Conclusion

The recommendations above are based on an assessment of the successes and challenges of bottle-deposit programs in a number of states. Ultimately, a review of the available literature and discussions with managers in many of the bottle-deposit states led us to believe that a beverage-container deposit program presents one way for Maryland to attempt to address its litter-reduction goals. Ancillary benefits



*The impact of a
deposit program on
beverage consumption
is essentially zero.*



through increased recycling rates and decreased greenhouse gas emissions are possible, though not guaranteed. As discussed throughout this document, deposit programs have distinct benefits and drawbacks that will require careful consideration from the state to determine whether investing the resources and political capital to establish a deposit program is worthwhile.

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Endnotes

- ¹ MSW Consultants, “2009 National Visible Litter Survey and Litter Cost Study,” Keep America Beautiful, September 18, 2009, www.kab.org/site/DocServer/Final_KAB_Report_9-18-09.pdf?docID=4561.
- ² 2010 Annual Report: Baltimore City Office of Sustainability, www.baltimoresustainability.org/metrics/2010/Cleanliness-Goal-1.pdf.
- ³ Letter from “Visit Baltimore” Partners, May 13, 2010, baltimore.org/media/happy-place/.
- ⁴ Trash Travels, International Coastal Cleanup, 2010 Report, act.oceanconservancy.org/images/2010ICCRReportRelease_pressPhotos/2010_ICC_Report.pdf.
- ⁵ House Bill 839 was proposed by Delegate Peter Hammen, et al., during the 2007 session of the Maryland General Assembly. The bill proposed the establishment of a container deposit law that would collect a 5 cent (or more) deposit on specified beverage containers. The bill did not make it out of committee in the House, and no action was taken in the Senate. No similar bottle-deposit legislation has been proposed in Maryland since the 2007 session. A similar bill, “Recycling—Bars and Restaurants—Beverage Containers,” was proposed in 2010 and again introduced in Maryland in early 2011. More on this legislation, which was ultimately withdrawn, is available in Section 2 of the full report.
- ⁶ A 16.9 oz PET bottle weighs 12.7 g.
- ⁷ “Maryland Thanks Pick Up America Volunteers for Litter Removal and Education Efforts,” April 29, 2010, Maryland Department of Transportation State Highway Administration, www.roads.maryland.gov/pages/release.aspx?newsId=637.
- ⁸ Ocean Conservancy, “Trash Travels: From Our Hands to The Sea, Around the Globe, and Through Time,” International Coastal Cleanup, 2010.
- ⁹ Waldron, Tom, “An Urban Trash Collage Speaks Volumes,” Urbanite Baltimore, August 1, 2007, www.urbanitebaltimore.com/baltimore/netscape-an-urban-trash-collage-speaks-volumes/Content?oid=1247200.
- ¹⁰ Vuoto, Loredana, “Mayor’s Spring Cleanup Generates Baltimore’s Green Pride,” Greenhandsusa, May 5, 2011, www.greenhandsusa.com/central/page:10346.
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- ¹² “23rd Annual Potomac River Watershed Cleanup: 2011 Final Results,” Alice Ferguson Foundation, 2011, potomaccleanup.org/trash_initiative/trash_cleanup.shtml.
- ¹³ “2007 Stream Cleanup Stats,” The Patapsco Valley Heritage Greenway, Inc., April 2007, www.google.com/url?sa=t&rct=j&q=patapsco%20cleanup%2071%2C272&source=web

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¹⁴potomaccleanup.org/trash_initiative/trash_cleanup.shtml, last accessed November 30, 2011.

¹⁵Report to the 25th Legislature, State of Hawaii, 2009, prepared by: State of Hawaii, Department of Health, November 2008.

¹⁶http://act.oceanconservancy.org/images/2010ICCRReportRelease_pressPhotos/2010_ICC_Report.pdf

¹⁷www.bottlebill.org/about/mythfact.htm#src5

¹⁸Full table was reported in the proceedings of the July 11, 2002 hearing before the Committee on Environment and Public Works of the U.S. Senate, www.access.gpo.gov/congress/senate/pdf/107hr/83716.pdf.

¹⁹Iowa Department of Transportation, Highway Division, Litter Survey, April 1980.

²⁰Ibid.

²¹U.S. General Accounting Office, Report by the Comptroller General of the United States, State's Experience With Beverage Container Deposit Laws Shows Positive Benefits, December 11, 1980, p. 9.

²²Ibid.

²³Environmental Action Foundation, Bottle Bills in the 1980's: A Handbook for Effective Citizen Action, August 1987.

²⁴Michigan Department of Transportation, Maintenance Division, Michigan Roadside Litter Composition Survey, Final Report, December 1979.

²⁵Ibid.

²⁶Final Report of the Temporary State Commission on Returnable Beverage Containers, March 27, 1985.

²⁷Projection from Center for Management Analysis, School of Business and Public Administration of Long Island University, New York State Returnable Container Act: A Preliminary Study, 1984.

²⁸Oregon Department of Environmental Quality, Oregon's Bottle Bill: The 1982 Report, p. 26.

²⁹Ibid.

³⁰U.S. General Accounting Office, Report to the Congress by the Comptroller General of the United States, Potential Effects of a National Mandatory Deposit on Beverage Containers, December 7, 1977, p. 54.

³¹Ibid.

³²Full table was reported in the proceedings of the July 11, 2002 hearing before the Committee on Environment and Public Works of the U.S. Senate, www.access.gpo.gov/congress/senate/pdf/107hr/83716.pdf.

³³Exceptions to the 5 cent fee level include Michigan's 10 cent fee, California's 10 cent fee

for containers over 24 oz, and Maine and Vermont's 15 cent charge for some wine and/or liquor bottles.

³⁴It should be noted, however, that although a 5 cent charge is more prevalent, a strong correlation has been shown to exist between the value of the deposit and redemption rates. Higher fees have been associated with higher redemption rates, which can be expected to result in greater levels of litter reduction.

³⁵Container Recycling Institute, Letter to Assembly Member DiNapoli, April 6, 2006, www.bottlebill.org/assets/pdfs/campaigns/newyork/2006-Rebuttals.pdf.

³⁶Prince George's County as cited in the Department of Legislative Services Fiscal and Policy Notes for HB 839 from the 2007 session, mlis.state.md.us/2007RS/fnotes/bil_0009/hb0839.pdf.

³⁷DSM Environmental Services, Inc., Analysis of Beverage Container System Options to Increase Municipal Recycling in Rhode Island, prepared for Rhode Island Resource Recovery Operation, 2009.

³⁸Understanding Beverage Container Recycling, A Value Chain Assessment prepared for the Multi-Stakeholder Recovery Project," Businesses and Environmentalist Allied for Recycling, January 16, 2002, thecorr.org/Bear.pdf.

³⁹See full report: Container Recovery, Inc., 2008, "Appendix C: Presentation to the Oregon Bottle Bill Task Force: The Industry Approach, May 13, 2008," In Bottle Bill Task Force Final Report, October, p. 15.

⁴⁰DSM Environmental Services, Inc., Analysis of Beverage Container System Options to Increase Municipal Recycling in Rhode Island, prepared for Rhode Island Resource Recovery Operation, 2009.

⁴¹Montgomery County as cited in the Department of Legislative Services Fiscal and Policy Notes for HB 839 from the 2007 session, mlis.state.md.us/2007RS/fnotes/bil_0009/hb0839.pdf.

⁴²However, this is a more desirable outcome to them becoming litter.

⁴⁴Crittenden, Guy, "Market for recycled materials collapsing," Solid Waste and Recycling, November 11, 2008, www.solidwastemag.com/news/market-for-recycled-materials-collapsing/1000086432/?issue=11022008, last accessed on December 8, 2011.

⁴⁵www.bottlebill.org/about/whatis.htm

⁴⁶Maryland Department of the Environment, "Maryland Solid Waste Management and Diversion Report: 2010 (Calendar Year 2009 Data), Technical Services and Operations Program, November 2010, <http://www.mde.state.md.us/xprograms/Land/SolidWaste/PermittedFacilities/Documents/%2710%20mswmdr.pdf>.

⁴⁷In addition to exporting waste, the Maryland Department of the Environment states that 206,698 tons were imported in 2009. Maryland Department of the Environment, "Maryland Solid Waste Management and Diversion

Report: 2010 (Calendar Year 2009 Data), Technical Services and Operations Program, November 2010.

⁴⁸These numbers are percentages of the 7,507,014 tons of waste accepted at Maryland's permitted solid-waste facilities and then transported out of state, landfilled, incinerated, or recycled/reused in Maryland.

⁴⁹Ibid.

⁵⁰Personal communication with various members of the Maryland Association of Counties and the Maryland Municipal League legislative and government relations staff, November 16, 17, and 21, 2011.

⁵¹Montgomery County as cited in the Department of Legislative Services Fiscal and Policy Notes for HB 839 from the 2007 session, mlis.state.md.us/2007RS/fnotes/bil_0009/hb0839.pdf.

⁵²Personal communications with Greg Cooper, deputy division director at the Massachusetts Department of Environmental Protection, October 28, 2011.

⁵³Morris, Jeff, et al., Economic & Environmental Benefits of a Deposit System for Beverage Containers in the State of Washington, April 2005.

⁵⁴It should be noted that, while scrap prices hit an historic low in 2008, they hit an historic high in 2010 for some materials. California's Beverage Container Recycling & Litter Reduction Program, Fact Sheet, CA Natural Resources Agency, Department of Resources, Recycling, & Recovery, Division of Recycling, June 2011.

⁵⁵www.ilsr.org/recycling/recyclingmeansbusiness.html, last accessed December 7, 2011.

⁵⁶It should be noted that the organization's website indicates that focusing on reusing materials generates even more jobs than recycling.

⁵⁷www.realrecyclingmass.com

⁵⁸www.mass.gov/dep/recycle/reduce/bbsurv11.pdf

⁵⁹Dewey, Jim, et al., "Analysis of Florida Beverage Container Deposit Refund System," March 15, 2011, Economic Analysis Program, Bureau of Economic and Business Research, University of Florida.

⁶⁰Berck, P. and G. Goldman, 2003, California Beverage Container Recycling & Litter Reduction Study: A Report to the California State Legislature, DRRR-2011-025, University of California at Berkeley, <http://www.calrecycle.ca.gov/Publications/default.asp?pubid=1389>, p. 3.

⁶¹We recognize that there will be pressure to use these monies to support other programs, including local recycling programs. The decision to address these needs will be political in nature, and therefore outside the scope of this report. However, if it is necessary to subsidize other programs, we suggest that the amount of revenue that stays with industry be high enough to act as an effective incentive to achieve program goals.

ABELL SALUTES

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tion that provides low-income high school graduates and GED recipients, ages 18 to 24, with a year of information technology (IT) training, leading to technical careers with starting salaries of \$30,000 or higher. During the first six months of the program, participants are paid weekly stipends and attend classes focusing on IT Help Desk and Desktop Support. During the second six months of the program, students are placed in paid apprenticeships with local partner companies to gain work experience in IT. In 2006, Year Up opened an office in the Washington, DC, area (the office is located in Arlington, VA), which has served more than 500 young adults. The site is posting impressive outcomes:

80 percent of graduates are employed or enrolled in college within four months of graduation, earning an average wage of \$15 an hour, or \$30,000 a year;

More than 85 percent of Year Up's corporate partners continue to renew their commitment to future classes; a 91 percent of corporate partners express satisfaction with apprentices.

With \$112,000 in funding from The Abell Foundation, 31 Baltimore City residents traveled to Year Up Washington, DC, to complete the six months of classroom work. They completed their internships with Baltimore employers, including Johns Hopkins Medicine, T. Rowe Price, and Morgan Stanley. A total of 18 of the 31 students (or 58 percent) graduated from the program. Of the students who graduated, 15 (or 83 percent) were employed and/or enrolled in college within four months of grad-

uation, earning a starting wage of \$15.50 an hour; several are now earning \$18 an hour.

In August, 2010, with a \$115,000 grant from The Abell Foundation, Year Up opened an office in Baltimore at 201 N. Charles St. Through a partnership with the Community College of Baltimore County, Year Up dual-enrolled 24 low-income students in



80 percent of graduates are employed or enrolled in college within four months of graduation, earning an average of \$15.00 an hour, or \$30,000 a year.



August, 2010, and 22 more in 2011. Of the 46 students, 24 had prior college experience and 42 reside in Baltimore City. All of the students are low-income (or come from households earning less than \$40,000 a year) and more than 80 percent are African-American or Latino.

Students attend classes in the morning at Year Up and are transported to take additional courses at CCBC in the afternoon, earning 13 college credits for this coursework. The Year Up students have surpassed

their peers at CCBC in their courses: 77 percent of Year Up students passed Introduction to Computers, compared to 64 percent of CCBC students; and 100 percent of Year Up students passed English 101 compared to 65 percent of CCBC students. Eight Year Up students completed an online developmental education class (ENG 052) at the same time they completed English 101, enabling them to earn college credit.

Students complete their six-month internships with local companies and organizations, including The Johns Hopkins Hospital, Constellation Energy, the Mayor's Office of Information Technology, Motor Vehicle Administration, T. Rowe Price, and Morgan Stanley.

Of the 24 students from Year Up's first Baltimore class, 15 (or 63 percent) graduated from the class, completing all coursework and the six-month internship.

Bryant Dooley is an instructor and teaches at Year Up in Baltimore. He adds to the profile of Year's Up's mission: "We not only teach the technical skills it take to work as an information technologist; Our students are moving from one world, where low wages inform the way of life, to the corporate world—where what we call 'soft skills' count. How to meet people. Vocabulary. Bearing. How to plan and organize. Year Up doesn't just teach a marketable skill, it opens doors and teaches students how to move through them, and take their place on the right side of it."

Abell Foundation Salutes Year-Up for teaching students not just a skill to work in the computer world, but one that leads the student from one world to another.