CPSC
California Product Stewardship Council SM

P.O. Box 216381
Sacramento, CA 95821
916-480-9010

www.CalPSC.org

Product Stewardship for Beverage Containers: A Comparison of Systems in California, British Columbia and Germany

The purpose of this white paper is to evaluate California's beverage container deposit and recycling system as compared to other systems which are based on producer responsibility. For the purpose of this paper, we will look at the structure of the beverage container recycling systems in California, British Columbia, and Germany. The British Columbia and German beverage container recycling systems were selected because they are well-established programs with available data and because both are based on the concept of Extended Producer Responsibility (EPR), also called Product Stewardship. EPR is a strategy to place the primary responsibility for end-of-life product management on the producers, but is shared with all entities involved in the product chain, instead of just the general public. EPR encourages product design changes that minimize a negative impact on human health and the environment at every stage of the product's lifecycle while reducing public costs and placing the costs of collection, reuse and recycling in the price of a product. Product stewardship places primary responsibility on the producer, or brand owner, who makes design and marketing decisions. It also creates a setting for markets to emerge that truly reflect the environmental impacts of a product, and to which producers and consumers respond.

We will look at how each system is structured, identify which beverage container types are included in each system, and identify the funding mechanisms. We will also evaluate available data on the following environmental and economic benefits of each system: recycling/recovery rates by product type, reduced Green House Gas (GHG) emissions and job creation, which is the same as jobs in the industry.

EXECUTIVE SUMMARY

EPR systems provide funding and collection mechanisms for various products, but beverage containers were one of the first product types addressed because of the associated litter problems. Both British Columbia and Germany have full EPR programs for beverage containers. This means that producers defined as manufacturers, brand owners, importers, and distributors, are responsible for funding, designing and managing collection programs, ensuring that their products are either refillable or recyclable and are recovered for reuse or recycling, and are held responsible for meeting the recycling rates set in regulations.

California's system differs, as the producers do not design and manage the collection system and only participate moderately in the funding of the system. Producers pay into the California Redemption Value (CRV) fund and also pay processing fees designed to offset costs for processors who handle the recyclable materials, which is intended to stimulate the value of recycled materials. California's system provides an incentive for consumers to recycle beverage containers covered by the California Refund Value by offering the return of the deposit paid on covered beverage containers.

Under California's system, producers are not responsible for funding collection programs or designing and managing the collection system. California's system also does not require any beverage containers be refillable.

The systems vary in terms of covered products, financing mechanisms, recovery rates, environmental benefits and job creation. However, there are some similarities in environmental and economic benefits, regardless of the structure of each system. Recycling conserves natural resources and reduces the amount of waste sent to landfills and ending up as litter. Recycling also saves energy, which results in the reduction of greenhouse gas (GHG) emissions, and reduces the consumption of virgin materials, thereby conserving natural resources. British Columbia and Germany's emphasis on refillable containers further promotes GHG emissions and conserves resources that would otherwise be required to produce new or re-manufactured beverage containers. Each system also stimulates the demand for recycled products. This paper explains each system and presents available data for 2007.

CALIFORNIA

In 1986, Californian's passed the Beverage Container Recycling and Litter Reduction Act, AB 2020. This law is commonly referred to as the "Bottle Bill." This is a deposit-based system wherein both beverage container distributors and consumers pay into a fund administered by the California Department of Conservation and consumers are paid the redemption value for a container when it is returned for recycling. It is administered and monitored by the California Department of Conservation's Division of Recycling. The primary goal of the Act, as set in statute, is to recycle 80% of the aluminum, glass, plastic and bimetal beverage containers sold in California. A secondary goal is to reduce the amount of litter from beverage containers.

AB2020 also established the California Redemption Value (CRV), which has been adjusted over time to keep pace with economic conditions. The bill also requires that glass bottle producers use at least thirty-five percent recycled glass in the production of new bottles.

AB2020 made it easier for consumers to recycle beverage containers in almost every California community by establishing a broad network of "Convenience Zones." These zones must be located within a one-half mile radius of supermarkets in urban areas and within a 3 mile radius of supermarkets in rural areas. The recycling centers are often stand-alone kiosks not affiliated with the supermarket, though often located either adjacent to or in the parking lot area of the supermarket. There are also recycling centers located outside of the convenience zones. Californians enjoy the availability of more than 3,400 convenience zones and approximately 2,000 recycling/redemption centers for consumers[1].

California's system is unique among other states and countries that have beverage container recycling systems because everywhere else, the containers are returned to the store from which they were purchased.

Covered Products: AB2020 originally targeted carbonated beverages, beer and wine. As the beverage industry has changed, so has AB2020 been expanded to include additional products. In fact, the Act has been changed more than 50 times since first being enacted in 1986. Currently, beverage containers

[1] http://www.conservation.ca.gov/index/AboutUs/Pages/aboutUs_DOR.aspx

covered by this program include: carbonated mineral and soda water and other similar carbonated soft drinks, non-carbonated soft drinks, wine coolers and distilled spirit coolers, beer and malt beverages, non-carbonated water and mineral water, sport drinks, coffee and tea drinks, vegetable juice in containers 16 ounces or less, carbonated and non-carbonated fruit drinks that contain any percentage of fruit juice and 100-percent fruit juices that are packaged in containers less than 46 ounces. Another expansion of this bill is being considered during the 2009 legislative season, which would remove some of the remaining exclusions for certain vegetable, nut, grain and soy drinks, though there would still be exclusions, including milk containers, pouches and small aseptic containers ("juice boxes".) On the surface, the act could seem confusing because of the variety of types and sizes of beverage containers that are or are not covered; however, covered beverage containers are clearly labeled with the CRV language so that consumers can easily identify covered products.

Funding: Beverage distributors pay into the Fund by paying the redemption value on every covered beverage container offered for sale in the State. Distributors are then reimbursed by the fund when they sell the beverage container to retail markets. Retailers charge consumers a deposit, the CRV, at the point of purchase. Retailers forward the CRV deposit, paid by the consumer, to the Fund. When consumers recycle covered beverage containers through a certified recycling center, they are reimbursed the deposit which is usually equal to the deposit they paid, though this has not always been the case. Currently, redemption values are $0.05 per container for containers under 24 oz. and $0.10 per container for containers greater than 24 oz.

Processing fees are also paid by beverage manufacturers. Processing fees are calculated by taking into account the recycling rate of the container material type as well as the scrap value of the material itself. The intent is to help stabilize the market value of the recycled material, thereby promoting continued use of recycled materials as feed stock for new beverage containers.

California's 2007 Recycling Rates[2]:

Table 1-1

Material	Tons Recovered	Target Recovery Rate	Actual Recovery Rate
Aluminum	259 million	80%	79%
PET	1.2 billion	80%	54%
Glass	318 million	80%	75%
HDPE	42 million	80%	67%

It should be noted that California's program reports on the number of containers received, rather than by weight. The above figures are derived by using the California Department of Conservation's Division of Recycling's *Biannual Report of Beverage Container Sales, Returns, Redemption & Recycling Rates* conversion factors for the number of containers per pound by material type.

Greenhouse Gas Emissions Reductions: The most recent California data available is for the period of January – June, 2007. California used the United States Environmental Protection Agency's (USEPA) Waste Reduction Model (WARM). Based on the WARM methodology, California reduced

[2] California Department of Conservation Division of Recycling, Biannual Report of Beverage Container Sales, Returns, Redemption & Recycling Rates, Jan – June, 2007

approximately 293,000 Metric Tons of Carbon Equivalent (MTCE) during this six-month period[3]. Since data for the remainder of 2007 is not yet available, for the purpose of this paper, we have extrapolated that figure to arrive at an estimated reduction of 586,000 MTCE during calendar year 2007.

Job Creation: There is little verifiable data available on green jobs in California, and even less that is specific to the beverage container industry. At best, we can report that there are approximately 250 full-time employees working in the California Department of Conservation's Division of Recycling[4]. According to the California Department of Conservation's Office of Public Affairs, there is "anecdotal data" that indicates there are at least 14,000 jobs, statewide, attributed to the beverage container industry, though no single report quantifies that data. Regardless, there are primary jobs in the recycling, collecting and processing sectors that directly result from beverage container recycling. There are also secondary jobs in industries that rely on the use of recycled beverage container materials, such as carpet manufacturers (PET), food packaging manufacturers (PET), and the fiberglass industry, which uses recycled glass cullet. Lack of concrete data on green jobs in the recycling industry is a serious data gap that could help support the development of product stewardship policy.

BRITISH COLUMBIA, CANADA

British Columbia's *Litter Act* was enacted in 1970, making it the first jurisdiction in North America to establish a mandatory deposit-refund system for soft drink and beer containers as a litter control initiative. However, over time the beverage industry began offering new products and container types not originally included under the *Litter Act* and significant numbers of beverage containers were again ending up in landfills and becoming litter. Local government began petitioning the provincial government for relief from the burden of litter cleanup and the costs of managing beverage containers in landfills and operating municipal recycling programs. In response, the Province enacted the *Beverage Container Stewardship Program Regulation of 1997*. This new regulation replaced the *Litter Act* and required all beverage brand-owners producing covered products to establish province-wide collection systems for beverage containers and to operate a deposit-refund system. The Beverage Container Stewardship Program Regulation set a goal of a minimum 85 percent recovery rate[5] and required that redeemed containers be either refilled or recycled. Most of the Stewardship Program Regulation has now been replaced by Section 1 of the Recycling Regulation of October 2004.

One of the most important aspects of the Recycling Regulation is that it provided the legal framework for establishing industry-led product stewardship programs. British Columbia's Recycling Regulation required beverage producers to be responsible for used beverage containers through third-party stewardship agencies.

British Columbia currently has two product stewardship organizations for beverage containers[6]:

[3] Ibid
[4] California Department of Conservation, Division of Recycling, Office of Public Affairs
[5] http://www.env.gov.bc.ca/epd/recycling/bev/history.htm
[6] Economic Impacts of the B.C. Recycling Regulation, Gardner Pinfold Consulting, August 31, 2008

- Brewers Distributor Ltd (BDL) manages refillable glass beer bottles and aluminum beer cans for domestic beer, ciders & coolers.
- Encorp Pacific manages soft-drinks and all non-alcoholic containers, and all alcohol containers except domestic beer bottles and all beer cans so that includes wine, spirits, non-refillable beer, cider, cooler and dairy containers. The British Columbia Dairy Council opted to establish a voluntary collection program for dairy containers, managed by Encorp.

The Recycling Regulation also stipulates that beverage containers be managed under a deposit-refund system. Consumers can return beverage containers either to the store at which they were purchased or to a product stewardship agency's collection depot. Approximately 90% of the containers are collected through depots which are privately operated collection centers.[7]

Covered Products: The Recycling Regulation applies to all containers of ready-to-drink beverages offered for sale in British Columbia, including aluminum cans, refillable glass bottles, non-refillable glass bottles, plastic containers made of HDPE, plastic containers made of resins other than HDPE, bimetal cans, drinking boxes, bag-in-a-box, gable top containers, and stand up pouches. Exceptions are containers for milk, milk substitutes, infant formula and meal replacements. Covered products apply to the residential sector only.

Funding: Funding for these stewardship organizations comes mainly from recycling fees, set by regulation. The consumer pays $0.05 for non-alcoholic beverages in containers of one liter or less; $0.10 for alcoholic beverages of one liter or less; and $0.20 for any beverage of more than one liter. The stewardship organizations are also funded by other mechanisms, including a visible, non-refundable fee charged to consumers at the point of sale and contract fees paid by the producers. Net revenues (deposits paid less deposits refunded) are used by the stewardship organizations to support operating expenses.[8]

Recycling Rates: In 2007, British Columbia's combined beverage container recycling programs reported the following totals[9] by material type (metric tons have been converted to U.S. tons):

Table 1-2

Material	Tons Recovered	Target Recovery Rate	Actual Recovery Rate
Aluminum	5,652 tons	75%	80%
Plastic	12,221 tons	75%	73%
Glass	63,210 tons	75%	96%
Other Metals	284 tons	75%	54%

Greenhouse Gas Emissions Reductions: In the 2007 study by Gardner Pinfold Consulting, it is reported that the combined activities of the beverage container stewardship programs in British Columbia resulted in a reduction of nearly 50,000 Metric Tons of Carbon Equivalent (MTCE). Gardner Pinfold used the United States Environmental Protection Agency's Waste Reduction Model (WARM) to calculate GHG reductions.

[7] Ibid
[8] Economic Impacts of the B.C. Recycling Regulation, Gardner Pinfold Consulting, August 31, 2008
[9] Ibid

Job Creation: Direct employment in the beverage container industry's stewardship and recycling activities amounted to approximately 745 full-time employees in 2007. This includes approximately 680 recycling depot employees, 26 administration employees, 19 transportation contractors and 20 material processors[10].

GERMANY

Germany has operated under the directives of its Packaging Ordinance since the 1990's. The Ordinance does not single out beverage containers, as does California's AB2020, but rather treats beverage containers as a type of packaging, much like cardboard boxes or plastic wrap. The Packaging Ordinance set target recovery rates for all product categories, placed an emphasis on refillable containers, obligated all producers to take back packaging sold in Germany and to reuse or recycle the packaging, and gave producers the opportunity to contract out this function through third-party product stewardship organizations, by far the most widely used being Duales System Deutschland GmbH. This stewardship organization has operated the German labeling initiative known as the Green Dot (Der Grune Punkt.) This is an exclusive labeling franchise, paid for by producers who purchase the right to use the Green Dot label on product packaging. In addition to Green Dot Licensing, with the passage of the 3rd amendment to the Packaging Ordinance, Germany began charging a deposit on non-refillable beverage containers. Retailers must take back non-refillable containers and are reimbursed from the deposit fund for doing so. Producers do not operate the collection and recycling system, but rather pay for it through the labeling initiative.

The Packaging Ordinance has undergone a major overhaul with the 4th Amendment, effective January 1, 2009[11]. As of this date, every business that produces packaging or puts packaged products on the market in Germany must conclude an agreement with a collection and disposal system licensed in Germany to ensure the take-back of all packaging. This includes not only German producers, but any producer marketing a product in Germany. This is a major change because it is no longer possible for producers and distributors to independently organize the take-back of their packaging. They must now participate with a product stewardship organization licensed by the German government. Operators of collection and disposal systems must collect and dispose of all packaging waste, including packaging and packaging waste from their competitor's customers. Since *all* packaging will be collected by such systems from private end-consumers, a marking of the packaging showing that it is subject to a particular licensing system – such as "Green Dot" - will no longer be required. This may open the door for additional stewardship programs. Perhaps most interesting is the Ordinance's provision that allows customers to remove packaging materials at the point of sale and requires the retailer to recycle it.

Covered Products: Germany's policy addresses all packaging materials, including beverage containers. There are no excluded beverage container types.

Funding: Financing[12] of Germany's Green Dot system is based on the "polluter-pays" principle. In other words, the producer pays for the end-of-life management costs of the product or product packaging

[10] http://www.env.gov.bc.ca/epd/recycling/bev/history.htm
[11] Baker & MacKenzie Law Firm, Environmental Newsletter, June 2008.
[12] http://www.gruener-punkt.de/en/info-for-consumers/faq/faq/a-questions-on-dsd-gmbh.html#c11536

(with respect to beverage containers, this applies to the product packaging.) Until the newly enacted 4th Amendment to the Packaging Ordinance went into effect, the overall system for the collection, sorting and recovery of recyclables has been funded by license fees paid by producers for the right to use the Green Dot symbol. License fees depended on variables such as the disparate costs for collecting, sorting and processing the individual packaging materials involved. However, with the revisions to the Ordinance, producers will continue to fund the system through the stewardship programs, which will include the Green Dot, as well as emerging stewardship programs.

The German system is an internal cost recovery system, whereby costs to producers are included in the product prices and are reflected in the total purchase price (to consumers). Payment is levied for packaging produced for sale or imported for sale in Germany. In addition to Green Dot Licensing, Germany charges a deposit on non-refillable beverage containers.

Recycling Rates: Germany's Green Dot Program reported the following totals for 2007[13]:

Table 1-3

Material	Tons Recovered	Target Recovery Rate	Actual Recovery Rate
Aluminum	29,779	60%	135%
Glass	1,344,552	75%	101%
Plastics	599,953	60%	121%

Germany's actual recovery rates as shown in Table 1-3, above, exceeded 100% because more products were recovered than initially anticipated, due to the recovery of non-licensed products.

Greenhouse Gas Emissions Reductions: There is no comprehensive data available on greenhouse gas emissions reductions relative to the beverage container industry. However, a presentation given by the Federal Association of German Beverage Wholesale in April of 2008 compared the CO_2 emissions from one-way versus refillable containers which showed a reduction of more than 1.1 million tons of CO_2 emissions by use of 100% refillable containers.[14]

Jobs Creation: We were unable to find comprehensive data on jobs in Germany's beverage container recycling industry. However, the Federal Association of German Beverage Wholesale recently compared the number of jobs in refillable mineral water bottling plants versus one-way (non-refillable) bottling plants. According to the report, of the 18,000 jobs in this sector, the refillable bottling plants accounted for 14,400 (80%) of the jobs[15]. While this represents only a small sector of Germany's reuse and recycling industry, it does support that Germany's product stewardship program and Packaging Ordinance, with its emphasis on refillables, foster jobs in this sector.

[13] http://www.gruener-punkt.de/en/company-info/the-company/performance-balance/mass-flow.html
[14] German Packaging Institute, 2007
[15] Genossenschaft Deutscher Brunnen, 2007

SUMMARY

Beverage containers are a somewhat unique product category in that the materials are readily recyclable, unlike some product categories for which recycling opportunities are either limited or some of the components of the product are easily recyclable while others are not (i.e., tires and electronic waste.) Each of the systems studied was initially developed to address the growing problem of litter and, to that end, have had successes, but this is an issue that will continue needing to be addressed.

The German system appears to have the highest recovery rates in all categories, though California's target recovery rate of eighty percent across-the-board is the most ambitious set by regulation. Germany does not report plastic types separately, but rather combines all plastics, including PET and HDPE into one reporting category. Aluminum has the highest recovery rate in both California and Germany; whereas, glass has the highest recovery rate in the British Columbia system, largely due to a strong market and heavy use of glass cullet by industry[16].

Comparable data on reduced Green House Gas emissions is lacking. California and British Columbia have published data available. The impact of Germany's system on Green House Gas emissions is not readily available at this time. This lack of comparable data underscores the need for cooperation between stewardship programs in different countries. Collaborating on data collection methods and reporting will create "apple-to-apple" comparison models that will highlight both the environmental and economic benefits of product stewardship systems.

All three systems use a deposit to incentivize consumers to utilize the recycling programs; however, the British Columbia and German systems emphasize producer responsibility for both funding and developing collection systems. Both the British Columbia and German systems also place an added emphasis on the use of refillable containers. California's system does not currently require the use of refillables and, as a result, there are no refillables in use in California at this time. Statutory requirements for the use of recycled content do help stimulate demand for materials and stabilize market prices. These may be areas for further study and consideration as California continues to work toward improvements in the existing beverage container system.

There is a need for additional data on Green House Gas emissions reductions and job creation in order to fully evaluate and understand the impacts and benefits of each system. Ultimately, it is very important for countries and states to share information that can help policy makers understand both the environmental and economic variables as we develop effective product policy.

[16] Economic Impacts of the B.C. Recycling Regulation, Gardner Pinfold Consulting, August 31, 2008