

BEVERAGE CONTAINER MANAGEMENT BOARD (BCMB)

Benchmarking Evaluation of Alberta's Stewardship
Program for Recycling Empty Beverage Containers

Final Report



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EXECUTIVE SUMMARY

The Beverage Container Management Board's (BCMB) mission is to establish and administer a leading beverage container management system that is innovative, accessible, and cost effective. The BCMB's broad mandate is to collect and recycle beverage containers throughout Alberta, and continually ensures their current approach to container recycling fulfils the requirements placed upon the organization.

Toward that end, BCMB has engaged Meyers Norris Penny (MNP) to conduct a benchmarking study of Alberta's beverage container stewardship program with a particular focus on program evaluation and assessing leading practices and innovations in comparable jurisdictions. This benchmarking study builds upon a similar study completed in 2004. The 2004 benchmarking study prepared by BearingPoint identified five opportunities for the BCMB to consider that may enhance the program and improve recoveries. Significant initiatives have been implemented, addressing each of the five opportunities as follows:

1. The program scope continues to be significantly broadened with other food and dairy products to continue to divert an increasing number of containers from the waste stream. Alberta is the first jurisdiction to include a broad range of dairy containers.
2. Deposit levels were doubled in most cases based on other jurisdiction's success increasing their deposit rates and experiencing a significant improvement in recoveries. Alberta's recoveries have continued to increase since deposit rates were increased. The harmonization of the deposit rate for aluminum containers to 10 cents also created significant operational efficiencies.
3. Portions of beer and non-beer processing streams are currently being consolidated reducing duplication and costs. This is a major cost reduction initiative. Unlike most North American jurisdictions, collection of beer and non beer containers was largely consolidated to a depot system years ago enhancing consumer convenience, standardizing the deposit redemption for beer and reducing overall program costs (with the exception of 62 retail liquor stores collecting approximately 1.5% of the recovered containers).
4. Handling commissions were reduced after a thorough cost analysis that reduced overall program costs, given handling commission represent over 60% of net program costs. New high speed sorting and compaction technology is presently being evaluated that may further reduce overall costs throughout the system.
5. Marketing initiatives were implemented to improve public awareness and increase recoveries, with many specific initiatives focused on specific communities and products. Increasing recoveries can be partially attributed to these marketing initiatives.

A major challenge in the beverage container recycling industry is that there is not a clearinghouse for program information. Each jurisdiction, and in many cases the brandowners within each jurisdiction, collects and reports their own results with varying commonality, disclosure and audit requirements; making comparisons challenging. This study is based upon the best data available.

Research and benchmarking efforts were conducted to answer the six key questions presented in the RFP for this project.

- 1. How does the overall effectiveness of Alberta's program compare, in terms of achieving mandated outcomes (e.g. material collection rates with programs targeting those same materials in other jurisdictions and, scope of materials covered)?**

Alberta deploys a very effective container recycling program. Alberta has the highest sales per capita creating a potentially larger environmental liability regarding containers than comparable jurisdictions.

Alberta has the broadest program scope, incorporating by far the highest number of unique containers. Alberta also was the first jurisdiction to include a broad range of dairy containers (milk and cream) in its deposit program.

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Alberta's program is mature and recoveries had plateaued over the past several years. Deposit rates were recently increased and significant funds are being expended in a broad marketing campaign, resulting in increased recoveries for comparable aluminum, plastic, glass and paper categories trending towards the recoveries of the jurisdictions with the highest recoveries in North America and Europe. Overall recoveries increased from 77% to 83% in one year as of December, 2009, compared to the world leaders with recoveries in the 87% range (and all with much narrower and easier to recover program scopes).

2. How does Alberta's program compare with those in other jurisdictions in terms to the types of environmental performance indicators that are tracked and measured by the program's managing organization (from the collection through final disposition of the containers)?

Virtually all jurisdictions track environmental performance indicators in a comparable way. The BCMB effectively tracks environmental performance indicators throughout their process.

3. What are the financial costs attributable to achieving mandated outcomes of Alberta's program and how does this compare with the program costs in other jurisdictions?

Alberta's net cost per container is as low as any comparable jurisdiction in North America, despite a large geographic area with a relatively sparse population.

Most of the jurisdictions examined have legislated an extended producer responsibility or product stewardship model designed to encourage brandowners to fundamentally change designs, packaging, etc to reduce waste while increase the re-use and recycling of waste materials. Despite this, most program costs are borne by consumers and governments, with minimal direct cost to industry.

Alberta's program (with the exception of refillable beer where a brandowner fee is levied, representing 9% of the container volume), like all comparable programs except California's and those in Europe, is funded by unredeemed deposits, consumer fees and revenues from processed collected containers. There is no direct funding by government or by brandowners for all other products.

Major program costs are handling fees (primarily collection depots), processing, transportation, communications and administration expenditures.

4. How does Alberta's program compare with programs in other jurisdictions in terms of the disposition of collected materials (i.e. the amount of material that is re-used, recycled, recovered and the amount of material that ends up as residual disposed of in landfill)?

All collected materials are recycled, at times at a loss, in a closed loop system as Alberta and all other North American jurisdictions generally do not incinerate or landfill collected containers. There is minimal incineration including incineration for energy capture and gasification in most jurisdictions.

Collected containers are commodities with varying values. The only material that has maintained a substantial value is aluminum, it tends to stay "cash positive", although this market is now in jeopardy given mergers in the aluminum manufacturing industry. Glass and the various types of plastic and paper tend to have low to nil values. Recycling of these products is heavily subsidized through consumer or brandowner fees.

California is the only North American jurisdiction identified that has embarked on developing legislation that may prescribe a minimum recycled content in containers. California is also partnering with academic institutions to research alternative container product compositions to improve environmental breakdown and create more sustainable packaging and recycling capability. It can be debated whether this is the role for government, industry or whether who does it matters.

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5. Are the most appropriate and efficient mechanisms being employed to achieve program objectives in Alberta?

Alberta's improving recoveries combined with low cost per container indicate that the Alberta beverage container recycling program is effective, thus mechanisms appear appropriate and efficient. This effectiveness is even greater when Alberta's broad program scope, large geographic area and relatively sparse population are considered.

Alberta's program appears financially sound as escheatment practices, where excess deposit funds are re-allocated to provincial or state government general revenues as happens in many US jurisdictions as well as Saskatchewan, New Brunswick and Nova Scotia, does not occur in the province. California is an example of a jurisdiction where financial stress has been placed on the program because unredeemed deposits have been directed to general revenues.

Alberta's program continues to add products to the program scope, and has the largest program scope in terms of number of unique items. The large majority of containers sold and collected traditionally have been aluminum, plastic and glass; but the recent introduction of dairy product containers to the program increases the volume of HDPE plastic and paper type products.

Two significant process changes have or are occurring. The first is the harmonization of deposit rates for aluminum at 10 cents. As a result beer and non-beer aluminum streams need not be sorted, creating tremendous process efficiency particularly given that aluminum is a large portion of the total volume of collected containers. The second change is been the ongoing consolidation of two collection agents. The official consolidation is targeted for January 2011. Brewers Distributor Limited (BDL) currently contracts Alberta Beverage Container Recycling Corporation (ABCRC) to collect all non-refillable beer. The goal is for beer and non-beer containers to be collected by one collection agent, receiving containers from 216 licensed collection depots in addition to licensed liquor establishments that collect primarily refillable beer containers.

The number of container depots has not changed in many years and may require revision to match the change in Alberta's population and demographics. While the number of depots has not changed, the capacity of the depots in the system has increased drastically over that time. Depots have changed location, built bigger buildings or increased the number of service points. Several rural depots have closed and urban depots opened, thus the number has remained static, the capacity has not.

On a broader basis, the North American container recycling industry has also been largely static for many years with most jurisdictions deploying similar physical operating models. The major cost elements for all jurisdictions are labour, occupancy and transportation to sort, count and move recovered containers to downstream processors, many outside of the jurisdiction.

To date sorting technology has yielded disappointing results, as reverse vending machines (RVMs) have generally proven to be slow, unreliable, and in the Alberta context, incapable of handling Alberta's large program scope and climate. RVMs were intended to both increase efficiency in depots as well as provide "mini-depots" throughout the community increasing recoveries of difficult to recover containers consumed outside of consumer's homes, schools and offices – the first generation RVM technology has proven incapable of this second objective.

Newer technology that can automate sorting and counting in depots is being evaluated and appears promising. A new generation of RVMs designed as stand-alone kiosks to be located at gas stations, convenience stores et al as a joint venture between Pepsi and Waste Management will be tested in US jurisdictions in 2010 with the goal to recover the hereto unreachable containers.

Compaction has also been problematic, as audit and integrity requirements prevented compaction at a depot level, resulting in double handling and counting driving significantly higher labour, occupancy and transportation costs throughout the system. New sorting technologies may make compaction at the depot level viable potentially driving process change and reducing costs.

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Some jurisdictions deploy a more rigorous franchise like contractual model for their collection depots, specifying signage, corporate dress, hours of operation, equipment, operating standards and procedures, etc. Alberta's collection depots operate with some independence within a structured set of standards. These jurisdictions view the commonality in their collection depots increases their ability to improve customer experience and potentially increase recoveries.

Alberta spends significantly more per capita on marketing than any other jurisdiction. This communications expenditure has increased in advance in preparation for the introduction of dairy containers into the program and the increase in deposit levels.

6. What are the examples of best practices or innovative approaches to waste stewardship of empty beverage containers that can be identified from this analysis that would be appropriate for consideration in Alberta?

The deposit program in Alberta is effective and cost efficient compared to others. The program is the broadest, has the lowest cost per collected container, and recovery rates are rising and appear to be heading towards the 85% plus range matching the global leaders. To further increase recoveries and reduce costs to match and potentially exceed where the leaders are now, strategic initiatives regarding the financial model, container life cycle (design, materials, packaging and material end markets), recycling processes, and consumer engagement must be developed and implemented. Seven strategic opportunities have been identified for Alberta to consider based upon the review of other jurisdictions in North America, Australia and Europe that may provide incremental program benefit.

1. Consider Fundamental Changes to the Funding Model

Investigate moving from the current consumer/brandowner fee structure to cover financial shortfalls as recoveries increase to a California style brandowner fee based on brandowner product specific recovery facilitated by the implementation of next generation automated counting and sorting equipment.

Virtually all deposit programs are structured through legislation describing extended producer responsibility or product stewardship; all programs are presently funded through unredeemed deposits and revenue from processed containers, with consumer/brandowner fees applied to fund program. This is the Alberta model, whereby consumer fees (with brandowner fees for refillable beer) increase as recoveries increase given the correlated unredeemed deposits decrease. This is a closed loop system that will always remain viable, but total costs to consumers (and refillable beer brandowners fees that may be partially or fully passed on to consumers) also increase as recoveries increase, assuming static commodity prices for recycled material.

California is unique where the State has legislated strictly brandowner fees on a material stream basis. The major objective for brandowner fees in California is to create financial incentives that can fundamentally change the container life cycle (design, materials, packaging and end markets) to better facilitate recycling and improve environmental outcomes, and ultimately reduce brandowner net costs. Their view is that consumer fees may not realize this same objective with consumers potentially viewing these fees as a tax, although it may be argued that consumers view products on a total cost basis, thus the incentive remains for brandowners to enhance the entire container life cycle to ultimately reduce overall costs.

To this end, California implemented a "processing fee offset" policy whereby the State pays a higher portion of the processing cost shortfall as recoveries increased to preset benchmarks. This has resulted in brandowners paying as little as 15% up to a maximum of 65% of the net recycling costs as recoveries have increased in conjunction with several simultaneous initiatives. Given the state has escheated a significant portion of the unredeemed deposits, the processing fee offset has been cancelled and brandowners will pay a larger portion of the financial shortfall in 2010.

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The current funding structure in Alberta creates several considerations:

- The current structure creates a natural tension between increasing recoveries (that automatically reduces unredeemed deposits), and the financial integrity of the program that currently survives on these unredeemed deposits, revenue from recovered containers and consumer/brandowner fees. Higher recoveries may mean higher product costs to consumers and potentially lower sales for brandowners.
- Most US jurisdictions and several provinces escheat unredeemed deposits. Escheats invariably result in higher consumer/brandowner fees again resulting in higher prices for consumers and potentially lower sales for brandowners.
- Collected containers are commodities with fluctuating values. Aluminum has traditionally been cash positive whereas other materials such as PET, HDPE, glass and others have had low to minimal values. Decreases in the value of these commodities will invariably result in higher consumer/brandowner fees.
- Increasing deposit rates generate short term cash surpluses due to the value of unredeemed deposits increasing and appear to result in increased recoveries. In the short term increases in unredeemed deposits due to the higher deposit rates may decline as recoveries increase, resulting in higher consumer/brandowner fees.
- Regardless whether a fee is charged to consumers or brandowners, it appears indifferent to consumers as both result in higher prices and potentially lower sales for brandowners. Current processes and technology deployed does not allow jurisdictions to track recoveries by brandowner or by brandowner product, thus brandowner fees are applied by material stream regardless of the greater or lesser efforts made by particular brandowners to improve the recovery and ability to recycle their containers. However, as there is currently no subsidization between material streams, manufacturers may benefit by choosing a container material stream that has low fees.
- Brandowners maintain and closely guard two proprietary items - their product formula and their sales. Moving to a brandowner fee based on actual recovery by product and brandowner would require sales and return data by product and brandowner. Alberta does not currently have access to return data by product and brandowner, although Collection System Agents (CSAs) perform the critical role of information clearinghouse ensuring the protection and security of this sales information.
- California implemented a brandowner fee across the board largely because their jurisdiction is approximately the size of Canada thus a market large enough to effectively negotiate with brandowners. Alberta, one tenth the size of California, may be in a poorer negotiation position, and may have to partner with other jurisdictions to effectively implement widespread brandowner fees.

A California style brandowner fee based on brandowner product specific recovery embodies the principal of extended producer responsibility. This may create the financial incentive for brandowners to compete with each other to fundamentally change design, materials, packaging et al with the goal to optimize recoveries and improve overall environmental outcomes. This type of fundamental move would require the implementation of next generation automated counting and sorting equipment allowing Alberta and many other jurisdictions to provide the actual recovery by brandowner and product.

2. Further Broadening the Program Scope Involves Broadening the Program Mandate

Alberta presently has the largest beverage container recycling deposit program scope in the world as well as the highest per capita consumption of in scope beverages - 25% greater than BC and 66% more than Saskatchewan. The vast majority of beverages sold in the province (including aluminum, plastic, glass and paper containers) are already in the program. Further expansion of the program would logically go in two directions - incorporating food and cleaning containers that are constructed of the same material types as beverage containers already in the program; and/or incorporating non sealing beverage containers such as paper/plastic/styrofoam cups and containers.

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Both options would be a significant extension from the current program mandate, and would venture into an area no other jurisdiction has attempted to pursue. There are significant volumes of containers in both areas thus diversion from landfills may be significant. Potential issues include resistance from brandowners and retailers, contamination concerns and the development of end markets where few exist now.

3. Develop and Support Regional Downstream Markets

Downstream markets are critical to the financial viability of a recycling program. Aluminum is the only material that consistently generates enough revenue to cover the associated recycling costs. Plastic, glass (except refillables) and especially paper have consistently had weak downstream markets and commodity values. That said, the one advantage recycling programs have is that they can deliver a constant supply of product which at times is valuable in the commodity marketplace.

California has developed a local market for plastics through a subsidization program. Approximately \$5 million in subsidies are paid to downstream processors annually. California has the critical mass to invest in market development given its size (\$1.2 billion in program gross revenue and 16.2 billion recovered containers).

Given geographic proximity, Alberta and brandowners may consider partnering with neighbouring jurisdictions to investigate opportunities to leverage their cumulative volume to develop regional markets for materials where few viable markets currently exist.

4. Support Research Projects to Enhance Re-use and Recycling

Only one jurisdiction appears to be funding third party research regarding container design and materials. California has partnered with academic institutions to develop alternative container designs and materials that are easier to recycle and breakdown faster in the oceans, rivers and landfills.

One major project is the development of "bio plastic". The State of California is also researching methane based plastics (PHA) and industry has developed corn based containers (PLA) and seeks to improve processing and enhance awareness with the public. The challenge with introducing both PHA and PLA containers is that they look very much like PET containers which may cause contamination problems in the PET recycling stream.

A second major project is gasification. Gasification has become a viable option for recycling (including containers) in Europe. Gasification is a flexible, reliable, and clean energy technology that can turn a variety of low-value feed stocks into high-value products, replacing traditional oil and natural gas as an energy source, and can provide a clean alternative source of base load electricity, fertilizers, fuels, and chemicals. It is a manufacturing process that converts any material containing carbon—such as coal, petroleum coke (petcoke), biomass, or many types of beverage containers—into synthesis gas (syngas). The syngas can be burned to produce electricity or further processed to manufacture chemicals, fertilizers, liquid fuels, substitute natural gas (SNG), or hydrogen. Gasification has been reliably used on a commercial scale worldwide for more than 50 years.

Alberta and all North American jurisdictions have long standing objections regarding traditional incineration (whether for waste or low efficiency energy recovery) which is generally viewed as comparable to land filling. Gasification appears to be an incremental to exponential improvement upon traditional burning technologies, and a case can be made that gasification may be a far better end use of some container streams for the environment than traditional recycling processes. This is an area that may be worth further scrutiny; especially given the City of Edmonton is building a gasification plant.

As a separate North American wide solely brandowner funded initiative, Coca-Cola introduced the "PlantBottle" in the fall of 2009 that is made from a blend of petroleum-based materials and up to 30 percent plant-based materials. The "PlantBottle" is currently made

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through a process that turns sugar cane and molasses, a by-product of sugar production, into a key component for PET plastic. Manufacturing the new plastic bottle is reportedly more environmentally efficient as well. Coca-Cola claims a life-cycle analysis indicates the "PlantBottle" with 30 percent plant-based material reduces carbon emissions by up to 25 percent, compared with petroleum-based PET. A significant advantage to the "PlantBottle" is that, unlike other plant-based plastics, it can be processed through existing manufacturing and recycling facilities without contaminating traditional PET. Another brandowner driven initiative has been the significant reduction of plastic (PET) in containers over the past couple of years, especially water bottles.

These initiatives are a conundrum, as the philosophy driving existing container recycling legislation is extended producer responsibility based on brandowners driving this effort to fundamentally redesign containers and packaging to facilitate re-use and recycling, and protection of the environment, and not government organizations and their delegated authorities. Conversely, it may be indifferent to consumers how dollars are collected that fund research like this, whether it be through increased product costs, consumer fees, unredeemed deposits, or provincial/federal taxes; as the net total cost to the consumer may be unchanged. In addition, initiatives such as gasification may require legislative support.

5. Enhance Depot Role, Technology, Location and Operations

a. Increase Depot Responsibility for Local Recovery Rate

The Alberta depots presently are licensed to accept empty registered beverage containers, refunding customer deposits as per legislation, and receive compensation from the brandowner's operational entities, ABCRC and ABCC. Depots are licensed independently from the ABCRC and are under the jurisdiction of the BCMB. BCMB and the brandowners are presently responsible for recoveries, not the depots, yet the depots are the only organization that interacts with the public and in the local communities. Depots are currently a service provider with no direct responsibility for recoveries although they are directly impacted by recoveries, as their revenue increases as their volume of redeemed containers increases which should relate to recoveries.

Most jurisdictions interviewed indicated that in their experience, the most effective marketing initiatives appear to be community based rather than broad jurisdiction wide initiatives. If this philosophy is accepted and embraced, the depot appears best positioned to drive community based marketing programs to drive recoveries versus BCMB or the brandowners.

California deploys a program whereby depots are eligible for a bonus for increasing their volume to certain pre-established benchmarks. The intent is to entice depots to market "recycling" in their local area to increase their volumes thus increasing recoveries – this program was implemented simultaneously with increased deposit rates resulting in increased overall state recoveries. This initiative's risk is that volumes are transferred from one depot to another with net recoveries unchanged.

There may be merit investigating the sharing of strategic responsibility for recoveries with the depots. One option to consider is the California model, whereby financial incentives are provided for increases in depot volume. A second option is revising the depot compensation model whereby recoveries are managed by sales in the depot area, and depots are compensated partially based on recoveries in their "area" – a much more complex approach. This may create significant additional financial incentives to optimize recoveries on a local basis.

b. Add Capital Intensive Technology to Reduce Variable Labour Costs

The current manual sorting at the depot and the ABCRC levels is extremely expensive, susceptible to human error, and slow. Reverse vending machines (RVMs) have been tested in Alberta and are deployed in other jurisdictions with minimal success. They are

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slow, unreliable, and unable to process many of the containers that are within the Alberta's program scope. RVMs have proven not to mitigate much of the labour component and cost, and also don't solve the current audit and compaction issues.

A new generation of automated counting and sorting technologies as well as compaction technologies at the depot level are currently being investigated by Alberta and other jurisdictions. Several sorting, counting and compaction technologies employed by other jurisdictions were documented during the benchmarking initiative. The leading technology is from Denmark and marketed by Anker Anderson. This technology is capable of 32 material type sorts and uses a bar code scanner with reported accuracy ratings of 98-99%. Given Alberta's wide range of material types in its program and manually sorts returned containers, the implementation of this type of technology presents potentially significant process improvement opportunities.

The benefit would be reducing overall provincial processing costs (primarily labour) as containers can be counted, sorted, compacted and audited at the depot level- thus a move to single handling of containers. Depot capacities would also be greatly increased with minimal requirements for additional floor space. Consumers will have their containers counted and sorted extremely quickly and accurately. Given this equipment sorts by bar code, contamination can be mitigated if and when PLA containers are introduced to the container stream.

The issue is the high capital cost, as the cost of each sorting unit ranges between \$200,000 and \$400,000. Compaction units are also capital intensive.

Consistent with the implementation of new and expensive technologies at the depot level is the concept of ABCRC moving to a cross dock and brokerage operation rather than a secondary sorting, compacting and audit operation, reducing overall system costs.

c. Locate More Depots in Retail Areas to Improve Customer Access

Alberta's program, like most North American jurisdiction's programs, began in the 1970s and 1980s based on a return to retail concept that beer retailers have successfully operated long before the advent of deposit systems for non beer containers in the 1970s.

The initial deposit systems for non beer containers were based primarily on a return to retail model similar to the beer. Beer retailers have continued to maintain return to retail operations in Alberta and most other jurisdictions; while non beer container recycling migrated to stand alone depots that are now located primarily in industrial or commercial areas due to local zoning restrictions. Municipal ordinances restricting depot locations to industrial and commercial areas is a common complaint by most North American jurisdictions as a barrier to improving recovery as customer access is potentially poor.

Alberta has largely merged the beer return to retail system with the non beer depots, as there are now only 62 beer retailers collecting beer containers representing approximately 1.5% of the total container stream. These 62 beer retailers remain out of the 145 beer retailers that were grandfathered into the system in 2001 when beer was regulated in the Beverage Container Recycling Regulation. The BCMB has not accepted any application from beer retailers for permits since these original retailers were grandfathered. Other jurisdictions such as BC and Saskatchewan are merged to a lesser degree.

One reason for this being beer retailers remit consumers their entire deposit whereas some depots remit only a portion of the consumer's deposit. The result is that most jurisdictions have beer retailers collecting beer containers in retail areas and depots collecting all containers (including beer containers, but in many cases remitting only partial deposits) located in commercial or light industrial areas. Regardless of the reasons, consumers outside of Alberta with beer and non beer containers must sort and

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return their containers to different collection systems to redeem a discounted rate on their paid deposits.

California's structure has merged the depot system with return to retail. Large grocery stores are legislated by the State as a "convenience zone" and in very simplistic terms must provide a recycling depot within a half mile of their store (the legislation is much more complex than this, and allows for one depot to service several retailers in close proximity). As a result, many large grocery stores have a depot located in their parking lot beside or behind the store (the customers and containers don't enter the store, and traffic and trucks are already present). The depot provides the customer a ticket voucher that is redeemed in the grocery store for cash or merchandise.

Pepsi and Waste Management have announced a program to place a new generation of RVMs in public areas such as gas stations, convenience stores, stadiums, parks, etc offering a personal reward system, allowing consumers to collect and redeem points for each bottle or can they recycle in the RVM beginning in 2010. This may also be an opportunity to investigate to improve customer access if the technical issues that plagued the first generation of RVMs can be resolved (acceptance of complete program scope, mechanical reliability, climate compatibility, etc).

Alberta may want to investigate the California "convenience zone" structure as it may be viable in many communities as a way to improve visibility and consumer access. This process can facilitate better cash management, and is a marketing venture for the grocery store without the issues historically related to return to retail as originally designed. This also provides a cross marketing opportunity for the retailer to market to consumers redeeming their deposit through coupons, offers, etc.

d. Review and Update Depot Network and Geographic Coverage

A thorough review of the existing depot network and the communities they serve should be considered. The network of 216 Alberta depots has been in place for many years while the communities they serve have grown, and in many cases the growth has been immense. While the numbers of depots has not substantially changed, the capacities and throughput of the existing depots have increased substantially. Despite this capacity increase, there may be incongruence's between the network and the communities that they serve regarding access, service and capability.

Determining the optimal number of depots is difficult. Geography, population demographics, transportation networks, depot location dynamics (retail vs. commercial vs. Industrial) and depot size all impact the assessment, and make a "depots per capita" comparison of lesser value.

The potential deployment of new equipment estimated to cost hundreds of thousands of dollars per depot may present the appropriate opportunity to review the depot network including the number, size, geographic location, zoning location (retail vs. commercial vs. industrial locations), capability, service standards et al; and adjust the network based on the current and forecast market requirements in conjunction to determining where and how to deploy this expensive technology. There are obviously barriers in place in Alberta regarding adjusting the network, not the least of which are zoning challenges and overall resistance within communities to the location of depots in retail areas.

The significant cost of this technology may drive the depot network to move to a "hub and spoke" system used by numerous distribution, warehousing and transportation organizations. The result of this type of network would result in small depots that don't have the volume to justify expensive technologies transporting containers to larger regional depots for counting, sorting, audit and compaction rather than the present model where all 216 depots collect containers and then transport the same containers to

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ABCRC processing centres in Calgary, Edmonton, Lethbridge and Red Deer for counting, sorting, audit and compaction (once the ABCC consolidation is complete).

e. **Enhance Commonality of Alberta's Depots**

Alberta's depots, as with depots in most jurisdictions, operate with a degree of independence. Alberta depots adhere to a series of service standards, but generally do not have common signage, corporate dress, hours of service, or specific service standards in place—each depot is very different from the next. Saskatchewan depots operate on more of a “franchise” model basis with many more common elements such as signage, corporate dress, etc. Most jurisdictions interviewed would prefer that their depots operate with the premise that a standardized approach to depot operations ensures a standard for customer service and is a contributing factor to optimizing recoveries. The reality is that most jurisdictions operate a legacy network of independent depots making standardization a difficult process.

There may be opportunities to enhance the service at Alberta depots that may contribute to increased recoveries through the implementation of more provincial standards for depot signage, appearance, location and service. This is in line with the vast majority of successful retail and service organizations that strive to standardize their operations from a customer perspective to optimize revenue and profit (and in the case of depots, recoveries and their profits).

6. **Minimal Strategic and Operational Synergies with other Recycling Programs**

Alberta, and most other North American jurisdictions, has separate recycling programs for tires, lubricating oil, oil containers, glycol containers oil filters, electronics, batteries, paint, hazardous household waste and dairy containers (outside of Alberta). Municipal blue box programs are also proliferating. Some depots in Alberta (approximately 50) and Saskatchewan collect used oil and electronics, with depots in other jurisdictions also collecting those and other recyclable products.

There appear to be few synergies with other programs at both the strategic and operations level due to different customer requirements for collection, risk and cost of cross contamination (many of the other products contain toxins), the differing requirements of processing and end markets, and the need to optimize labour and transportation efficiencies. A direct comparison between deposit programs and blue box programs was not explored, as the focus of this report was to compare deposit programs.

7. **Local Marketing Initiatives Appear to Most Effectively Increase Recoveries**

The relationship between marketing (and specifically funds spent) and recovery rates is debatable. Alberta spent \$4.3 million on marketing in 2008 in anticipation of the increase in deposit rates and the addition of dairy containers to the program. Recoveries for non-beer aluminum, plastic and glass increased almost immediately as a result of the combined increase in deposit levels, a massive marketing effort and a downturn in the provincial economy. Separating the impact of each is difficult – most other jurisdictions view deposit rates as the driver of recoveries versus marketing, but few have ever spent this magnitude of funds on marketing.

Virtually all other jurisdictions continue to spend relatively few dollars on marketing initiatives except BC. Marketing initiatives consist of traditional media advertising (TV, radio, print and internet), joint ventures with partners that generally takes the form of fundraising for non-profit organizations, community initiatives lead by local champions (community clean up campaigns, etc) and small scale local initiatives.

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a. Traditional Advertising Quickly has Diminishing Returns

Most jurisdictions do little advertising through media such as print, TV, radio and internet. Beverage container recycling programs tend to be mature and have been well branded since their introduction. The consensus of reviewed jurisdictions is that the message requires reinforcement, but there are quickly diminishing returns.

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b. Recycling Initiatives with Community Partners Appear Promising

Alberta and most jurisdictions have had success partnering with primarily non-profit organizations to drive local recoveries while assisting the partner organization to raise funds. The non-profit organization essentially collects containers in the local community ideally including containers that otherwise may not have been recycled.

c. Focus Marketing Locally in Each Communities

Alberta and most jurisdictions have found that the most effective marketing is in local community and not jurisdiction wide advertising campaigns. Local marketing take the form of community clean ups, recycling drives in schools, etc, and usually are most effective when there is a local "champion". There may be opportunities to leverage the depot's presence in their communities regarding local marketing.

d. Investigate Customer Rewards Initiatives

Customer loyalty programs have been extremely successful in numerous industries, ranging from earning "points" or "coupons" redeemable for merchandise, services, air travel, etc.

In the recycling field, California has seen the beginning of industry developed loyalty programs. Los Angeles has recruited marketing partners whereby frequent users (based on the volume of materials in the curb side boxes) receive coupons from participating sponsors. The "Toll Roads", a DAO like organization that manages the toll freeways in southern California, has partnered with several retailers who in one case will pay \$5 in a customer's Toll Road account for every \$100 spent in the retailer's store. A large high profile grocery store will pay \$0.10 per gallon of gas at a specific service station chain to a maximum amount for every \$100 spent in their store (gas stations in Alberta have similar programs with air travel organizations).

There is also the Pepsi – Waste Management Dream Machine initiative referenced earlier that is also based on a loyalty program.

There may be opportunities worth investigating in this area to drive additional recoveries of containers through a "frequent beverage container recycler program" whereby a person earns points, coupons or other types of perceptible value based on volumes recycled.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

1. INTRODUCTION

1.1. PROJECT OBJECTIVES AND SCOPE OF WORK

The BCMB has been given ambitious targets for beverage container recycling in Alberta. Over the next few years, the BCMB is expected to achieve a minimum recovery rate of 85% and become a leader in the beverage container recycling industry with a system that meets the Province's expectations and that is innovative, accessible and cost effective. The BCMB's 2009 – 2011 Three Year Business plan identifies five priorities for beverage container recycling system:

- Improved (and thus sustained) return rates.
- Reduced environmental impact for container use.
- Cost effective recycling system operations.
- Effective governance and management.
- Accountability and transparency.

Given the ambitious timeframes and the need to move quickly, Meyers Norris Penny (MNP) was engaged to identify opportunities that may contribute to increased return rates and to system cost effectiveness. Effectiveness was evaluated with respect to achieving mandated beverage container recycling outcomes, environmental performance, cost efficiencies, and the disposition and use of processed containers. Industry innovation and leading practice information was collected to provide a broad evaluation of systems in other jurisdictions and to consider opportunities for Alberta's container recycling system.

1.2. KEY QUESTIONS TO BE ADDRESSED

As presented in the Request for Proposal for this engagement, the research and analysis needed to address the following six key questions¹:

1. How does the overall effectiveness of Alberta's program compare, in terms of achieving mandated outcomes (e.g. material collection rates with programs targeting those same materials in other jurisdictions and, scope of materials covered)?
2. How does Alberta's program compare with those in other jurisdictions in terms to the types of environmental performance indicators that are tracked and measured by the program's managing organization (from the collection through final disposition of the containers)?
3. What are the financial costs attributable to achieving mandated outcomes of Alberta's program and how does this compare with the programs costs in other jurisdictions?
4. How does Alberta's program compare with programs in other jurisdictions in terms of the disposition of collected materials (i.e. the amount of material that is re-used, recycled, recovered and the amount of material that ends up as residual disposed of in landfill)?
5. Are the most appropriate and efficient mechanisms being employed to achieve program objectives in Alberta?
6. What are the examples of best practices or innovative approaches to waste stewardship of empty beverage containers that can be identified from this analysis that would be appropriate for consideration in Alberta?

¹ *Key Questions to be Addressed*. Request for Proposal Benchmarking Evaluation of Alberta's Stewardship Program for Recycling of Empty Beverage Containers. Beverage Container Management Board. Issue date: September 28, 2009. Page 1.

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Building a response to these key questions required research effort in four main areas, these were the primary focus of MNP's work:

- The achievements of the BCMB's program compared with other jurisdictions. Focus is placed on key mandated outcomes such as material collection rates on a container stream specific basis.
- The environmental performance indicators that are tracked and measured by the BCMB compared to other jurisdictions. These indicators relate to all aspects of the program from collection through to final disposition of containers.
- The financial costs attributed to achieving the mandated outcomes.
- The disposition of collected materials in Alberta and other jurisdictions. This includes comparisons of the amounts of material re-used, recycled and recovered versus land filled.

Additionally, leading practices and innovative approaches identified through the research and analysis of other jurisdictions are to be highlighted for consideration by Alberta's beverage container stewardship program.

A major challenge in the beverage container recycling industry is that there is not a clearinghouse for program information. Each jurisdiction, and in many cases the brandowners within each jurisdiction, collects and reports their own results with varying commonality, disclosure and audit requirements; making comparisons challenging. This study is based upon the best data available.

1.3. PROJECT DELIVERABLES AND TIMELINES

Project deliverables and timelines were discussed during the project planning and initiation activities in Phase 1. The projected project end was initially March 12, 2010. Due to delays in engaging comparable jurisdictions, timelines for the project shifted. The final report, this document, was provided to BCMB on Friday, June 25.

2. APPROACH & METHODOLOGY

2.1. PRELIMINARY RESEARCH

MNP conducted desktop research reviewing current beverage container deposit systems in jurisdictions across Canada, the United States (US) and Europe. A preliminary evaluation revealed a number of potential comparable jurisdictions that may be effectively benchmarked against Alberta's approach and system for container recycling. The selection was based on the jurisdictions: 1) comparability to the Alberta model in the areas of governance structure, the types of containers collected and the source of program funds, and 2) the overall strength of the collection program including the demonstration of leading practices and innovative approaches.

The beverage container recycling programs chosen for comparison were organized into two tiers. The first encompassed eight programs or jurisdictions that were considered relevant for effective benchmarking. Research to date revealed that these programs, spanning Canada, the US, Europe and Australia, lead the field in terms of their organizational structure, overall effectiveness, or their innovative practices.

- BC
- Saskatchewan
- Oregon
- California
- Norway
- Denmark
- Germany
- South Australia

There is a second tier of programs that were considered to add value to the benchmarking despite duplicating some of the systems examined in Tier 1 or possessing key characteristics that may limit direct comparisons to Alberta's approach. These jurisdictions are particularly well-suited to an investigation of leading practices, and further research can enhance the benchmarking analysis. The following four programs were chosen to be studied in greater depth and compared to Alberta:

- New Brunswick
- Michigan
- New York
- Sweden

2.2. IN DEPTH BENCHMARKING

MNP conducted a review of leading practices within the industry during the in depth benchmarking study of selected jurisdictions. The differing approaches to beverage container recycling deployed by certain North American and international jurisdictions provide a basis for a review of alternative approaches and leading practices that may be applied towards improvements in Alberta's system. In addition to evaluating program scope, deposit levels, sales, recoveries and costs, a review of leading practices was conducted in the following categories:

- Legislation and regulation;
- Program structure including depot incentives and deposit rates;
- Depot infrastructure and operations including depot organization, depot locations and corporate standards;
- Technology;
- Transportation;
- Marketing initiatives;
- Incineration for end use; and
- European initiatives.

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Data questionnaires were designed to collect information about a jurisdiction's program, containers included in the program, recycling volumes, return rates, deposit rates, financial data (revenues and costs), materials handling and disposition practices, environmental performance measures and leading practices. The complete data questionnaire is provided in Appendix B.

Data questionnaires were sent to representatives in jurisdictions that agreed to participate in the study. In some cases, the data questionnaire was sent as part of the request for participation to facilitate identifying the appropriate contact in a jurisdiction. Interview protocols were developed to guide a telephone interview discussing additional program details, evaluating leading practices about technology, marketing budget spending, environmental activities, and performance measures. The interview protocol sent to interviewees is provided in Appendix C.

Given the amount and diversity of information being requested, in some cases answers and knowledge about a jurisdiction's recycling program was spread across numerous people, departments and/or companies. In those cases, every reasonable effort was made to engage the right stakeholders while ensuring each key player was given the opportunity to participate. For example, in New Brunswick a system regulated by the New Brunswick Environment (government) and implemented by two agents. MNP was successful in engaging the government and one agent, Alcool. Rayan Investments, the other agent, declined to participate in our study. In this case, two data questionnaires were collected and two interviews conducted to ensure MNP gathered as much information as possible to develop a strong understanding about all aspects of the jurisdiction's practices.

The following table, Exhibit 2-1 depicts by jurisdiction the departments/companies contacted and what information MNP was able to collect.

Exhibit 2-1 Jurisdiction Participation Summary

Jurisdiction	Agent/ Company/ Government Department	Data Questionnaire	Interview	Notes
British Columbia	Encorp Pacific	●	●	
	Brewers Distributor Ltd	●	●	
Saskatchewan	SARCAN	●	●	
New Brunswick	New Brunswick Environment	●	●	
	Alcool	●	●	
	Rayan Investments	-	-	
California	Department of Resources Recycling and Recovery	●	●	
Oregon		-	-	Declined to participate
Connecticut	Department of Environmental Protection	●	●	Substitution for Oregon
	Department of Environmental Protection, Recycling Division	-	-	
	Department of Environmental Protection, Pollution Division	-	-	
Michigan	Department of Treasury	●	-	
	Used Beverage Container Recovery (UBCR)	-	●	
New York	Department of Environmental Conservation	-	-	
Norway	Norsk Resirk	-	-	
Sweden	Environmental Protection Agency	-	-	
Denmark	Retursystem	-	-	Received notes from John Bachinski
Germany	Pfandsystem GmbH	-	-	Received marketing materials
South Australia	Statewide Recycling Pty. Ltd	●	●	
	Marine Store Pty. Ltd	-	-	
	Environmental Protection Agency	-	-	

● Information collected

- Information not collected

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In some cases, identifying an appropriate contact in particular jurisdictions willing to participate in the benchmarking presented significant challenges. Mid-way through the project Oregon was substituted for Connecticut as they declined to participate. While other jurisdictions initially agreed to participate, they eventually declined. Online information has been used to populate tables where possible.

Jurisdictions track and monitor program performance differently. Sales, recoveries and cost information are inconsistently reported and often not directly comparable to other jurisdictions. Our approach was to normalize all data where feasible to facilitate accurate comparisons. Additionally, private sector organizations in many jurisdictions are responsible for beverage container recycling and view some of all of the information requested to be proprietary, thus little to no information in some jurisdictions could be accessed, particularly in Europe. Despite the challenges, a critical mass of information was collected to effectively benchmark the BCMB program and answer the six questions posed as the basis of the engagement.

2.3. ASSESSMENT AND EVALUATION

Information and data collected throughout the research and benchmarking activities was compiled and organized to facilitate review. Using the evaluation framework developed in advance of the research activities, evaluation and analysis was undertaken to answer the questions posed as the basis of the engagement.

Quantitative and qualitative analysis was conducted to determine findings and draw conclusions about:

- The BCMB's achievement of its program mandate including its collection rates and the scope of materials covered.
- Environmental performance including the tracking and monitoring that occurs to monitor achievements from container collection through disposition.
- Program costs based on calculations that normalize comparisons between jurisdictions where practical.
- The disposition of collected materials and opportunities to improve the reuse, recovery and recycling of containers through the identification of practices that reduce recyclables in landfills.
- The effectiveness of different approaches used to meet recycling program objectives and the opportunities for improvement.
- The relevant marketing, technology and partnership arrangements that other jurisdictions have entered into.
- Appropriate leading practice opportunities for Alberta to improve waste stewardship of empty beverage containers and develop innovative approaches for future consideration.

3. PROGRAM ATTRIBUTES & PERFORMANCE

Benchmarked programs operate similarly in that they each refund a deposit (or portion thereof) that consumers paid when they purchased a beverage container. Empty containers are collected, processed and recycled for the material to be used again thereby reducing waste and protecting the environment. Different funding strategies exist but most jurisdictions finance operations by using unredeemed deposits, an additional consumer fee (termed a Consumer Recycling Fee, or CRF, in Alberta), a brandowner fee and the sale of processed containers.

This chapter contains program information and performance data for reviewed jurisdictions where information was available. Several jurisdictions selected for in-depth study declined to provide benchmarking data required to undertake analysis and draw conclusions. All Canadian jurisdictions not in the scope of the in-depth benchmarking but whose data was readily accessible are included in the program performance evaluation to better compare Alberta to others in the beverage container recycling industry.

3.1. LEGISLATION

Beverage container stewardship exists in varying forms where regulation may define program parameters, governance model, materials scope, funding model, licensing and permitting depot operations, and set deposit-refund amounts and recovery rate targets. Across jurisdictions, the objective of implementing stewardship programs is consistent; to maximize recovery of containers to reduce the environmental impact of beverage containers on the environment, to divert materials from landfills and to re-use or recycle beverage containers. In many cases, beverage container stewardship legislation originates in a government's efforts to solve a common problem: litter.

As early as 1970, Canadian provinces began legislating beverage container recycling many to reduce the impact of litter in communities. BC led legislating beverage container stewardship by introducing their Recycling Regulation in 1970, followed closely by Alberta in 1972 with the Alberta Beverage Container Recycling Program. Several other Canadian provinces and US jurisdictions soon followed in the late 1970s and 1980s. European countries began legislating beverage container recycling programs in the 1980s and 1990s. South Australia introduced legislation in 1975 and while planning is underway, they continue to this day as the only Australian state with a beverage container stewardship program in place.

Exhibit 3-1 illustrates an overview of the dates stewardship programs were implemented in each jurisdiction. It also states the legislation that led to the program's existence.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

Exhibit 3-1 Legislation Summary

Jurisdiction	Inception	Legislation Title
Alberta	1972	Alberta Beverage Container Recycling Program
British Columbia	1970	British Columbia Recycling Regulation under Environmental Management Act, Reg. 449/2004
Saskatchewan	1973	Saskatchewan Litter Control Act
New Brunswick	1992	Beverage Containers Act; General Regulation-Beverage Containers Act
California	1987	Public Resources Code Division 12.1, 14500-14599. California code of regulations Title 14, Division 2, Chapter 5.
Connecticut	1980	Beverage Container Deposit and Redemption Law
New York	1983	New York State Returnable Container Law
Michigan	1978	Michigan Beverage Container Act
Sweden	1984 1994	SFS 1982 349 (Amended in 1986 and 1994) SFS 1993 1154
Germany	2003	Ordinance on the Avoidance of Packaging Waste
Norway	1994	The Product Control Act
Denmark	1989	Statutory Order on Packaging for Beer and Soft Drinks #124, amended by Statutory Order #540
South Australia	1975	Environment Protection Act 1993, Part 8, Division2: Beverage Containers

As needs change and technology improves, programs evolve and expand. Alberta began with soft drink and liquor containers, and has gradually added products of different materials (primarily bi-metals, plastic and paper) and contents (juice and similar beverages) over the years, just as Saskatchewan and BC have. Recently, Alberta became the first jurisdiction in North America to include dairy containers into its regulated deposit program on June 1, 2009. Other North American programs almost all started with beer and soft drink bottles, then over time adding cans and plastic containers. Relatively few jurisdictions include paper based container materials (tetrapaks, gable tops, aseptic, juice boxes, etc). Programs typically followed the same growth pattern in Europe although most do not include paper based containers in their programs as of yet.

Beverage container recycling related legislation was found to vary across jurisdictions. For example California's stewardship program is highly legislated resulting in a highly prescriptive system. By contrast, Norwegian legislation is less prescriptive and assigns high level decision-making responsibilities to the King; regulation is subsequently created to define stewardship program requirements.

Benchmarked legislations are comparable and generally encompass the following elements:

- Extended producer responsibility (EPR) – Legislation in most jurisdictions is based on the concept of brandowners being responsible to recycle their containers after use. The intent is to drive brandowners to fundamentally redesign packaging and change material to reduce environmental impact and increase re-use and recycling.
- Polluter pay principle – Legislation is also based on the concept that the polluter should pay for “their” waste. There is debate whether the consumer who does not recycle their empty container or the brandowner who sells the container is the polluter and should pay the cost of recycling empty containers.
- Program management – Legislation in most jurisdictions creates an entity to manage the deposit program with brandowners. The BCMB is an example of such an organization, and is structured as a Delegated Administrative Authority. In other jurisdictions, the managing entity ranges from completely industry based to completely government based.
- Financial model – Legislation typically prescribes the financial model either directly in the legislation or in a supporting regulation. Deposit programs have variances in the details of their legislation, but all prescribe a deposit and refund upon return of the empty container system, with the costs funded by unredeemed deposits and net revenue from recycled material, or a “half deposit back” system whereby half of the deposits are retained to fund the program along with net

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revenue from recycled material. Additional consumer fees are typically allowed within the legislation or within policy where unredeemed deposits and recycled material revenues do not fully fund the program.

- **Escheats** – Legislation, typically in US jurisdictions, allow state governments to use unredeemed deposits for other purposes. Escheating in California has recently contributed to funding instability of the State beverage container recycling program. Some Canadian programs that employ a half-back refund return rate are considered to escheat as does Saskatchewan where the provincial government retains all deposits and grants their program operating funds.
- **End use** – With the exception of California, all North American jurisdictions prohibit the burning of recycled beverage containers by legislation or by practice (with minimal exceptions in most jurisdictions, primarily some paper products). Most European jurisdictions do allow burning for energy recovery, as they consider this a re-use of the material.

3.1.1. Legislated Program Scope, Deposit-Refund Rates & Recovery Rates

Program scope and recovery are defined in all jurisdictions either by legislation or by regulation. Legislation in jurisdictions such as BC, New Brunswick and California specifically describe which containers are included and excluded in program scope whereas other jurisdictions such as Alberta and Saskatchewan describe program scope in regulations and/or policies.

Deposit-refund rates are legislated in some jurisdictions such as Alberta, BC, New Brunswick, California and Denmark. Jurisdictions such as Norway and Saskatchewan do not legislatively mandate deposit-refund rates but assign them in regulations and policy.

Four jurisdictions reviewed mandate recovery rate targets in legislation. BC requires 75% recovery, California mandated an 80% recovery and Denmark a 98%. Distributors in South Australia are required to submit stewardship plans to achieve a 75% return rate within two years of the commencement of the plan, and a recovery rate of 80% within five years. Each jurisdiction has relatively unique agreements between the governing entity and brandowners that were not provided for purposes of this study by the respective jurisdictions.

3.2. GOVERNING STRUCTURE

Stewardship programs across North America and Europe are structured differently in order to efficiently operate within its jurisdiction's unique economic and demographic environment. However, all jurisdictions share high level similarities in its governance structure; each program is overseen by the government, an arm's length organization, or the beverage industry itself.

Extended Producer Responsibility Organization: Legislation is in place to impose recycling obligations on the beverage industry (brandowners). Under this model, government has no direct involvement in how industry undertakes and performs recycling responsibilities. In these cases, industry may collaborate and structure itself or outsource its responsibilities to a third party to ensure recycling requirements are collectively fulfilled. Decision making is taken in the best of interest of the participant companies, who all have strong motivation to meet their legislated duties.

Governmental Administrative Agency: Programs that are publicly administered and managed under the Government's Environmental Ministry or equivalent department follow this governance structure. Participation of industry stakeholders is limited to input and collaboration between relevant agents, but neither they nor the public, have direct influence or decision-making power within the program.

Delegated Administrative Organization (DAO): Stewardship programs may operate by an arm's length organization that is delegated government authority to impose requirements on recycling program stakeholders. DAO's are unique as a range of stakeholders are encouraged to participate, such as industry, government, and the public. These parties are primarily involved in program stewardship through appointments to the Board of Directors.

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Exhibit 3-2 summarizes the governance structure for each jurisdiction reviewed.

Exhibit 3-2 Governance Structure by Jurisdiction

Jurisdiction	Governance Structure
Alberta	Delegated Administrative Organization
British Columbia	Producer Responsibility Organization
Saskatchewan	Delegated Administrative Organization
New Brunswick	Governmental Administrative Agency
California	Governmental Administrative Agency
Connecticut	Governmental Administrative Agency
Michigan	Producer Responsibility Organization
New York	Governmental Administrative Agency
Denmark	Delegated Administrative Organization
Germany	Producer Responsibility Organization
Norway	Producer Responsibility Organization
Sweden	Producer Responsibility Organization
South Australia	Producer Responsibility Organization

Sources of revenue to fund program operations are in many cases defined by governance structure. Legislation mandating *extended producer responsibility* typically considers revenue generation through unredeemed deposits, consumer fees, brandowner fees and revenue from the sale of processed containers. Where the intent is for brandowners to take financial responsibility, the critical program funding decision is made when unredeemed deposits and revenue from collected material doesn’t cover the total recycling cost. Alberta and most other North American jurisdictions impose a consumer fee (except for refillable beer in Alberta, 9% of the container volume), whereas in California and some European jurisdictions, a brandowner fee is levied. Legislation in each jurisdiction is different, with the legislation being very prescriptive regarding the funding sources, while others such as Alberta are silent on funding options beyond unredeemed deposits.

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3.3. PROGRAM STRUCTURE

Stewardship programs are fundamentally based on the same premise – to collect and recycle a maximum amount of empty beverage containers – each program comprises design features to meet the unique needs of a jurisdiction. The following are two key variances in program structures.

3.3.1. Variances in the Deployment of the Extended Producer Responsibility Model

Beverage container stewardship programs are regulated and legislated in all jurisdictions under study. Several jurisdictions reviewed operate industry led programs, with the extended producer responsibility model embedded in the legislation. Jurisdictions reviewed were found to have similar legislation with respect to governance models with most ultimately placing the onus on brandowners to ensure their products are recycled and satisfactory environmental outcomes are achieved.

- BC legislation assigns full stewardship responsibilities to brandowners. They are required to submit and have approved a Product Stewardship Plan that provides for collecting and paying the costs of collecting and managing products in the system; provide consumers access to collection facilities; make consumers aware of the program; assess the program's performance; offer a dispute resolution process; and minimize environmental impacts of a product. Producers may appoint an agency to carry out stewardship responsibilities. Encorp Pacific is assigned stewardship responsibilities for non-beer containers, including licensing depots in the province and Brewers Distributor Limited (BDL) is responsible for beer containers. For BDL, a 75% recovery rate in legislation is the only prescribed outcome. Comparable legislation exists for Encorp for the non-beer stream. Brandowner's Product Stewardship Plans, that may detail additional requirements, were not made available by the province or brandowners for this benchmarking initiative.
- Saskatchewan does not mandate the recovery rates for the deposit beverage system. The provincial government has mandated a 75% return rate for the voluntary dairy container recycling program which has not been met, and government has done nothing to enforce this expectation. SARCAN is funded through a grant process (given the organization's mission to employed challenged citizens in addition to help steward the environment) not directly connected to program performance.
- New Brunswick follows an extended producer responsibility model where distributors submit a stewardship plan for containers they produce that are approved for sale in the province. Distributors may assign stewardship responsibilities to an agent acceptable to the Minister.
- While not a pure extended producer responsibility model in Denmark, the state has appointed Dansk Retursystem A/S for collection and recycling management responsibilities as well as settling financial accounts and monitoring program compliance. Brandowners are required to register containers with Dansk Retursystem A/S for inclusion in the deposit program. Fees charged to brandowners finance the program.
- Norwegian legislation is very broad and assigns decision making powers to the King. It requires that any producer of beverages take reasonable steps to prevent or limit the environmental effects of materials they produce.
- All containers sold in South Australia must have a waste management arrangement in place to deal with empty containers, in some cases a Super Collector (agent) must be selected for collection and recycling duties. As with numerous other jurisdictions, South Australia brandowners are required to apply and have their beverage containers approved by the Authority for them to be included in the deposit program.

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- Alberta's stewardship program is structured as a DAO, underneath the DAO it operates as an industry led *extended producer responsibility* model. Alberta's board functions as a regulatory board comprised of balanced representation from manufacturers, depots and the public. Brandowners are mandated to use common collection and recycling systems thus the formation of the ABCRC (non-beer) and the recycling division of BDL (beer). In contrast BC's program is operated by Encorp who are governed by an industry board. In Alberta the governing body, the BCMB, is responsible to license depots compared to BC where the industry body, Encorp, licenses provincial depots.

3.3.2. Deposit Rates

Varying deposit rates are a major factor in recoveries. Deposit rates are viewed to be the most influential driver of return rates by most jurisdictions reviewed. The higher the deposit rate, the higher the return rate. Deposit rates generally increase by container size, container material and/or the type of beverage a container holds (i.e. alcoholic, non-alcoholic, dairy, etc.). Deposit rates reviewed range greatly and typically start from \$0.05 in Connecticut and New York and go up to \$0.57 (CDN) for refillable plastic bottles in Denmark. Deposits are refunded when customers have met the recycling requirements.

Alberta does not require customers to sort containers. In many jurisdictions, consumers must sort containers to a greater or lesser extent (depending upon the jurisdiction and the type containers – in many jurisdictions, beer containers have different processes than non beer containers) prior to deposit refund. In 2007, California raised their deposit rates the second time in two year resulting in an increasing overall recovery rate of 85.2% in January to June, 2009. Alberta has recently raised their deposit rates and recovery increased 5.7% resulting in an overall 82.4% recovery rate in December 2009 (please refer to 3.11 for a further discussion regarding deposit rates and recovery).

Some jurisdictions, such as California, employ a variable deposit-refund rate that differs by container volume. For example, sorted containers less than 24 ounces have a deposit-refund rate of \$0.05, and sorted containers 24 ounces and greater have a deposit-refund rate of \$0.10. Deposit-refund rates differ when containers are returned unsorted. Unsorted container loads are given co-mingled return rate. The co-mingled return rate is less than a full refund for a load of sorted material and is calculated as an average of return value of all materials. A co-mingled rate offers choice to the recycling public, and provides an incentive for pre-sorting to take place, thus reducing program costs by limiting manual sorting in advance of deploying high speed sorting technology.

3.4. DEPOT INFRASTRUCTURE AND OPERATIONS

Depots represent the public face of beverage container recycling. Their location, infrastructure and organization are generally thought to be an important mechanism to attract the recycling consumer.

3.4.1. Depot Organization

Currently in Alberta, as with most other deposit program jurisdictions reviewed, depots tend to be independent businesses licensed by the governing body or the brandowner organization. License arrangements vary significantly, ranging from rigorous "franchise" type arrangements in BC, Saskatchewan and other jurisdictions where signage, corporate dress, hours, procedures, etc, are prescribed in detail; compared with much looser arrangements such as those in Alberta and California with lesser prescription. As a result, most depots in BC look and operate very much alike, whereas depots in Alberta and other jurisdictions may look and operate very differently from each other.

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3.4.2. Depot Funding

Depot revenue is typically generated solely by handling fees paid for collection efforts at recycling stations. Some jurisdictions supplement the handling fee revenue stream and offer incentive based funding to depots for undertaking additional recycling processing tasks, such as sorting and densification. Additional funding for recycling centres creates opportunity to purchase and implement technology to improve economies of scale and continue to increase production, thereby potentially increasing depot revenue and overall program recovery rates. While depots are not assigned responsibility for maintaining or increasing recovery rates, they may benefit financially from actively participating in doing so by increasing their volume.

BDL in BC is one such example; depots collect additional payments for sorted and compacted containers. Depots can earn additional revenue by coordinating the pick-up of empty containers from licensees such as bars, restaurants and hotels, therefore reducing BDL transportation and storage costs. California implemented a program whereby depots were paid a bonus to increase their volume to pre-determined benchmarks, with the intent to increase overall state recoveries. Some California depots were also paid a bonus for quality, referring to sending collected containers to processors free of contaminants, again with specific pre-determined criteria.

Beer containers are an anomaly. Alberta is the only province under review that has regulated beer containers for a deposit-refund rate. Saskatchewan mandates a refund amount of \$0.05 for all containers, but deposit-refund amounts implemented generally exceed the minimum set by legislation. In BC and other jurisdictions, beer refunds to the consumer are at times discounted in order that the depot can cover its costs to handle the container. The result is that the deposit value returned to the customer may vary by depot, and is generally lower and less than the full refund at a depot than a beer retailer.

3.4.3. Depot Locations

Generally, depots are geographically located to optimize accessibility and are typically based on demographics and population distributions. Differing strategies are employed depending on the areas where depots are located, e.g. retail, commercial and/or industrial.

In North America, most depots are in commercial and industrial areas due to limitations imposed by local governments. Local governments tend to restrict depots to commercial or industrial areas as opposed to residential developments due to perceptions associated with depots in that they attract undesirable customers, they can be unsightly, noisy, dirty, smelly, and attract significant increases in traffic, including increased truck traffic. Occupancy costs are a second driver for depots to be in industrial and commercial areas as this space tends to be less expensive than retail space.

California has overcome objections from local governments through state legislation establishing "convenience zones" requiring a recycling facility within a half mile of a major grocery retailer. The result is that most California depots are located in retail areas optimizing convenience for consumers, and overcoming local government objections. Many depots actually operate in the parking lots of major grocery chains, mitigating the issues of additional traffic and specifically truck traffic. This also presents a cross marketing opportunity for the grocery retailer as the actual cash is redeemed inside the grocery store while the containers are redeemed at the depot outside the store.

Return centres in European jurisdictions are typically found in retail locations as the return to retail model is widely deployed across Europe.

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3.4.4. Return to Retail

Some jurisdictions legislate a return to retail requirement, a return approach that requires retailers that sell beverage containers to accept the empty containers and refund deposits. Most jurisdictions other than Alberta and California mandate a return to retail mechanism for some or all products. Beer, especially refillable beer, has long had a return to retail structure in place typically before deposit programs were formalized and deposit networks were established. Given this legacy, many jurisdictions including BC and Saskatchewan have separate recycling structures for beer and non beer products.

While legislation may not specifically require return to retail in European jurisdictions, this system is particularly prevalent in areas of Europe. The return to retail concept in Europe appears to be culturally accepted. Shopping habits and household storage are different in European households than in North American. People shop more frequently in Europe and recycling fewer containers more often making a return to retail model attractive and feasible.

Return to retail for beer containers (especially refillable beer) is somewhat unique in North America and appears to be an anomaly for return to retail. Consumers have recycled beer containers long before recycling programs and deposit systems were implemented in the 1970s with the recycling of specifically these containers at beer or liquor stores appears to have become a cultural norm. Refillable beer containers almost always have the highest recovery rate in every jurisdiction followed closely aluminum and non refillable glass containers. Beer and liquor used to be sold exclusively in liquor stores across North America as it still is in Alberta, and most of these liquor stores also collected the empty containers. Beer and liquor is now widely available outside of liquor stores in most US jurisdictions while the liquor and/or beer store model generally prevails in Canada.

Canadian return to retail program structures for non beer products have proven problematic. Retailers historically discouraged the program, did not set up for it to streamline the process, and this approach generally proved inconvenient for consumers. Consumers found hauling large volumes of containers through grocery stores and convenience stores to be undesirable and inconvenient. The result is that stand alone depots have become commonplace and return to retail volume of non beer containers is low. Another reason for the low volumes at return to retail locations are the maximum limits on container returns that are imposed, and BC and Saskatchewan are two such examples.

Beer retailers in Alberta, BC and other provinces continue to collect beer containers in large volumes; whereas return to retail collection systems for non beer containers at grocery and convenience stores, have historically collected small volumes while stand alone depots collect the majority of containers. There are currently 62 active beer retailers that accept returned beer containers, representing approximately 1.5% of the total containers recovered in Alberta.

Return to retail structures in Canada for beer containers is also a marketing initiative for beer brandowners. Encouraging the redemption of empty containers at beer retailers is an incentive to bring consumers into these stores and a sales opportunity. As an additional incentive for consumers, full refunds are offered at return to retail beer stores whereas the refund is discounted at depots (except in Alberta, where consumers always receive full refunds on beer containers).

Return to retail appears more popular in the US for the wide spectrum on containers, where Michigan and nine of the other 10 deposit systems operate a variety of return to retail and depot systems. California does not operate a return to retail system, but given the State does have requirements about the location of return centres nearby grocery stores, they seem to have partially achieved the best of both models. Numerous grocery stores have recycling facilities in their parking lots offering convenient returns to their customers. Many recycling facilities are equipped with RVMs for small numbers of returns, while offering return by weight options for those returning larger quantities. While this system is not a pure return to retail system, it functions in a similar way. One grocery chain, Whole Foods, representing approximately 1% of the grocery market deploys RVMs as a kiosk in front of their stores.

There are ongoing issues with both approaches – return to retail and depots.

Return to retail is very convenient for consumers redeeming small numbers of containers. It is also cost effective where the retail facilities are set-up for recycling such as the beer retailers are in most Canadian

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jurisdictions. They are inconvenient for consumers with large volumes of containers and those with more than just beer containers as the non beer containers must be redeemed elsewhere. They are also inconvenient for consumers when there are two recovery mechanisms for beer and non beer containers, especially as the deposit redemption is discounted at a depot versus the beer retailer, thus the consumer needs to make two trips to get their deposit fully refunded.

Grocer's associations in Alberta and across North America generally support depot networks as an alternative to return to retail, given their members stores are typically not set-up for container collection and they view it as a detriment (perceptions of consumers with dripping bags of containers waiting in long lines, sanitary and contamination issues, logistical and space issues, labour costs, etc).

Stand alone depots are far more convenient for consumers returning larger volumes of containers and/or a mix of containers, and being located in non retail areas generally results in better vehicle access. The location of depots is an ongoing issue. Municipalities tend to restrict depots to commercial or light industrial areas as discussed in 3.4.3, making their location less convenient for consumers. A benefit to being located in non-retail areas is that occupancy costs tend to be lower thus lowering overall collection system costs. As previously mentioned, depots in many jurisdictions offer discounted deposit redemptions for beer containers due to the lack of legislation that creates two separate collection streams that Alberta has largely harmonized, creating angst among consumers.

3.4.5. Depot Standardization

Each jurisdiction imposes varying degrees of standardization on their depots for signage, corporate dress, facilities and procedures. As part of the licensing process in most jurisdictions, depots must meet inspection requirements; but requirements and regulation significantly vary from one jurisdiction to another. Beyond meeting minimum health and safety regulations and some operational standards, the degree of involvement from a licensing body can vary quite drastically. Jurisdictions like Alberta, California and Connecticut impose no standard corporate dress requirements and depot operators are able to set up their facility as they choose as long as required criteria are met.

All jurisdictions, including Alberta attempt to impose some service standards in order to encourage a pleasant customer experience. These may include signage, posted hours of operation and inspection requirements. Each jurisdiction reviewed has a varying set of depot standards, and most would prefer to move towards standardizing corporate dress and facility appearance, including floors, counters, paint, lighting, staff uniforms and signage in an effort to improve the customer experience as a measure towards improving recoveries.

3.5. TECHNOLOGY

Consensus exists among virtually all jurisdictions that investment in high speed sorting and compaction technology may revolutionize the beverage container recycling industry. Technology is being deployed to address the following challenges:

- High manual labour investment required by depots to sort and count containers as they arrive, and then sort, count and audit the same containers two or three times over throughout the downstream process;
- Co-mingling of materials that increase the incidence of contaminants in a recyclable material stream reducing recycled material value in downstream markets;
- Large volumes of returned containers require large warehouse space. Increasing recoveries increase depot volumes thus the need for a larger footprint driving higher occupancy costs.
- High transportation costs and the impact of trucking on the environment. Recovered beverage containers have a very low weight to volume ratio unless very compacted, resulting in most trucks transporting recovered containers to process travelling significantly underweight;
- Manual sorting results in inaccurate counts, sorts and auditing functions to improve product cleanliness and appropriate payments; and
- Depots transact a large amount of cash, resulting in serious cash management risks. Cash management solutions are a tremendous need for depots across North America. Smart cards and

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other electronic funds transferring mechanisms are being deployed to reduce the number of cash transactions and reduce the overall exchange of cash. For example, California provides receipts for redemption in grocery stores.

The following are technologies currently being used or considered by jurisdictions reviewed.

3.5.1. Reverse Vending Machines (RVMs)

Several jurisdictions have implemented the use RVMs to facilitate the collection and sorting of empty containers. RVMs were designed to automate this process and replace systems where either customers or depot manually count and sort containers. In Alberta, depots count and sort containers for the consumer, whereas in BC and other jurisdictions, the consumer is required to sort containers prior to redemption (except for some return to retail outlets). Regardless of who sorts the containers, the process is slow, labour intensive and inconvenient for consumers who either sort their own containers or watch someone else sort them.

RVMs were also seen as a mechanism to recover the hereto "unreachable" containers consumed outside of consumer's homes, schools and offices. RVMs have been reasonably successful in some jurisdictions, but have proven to be slow, mechanically unreliable and incapable of handling a diverse range of containers, as well as cold weather climate. To offset their RVM's slow speed, California has established a return by weight option for consumers returning larger quantities of containers. California has found that contamination issues are greater with payment by weight purchases (the opportunity for contaminants such as sand or water in containers has also created fraud issues).

RVMs are common in European jurisdictions; they are located in grocery stores and other retailers where beverages can be purchased. The European preference for the technology may stem from having become accustomed to returning containers using RVMs and being limited in other deposit-refund options.

Benefits of RVMs include 24/7 beverage container recycling and support for customers with smaller volumes. RVMs are better suited for jurisdictions that have fewer materials included in their deposit program like Connecticut and Michigan. While Connecticut has had mixed reviews about the technology, they are reported to be somewhat popular. RVMs have proven unsuccessful in Alberta due to their slow speed, unreliability and inability to handle the diversity of materials included in Alberta's program. The inability to accept the range of containers in Alberta's program scope is a major barrier, as the majority of containers not accepted may find their way into landfills, defeating the overall program mission. Secondly, Alberta's severe winter weather provides additional challenges to RVMs as the machines require heated and dry locations for optimal operation.

Pepsi and Waste Management have announced the introduction of a new generation of RVMs branded as a "Dream Machine" with a personal points rewards program, but no other information is available at this time.

3.5.2. High Speed Sorting

Automated high speed sorters are beginning to replace slow, expensive and inaccurate manual sorting methods in Europe. Manual counting creates significant work and cost, in addition it also introduces human error and potentially inaccurate payments to customers and/or depots, as well as inaccuracies in the payments from processors to depots.

High-speed sorting technology is currently used in Denmark and Germany with reportedly excellent results. The technology takes pictures of empty beverage containers to read the bar codes and perform a sort. This technology is able to accommodate up to 32 material types and is well suited for recycling programs with wide material scope. Jurisdictions currently using the technology report a sorting accuracy of 98-99%. High speed sorting creates the opportunity to change the cash management structure for both the depot and the customer. The optics are better for the customer (accurate sorts) and associated technologies such as Smart Cards can be deployed. This technology, especially when combined with densification technologies, may facilitate changes to the depot audit and payment processes. If the

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appropriate security systems are installed, the ability may exist to pay the depot based on containers through the counting equipment.

Alberta, BC and several other North American jurisdictions are investigating the potential implementation of this high speed sorting technology. It is capital intensive as each unit has an initial cost of \$200,000 to \$400,000 plus ongoing support costs. The capital cost of implementing this technology across a jurisdiction the size of Alberta will require other fundamental changes given that less than 40% of Alberta depots presently handle over 80% of the recovered containers.

An element to consider when evaluating high speed sorting technology is that this technology sorts based on a bar code, not the shape or type of container. The customer is paid based on bar codes returned, and if the bar code is damaged, the technology can't sort the container resulting in a potential manual sort stream. In Europe, it is accepted by consumers that a damage bar code makes the returned container worthless.

In Connecticut, a simpler version of automated container sorting is deployed to separate the deposit eligible containers from ineligible containers. This process uses a laser marking on the label that indicates inclusion in the deposit program. This reduces cross-border returns of ineligible containers and prevents deposit refunds on containers outside of the deposit program.

3.5.3. Compaction / Densification

Compaction of material improves recycling process efficiencies, reduces required depot footprint, and reduces shipping and transportation costs. Compaction can be performed at the depot level, upon return of the container by the customer, or at the recycling processing centre. The earlier compaction is introduced, the earlier process efficiencies can take place.

Upgrades to 15 depots in BC over the course of 2010 will introduce compaction units for PET plastic and aluminum cans. The EnviroPactor, a New Brunswick produced compaction technology, is also being introduced in BC. The EnviroPactor, a truck mounted unit, can compact virtually any aluminum or plastic container at a 2:1 ratio. Encorp in New Brunswick also uses EnviroPactors and report truck container capacity increases by 300%. Other benefits include a reduction in fuel costs.

Saskatchewan uses compaction technology. Small depots use ORWAK Barrel Compactors for plastics; Prodava systems are employed at medium sized depots, and Multi Material Flatteners are used in large depots. Although these compactors make transportation more efficient, materials require additional compaction prior to being sent to a downstream processor. Additional compaction and bailing is undertaken at a central processing centre. Beer stores in BC and other provinces also use a variety of compaction processes.

Compaction is a mature and proven technology. Any reluctance to implementation is related to audit requirements. Once containers are compacted on a 6 to 1 basis or more, it is extremely difficult to audit by recounting the crushed containers. Compaction technology on a program wide basis is only viable when coupled with automated sorting and counting equipment that lessens or eliminates the audit requirement or where there is an agreement in place between the retailer and presser to use weight as a proxy for count.

3.5.4. Cash Management

Smart cards and other electronic funds transferring mechanisms are being considered as a method to reduce the number of cash transactions and reduce the overall exchange of cash. California minimizes cash management in depots by providing receipts for redemption in nearby grocery stores.

The combination of sorting and compaction technologies improves accuracy, keeps material streams free from contaminants, reduces depot footprints (or provides opportunities to grow volume without adding space) and transportation costs, reduces manual labour errors and costs, and streamlines the recycling process. Densification following the count ensures containers cannot be removed from the stream and returned for deposit redemption.

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Sorting and compaction technologies present the following challenges:

- Auditing - Compaction complicates the auditing process as unit counts are not possible. Auditing by weight conversion provides alternatives, however for accurate weight measurement the material must be contaminant free. In virtually all jurisdictions depots are independent from processors, thus rigorous audit procedures including secondary and tertiary counts are standard practice. Saskatchewan uses a weight conversion verification approach at their processing plants. In a California where recycling centres and processing facilities are owned by the same organization, counting collected containers occurs once at the recycling centre unless signs of fraud are identified.
- Managing contaminants - Purchasers of recycled materials require a product free from contaminants. For example, no HDPE should be present in recycled aluminum. Purchasers impose a threshold of acceptable contaminant levels, and resulting sorting technologies must be accurate enough to ensure contamination levels fall within these thresholds to maintain the downstream market price for the recovered container material.
- Rejecting containers – Customers return empty containers in all formats. High speed sorting technology requires a legible bar code. Should the bar code be damaged or illegible, the sorter rejects the product. Containers that are too large or misshapen, such as tetrapaks and milk jugs, are difficult to read and may require manual sorting and counting.
- Cost of technology - While very expensive, European jurisdictions where large volumes of recyclable container materials are processed have justified the investment through reduced labour, occupancy and transportation costs, and an increase in quality and higher downstream revenue for less contaminated material.

3.5.5. New Material Types

Technology also comes in the form of innovative materials that may facilitate the manufacturing and recycling of beverage containers. Research is underway to develop new container materials designed to improve breakdown times and facilitate sustainable packaging. California is exploring container material options and researching materials (through partnerships with academic institutions) that may have higher breakdown rates in environments with particular characteristics, such as salt water (to combat pollution in the ocean).

California also provides grants and has contracts with California universities to support research of bio-plastic development. It is thought bio-plastics would limit the effect bottles have on the environment if they are not recycled. The main challenge with bio-plastic is managing public perception to prevent people from littering as they believe bio-plastic containers will simply disintegrate, thus feeling that recycling is not necessary. Another key challenge relates to the contamination of the bio-plastic recycling stream with other plastics, especially PET.

California is also researching methane based plastics, PLA. The challenge with introducing PLA containers is that they require different processing temperatures than PET, making it a contaminate. PLA mixed with PET would dramatically increase the cost of recycling and reusing PET material.

3.6. TRANSPORTATION

Transportation challenges arise as recovered containers are extremely bulky yet lightweight, requiring significant densification to improve efficiency. Each jurisdiction reports that “trucks are cubed out, but far from grossed out.” Depots also tend to have a one way process flow, thus natural back haul opportunities are limited.

Potential process improvement and cost reduction solutions for these issues include densification of containers to increase volume of recyclable material transported in a load, ensuring only full loads are picked up, and beer distributors picking up refillable bottles at the time of delivery of new product to retailers.

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Most North American jurisdictions employ a transportation system that augments depot footprints thus reducing floor space requirements by using trailers or containers to store empty beverage containers. Trailers can augment depot floor space on a cost effective basis, and may improve overall depot efficiency. Transportation systems can accommodate other recycling program products in some jurisdictions such as recycled electronics, used oil products and paint.

SARCAN in particular transports other recycled material such as electronics, although this volume is small and tends to be inefficient on a large scale. New Brunswick collaborates with the Product Care Association to transport used paint, and Encorp in BC collects and transports used electronics in working with Electronics Association of BC. Cross contamination of materials is always a risk, and transporting diverse materials creates contamination risk and is generally discouraged.

All jurisdictions struggle with optimizing transportation efficiency. Increasing the weight of loads transported from depots and optimizing backhauls is an ever present challenge in every jurisdiction.

3.7. FUNDING MECHANISM

Stewardship programs employ different mechanisms for collecting deposits and offsetting operating costs. Strategies such as Deposit Value are common in virtually all stewardship programs across North America and Europe, whereas strategies such as Taxation are much less common. The use of multiple funding mechanisms is common in virtually all jurisdictions, and they can be initiated or removed depending on the rate of return that is observed in an operating year. Attributes of the various funding mechanisms are illustrated in Exhibit 3-3.

- **Deposit Value:** The program regime provides customers with compensation upon return of beverage containers in order to provide an incentive to participate in the program. The amount of deposits collected on unreturned containers are considered unredeemed deposits and they are often used to cover the cost of recycling, or are remitted to the government for various uses such as funding environmental programs, adding to the general revenue fund, or completely unrelated programs.
- **Recycling Levy or Consumer Fee:** The purpose of this fee is to offset or subsidize the cost of recycling materials that are included in the relevant program. It is a non-refundable fee that is attached to beverage containers and is active at the time of consumer purchase.
- **Halfback System:** Instead of refunding a full deposit value to customers for a container, these systems provide only a partial refund, usually 50%. The other portion may be used by the governing body to pay for the program or to fund other environmental/government programs. Half back systems are useful when the governing body of the recycling program does not have the authority to impose a recycling levy (because they are not part of the jurisdiction's Government).
- **Sale of Processed Collected Containers:** Recycling programs will incur a significant amount of expenses during collection, processing, and transportation operations. Selling processed containers (recyclable materials) to different markets often helps to recover a significant portion of related expenses. Markets for processed containers are diverse and some materials, such as aluminum, command higher prices than others due in part to high demand levels.
- **Stewardship or Brandowner Fee:** Puts the requirement on the beverage industry to contribute financially to pay recycling costs of containers they introduced to the system. These costs are may be passed down to the consumer via the purchase price. Stewardship fees may be calculated as a function of container weight using a collectively agreed upon fee schedule.
- **Taxation:** This model is most often used in non-deposit jurisdiction where local municipalities and townships are responsible for the collection and processing of used beverage containers. It is unique in that beverage container users or distributors are not directly responsible for funding the program. Instead, recycling costs are shared equally by tax payers in the jurisdiction.
- **Escheats:** In these situations government collects any surplus that is accumulated through unredeemed deposits or other aspects of the program's operation. Instead of being used to offset the cost of the program (which is the most common use), these funds are used to support government programs, often environmental, outside of the recycling program.

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**Exhibit 3-3
Program Funding Mechanisms**

Jurisdiction	Deposit	Recycling Levy	Stewardship/ Environmental Fee	Taxation	Escheats
Alberta	•	•			
British Columbia	•	•			
Saskatchewan	•				•
New Brunswick	•				•
California	•	•			•
Connecticut	•				•
New York	•				
Michigan	•				
Sweden	•				
Germany	•				
Norway	•	•	•		
Denmark	•		•		
South Australia	•				

California policy is silent on escheatment. Since 2002 the state government in California has diverted more than \$500 million to public funds to ease financial difficulties². California presents an example that escheatment may have a negative impact on the financial integrity of the recycling program. Saskatchewan also escheats all unredeemed deposits, and grants SARCAN operating funds as a registered charity. Half back programs in New Brunswick and Nova Scotia are also a form of escheatment.

Another challenge with funding lies in the paradox that is created when unredeemed deposits fund a stewardship program. The use of unredeemed deposits to fund recycling program follows the principal of "polluter pays" where in this case the polluter is defined as the wasteful consumer, meaning that consumers who do not recycle their containers forfeit their paid deposit to pay for the recycling of the containers that other consumers did return their container for remittance of their deposit. Given the objective of a stewardship program is to achieve as high return rates as possible, declining unredeemed deposits (as recoveries increase) reduce the revenue stream expected to pay for recycling activities. This may eventually create financial shortfalls.

When these shortfalls have occurred in Alberta and most North American jurisdictions, container recycling fees are applied to containers and the cost is charged to all consumers (both wasteful and recycling consumers), or in some cases fees are assessed to brandowners. In programs based on the *extended producer responsibility* philosophy where brandowners are defined as the polluter, they are mandated the responsibility to collect and recycle empty beverage container material, the use of fees applied to all consumers appears to contradict this philosophy. Europe typically implements brandowner fees.

All jurisdictions under review use unredeemed deposits to fund their stewardship program along with revenue from downstream markets for recycled material, thus higher costs will be incurred by consumers/brandowners (through non refundable fees) if rising recoveries diminish the pool of unredeemed deposits, revenue from downstream markets decline due to falling prices, and/or unredeemed deposits are escheated. Consumer or brandowner fees that cover shortfalls ensure perpetual program financial integrity barring escheatment.

² See *Recycling Program to Get Needed Funds: Governor Plans to Repay Millions Borrowed by State*. Sign-On San Diego. Sourced: January 13, 2010. <http://www.signonsandiego.com/news/2010/jan/13/recycling-program-get-needed-funds/>

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Funding recycling programs through unredeemed deposits create a natural tension between rising recoveries and overall product cost to the consumer. As recoveries increase, unredeemed deposits decline, and assuming scrap value of recovered containers remains constant, consumer/brandowner fees must eventually increase to keep the program solvent. All beverages all have a market price elasticity, increasing the overall price of a beverage through additional consumer/brandowner fees will negatively impact sales, thus a disincentive for brandowners to support increased recoveries.

Most deposit programs also deploy consumer fees. The consumer fee (container recycling fee, or CRF) approach sees all consumers, whether they do or do not recycle their containers and redeem their deposit, paying for the cost shortfalls for recycling containers. The CRF is transparent given it is charged separately, creating public awareness of the cost of recycling containers. There is no direct cost to brandowners, but as mentioned previously there is an indirect cost as the selling price to consumers of their products is higher when the deposit and CRF is added, potentially impacting sales based on the price elasticity of the local consumer.

Alberta has implemented consumer fees across the board specific to each material stream to cover shortfalls. It may be argued that the refillable beer stream in Alberta, representing 9% of the in scope containers sold in Alberta, operates as a brandowner fee as the deposit and the container recycling fee are applied to the price charged to the provincial wholesaler (Alberta Gaming and Liquor Commission, or AGLC), who then sell it to retailers and ultimately to consumers for an "all in" price inclusive of the deposit and container recycling fee. All other beer and non beer products in Alberta are sold to the wholesaler, retailer and consumers with the deposit and container recycling fee as an additional fee at the point of sale.

The brandowner fee approach is deployed in California, Europe and to portions of beer streams in selected other jurisdictions. The brandowner fee approach in California is structured on an inverse sliding scale basis correlated to recoveries. Each material stream has a separate scale, but a brandowner will pay a minimum of 15% and a maximum of 65% of the financial shortfall, depending upon the actual recovery rate, thus there is a financial incentive for brandowners support recycling efforts through design and packaging changes, marketing initiatives, etc. Given the state has escheated a significant portion of the unredeemed deposits; brandowners will pay a much larger portion of the shortfall in 2010.

Given California is approximately the size of Canada, financial incentives for brandowners in California are obviously significant. Given brandowner fees are based on material stream versus specific brandowner, the result is similar to the consumer fee approach as all containers in the stream are subject to the same brandowner fee regardless of design, recycling attributes, etc. Current sorting technology in California doesn't permit calculating recovery by brandowner. Creating competition between brandowners within each material stream, thus a real financial incentive to reduce costs through improved recoveries versus competitors, requires the next generation of counting and sorting technology.

The philosophies of "extended producer responsibility" and "polluter pays" have presently ended up with current consumer and brandowner fees (other than the brandowner fee structure in California) appearing indifferent from a consumer perspective. Program financial shortfalls are either charged directly to consumers as a flat fee by material stream, or charged to all brandowners as a flat fee by material stream and passed onto consumers in the product's selling price. The one benefit to consumers of the current brandowner fee structure is that individual brandowners may or may not pass the entire recycling fee onto consumers within their product's selling price.

All jurisdictions reviewed embrace the philosophy of disallowing cross-subsidization between container streams (e.g. aluminum revenues are not allowed to subsidize revenues for plastic, paper, etc.). This philosophy is imbedded as part of the extended producer responsibility philosophy on which virtually all jurisdictions base their legislation. The notion is twofold. First, it is economically unfair to both consumers and brandowners. Second, it is an incentive for consumers and brandowners to move away from containers with higher costs to more recyclable containers. The preference is that consumer and brandowner fees are established by container stream based upon that stream's financial shortfall. Fees are low or zero on aluminum (higher downstream value), and higher on material streams that have a low or near zero downstream value.

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3.8. PROGRAM SCOPE

All benchmarked programs include aluminum, plastic (this includes PET and other plastic based materials) and glass in their programs. Beyond this fundamental scope, programs vary a great deal. Four other programs recycle dairy containers on a voluntary basis outside of the deposit program. The inclusion of dairy containers, either voluntary or on a deposit basis expands a program's scope although the volume increase may be small.

Legislation in most jurisdictions begins with beer and non-beer glass followed by aluminum and plastic. These are the most common beverage containers, and tend to also have the highest recycled material value. As programs mature, paper products such as tetrapaks (commonly known as juice boxes) and gable tops (cartons) are typically added, as are bi-metal, bag in a box and other low volume products. The low volume products often have minimal residual value and lower recovery rates.

Alberta is the first and only jurisdiction (June 1, 2009) to add dairy products (aside from very low volume flavoured milk products already in several programs). This increases the volume of HDPE plastic and paper products in the program but doesn't dramatically change the economics.

Exhibit 3-4 illustrates a direct comparison of the material types that are included in each jurisdiction's program. It also differentiates between materials that are included in the jurisdictions' legislation and materials that are recycled on a voluntary basis.

Exhibit 3-4 Program Scope Summary

Jurisdiction	Aluminum (incl. Bi-Metal)	PET	Other Plastics (e.g. HDPE)	Glass	PolyCoat*	Dairy	Other
Alberta	•	•	•	•	•	•	
British Columbia	•	•	•	•	•	v	• Pouches, Bag-In-A-Box
Saskatchewan	•	•	•	•	•	v	
Newfoundland	•	•	•	•	•	o	
New Brunswick	•	•	•	•	•	o	• Gable Top, Cartons
Nova Scotia	•	•	•	•	•	v	
California	•	•	•	•	o	o	
Connecticut	•	•	o	•	o	o	
Michigan	•	•	•	•	o	v	
New York	•	•	•	•	-	-	
Denmark	•	•	•	•	•	o	
Germany	•	•	-	•	-	o	
Norway	•	•	o	•	o	o	
Sweden	•	•	-	•	-	-	
South Australia	•	•	•	•	•	v	o Wine glass bottles, casks or sachets

* = includes aseptic containers

• = included in legislated deposit program

o = not included in legislated deposit program

v = included in recycling program on a voluntary basis (i.e. no deposit)

-" = unclear whether included in deposit program

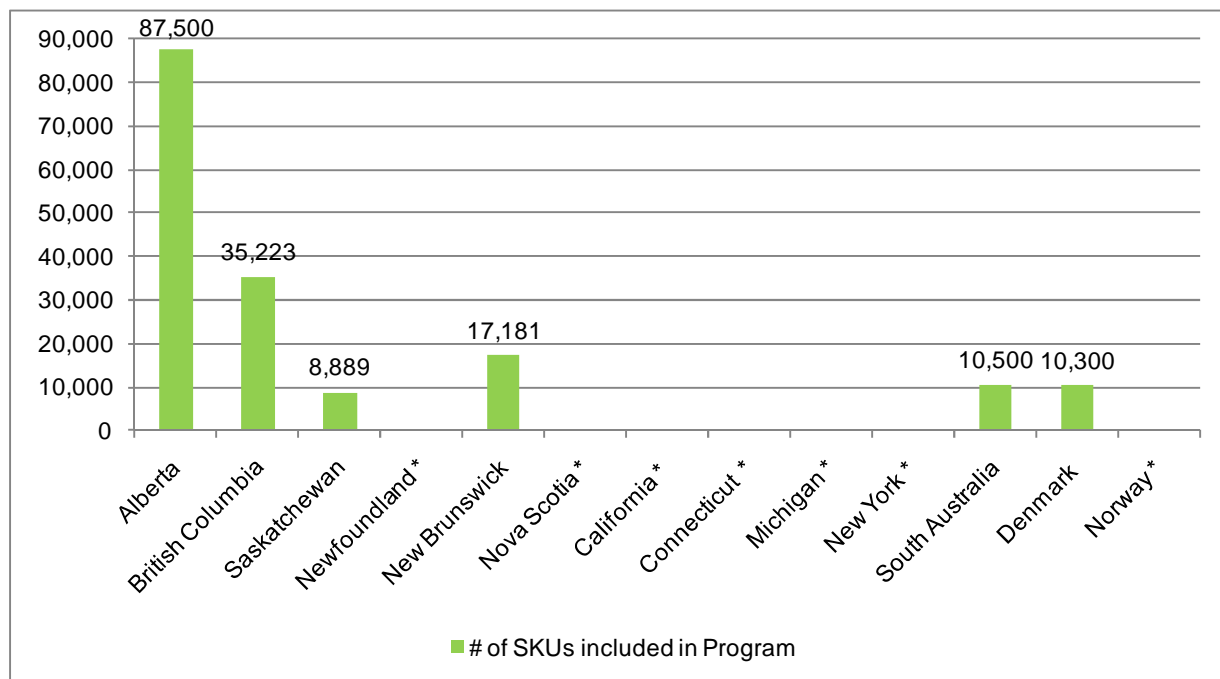
Alberta continues to have the widest program scope of jurisdictions studied. BC, Saskatchewan, New Brunswick and South Australia have the next greatest diversity in their deposit programs largely due to their acceptance of dairy containers on a voluntary basis. Several other jurisdictions reported considering including dairy products in their deposit programs. The balance of the jurisdictions include mainly the traditional beer and non-beer aluminum, plastic and glass in their programs, high volume products that are the easiest and most cost effective to recycle due to higher value residual markets.

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Program scope, aside from the types of materials included, may be assessed by evaluating the number of unique containers accepted for deposit (termed stock keeping units, or SKUs). Alberta again leads jurisdictions with the highest number of registered active and inactive SKUs, (over 87,500) followed by BC (over 35,000) and Saskatchewan (8,900). Alberta's wide scope is partly attributed to the inclusion of numerous low volume liquor and beverage products in a wide variety of packaging. A large number of SKUs may be misleading depending if a jurisdiction posts both active and inactive containers. The vast majority of products sold in Alberta and all other North American jurisdiction are beer and non-beer aluminum, plastic and glass products with a relatively small number of SKUs. The majority of dairy products sold also account for a relatively small number of SKUs.

Exhibit 3-5 illustrates the number of unique registered containers (active and in-active) in jurisdictions reviewed. All jurisdictions represented below include alcoholic and non-alcoholic beverage containers. South Australia excludes wine bottles and Denmark excludes wine and spirits containers as they are not eligible for deposit-refund in either program.

Exhibit 3-5
Number of Unique Containers Accepted by Program (SKUs) in 2010



* Data unavailable

3.9. DEPOSIT VALUES

A deposit is an amount of money paid by consumers at the time of purchase of an in-scope beverage container. When an empty container is returned to a depot, the customer may receive a full or partial reimbursement of the deposit amount. Generally, deposit rates are based on container volume and/or material type. One jurisdiction, New Brunswick sets deposit levels based on the alcoholic or non-alcoholic content of the containers.

Deposit amounts vary across jurisdictions; they are summarized in Exhibit 3-6.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

**Exhibit 3-6
Beverage Container Deposit Levels in 2010**

Jurisdiction	Local Deposit	Comments	Jurisdiction	Local Deposit	Comments
Canada (\$ CDN)			International (local currency)		
Alberta	10¢ ≤ 1L 25¢ > 1L			Refillable Glass Bottles 1.00 DKK ≤ 500ml 3.00 DKK > 500ml Refillable Plastic Bottles 1.00 DKK < 500ml 1.00 DKK 501ml - 999ml 1.50 DKK = 500ml 3.00 DKK ≥ 1L Type A [Cans, Plastic Bottles] 1.00 DKK < 1L Type B [Plastic Bottles] 1.50 DKK = 500ml Type C [Cans, Glass, Plastic Bottles] 3.00 DKK ≥ 1L	1.00 DKK = \$0.19 CDN 1.50 DKK = \$0.28 CDN 3.00 DKK = \$0.57 CDN
British Columbia	Non-Alcohol 5¢ ≤ 1L 20¢ > 1L Alcohol 10¢ ≤ 1L 20¢ > 1L		Denmark		
Saskatchewan	Metal Cans & Plastic 10¢ < 1L 20¢ ≥ 1L Non-Refillable Glass 10¢ < 300ml 20¢, 300ml-1L 40¢ ≥ 1L Polycoat 5¢, all Aseptic 5¢, all		Germany	One Way [all] 0.25 € Refillable Glass 0.08€ ≤ 500 ml 0.15€ > 500 ml Refillable PET 0.15€, all	0.08 € = \$0.11 CDN 0.15 € = \$0.20 CDN 0.25 € = \$0.34 CDN
New Brunswick	Non-Alcohol 10¢ ≤ 5L Alcohol [One-Way] 10¢ < 500ml 20¢ > 500ml Alcohol [Refillable] 10¢ ≤ 5L	Half-back System	Norway	PET and Aluminum [all] 1.00 NOK ≤ 500ml 2.50 NOK > 500ml	1.00 NOK = \$0.17 CDN 2.50 NOK = \$0.44 CDN
United States (\$ USD)			Sweden	Metal Cans 1 SEK, all PET Plastic 1 SEK < 500ml 2 SEK ≥ 500ml	1.00 SEK = \$0.14 CDN 2.00 SEK = \$0.28 CDN
California	5¢ < 0.71L 10¢ ≥ 0.71L	24 ounces = 0.709764L	South Australia	10¢, all	0.10 AUD = \$0.094 CDN
Connecticut	5¢, all				
New York	5¢, all				
Michigan	10¢, all				

Alberta increased and harmonized minimum deposit levels on November 1, 2008 and now has rates as high as most other North American jurisdictions. Manufacturers in Alberta may opt to charge and reimburse higher than minimum deposit-refund amounts, this has been the experience with refillable containers such as large water bottles, beer kegs and glass milk bottles.

European deposit rates, when harmonized using a Purchasing Price Parity approach to convert European currencies to Canadian currencies, appear somewhat higher. Comparative price levels for January 2010 applying Purchasing Price Parity (PPP) indicate a Canada: Denmark ratio of 100:68, 95 (Germany); 90 (Sweden) and 69 (Norway) and 85 (Australia)³. This is to say that European and international currencies have even more buying power than Canadian dollars implying that container deposit rates in those countries are higher than the converted values shown in Exhibit 3-6.

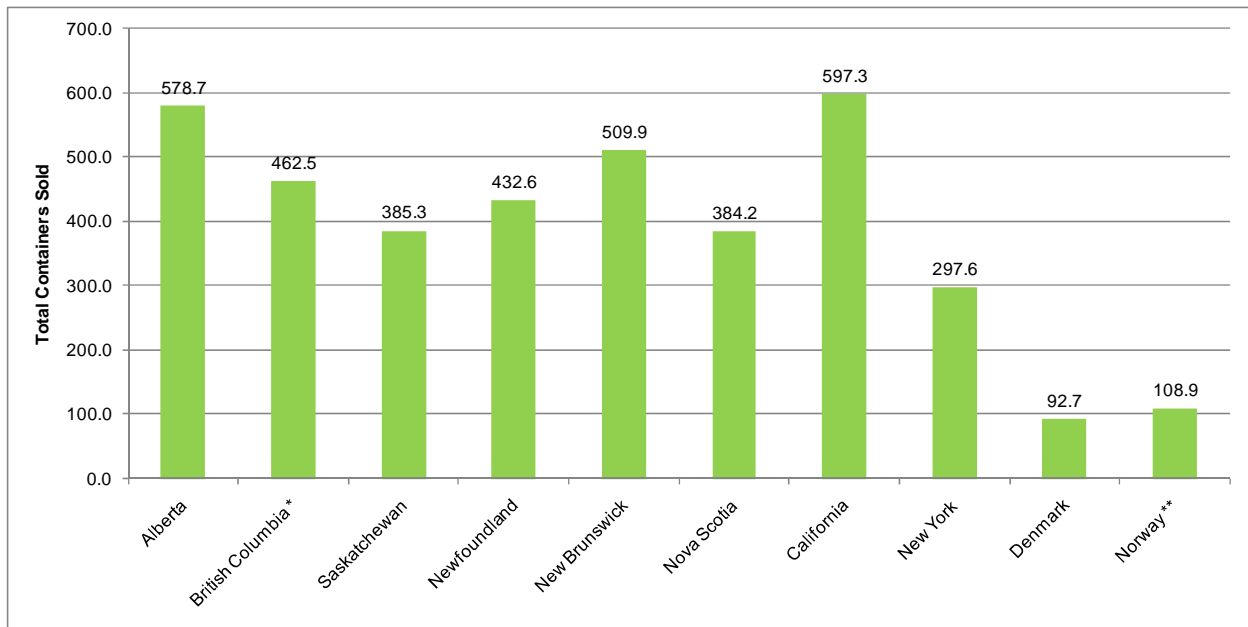
³ *Purchasing Power Parities – Comparative Price Levels*. Organization for Economic Co-operation and Development, Statistics Directorate. www.oecd.org/dataoecd/48/18/18598721.pdf Sourced: April 10, 2010.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

3.10. BEVERAGE CONTAINER SALES

Alberta and California, due to their broad program scopes, attempt to divert the largest number of containers sold per capita from the waste stream. Exhibit 3-7 illustrates sale of in-scope containers per capita by jurisdiction. All beverage types included in various programs are represented below making programs less comparable due to differing program scope. Second only to California internationally and first among Canadian provinces, Alberta leads in per capita beverage container sales.

Exhibit 3-7
Total in Scope Beverage Container Sales Per Capita in 2008



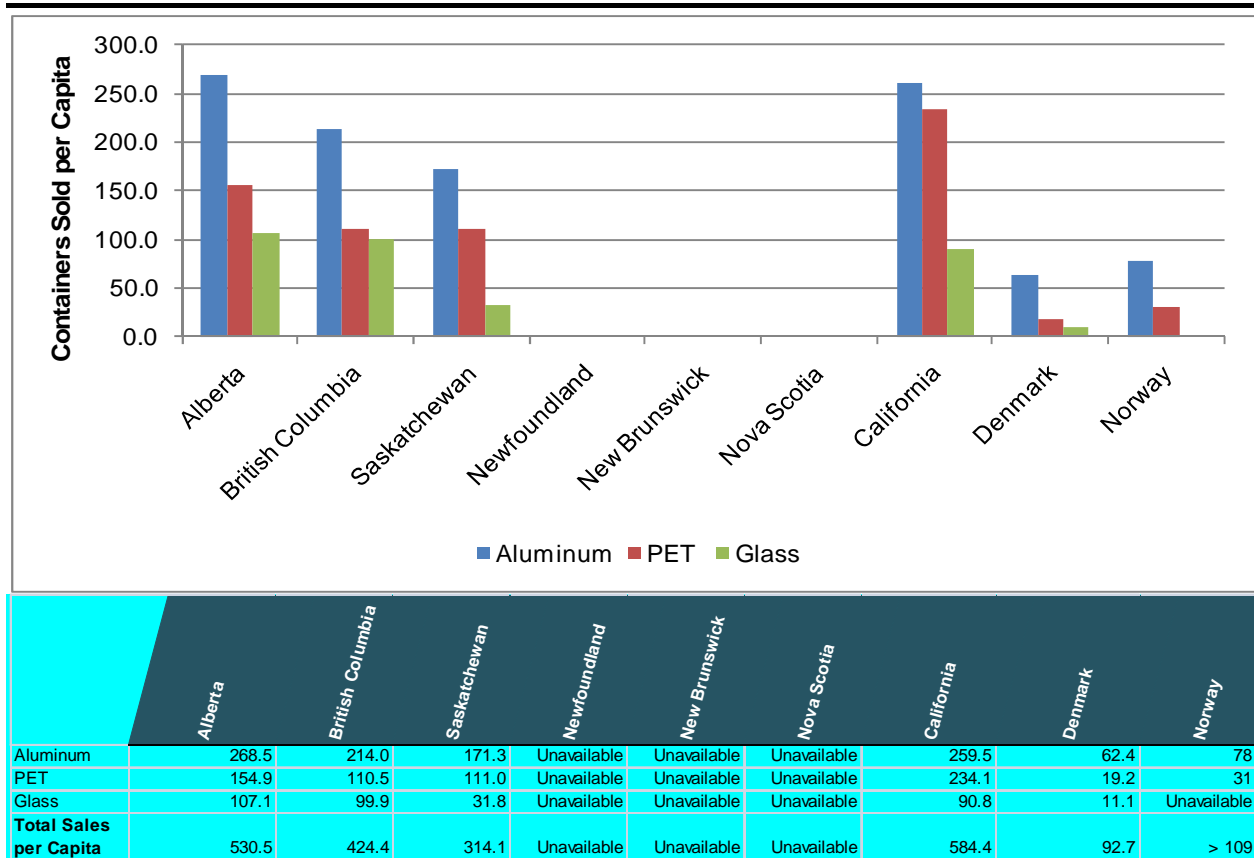
* BC beer volumes were extrapolated from the Brewers Association of Canada, 2008 Annual Statistical Bulletin. Import beer cans and bottles were estimated using two methods and results varied only slightly.

** Norwegian numbers include aluminum (beer and non-beer) and PET only. Glass materials are handled by other organizations for which data was unavailable.

Enabling program comparison, Exhibit 3-8 illustrates container sales per capita by material type.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

**Exhibit 3-8
Aluminum, PET & Glass Containers Sales per Capita in 2008**



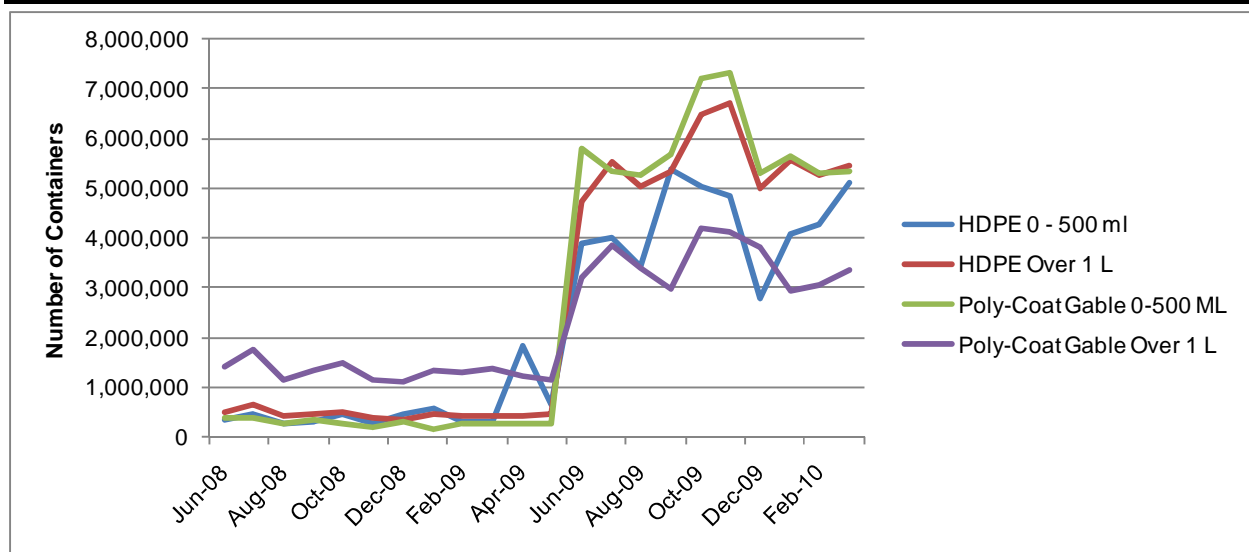
In all jurisdictions, aluminum (beer and non-beer) containers have the highest sales per capita followed by PET then glass. Aluminum, plastic (largely PET) and glass (beer and non-beer) make up the majority of Alberta's containers and initiatives to improve overall program recoveries and efficiency must be focused on these three material streams.

Refillable glass is an anomaly. The vast majority of refillable glass containers are beer containers. There are a very small number of other refillable containers of various materials in North America. In addition to glass, some plastic containers are refillable in Europe. Sales of refillable beer containers has been forecast to decline for the past two decades given the relatively high cost of refilling them (handling, breakage, cleaning, etc.), but volumes have only declined marginally. It is assumed that refillable glass containers will remain an active category for the foreseeable future.

Alberta expanded deposit legislation on June 1, 2009 to include dairy containers in the program. Most dairy containers produced in the province are made from HDPE plastic or poly-coat gable paper products. Exhibit 3-9 illustrates the effects of the legislation change on in program scope sales to include HDPE and poly-coat gable dairy containers. It should be noted that HDPE and poly-coat gable materials were previously included in program, but going forward the many of the containers in these categories will originate from the dairy container stream.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

Exhibit 3-9
Alberta In-Scope HDPE & Poly-Coat Gable Sales Before and After Introduction of Dairy Products



	HDPE 0-500 ml	HPDE Over 1L	Poly-Coat Gable 0- 500 ml	Poly-Coat Gable Over 1 L
Jun-08	351,124	493,450	373,249	1,395,253
Jul-08	458,774	648,342	392,494	1,764,178
Aug-08	283,935	438,483	254,279	1,134,804
Sep-08	327,491	446,379	341,395	1,318,624
Oct-08	472,268	483,988	266,748	1,473,156
Nov-08	268,445	401,853	190,007	1,144,505
Dec-08	475,313	337,705	297,199	1,107,205
Jan-09	558,361	473,856	166,461	1,339,062
Feb-09	319,613	420,702	258,174	1,293,063
Mar-09	310,494	404,677	277,524	1,389,939
Apr-09	1,823,366	412,392	275,487	1,229,048
May-09	638,032	478,314	266,663	1,143,211
Jun-09	3,896,962	4,744,687	5,797,596	3,217,284
Jul-09	4,005,109	5,518,256	5,326,318	3,836,875
Aug-09	3,434,321	5,033,946	5,275,391	3,392,381
Sep-09	5,364,114	5,327,464	5,696,798	2,988,171
Oct-09	5,039,024	6,464,002	7,199,653	4,177,871
Nov-09	4,825,023	6,695,162	7,334,189	4,136,988
Dec-09	2,784,571	4,979,289	5,293,470	3,812,136
Jan-10	4,090,214	5,574,136	5,637,167	2,948,849
Feb-10	4,279,888	5,281,005	5,282,114	3,057,820
Mar-10	5,091,955	5,447,243	5,354,823	3,343,404

Percentage Increase by Category following June 1, 2009 introduction of dairy

- HDPE (0-500ml) **610.78%**
- HDPE (over 1L) **991.96%**
- Poly-Coat Gable (0-500ml) **2174.13%**
- Poly-Coat Gable (over 1L) **281.43%**

The inclusion of dairy containers in the deposit system nearly doubled the number of in-scope containers sold in the two primary dairy container types - HDPE and poly-coat gable. The table above provides actual sales volumes from June 2008 to February 2010. The largest sales volume increase following the introduction of dairy into the deposit program was in poly-coat gable containers (less than 500 millilitres) where sales increased by over 2000%.

Following the introduction of dairy products in June 2009 to the end of February 2010 HDPE eligible containers increased 856.4% and poly-coat gable containers increased 591.5% in the same period. By the end of February 2010, HDPE containers represented 6.8% of the Alberta program scope and gable containers 5.9%.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

3.11. RECOVERIES

In recent years, Alberta has some improvement in beverage container recovery rates. Two significant program changes have recently occurred, the increase of deposit-refund rates and the expansion of the deposit legislation to include dairy containers in Alberta's stewardship program. In addition, there was an economic downturn during this period which historically has a positive impact on recoveries.

On November 1, 2008, deposit-refund rates increased from \$0.05 to \$0.10 for containers one litre or less and from \$0.20 to \$0.25 for containers over one litre. Since that increase, recovery rates increased and began to plateau toward the end of 2009. Albertans had previously recycled dairy containers since 1999 through community curb side and other voluntary recycling programs. The Dairy Council of Alberta's award winning voluntary program successfully raised public awareness of the need to recycle dairy containers and increased HDPE jug recovery rates by 22% and 28% for gabletop cartons in its first seven years of operation. Dairy containers were incorporated into the deposit program effective June 1, 2009.

Exhibit 3-10 illustrates overall recovery rates by jurisdiction. A major issue in their field is that there is not a clearinghouse for program information. Each jurisdiction collects and reports their own results with varying commonality, making comparisons challenging. All efforts have been made to ensure fair comparisons are presented. Table A presents full program scope recovery rates for comparisons are difficult due to the different program materials included. Michigan reports high return rates attributable to having the highest overall deposit rates (\$0.10 USD for all containers) in the United States and one of the narrower program scopes focusing their program on beer and non-beer aluminum, plastic and glass. Their geographic proximity to five non deposit jurisdictions thus potentially attracting out of state containers may contribute as well. Regardless, Michigan's very high return rate of 96.9% may be considered an outlier given their recovery is so much higher than any other jurisdiction, including the mature Scandinavian programs. By comparison, Alberta has the widest program scope and now achieved overall recovery rates comparable to most other jurisdictions under study except Michigan.

Table B provides recovery rates for aluminum, PET and glass only, enabling a more consistent comparison of jurisdictions. The ranking changes for the five jurisdictions listed. Aluminum, PET and glass accounted for 91.6% of Alberta's deposit program, 87.8% in BC, 81.5% in Saskatchewan, 97.8% in California and 100% in Denmark.

Exhibit 3-10 Recovery Rates by Jurisdiction in 2008

Table A: Full Program Scope

	Entire Program Scope: Overall Recovery Rate
Michigan	96.9%
Denmark	86.9%
Norway	86.8%
South Australia	~ 85%
New Brunswick *	80.0%
Saskatchewan	79.8%
Nova Scotia *	78.1%
British Columbia *	77.1%
Alberta	76.8%
California	73.7%
Newfoundland *	68.0%
New York	67.8%
Connecticut	64.0%
Germany	62.4%
Sweden	Unavailable

Table B: Limited Program Scope

	Limited Program Scope: Overall Recovery Rate
Saskatchewan	87.8%
Denmark	86.9%
British Columbia *	80.4%
Alberta	78.7%
California	73.8%
Connecticut	Unavailable
Germany	Unavailable
Michigan	Unavailable
New Brunswick	Unavailable
Newfoundland	Unavailable
New York	Unavailable
Norway	Unavailable
Nova Scotia	Unavailable
South Australia	Unavailable
Sweden	Unavailable

* Recovery rates include non-beer containers only.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

Table B rates are calculated using sales and return volumes to ensure a weighted average calculation. Both Alberta and BC, with similar program scope and number of unique containers included for deposit, have achieved recovery rates reflecting wide program scope. Jurisdictions where the sale of beverage containers per capita is highest and have the biggest opportunity to remove the most material from the waste stream, California, Alberta and New Brunswick, have recovery rates between almost 74% and 80%. As of April 2010, Alberta's return rate has climbed to 83.4%.

By contrast, Denmark enjoys high recovery rates in a program that accepts only three material types. Germany's recovery rates for aluminum, glass and plastics all exceed 100% as non-licensed, yet recyclable, products are recovered that originate from other jurisdictions and the basis for calculating the recovery rate is the quantity of packaging marked eligible for deposit-refund. For consistency in evaluating recovery rates, the overall German rate of 62.4% returned eligible containers is quoted.

Exhibit 3-11 provides a direct comparison of the individual recovery rates for each jurisdiction in the most recent year that the data was available. In jurisdictions where multiple organizations collect and recycle containers, the individual recovery rates of each organization has been recorded and combined to form the overall rate. Information for US jurisdictions was not available online and benchmarked organizations were unable to provide it for comparison.

Exhibit 3-11 Recovery Rates by Material Type in 2008

	Alberta	British Columbia *	Saskatchewan	Newfoundland	New Brunswick *	Nova Scotia	California	Denmark	Germany	Norway	Sweden	South Australia
Aluminium	79.8%	81.5%	90.9%	69.0%	Unavail.	Unavail.	83.9%	84%	135.0%	91.0%	91.0%	80.0%
PET	69.6%	75.8%	84.1%	75.5%	Unavail.	Unavail.	61.9%	93%	121.0%	82.0%	40.0%	75.0%
Glass	89.3%	87.3%	84.8%	70.0%	Unavail.	Unavail.	75.6%	93%	101.0%	Unavail.	45.0%	90.0%
Bi-Metal	64.7%	59.6%	90.9%	-	Unavail.	Unavail.	13.6%	-	-	-	-	-
Mixed Plastic	-	41.3%	84.1%	-	Unavail.	Unavail.	77.3%	-	121.0%	-	-	85.0%
Polycoat	54.6%	53.2%	54.8%	48.0%	Unavail.	Unavail.	-	-	-	-	-	85.0%
Dairy	46.0%	-	31.2%	-	-	Unavail.	6.8%	-	-	-	-	-
Overall Recovery Rate	76.8%	77.1%	79.8%	68.0%	80.0%	78.1%	73.7%	86.9%	62.4%	86.8%	Unavail.	~ 85%
Limited Scope Recovery Rate	78.7%	80.4%	87.8%	Unavail.	Unavail.	Unavail.	73.8%	86.9%	Unavail.	Unavail.	Unavail.	Unavail.

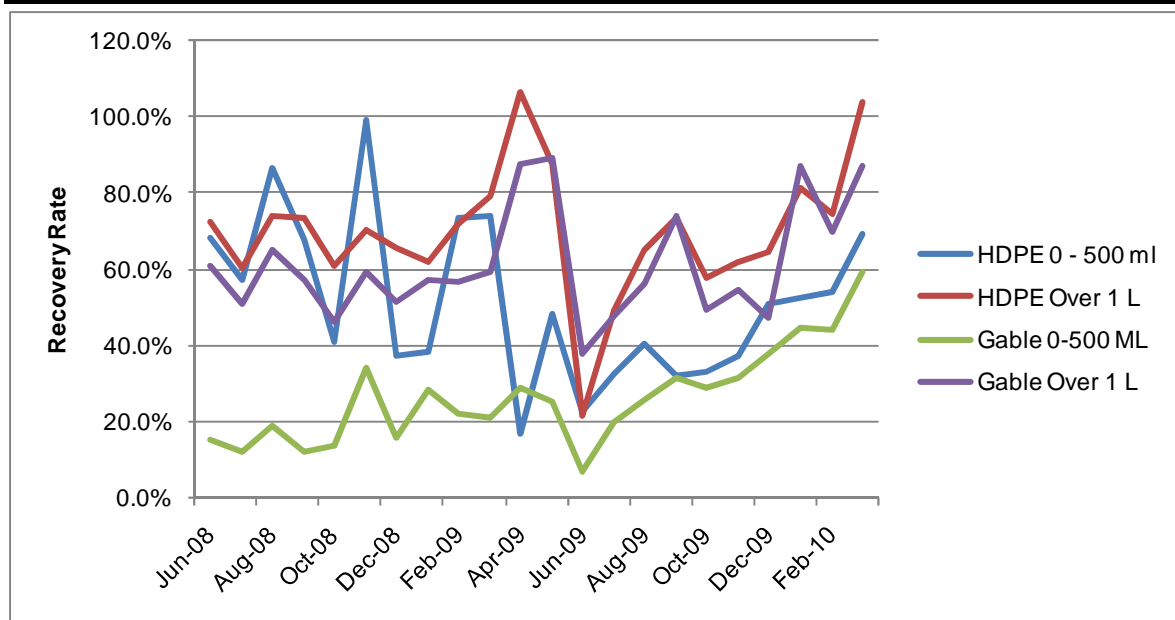
* BC and New Brunswick report non-beer only recovery rates.

Alberta's dairy recovery rate is calculated using sales and return data for HDPE and poly-coat gable containers, as indicated previously other beverage types contribute containers to these material streams however they are considered less significant.

All benchmarked jurisdictions suggested deposit-refund rates are the most influential factor driving return rates. Recovery rates on dairy containers in Alberta would have been expected to increase following the introduction of that material type to the deposit program on June 1, 2009. The following exhibit provides an overview of historical dairy (HDPE and poly-coat gable) container return rates.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

Exhibit 3-12
Historic Diary Container Recovery Rates in Alberta



	HDPE 0-500 ml	HPDE Over 1L	Poly-Coat Gable 0-500 ml	Poly-Coat Gable Over 1 L
Jun-08	68.1%	72.5%	15.5%	60.7%
Jul-08	57.3%	60.3%	12.2%	51.0%
Aug-08	86.6%	73.7%	19.2%	65.0%
Sep-08	67.8%	73.6%	12.4%	57.0%
Oct-08	41.1%	60.7%	13.8%	45.9%
Nov-08	99.0%	70.1%	34.4%	59.2%
Dec-08	37.2%	65.4%	15.6%	51.7%
Jan-09	38.2%	61.9%	28.4%	57.0%
Feb-09	73.7%	71.7%	22.1%	56.4%
Mar-09	73.7%	79.3%	21.2%	59.4%
Apr-09	17.0%	106.5%	29.1%	87.6%
May-09	48.1%	87.6%	25.1%	89.0%
Jun-09	22.6%	21.7%	6.8%	37.8%
Jul-09	32.5%	49.4%	20.2%	47.6%
Aug-09	40.6%	65.2%	26.0%	56.1%
Sep-09	31.9%	73.2%	31.6%	73.9%
Oct-09	32.9%	57.6%	28.9%	49.3%
Nov-09	37.2%	62.0%	31.6%	54.7%
Dec-09	51.1%	64.7%	37.9%	47.2%
Jan-10	52.4%	81.5%	44.5%	87.2%
Feb-10	54.3%	74.6%	44.3%	69.6%
Mar-10	69.0%	103.9%	59.2%	87.0%

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

Prior to the program's expansion in June 2009, containers HDPE and poly-coat gable containers over 1 litre were observing increasingly improved recovery rates. As expected, recovery rates overall for HDPE and poly-coat gable containers dropped in June 2009 following the introduction of dairy to Alberta's deposit program and the increase in container volumes eligible for sale. Following the inclusion of dairy and the immediate decline, recovery rates have trended positively and are expected to continue.

3.12. COSTS

Deposit program costs vary widely across benchmarked jurisdictions where influential factors may include the scope, sales volumes, operational and program efficiencies, use of technology, geographic and socio-cultural elements of a jurisdiction.

Program costs are typically categorized as: collection, transport, processing, administration, communication, depreciation and other miscellaneous costs.

- Collection costs mainly represent handling commissions at the depot level and are primarily comprised of labour and occupancy expenses.
- Transport costs include the expense of moving containers from depots to centralized processing facilities and then to end markets.
- Processing costs cover centralized sorting, counting, and palletizing expenses incurred prior to transporting collected containers to end markets.
- Administration costs are the costs associated with managing the program.
- Communication costs are usually limited to marketing expenses (e.g. advertising, web development).
- Miscellaneous costs include all minor expenses incurred managing and growing the program that are not captured in administration and communication cost categories.

Activities related to the collection of empty beverage containers contribute the largest portion of total program costs in Canadian provinces. Collection represents 70% of Alberta and Saskatchewan's budgets, and 61%, 62% and 63% for New Brunswick, BC and Nova Scotia respectively. The lowest is Newfoundland at 55%. Collection expenses are essentially handling commissions paid to collection depots, where the major cost components are labour and occupancy.

Transportation costs are driven by volume and geographic area. Alberta, BC and Saskatchewan have a very similar sized land bases, although Saskatchewan's much lower population results in significantly lower total volumes and greater difficulty in finding efficiency. The other major driver of transportation costs is the location of end markets for each material stream. Aluminum tends to be shipped to US locations whereas PET is processed locally.

Administration costs tend to be fixed and insignificant. On an administration cost per container recovered basis, 2008 costs for Alberta, BC and Saskatchewan were \$0.001592, \$0.003264 and \$0.004188 respectively, thus Alberta's administration costs are almost half of BC's and about a third of Saskatchewan's, the most comparable jurisdictions and the only ones where comparable data exists. In any event, Alberta's administration costs are dwarfed by a deposit of \$0.10 to \$0.25 and a CRF ranging from nil to \$0.08 per container sold in the province.

Communication costs are discretionary and independent of volume. One anomaly of note is that Alberta brandowners spent almost \$5 million in 2009 on communications (marketing), whereas the BC spent \$2.5 million and Saskatchewan spent little over \$200,000. The communications budget in Alberta increased significantly in preparation to support the increase in deposits and the introduction of dairy containers to the program. Exhibit 3-13 illustrates total program costs by category as reported by the jurisdictions where data is available.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

Exhibit 3-13
Total Program Costs by Category in 2008

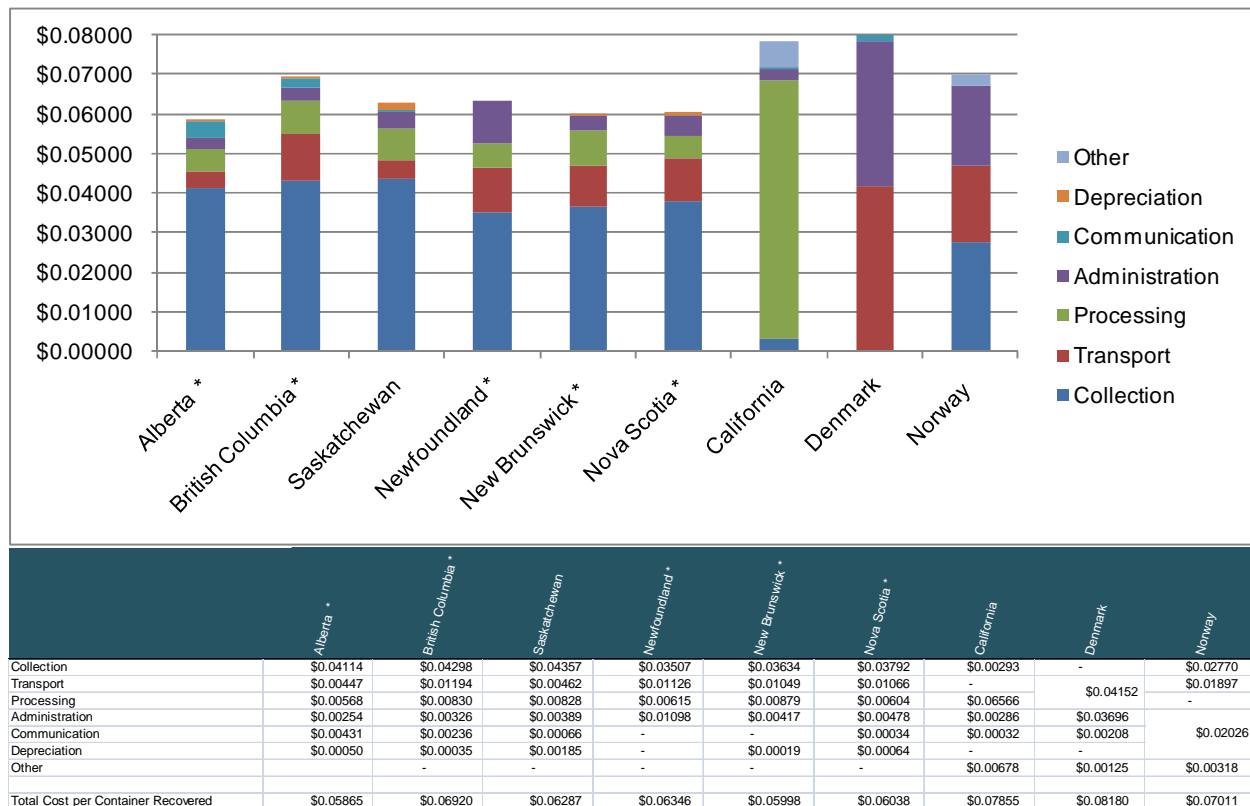
	Alberta *	British Columbia *	Saskatchewan	Newfoundland *	New Brunswick *	Nova Scotia *	California	Denmark	Norway
Collection	\$41,569,177	\$45,731,185	\$14,231,513	\$5,250,121	\$5,961,899	\$11,106,529	\$45,536,407	-	\$12,676,362
Transport	\$4,513,677	\$12,705,170	\$1,508,127	\$1,686,125	\$1,721,826	\$3,123,094	-	\$18,520,000	\$8,682,755
Processing	\$5,742,452	\$8,835,075	\$2,705,141	\$919,907	\$1,442,790	\$1,769,155	\$1,020,341,497	-	-
Administration	\$2,568,909	\$3,472,726	\$1,272,083	\$1,644,114	\$683,591	\$1,401,123	\$44,436,538	\$16,482,800	-
Communication	\$4,356,420	\$2,508,386	\$214,643	-	-	\$98,512	\$4,912,833	\$926,000	\$9,272,831
Depreciation	\$508,684	\$375,784	\$604,693	\$114,133	\$31,200	\$186,212	-	-	-
Other	-	-	-	-	-	-	\$105,390,587	\$555,600	\$1,457,247
Total Cost	\$59,259,319	\$73,628,326	\$20,536,200	\$9,614,400	\$9,841,306	\$17,684,625	\$1,220,617,862	\$36,484,400	\$32,089,195

* Jurisdictions report non-beer costs only therefore non-beer volumes are reflected.

Connecticut, Michigan and New York costs were unavailable; those jurisdictions are therefore excluded from the cost analysis in the remainder of the chapter.

A more relevant comparison is the costs per container recovered as illustrated in Exhibit 3-14.

Exhibit 3-14
Cost per Container Recovered in 2008



* Jurisdictions report non-beer costs only therefore non-beer volumes are reflected.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

On a per unit sold basis, Alberta's program costs are the lowest⁴ in each cost category with the exception of communication.

Collection costs are the highest cost component in every jurisdiction given the multiple sorts and handling of containers. High collection costs observed in Saskatchewan reflect SARCAN's commitment to leverage a labour force to undertake these activities in an effort to provide employment to disabled persons in the province.

Transportation costs, as mentioned, are driven by geographic area, population, volume and distance to recycled material processors. Numerous transportation strategies are deployed in North American jurisdictions to optimize truck loading, backhauls and minimize depot storage through the use of containers or trailers as temporary storage at depots. The challenge is that collected containers tend to be high volume, extremely low weight items. Given the current manual multiple sort processes and the audit requirements, containers are not completely compacted at the depot level thus trucks are "cubed out long before they are grossed out". Product movement is also virtually all one way, making backhauls challenging for all jurisdictions.

As recovery rates improve and volume of returned containers become closer to the volume sold, costs in all categories may drop on a per container basis as economies of scale continue to be realized.

3.13. MARKETING INITIATIVES

Marketing is a category where the widest range of approaches was identified, as jurisdictions embrace significantly different approaches to marketing and their associated budgets. There are large differences between how marketing is defined, what is included, and how funds are spent. The common element is that all initiatives were ultimately designed to improve recovery rates and improve environmental outcomes.

Marketing includes traditional media advertising reinforcing recycling awareness, attitudes and behaviours, specific advertising targeted at specific jurisdiction or local initiatives, formal partnerships with typically non-profit organizations, funding local community initiatives (representatives organizing short term events, mobile collectors, setting up and managing collection bins, presenters and presentation materials for school, church, community et al events, etc.), promotional items, etc. Advertising partnerships with private sector organizations is a relatively new initiative.

Marketing in some jurisdictions includes funding for broader environmental initiatives beyond the scope of strictly containers. New Brunswick and European jurisdictions all fund environmental projects that do not relate to recycling beverage containers. California beverage container recycling legislation requires that project funding target improvements to beverage container recycling activities. All jurisdictions have an increased website and web presence and some deploy call centres. There appears to be minimal joint marketing with other recycling programs within jurisdictions.

3.13.1. Traditional Marketing and Promotion

Virtually all jurisdictions advertise their programs to reinforce consumer attitudes and behaviour. Virtually all jurisdictions consider their programs mature and well entrenched, and most view advertising as having a diminishing return, thus most spend minimal money on traditional media like TV, radio and print. Advertising tends to be focused on support of program changes – increases in deposit rates, addition of new products into the program or other changes to public face of the programs.

⁴ MNP is unable to evaluate cost data provided by California in this evaluation as costs were provided in aggregate making comparisons unachievable.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

Few jurisdictions spend more than \$200,000 on this type of advertising. Alberta spent almost \$5 million on advertising in 2008, a year when both deposit rates were increasing (virtually every deposit rate changed, doubling in most categories) and dairy products were added (a wide variety of products in a non traditional category, but with relatively low volume). The jurisdictions viewed marketing as ineffective at increasing recovery rates, with funding for marketing activities better spent on improving system effectiveness and efficiencies. The consensus was marketing had a marginal impact at best on increasing recovery rates, and that increasing deposit rates had a far higher correlation to recovery rates.

3.13.2. Marketing Partnerships

Alberta and most jurisdictions have found greater success in local marketing initiatives. These take the form of recycling drives, specific advertising targeted at specific jurisdiction or local initiatives, partnerships with local community organizations (schools, churches, sports teams, charities, etc.), funding local community initiatives (representatives organizing short term events, mobile collectors, setting up and managing collection bins, presenters and presentation materials for school, church, community et al events, etc.), promotional items, etc. These programs tend to be labour intensive, as they invariably require people for the short or long term organization and management of these initiatives. The benefit is that local initiatives typically "touch" local residents directly whereas traditional media advertising tends to be generic and has minimal local impact.

Partnerships with charitable and other non-profit organizations in Alberta and many other jurisdictions have been successful in raising awareness about both the charity and beverage container recycling in the province. The non-profit organization benefits from funds generated through the partnership.

The two following examples come from BC. Programs that engage companies and the public have been implemented in BC. The "Return at Work" program sponsored by Encorp sends mobile collectors to offices buildings where companies can donate their empty beverage containers with proceeds going to support the United Way.

Another BC program designed to support the Salvation Army installs recycling bins at public events. The Salvation Army collects the containers and Encorp reimburses the deposit and pays them the handling fee (which would normally be kept by the depot). In BC charities are allowed to retain the refund and the handling fee, whereas in Alberta the depot will retain handling fees therefore requiring charities to return empty containers to depots to collect deposit-refund amounts.

Partnerships also take the form of marketing media such as bins, posters, etc. Most jurisdictions provide this type of media throughout their jurisdiction.

California offers the Comprehensive Recycling Community program. This community based program selects four communities annually. Recycling staff work directly with each community to increase awareness and participation in their local recycling programs. Communities are selected based on the level of media exposure and activity in environmental programs. Recycling staff collaborate with local authorities; curb side programs, churches, schools, city council, etc. for an entire year.

A relatively new initiative in California sees advertising contracts with private sector firms. While it is not in the beverage container recycling field, this is a very transferable example. The "Toll Roads", a DAO like agency that manages the toll highways throughout southern California, has a marketing arrangement with Bristol Farms, a high end grocery retailer. The promotion is that for every \$100 a customer spends at Bristol Farms, Bristol Farms will then deposit \$5 in their customer's "Toll Roads" account (https://www.thetollroads.com/home/getfastrak_promotions.htm). This is similar to well established loyalty programs that have evolved from airline loyalty programs.

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3.14. RESEARCH AND DEVELOPMENT

Only one jurisdiction appears to be funding third party research regarding container design and materials. California has partnered with academic institutions to develop alternative container designs and materials that are easier to recycle and that breakdown faster in the oceans, rivers and landfills. One major project is the development of "bio plastic" (PHA) and corn based containers (PLA). The challenge with introducing bio-plastic containers is that they look very much like PET containers which may cause contamination problems in the PET recycling stream.

This initiative is a conundrum, as the philosophy driving existing container recycling legislation is *extended producer responsibility* based on brandowners driving this effort to fundamentally redesign containers and packaging to facilitate re-use and recycling, and protection of the environment, and not government organizations and their delegated authorities. Conversely, it may be indifferent to consumers how dollars are collected that fund research like this, whether it be through increased product costs, consumer fees, unredeemed deposits, or provincial/federal taxes; as the net total cost to the consumer may be unchanged.

3.15. INCINERATION FOR END USE

Incineration of collected container materials for energy (or for gasification), whether formalized in legislation or not, is primarily conducted in Europe. All North American jurisdictions will attempt to recycle virtually all container products, even at a loss. Whether it is written into legislation or policy, or simply a stated practice, the incineration of recyclable material, including beverage containers, is avoided if at all possible in the North American jurisdiction reviewed. Many jurisdictions like Saskatchewan, BC, New Brunswick and Connecticut do not permit the incineration of recyclable material, even if there is a negative net loss in recycling the containers. A few grandfathered containers along with a very small number of containers where no end market exists are incinerated in Alberta and in other North American jurisdictions. California also allows the incineration of a very small number of recovered containers on an exception basis but it has not been used in years. Most European jurisdictions use incineration for energy recovery as a viable means of re-use, especially where other reuse and recycling options are not feasible.

Gasification has become a viable option for recycling (including containers) in Europe. It is a flexible, reliable, and clean energy technology that can turn a variety of low-value feed stocks into high-value products, replacing traditional oil and natural gas as an energy source, and can provide a clean alternative source of base load electricity, fertilizers, fuels, and chemicals. It converts any material containing carbon—such as coal, petroleum coke (petcoke), biomass, or many types of beverage containers—into synthesis gas (syngas) or methanol. The syngas or methanol can be upgraded or burned to produce electricity or further processed to manufacture chemicals, fertilizers, liquid fuels, substitute natural gas (SNG), or hydrogen. Gasification has been reliably used on a commercial scale worldwide for more than 50 years in the refining, fertilizer, and chemical industries, and for more than 35 years in the electric power industry. There are more than 140 gasification plants operating worldwide including nineteen located in the United States. Some sources predict worldwide gasification capacity to grow 70 percent by 2015, with up to 80 percent of the growth occurring in Asia.

North American jurisdictions have long standing objections regarding traditional incineration (whether for waste or low efficiency energy recovery) which is generally viewed as comparable to land filling. Gasification appears to be an incremental to exponential improvement upon traditional burning technologies, and a case can be made that gasification may be a far better end use of some container streams for the environment than traditional recycling processes. This is an area that may be worth further scrutiny.

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3.16. COMPARISONS

With the exception of the introduction of sorting, counting and densification technology in European and some North American jurisdictions, little has changed in beverage container industry over the past five years. Alberta continues to compare favourably to other jurisdictions under study as it exists it's the:

- **Largest program scope.** With over 85,000 registered containers in the program (active and inactive), Alberta includes 59% more beverage containers than the next largest program (BC).
- **Highest in-scope sales per capita in Canada.** Sales volumes in Alberta indicate the highest ongoing need for diversion of beverage containers from the province's landfills.
- **Comparable recovery rates.** While other jurisdictions may have similar recovery rates, Alberta's program includes a wider range of materials. Recovery rates for beer and non-beer aluminum, plastic and glass were 78.7% in 2008 and rising as the full impact of increased deposit rates and the significant marketing campaign are still being realized, while the overall program recovery rate is 76.8%. By December 2009, the recovery rate has increased to 82.4%. In 2010, the return rate is expected to approach the provincial target of 85%.
- **Lowest total recycling cost per container.** Alberta has the lowest recycling cost per container in North America. Alberta benefits from economies of scale due to high sales per capita and large program scope, but overcomes a challenging geography, an affluent economy, and minimum of labour saving technology deployed.
- **Recent inclusion of dairy containers for deposit.** Alberta is an industry leader with the inclusion of dairy products as no other jurisdiction reports the inclusion of dairy containers in the deposit programs.

3.17. LEARNINGS FROM EUROPE

European beverage container programs share similar objectives as North American jurisdictions and are structured and operate similarly. The flow of containers through the recycling system reflects closely the operations of North American jurisdictions. Funding recycling programs in Europe is also structured comparably to Alberta and other North American jurisdictions, in their use of unredeemed deposits, consumer fees, manufacturer fees and the sale of processed containers. European programs tend to differentiate themselves from North American programs in several ways:

3.17.1. Legislation

European legislation is quite different from North American legislation, but much of the difference is associated with government structure and beyond the scope of this engagement. Legislation is based on the *extended producer responsibility* model, whereby the brandowners are required to re-use or recycle their containers sold through a variety of means in a deposit program model. Europe is a complex regulatory environment, especially regarding trade issues. Each country appears to have a slightly different structure for assessing and collecting fees beyond consumer deposits. Organizations that manage each country's beverage container recycling program collect and disburse monies and collect and process recovered containers tend to be separate from government. There are mixes of non-profit and for-profit entities.

3.17.2. Fees

Most programs are deposit programs supplemented by consumer fees and brandowner fees. All programs are funded through unredeemed deposits, consumer fees and brandowner fees. Norway, similar to California, has a downward sliding scale brandowner fee based on recoveries for non refillable containers, whereby the fee begins to decline at 25% recovery and becomes nil when recovery reaches 95%. The complex European regulatory environment makes identifying the flow of monies a complex task.

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3.17.3. Program Scope

Program scope tends to be narrower, focusing on beer and non-beer aluminum, glass and plastic (primarily PET). Few programs include products such as tetrapaks, gable tops, bi-metals, dairy and other containers. The product mix varies from North America and is purported to include more refillable containers. Some categories of plastic containers are refilled in Europe.

3.17.4. Return to Retail

Collection tends to follow the return to retail model more so than North American jurisdictions. This reflects European consumer behaviour where food and beverages are purchased more frequently but in small quantities. Consumer storage space also tends to be limited thus containers are recycled more frequently but in smaller quantities. Given this, return to retail becomes more convenient for the consumer and generally an expectation in Europe. Grocery trucks that are empty after their deliveries can collect and bring containers to processors creating a natural backhaul opportunity that significantly improves efficiency and reduces cost.

3.17.5. Technology

The widespread adoption and implementation of technology is a major difference between North American and European jurisdictions. RVMs are deployed in large numbers in retail locations, facilitating accessible and convenient return of empty beverage containers. RVMs appear more effective in Europe, given the lower number of containers returned per visit and the small program scopes. Additionally, significant investments are being made in sorting and densification technology at retail locations. It is expected to provide return on investment through improved processing efficiencies and further reductions in transportation costs. Climate is a significant challenge for automated technologies as containers with frozen contents introduce contaminants, process hazards and prohibit accepting product by weight.

Given the widespread use of technology for sorting, the European consumer has adopted the concept that the value of the container is the bar code and not the container itself. Deposits tend to be returned based strictly on the bar code, and if the bar code is destroyed, the container itself has no value. This is much like paper currency or a winning lottery ticket, as if the bill or ticket is damaged beyond recognition, the bill becomes worthless.

3.17.6. Incineration for End Use

European jurisdictions embrace burning of recycled material for energy. Containers with minimal end markets are incinerated, much like recycled lubricating oil, recycled tires, etc. There is actually a thriving market for specific types of recycled containers given their unique incineration attributes.

4. OPPORTUNITIES FOR CONSIDERATION

The deposit program in Alberta is effective and cost efficient. The program is the broadest, has the lowest cost per collected container, and recovery rates are rising and appear to be heading towards the 85% plus range matching the global leaders. To further increase recoveries and reduce costs beyond where the global leaders are now, fundamental strategic initiatives regarding the financial model, container life cycle (design, materials, packaging and material end markets), recycling process, and consumer engagement must be embraced and implemented. Seven strategic opportunities have been identified for Alberta to consider investigating based upon the review of other jurisdictions in North America, Australia and Europe that may provide incremental program benefit.

4.1. FUNDAMENTALLY CHANGE THE FUNDING MODEL TO CREATE INCENTIVES FOR BRANDOWNERS TO ENHANCE CONTAINER DESIGN

Consider investigating moving from the current consumer/brandowner fee structure to cover financial shortfalls as recoveries increase to a California style brandowner fee based on brandowner specific recovery facilitated by the implementation of next generation automated counting and sorting equipment.

Virtually all deposit programs are structured through legislation describing extended producer responsibility or product stewardship based legislation, and all programs are presently funded through unredeemed deposits and revenue from processed containers, with consumer/brandowner fees applied to fund programs. This is the Alberta model, whereby consumer fees (with brandowner fees for refillable beer) increase as recoveries increase given the correlated unredeemed deposits decrease. This is a closed loop system that will always remain viable, but total costs to consumers (and refillable beer brandowner fees that may be partially or fully passed on to consumers) also increase as recoveries increase.

In addition, a policy of no cross subsidization by product stream has been generally adopted across North America and Europe meaning each product stream must “pay its own way”. For example, excess revenues from a strong market for aluminum are not used to subsidize a weaker PET market, etc.

California is unique in North America where the State has legislated strictly brandowner fees on a material stream basis for all materials – all other states and provinces have largely implemented consumer fees with brandowner fees on some beer products. The paradigm in Europe appears to be the opposite, where program financial shortfalls are funded by brandowner fees versus consumer fees.

The objective for brandowner fees in California is to create financial incentives for brandowners to fundamentally change the container life cycle (design, materials, packaging and end markets) to facilitate recycling and improve environmental outcomes, and ultimately reduce brandowner net costs. Their view is that consumer fees may not realize this same objective with consumers potentially viewing these fees as a tax, although it may be argued that consumers view products on a total cost basis, thus the incentive remains for brandowners to enhance the entire container life cycle to ultimately reduce overall costs.

To this end, California implemented a “processing fee offset” policy whereby the State would pay a higher portion of the processing cost shortfall as recoveries increased to preset benchmarks. This has resulted in brandowners paying as little as 15% up to a maximum of 65% of the net recycling costs as recoveries have increased in conjunction with several simultaneous initiatives. Given the state has escheated a significant portion of the unredeemed deposits, the processing fee offset has been suspended thus brandowners will pay a much larger portion of the financial shortfall in 2010.

The current Alberta funding structure creates several considerations:

- The current structure creates a natural tension between increasing recoveries (that automatically reduces unredeemed deposits), and the financial integrity of the program that currently survives on these unredeemed deposits, revenue from recovered containers and consumer/brandowner fees. Higher recoveries mean higher product costs to consumers and potentially lower sales for brandowners.

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- Most US jurisdictions allow state government to escheat unredeemed deposits, with the current program in California facing fiscal issues due in part to the state allocating \$99 million of unredeemed deposits to general revenues in 2009 alone. Some Maritime Provinces escheat as a result of "half-back programs" as does Saskatchewan where government holds all deposits and grants funds back to SARCAN to operate as a charity. Alberta's program does not practice escheats. Escheats invariably result in higher consumer/brandowner fees again resulting in higher prices for consumers and potentially lower sales for brandowners.
- Collected containers are commodities with fluctuating values. Aluminum has traditionally been cash positive whereas other materials such as PET, HDPE, glass and others have had low to minimal values. Decreases in the value of these commodities will result in higher consumer/brandowner fees.
- Increasing deposit rates generate short term cash surpluses and appear to result in increased recoveries. California increased deposit rates in both 2005 and 2007, and saw a net increase in recoveries of approximately 10%. On November 1, 2008 Alberta raised deposit rates and is seeing increased recoveries in aluminum, plastic and glass. The intent of Alberta's deposit rate increase is increased recovery rates. In the short term increases in unredeemed deposits due to the higher deposit rates may decline as recoveries increase, resulting in higher consumer/brandowner fees.
- A consumer or brandowner fee as currently structured appears indifferent, as both result in higher prices for consumers and potentially lower sales for brandowners. Current processes and technologies deployed do not allow jurisdictions to track recoveries by brandowner, thus brandowner fees are applied by material stream regardless of the greater or lesser efforts made by particular brandowners to improve the recovery and ability to recycle their containers.
- Brandowners maintain and closely guard two proprietary items - their product formula and their sales. Moving to a brandowner fee based on actual recovery by product and brandowner would require sales and returns data by product and brandowner. An information clearinghouse ensuring the protection and security of this information would be critical.
- California implemented a brandowner fee across the board largely because their jurisdiction is approximately the size of Canada thus a market large enough to effectively negotiate with brandowners. Alberta, at one tenth the size of California, may be in a poorer negotiation position, and may have to partner with other jurisdictions to effectively implement widespread brandowner fees.

A California style brandowner fee based on brandowner product specific recovery embodies the principal of extended producer responsibility. This would create the financial incentive for brandowners to compete with each other to fundamentally change design, materials, packaging et al with the goal to optimize recoveries and improve overall environmental outcomes. This type of fundamental move would have to be facilitated by the implementation of next generation automated counting and sorting equipment that Alberta and many other jurisdictions to provide the actual recovery by brandowner and product.

4.2. FURTHER BROADEN PROGRAM SCOPE

Alberta presently has the largest beverage container recycling deposit program scope in the world as well as the highest per capita consumption of in scope beverages - 25% greater than BC and 66% greater than Saskatchewan. The vast majority of beverages sold in the province (including aluminum, plastic, glass and paper containers) are already in the program. Further expansion of the program would logically go in two directions - incorporating food and cleaning containers that are identical to beverage container materials already in the program; and/or incorporating non sealing beverage containers such as paper/plastic/styrofoam cups and containers.

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Both options would be a significant extension from the current program mandate, and would venture into an area no other jurisdiction has attempted to pursue. There are significant volumes of containers in both areas thus diversion from landfills may be significant. Potential issues include resistance from brandowners and retailers, contamination concerns and the development of end markets broadening those that exist now. The generation of greater volumes of certain materials may actually create a critical mass to establish or broaden better end markets than those the currently exist.

4.3. DEVELOP AND SUPPORT REGIONAL DOWNSTREAM MARKETS

Downstream markets are critical to the financial viability of a recycling program. Aluminum is the only material that consistently generates enough revenue to cover the associated recycling costs. Plastic, glass (except refillables) and especially paper have consistently had weak downstream markets and commodity values. That said, the one advantage recycling programs have is that they can deliver a constant supply of product that does have value in the commodity marketplace.

California has developed a local market for plastics through a subsidization program. Approximately \$5 million in subsidies are paid to downstream processors and manufacturers annually. California has the critical mass to invest in market development given its size (\$1.2 billion in program gross revenue and 16.2 billion recovered containers).

Given geographic proximity, Alberta and brandowners may consider partnering with neighbouring jurisdictions to investigate opportunities to leverage their cumulative volume to develop regional markets for materials where few viable markets currently exist.

4.4. SUPPORT RESEARCH PROJECTS TO ENHANCE RE-USE AND RECYCLING

Only one jurisdiction appears to be funding third party research regarding container design and materials. California has partnered with academic institutions to develop alternative container designs and materials that are easier to recycle and breakdown faster in the oceans, rivers and landfills.

One major project is the development of "bio plastic". The State of California is also researching methane based plastics (PHA) and industry has developed corn based containers (PLA) and seeks to improve processing and enhance awareness with the public. The challenge with introducing both PHA and PLA containers is that they look very much like PET containers which may cause contamination problems in the PET recycling stream.

A second major project is gasification. Gasification has become a viable option for recycling (including containers) in Europe. Gasification is a flexible, reliable, and clean energy technology that can turn a variety of low-value feed stocks into high-value products, replacing traditional oil and natural gas as an energy source, and can provide a clean alternative source of base load electricity, fertilizers, fuels, and chemicals. It is a manufacturing process that converts any material containing carbon—such as coal, petroleum coke (petcoke), biomass, or many types of beverage containers—into synthesis gas (syngas). The syngas can be burned to produce electricity or further processed to manufacture chemicals, fertilizers, liquid fuels, substitute natural gas (SNG), or hydrogen. Gasification has been reliably used on a commercial scale worldwide for more than 50 years.

Alberta and all North American jurisdictions have long standing objections regarding traditional incineration (whether for waste or low efficiency energy recovery) which is generally viewed as comparable to land filling. Gasification appears to be an incremental to exponential improvement upon traditional burning technologies, and a case can be made that gasification may be a far better end use of some container streams for the environment than traditional recycling processes. This is an area that may be worth further scrutiny; especially given the City of Edmonton is building a gasification plant

As a separate solely brandowner funded initiative, Coca-Cola introduced the "PlantBottle" in the fall of 2009, that is made from a blend of petroleum-based materials and up to 30 percent plant-based materials. The "PlantBottle" is currently made through a process that turns sugar cane and molasses, a by-product of sugar production, into a key component for PET plastic. Manufacturing the new plastic

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bottle is reportedly more environmentally efficient as well. Coca-Cola claims a life-cycle analysis indicates the "PlantBottle" with 30 percent plant-based material reduces carbon emissions by up to 25 percent, compared with petroleum-based PET. A significant advantage to the "PlantBottle" is that, unlike other plant-based plastics, it can be processed through existing manufacturing and recycling facilities without contaminating traditional PET. Another recent brandowner initiative has been to significantly reduce the plastic content (PET) in containers themselves, especially water bottles.

These initiatives are a conundrum, as the philosophy driving existing container recycling legislation is extended producer responsibility based on brandowners driving this effort to fundamentally redesign containers and packaging to facilitate re-use and recycling, and protection of the environment, and not government organizations and their delegated authorities. Conversely, it may be indifferent to consumers how dollars are collected that fund research like this, whether it be through increased product costs, consumer fees, unredeemed deposits, or provincial/federal taxes; as the net total cost to the consumer may be unchanged. In addition, initiatives such as gasification may require legislative support.

4.5. ENHANCE DEPOT ROLE, TECHNOLOGY, LOCATION AND OPERATIONS

4.5.1. Increase Depot Responsibility for Local Recovery Rate

The Alberta depots presently are licensed to accept empty registered beverage containers, refunding customer deposits as per legislation, and receive compensation from the brandowner's operational entities, ABCRC and ABCC. Depots are licensed independently from the ABCRC and are under the jurisdiction of the BCMB. BCMB and the brandowners are presently responsible for recoveries, not the depots, yet the depots are the only organization that interacts with the public and in the local communities. Depots are currently a service provider with no direct responsibility for recoveries although they are directly impacted by recoveries, as their revenue increases as their volume of redeemed containers increases which should relate to recoveries.

Most jurisdictions interviewed indicated that in their experience, the most effective marketing initiatives appear to be community based rather than broad jurisdiction wide initiatives. If this philosophy is accepted and embraced, the depot appears best positioned to drive community based marketing programs to drive recoveries versus BCMB or the brandowners.

California deploys a program whereby depots are eligible for a bonus for increasing their volume to certain pre-established benchmarks. The intent is to entice depots to market "recycling" in their local area to increase their volumes thus increasing recoveries – this program was implemented simultaneously with increased deposit rates resulting in increased overall state recoveries. This initiative's risk is that volumes are transferred from one depot to another with net recoveries unchanged.

There may be merit investigating the sharing of strategic responsibility for recoveries with the depots. One option to consider is the California model, whereby financial incentives are provided for increases in depot volume. A second option is revising the depot compensation model whereby recoveries are managed by sales in the depot area, and depots are compensated partially based on recoveries in their "area" – a much more complex approach. This may create significant additional financial incentives to optimize recoveries on a local basis.

4.5.2. Add Capital Intensive Technology to Reduce Variable Labour Costs

The current manual sorting at depots and the ABCRC is expensive, susceptible to human error, and slow. Reverse vending machines (RVMs) have been tested in Alberta and are deployed in other jurisdictions with minimal success. They are slow, unreliable, and unable to process much of Alberta's program scope. RVMs have proven to not mitigate much of the labour component and cost, and also don't solve the current audit and compaction issues.

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A new generation of automated counting and sorting technologies as well as compaction technologies for depots are currently being investigated by Alberta and other jurisdictions. The leading technology is from Denmark and marketed by Anker Anderson. This technology is capable of 32 material type sorts. It uses a bar code scanner with reported accuracy ratings of 98-99%. This type of sorting technology enables customers to bring in co-mingled loads of containers to be easily sorted and counted. These technologies are especially useful in jurisdictions or centres where recycling volumes are high, thus reducing labour costs and cross-contamination of materials, and improving count accuracy. Given Alberta's wide range of material types in its program and manually sorts returned containers, the implementation of this type of technology presents potentially significant process improvement opportunities.

Compacting technology would help depots by improving their use of space. More containers could be stored in the same space if they were compacted. Trucking and transportation costs of recyclable material would also be reduced as more containers would be transported with the same volume of truck capacity.

The main challenge faced with compaction technology is within auditing. When compaction is partnered with sorting technology and security processes (security cameras, DVRs, etc.) confidence in accuracy is high and audits take place infrequently. Spot audits could be undertaken at the depot/collection centre and large penalties given if violations occur. Compaction technology alone would require strict control and audit processes to strengthen the system against fraud.

Technology can be used to reduce overall provincial processing costs. Containers can be counted, sorted, packaged and audited at the depot level - a move to single handling of containers. Depot capacities would also be greatly increased. Consumers will see their containers counted and sorted extremely quickly and accurately. Given the equipment reads bar codes, potential contamination can be mitigated (especially if PLA containers are introduced).

The issue is the capital cost, as each sorting unit ranges between \$200,000 and \$400,000. Compaction units are also capital intensive.

In parallel with implementation of new technologies at the depot, ABCRC may move to a cross dock and brokerage operation rather than a secondary sorting, compacting and audit operation, significantly reducing overall system costs.

4.5.3. Locate More Depots in Retail Areas to Improve Customer Access

Alberta's program, like most North American programs, began in the 1970s and 1980s based on a return to retail concept that beer retailers have successfully operated long before the advent of deposit systems for non beer containers in the 1970s. This was also the model for long defunct regional Alberta soft drink brandowners such as "The Pop Shoppe" and "Happy Pop".

The initial deposit systems for non beer containers were based primarily on a return to retail model similar to the beer model; but this return to retail model proved unpopular with retailers as they were not set up for it, didn't have the space for it, and in addition it wasn't popular with consumers (hauling large volumes of empty containers through grocery or convenience stores wasn't feasible for most consumers). Communities also perceive beverage container recycling to be noisy, dirty, smelly, attracting undesirable customers, require significant parking, and attract too much traffic, especially truck traffic.

While beer retailers continue to maintain the return to retail operations in Alberta and most other jurisdictions; non beer container recycling migrated to stand alone depots that are now located primarily in industrial or commercial areas due to local zoning restrictions. Much like Alberta, communities across North America tend to restrict depots to these areas given the negative stigma some communities generally have regarding depots. Municipal ordinances restricting depot locations to industrial and commercial areas is a common complaint by most North American jurisdictions as a barrier to improving recovery as customer access is potentially poor.

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Alberta has largely merged the beer return to retail system with the non beer depots, as there are now only 62 beer retailers collecting beer containers representing approximately 1.5% of the total container stream. Other jurisdictions such as BC and Saskatchewan are merged to a lesser degree. One reason for this being beer retailers remit consumers their entire deposit whereas depots generally remit only a portion of the consumer's deposit. The result is that most jurisdictions have beer retailers collecting beer containers in retail areas and depots collecting all containers (including beer containers, but in many cases remitting only partial deposits) located in commercial or light industrial areas. Regardless of the reasons, consumers outside of Alberta with beer and non beer containers must sort and return their containers to three different collection systems (return to retail, beer/liquor stores and depots) to redeem their paid deposits in full.

California's structure has merged the depot system with return to retail. Large grocery stores are legislated by the State as a "convenience zone" and in very simplistic terms must provide a recycling depot within a half mile of their store (the legislation is much more complex than this, and allows for one depot to service several retailers in close proximity). As a result, many large grocery stores have a depot located in their parking lot beside or behind the store (the customers and containers don't enter the store, and traffic and trucks are already present). The depot provides the customer a ticket voucher that is redeemed in the grocery store for cash or merchandise.

Pepsi and Waste Management have recently announced a program to place a new generation of RVMs in public areas such as gas stations, convenience stores, stadiums, parks, etc offering a personal reward system, allowing consumers to collect and redeem points for each bottle or can they recycle in the RVM beginning in 2010. This may also be an opportunity to investigate to improve customer access if the technical issues that plagued the first generation of RVMs can be resolved (acceptance of complete program scope, mechanical reliability, climate compatibility, etc).

Alberta may want to investigate the California "convenience zone" structure as it may be viable in many communities as a way to improve visibility and consumer access. This process can facilitate better cash management, and is a marketing venture for the grocery store without the issues historically related to return to retail as originally designed. This also provides a cross marketing opportunity for the retailer to market to consumers redeeming their deposit through coupons, offers, etc. There are approximately 2,200 depots in California; with 1,400 located in convenience zones (the number of depots per capita in California is comparable to the ratio in Alberta). Depots located in convenience zones receive additional compensation termed a "handling fee" which is a payment averaging \$22,000 annually per depot to compensate for the higher cost of occupancy of being located in a retail area.

4.5.4. Review and Update Depot Network and Geographic Coverage

A thorough review of the existing depot network and the communities they serve should be considered. The network of 216 Alberta depots has been in place for many years while the communities they serve have grown, and in many cases the growth has been immense. While the numbers of depots has not substantially changed, the capacities and throughput of the existing depots have increased substantially. Despite this capacity increase, there may be incongruence's between the network and the communities that they serve regarding access, service and capability.

Determining the optimal number of depots is difficult. Geography, population demographics, transportation networks, depot location dynamics (retail vs. commercial vs. Industrial) and depot size all impact the assessment, and make a "depots per capita" comparison of lesser value.

The potential deployment of new equipment estimated to cost hundreds of thousands of dollars per depot may present the appropriate opportunity to review the depot network including the number, size, geographic location, zoning location (retail vs. commercial vs. industrial locations), capability, service standards et al; and adjust the network based on the current and forecast market requirements in conjunction to determining where and how to deploy this expensive technology. There are obviously barriers in place in Alberta regarding adjusting the network, not the least of which are zoning challenges and overall resistance within communities to the location of depots in retail areas.

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The significant cost of this technology may drive the depot network to move to a “hub and spoke” system used by numerous distribution, warehousing to and transportation organizations. The result of this type of network would result in small depots that don't have the volume to justify expensive technologies transporting containers to larger regional depots for counting, sorting, audit and compaction rather than the present model where all 216 depots collect containers and then transport the same containers to ABCRC processing centres in Calgary, Edmonton, Lethbridge and Red Deer for counting, sorting, audit and compaction (once the ABCC consolidation is complete).

4.5.5. Enhance Commonality of Alberta's Depots

In Alberta as in most jurisdictions, depots operate with a degree of independence. They adhere to a series of service standards, but generally do not have common signage, corporate dress, hours of service, or specific service standards in place—each depot is very different from the next. Saskatchewan depots operate on more of a “franchise” model basis with many more common elements such as signage or corporate dress. Most jurisdictions interviewed would prefer that their depots operate a standardized approach to provide a standard for customer service and contribute to recoveries. The reality is that most jurisdictions operate a legacy network of independent depots making standardization a difficult process.

There may be opportunities to enhance the service at Alberta depots and contribute to increased recoveries through the implementation of provincial standards for depot signage, appearance, location and service. This is in line with the vast majority of successful retail and service organizations that strive to standardize their operations from a customer perspective to optimize revenue and profit (and in the case of depots, recoveries and their profits).

4.5.6. Returns by Weight Bring Significant Risk

Some jurisdictions such as California and South Australia, accept empty container returns by individual count or by weight. In California, when a load of 50 or more empty containers is returned, the refund is based on weight. This is necessary in California where RVMs are in widespread use and are extremely slow. The Division of Recycling in California and South Australia's Super Collectors are careful to calculate and update weight to volume conversion rates to ensure fairness and transparency. Returns by weight may be an option for Alberta; at least until high speed sorting can occur at the depot level. Note that Alberta's winter weather may be problematic as empty containers could be filled and frozen, thereby skewing returnable weight and creating erosion deposit payments to customers. Both California and South Australia continue to experience contaminants at the processor level, creating additional process costs.

4.6. THERE ARE FEW STRATEGIC AND OPERATIONAL SYNERGIES WITH OTHER RECYCLING PROGRAMS

Alberta, and most other North American jurisdictions, has separate recycling programs for tires, lubricating oil, oil containers, glycol containers oil filters, electronics, batteries, paint, hazardous household waste and dairy containers (outside of Alberta). Municipal blue box programs are also proliferating. Some depots in Alberta (approximately 50) and Saskatchewan collect used oil and electronics, with depots in other jurisdictions also collecting those and other recyclable products.

There appear to be few strategic or operational synergies with other programs due to different customer requirements for collection; risk and the cost of cross contamination (many of the other products contain toxins); the differing requirements of processing and end markets; and, the need to optimize labour and transportation efficiencies. A direct comparison between deposit programs and blue box programs was not explored, as the focus of this report was to compare deposit programs.

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4.7. LOCAL MARKETING INITIATIVES APPEAR TO MOST EFFECTIVELY INCREASE RECOVERIES

The relationship between marketing (and specifically funds spent) and recovery rates is debateable. Alberta spent \$4.3 million on marketing in 2008 in anticipation of the increase in deposit rates and the addition of dairy products to the program. Recoveries for non-beer aluminum, plastic and glass increased almost immediately as a result of the combined increase in deposit levels, the marketing effort and a downturn in the provincial economy. Separating the impact of each is difficult – however, most jurisdictions view deposit rates as the driver of recoveries and not marketing, but few have ever spent this magnitude of funds on marketing.

Virtually all other jurisdictions continue to spend relatively few dollars on marketing initiatives except BC. Marketing initiatives consist of traditional media advertising (TV, radio, print and internet), joint ventures with partners that generally take the form of fundraising for non-profit organizations, community initiatives lead by local champions (e.g. community clean up campaigns) and small scale local initiatives.

4.7.1. Traditional Advertising Quickly has Diminishing Returns

Most jurisdictions do little advertising through media such as print, TV, radio and internet. Beverage container recycling programs tend to be mature and have been well branded since their introduction. The consensus of reviewed jurisdictions is that the message requires reinforcement, but there are quickly diminishing returns.

4.7.2. Recycling Initiatives with Community Partners Appear Promising

Alberta and most jurisdictions have had success partnering with primarily non-profit organizations to drive local recoveries while assisting the partner organization to raise funds. The non-profit organization essentially collects containers in the community ideally gathering containers that otherwise may not have been recycled.

4.7.3. Focus Marketing Locally in Each Communities

Alberta and most jurisdictions have found that the most effective marketing is community focused not jurisdiction wide advertising campaigns. Local marketing can take the form of community clean ups or recycling drives in schools. They are usually most effective when there is a local “champion”. There may be opportunities to leverage the depot’s presence in marketing their communities.

4.7.4. Investigate Customer rewards initiatives

Customer loyalty programs have been extremely successful in numerous industries – for example earning “points” or “coupons” redeemable for merchandise or services.

In the recycling field, California has seen the beginnings of industry loyalty programs that are not operated by or affiliated with the State. Los Angeles has recruited marketing partners whereby frequent users (based on the volume of materials in the curb side boxes) receive coupons from participating sponsors. The “Toll Roads”, a DAO like organization that manages the toll freeways in southern California, has partnered with several retailers who in one case will pay \$5 in a customer’s Toll Road account for every \$100 spent in the retailer’s store. A large high profile grocery store will pay \$0.10 per gallon of gas at a specific service station chain to a maximum amount for every \$100 spent in their store.

One option for Alberta would be a rewards program where customers create an account and are provided with a branded smart card. The smart card is scanned at point-of-sale (POS) where reward points are collected and points accrue. In this scenario, the more containers recycled, the more reward points are accrued. Rewards points would be able to be exchanged for goods services or coupons valid at participating retailers.

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At the outset a financial investment in marketing would be required to build awareness and establish relationships with participating retailers. However as the program evolves, retailers may want to promote and advertise their participation in the program reducing the need for support from BCMB. In support of the environmental aspect of the beverage stewardship container program, reward points could be donated to charitable organizations or environmental causes.

A Recycling Rewards Program would require supporting technology such as customer information and rewards tracking databases, POS technology and retail partnerships where points can be redeemed. The Pepsi-Waste Management Dream Machine initiative is very much along these lines, whereby a consumer returning containers can collect points in addition/instead of receiving their deposit back using a log in screen and a PIN and password.

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5. PROGRAM SUMMARIES

5.1. ALBERTA

5.1.1. Program Overview

The Alberta program is guided by the province's Environmental Protection and Enhancement Act, Beverage Container Recycling Regulation 101/97. The Alberta stewardship program operates on a Delegated Administrative Organization model where the Beverage Container Management Board is granted the regulatory authority and exclusive right to operate the program by the Government of Alberta. Overseen by the BCMB, stewardship program activities are managed by a consortium of 216 independently owned and operated depots, the beverage industry, and two industry-appointed collection agents: the Alberta Beverage Container Recycling Corporation (ABCRC) and the Alberta Beer Container Corporation (ABCC). The BCMB is supported by the Beverage Container Management Board Administrative By-Law and the Beverage Container Management Board Fee By-Law.

- The program is entirely self-funded and does not receive government financing.
- The program is funded through recycled materials sales, unredeemed deposits, revenue from recycled material and consumer fees (termed Container Recycling Fee or CRF) - a levy imposed on certain container types that operate at a loss due to low raw material values.
- The refillable beer stream, representing approximately 9% of the total program volume, is funded in a comparable manner, except that deposits and CRFs are paid by the brandowner versus the consumer, thus refillable beer products are sold to the provincial liquor wholesale entity (AGLC) for an "all in price".

5.1.2. Legislation

The Litter Control Act created the Alberta deposit program in 1972. It originally included traditional beverage containers such as soft drink and liquor containers, but the legislation was expanded to include bottled water and juice containers in 1989. TetraPaks and gable top containers were added in 1997, and beer containers became eligible due to a regulatory change in 2001. In June 2009, the program scope was expanded to include dairy containers and Alberta is now the only jurisdiction in North America to include them in a legislated deposit program.

5.1.3. Stakeholders

Depot operators, the beverage industry, the Alberta Beverage Council (ABC), ABCRC and the ABCC are key stakeholders in Alberta's stewardship program and their operations are overseen by the BCMB. Beverage producers and brand owners are required by provincial regulations to register their products, collect, transport, and recycle used containers.

- Alberta's beverage container registration system is managed by the BCMB. Brand owners of non-alcoholic products must register containers with the BCMB directly. The Alberta Gaming and Liquor Commission (AGLC) registers warehoused alcoholic product containers with the BCMB.
- ABC represents beverage manufacturers and beverage distributors in Alberta through its representation on the ABCRC and the BCMB board of directors.
- The ABCRC operates as the stewardship agent for all non-beer producers/brand owners in Alberta as well as for one refillable beer company. In addition to collection and processing activities, the ABCRC manages handling fee disbursement to bottle depots upon container collection from depot locations.
- Through the use of subcontractors, the ABCC undertakes stewardship activities on behalf of beer producers and brand owners in Alberta. The ABCRC is subcontracted to collect non-refillable beer containers from depots, and the Brewer's Distributors Limited (BDL) is subcontracted to collect and process all refillable beer containers.

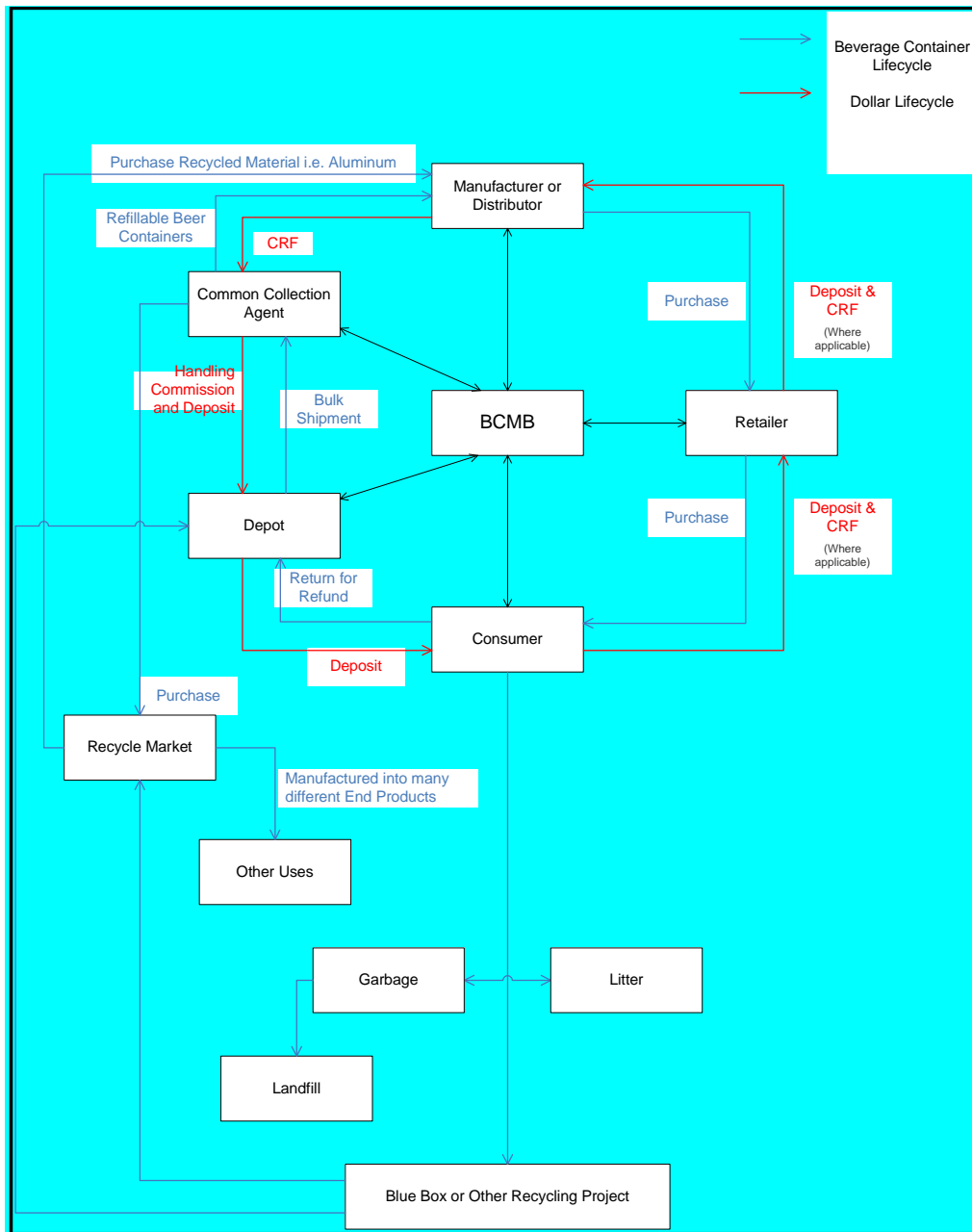
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- Depots in Alberta are independently owned and operated businesses, represented by the Alberta Bottle Depot Association (ABDA), and are separate from brandowners, and apply for their operating permit from the BCMB. Their revenue is earned by exchanging collected containers for handling fees paid by the collection agent.

5.1.4. Program Structure

The BCMB, as created by Government of Alberta legislation, governs the Alberta program. The BCMB requires operating plans from either Collection System Agents (CSA) (or stewards, ABCRC and ABCC) and oversees the program as per legislation. The BCMB's role in the stewardship program involves approving operating agreements between CSAs and the ABDA, depot licensing and inspection functions, collecting depot financial data and setting handling commissions. The BCMB operates quality control mechanism including depot and CSA audits and is ultimately responsible for the 85% return rate. Neither the government nor the BCMB have direct involvement in stewardship program collection and recycling activities. The funding container collection responsibilities are managed by the ABCRC and ABCC. These agents also actively market and sell processed containers to generate revenue and sustain the stewardship program. The beverage industry, its retailers, and depots offset program costs with revenue from recycled material sales, unredeemed deposits and the CRF. The diagram below outlines the beverage container lifecycle and the dollar lifecycle in Alberta:

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Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

- The flow of non beer containers and deposits begins with the brand owners (manufacturer/distributor) that deliver beverage products to retailers. Upon delivery, retailers pay a \$0.10 or \$0.25 deposit per container along with an appropriate CRF to the brand owner. Brand owners remit these collected deposits and CRF to their appointed collection agent, the ABCRC or ABCC as appropriate.
- All liquor products are sold initially to the provincial regulator and wholesaler (AGLC). The deposit and CRF is applied to the price of refillable beer products sold to AGLC and subsequently sold to retailers for an "all in" price including the \$0.10 or \$0.25 deposit and CRF. All other liquor products have the \$0.10 or \$0.25 deposit and CRF added separately from the product price invoiced to retailers.
- The retailer includes the deposit value and any applicable CRF into the price of the product (except refillable beer) and recovers their deposit payment when customers purchase the beverage.
- Customers recover their deposits by returning empty containers to a bottle depot.
- Empty container collection occurs at bottle depots and registered beer retail stores where owners are required to refund consumers for their deposit. Agents collect and transport containers from depots/registered retailers and reimburse deposits paid to customers. A per container handling commission (depot revenue) is also paid by collection agents at the time of deposit reimbursement.
- Waste management operators that collect via blue box return empty containers to depots to generate revenue, since it's inclusion in the deposit program the return of dairy containers has been lucrative for these operators as well as beneficial for the return rate of the material.
- Collection agents transport empty containers to a facility for processing and sell processed containers in open markets. Materials may be recycled into new containers, articles of clothing, construction materials or other uses as appropriate.
- Revenue generated from the sale of processed containers, combined with unredeemed deposits and Container Recycling Fees are used to fund Alberta's beverage container stewardship program.

5.1.5. Program Scope

At time of writing Alberta's deposit program is the most inclusive in reviewed jurisdictions and accepts the following containers: plastic containers (PET, HDPE), aluminum, bi-metal, polycoat, glass, bag-in-a-box, juice pouches, and dairy containers.

Deposits in Alberta are based on container capacity, \$0.10 is collected for one litre or less, and \$0.25 for more than one litre.

5.1.6. Program Performance

Between 2004 and 2009, the total number of containers returned to depots increased by 42% from 1.03 to 1.78 billion. This increase is attributed to Alberta's strong interest in the program; 85% of Albertans report that they actively contribute to and support the program.

Performance is also measured by reducing the impact of beverage containers on the environment. The BCMB is unique in that it calculates and publicly reports measures such as barrels of oils saved (351,512 in 2008), greenhouse gas emissions avoided (128,530 metric tonnes in 2008) and cubic meters of landfill space saved (344,620 in 2008), each measure increasing over the previous year.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

5.2. BRITISH COLUMBIA

5.2.1. Legislation

The Beverage Container Stewardship Program Regulation governs BC's bottle deposit program. The legislation requires all ready-to-serve beverages be sold in recyclable or refillable containers. All are subject to a deposit with the exception of dairy and dairy substitutes. The following are significant characteristics of the program:

- The program is based on an extended producer responsibility model, which states that brand owners must file a stewardship plan in order to sell or distribute product in the province. The stewardship plan describes how the program will be operated and funded. Stewardship plans must be approved by the Ministry of Environment.
- Agents may be appointed by producers to carry out collection and recycling responsibilities. All non-alcoholic and most non-beer alcoholic brand owners have appointed Encorp Pacific as their agent, where as beer manufacturers have appointed Brewers Distributor Limited (BDL).
- BC's Ministry of Environment is responsible for overseeing any modifications made to recycling legislation, such as introducing new materials, and thus controls the future direction of the stewardship program. The Ministry has no direct involvement in the operations of either Encorp or BDL.

5.2.2. Program Scope

Containers in BC's program are all assigned a deposit based on original contents and volumetric size, and may be redeemed at all depots, retail locations, and Liquor Distribution Branch stores. The structure and range of accepted materials in BC's program align very closely with Alberta's program, albeit with a difference in the total number of container types accepted by each program. BC accepts approximately 35,000 SKU's; while Alberta's accepts approximately 85,000.

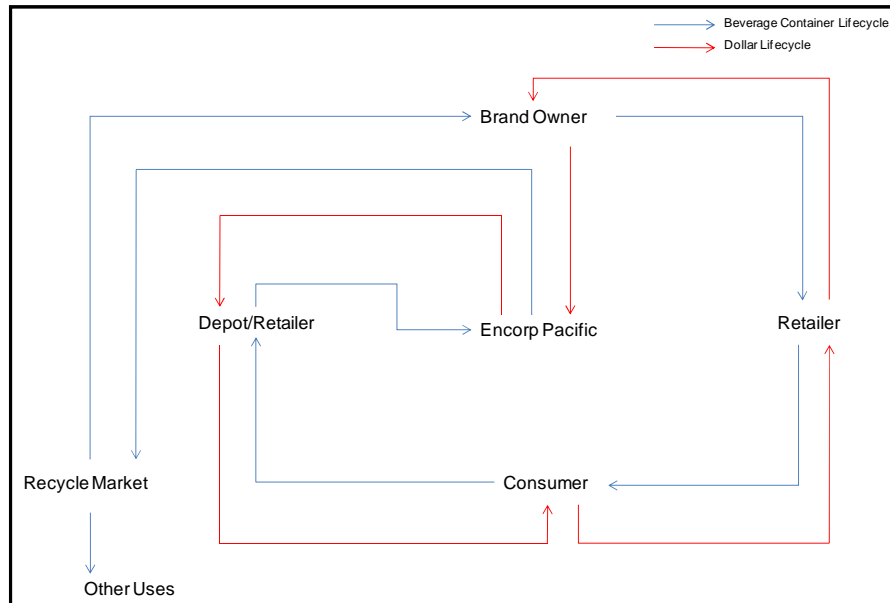
- BC's legislation mandates the stewardship program accepts all non-alcoholic and alcoholic ready-to-drink beverage containers including soda, water bottles, juice, sports drinks, spirits, and wine. It also accepts beer bottles and one-way can formats.
- Dairy and dairy substitute containers are not included in the legislation and are excluded from the deposit program. As deposits are not charged on these containers they do not contribute to return rate calculations although redemption centres accept dairy containers on a voluntary basis. At the time of writing BC reports no intention of introducing dairy and dairy substitute containers into their deposit program.
- Containers are assigned a deposit based on whether its contents are alcoholic or non-alcoholic, then further categorized by container volume. Non-alcoholic containers less than or equal to one litre have a deposit of \$0.05, and non-alcoholic containers greater than one litre have a \$0.20 deposit. Alcoholic beverages less than or equal to one litre have a deposit of \$0.10, and containers greater than one litre have a \$0.20 deposit.

5.2.3. Program Structure

BC is characterised by the exclusion of government in implementation and operation activities of the beverage container recycling program. Empty container collection and recycling responsibilities are delegated to industry that has assigned agents to undertake these activities on their behalf. Diagrams representing the beverage container lifecycle and the dollar life cycle for both Encorp Pacific and for BDL follow:

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Encorp Pacific

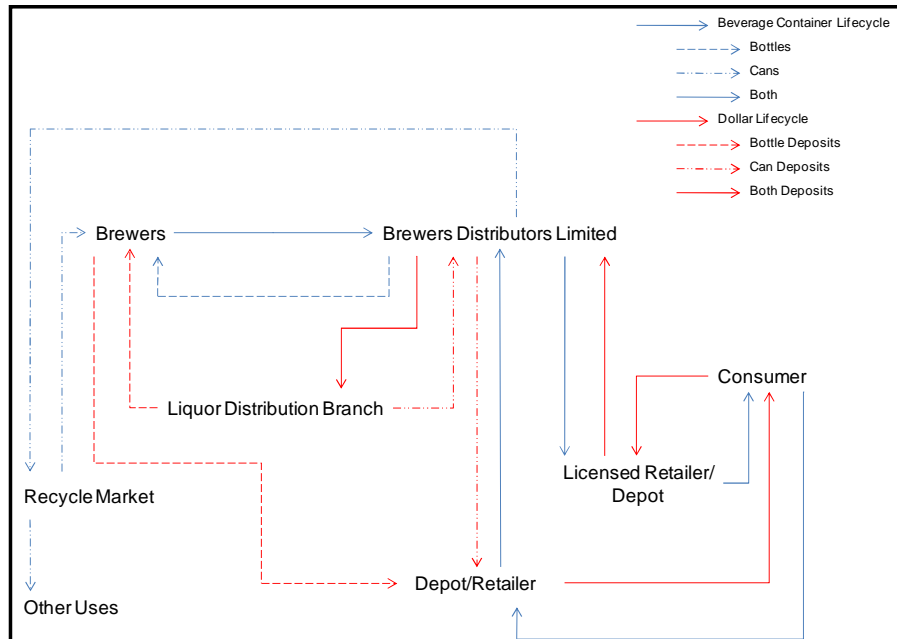


Encorp plays a central role in the lifecycle of most beverage containers and deposits within BC's stewardship program, with beer containers being their only exception. Encorp's process flow is described as follows:

- The flow of all non-alcoholic and most alcoholic beverage containers, along with corresponding deposits, begins with the brand owner. The brand owner receives a deposit and applicable Container Recycling Fee (CRF) from the retailer at the time of delivery and remits that amount to their appointed agent, Encorp Pacific.
- Retailers include the deposit and any applicable CRF into the price of beverage products and recover their payment when the customer makes a purchase.
- Customers are eligible to receive a deposit refund when empty beer and non-beer containers are returned to any of the province's approximately 170 depots or 250 retail locations, such as grocery stores, convenience stores, and gas stations (very few containers are returned to retailers – the vast majority of containers are collected at depots). Beer containers can be returned to an additional 1,200 plus locations.
- Encorp collects containers from redemption centres. Depot owners are remunerated a handling fee and a reimbursement for deposits they refunded customers upon exchange for the empty beverage container.
- Encorp transports empty containers to an interim processor, where they are recycled and the material shipped to an end buyer. As owners of the recycled material, Encorp is entitled to any profit and strive to maximize sales revenue and minimize recycling expenses.
- Unredeemed deposits are held by Encorp and are used to sustain the stewardship program. Unredeemed deposits are used to pay depot owners a handling fee which represents the depot's sole source of revenue. While Encorp provides pick-up services to grocery stores, they do not support such services for smaller retail locations such as convenience stores or gas stations. These retailers are required to have independent collection arrangements set up with depots or grocery stores.

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Brewers Distributor Limited



BDL, the beer brewers' agent in BC, is responsible for the distribution, collection, recycling and reuse of all beer containers sold in the province. BDL's process flow is described as follows:

- A licensed retailer (government and private liquor stores, restaurants, bars, etc.) place purchase orders for beer with a brewer and BDL prepares the shipment. Upon delivery of the order, BDL collects product sale revenue from the retailer, and charges the container deposit and any applicable CRF. BDL remits these to the Liquor Distribution Branch (LDB).
- Within two weeks BDL receives the deposits and CRF collected from the LDB. These are used to reimburse retailers and redemption centres for refunds to customers, as well as to pay depot operator handling fees. BDL only refunds deposits on beer cans; refunds for bottles are handled in a separate stream outside of BDL's operations.
- BDL collects beer cans directly from licensed retailers and contracted redemption centres, sorts and condenses containers that have not already been done at the depot level and ships the material to an end buyer.

Beer container refunds may be discounted depending on the receiving depot and whether that depot has an agreement with BDL. Liquor store return centres are required to provide a full deposit refund. Depots solely on contract with Encorp are not required to reimburse any amount to consumers for returned beer containers as Encorp will not pay the depot for non-Encorp containers. Where depots have agreements with both Encorp and BDL, or just with BDL, a full deposit refund must be reimbursed.

In cases where the depot is not required to accept or reimburse a beer deposit, depot operators may do so of their choosing to offer enhanced service their customers. The deposit refund amount is at the depot's discretion and may be equal to or less than the full deposit paid at point of purchase. For example, if a \$0.10 deposit is paid on a beer can and the depot owner is not on contract with BDL and chooses to offer a \$0.07 refund, the \$0.03 difference is retained by the depot. This additional revenue may be used to compensate depots for organizing delivery of beer containers to BDL.

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Variance in the flow of beer cans and refillable beer bottles exists:

- When an order is placed for beer bottles, BDL acts as the collection agent for deposits and remits funds to the LDB which then transfers deposits directly to brewers instead of BDL.
- Brewers internalize program costs; no recycling agent such as Encorp or BDL handles the flow of deposits. They are responsible for reimbursing retailers and depots for deposits and issue handling fees. However, BDL manages the collection and transportation of returned beer bottles to a brewery for reuse.

5.2.4. Program Comparison

BC's stewardship program is the most similar to Alberta's program. The structure, scope, and processes are directly comparable and many features, such as use of CRF and third party collection agents, exist in both jurisdictions. There are few operating differences that separate the programs, such as the slightly different regulatory structure (BC does not have an equivalent of the BCMB, as brandowners outsource management of the program to Encorp Pacific), depots operate within a more standardized operating model and there are lower deposit rates for some containers.

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5.3. SASKATCHEWAN

5.3.1. Legislation

The Saskatchewan Litter Control Act, enacted in 1973, governs the province's stewardship program. In 2009, the Act was merged into the larger Saskatchewan Environmental Management and Protection Act.

- The program is administered by SARCAN, the recycling division of the Saskatchewan Association of Rehabilitation Centres (SARC).
- SARCAN operates under an exclusive contract with the Government of Saskatchewan to operate the province's entire stewardship program.
- There are 71 return depots in Saskatchewan; 28 are operated directly by SARCAN and 43 are operated by SARCAN "franchise members". These depots operate on a "franchise" model but are independent businesses. They are contractually obligated to abide by all SARCAN policies and regulations, and they receive operational funding, promotional materials, float money, etc. in return.

5.3.2. Program Scope

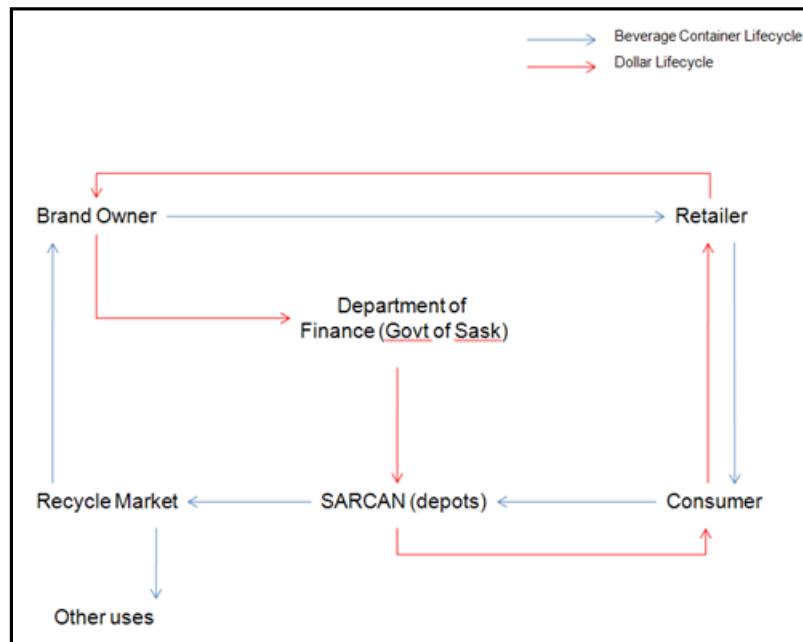
The program operates on a Delegated Administrative Organization model in which SARCAN is granted the sole responsibility for operating the stewardship program. SARCAN's primary objectives extend beyond recycling as the program was designed to provide maximum employment opportunities for disabled people. SARCAN's efforts to employ disabled people have received favourable recognition from the public and government, and those resources have become a significant asset for them.

- SARCAN accepts aluminum, bi-metal, PET, HDPE, polycoat, and glass in the deposit program. Refillable beer bottles are also accepted by SARCAN and they can be returned for a full refund at ten Brewer's Distributors Agent locations, or at any SARCAN depot or beer retailers for a discounted refund.
- Dairy containers are excluded from the legislation and are not included in SARCAN's deposit program. Dairy containers are accepted at SARCAN depots on a voluntary basis although customers do not receive a refund for any dairy container they return.
- Containers are assigned a deposit based on the container material type, and are further categorized based on container volume. Classification categories include metal cans and plastic, non-refillable glass, polycoat containers, and aseptic containers. Deposits in Saskatchewan range from a minimum of \$0.05 for all polycoat and aseptic containers up to a maximum of \$0.40 for a non-refillable glass container over 1 litre.
- As there is no environmental handling charge paid at point of purchase on beer bottles, SARCAN reimburses partial refunds to generate revenue to cover refillable beer bottle processing costs. Consumers are charged a \$0.10 deposit and are refunded \$0.04. Collection, handling and transportation costs associated with these containers are paid for using the \$0.06 difference in deposit paid and refund reimbursed amounts.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

5.3.3. Program Structure

SARCAN is the sole organization active in Saskatchewan's stewardship program. It is a vertically integrated system and every aspect of the program's operations is controlled by a direct SARCAN employee or a franchise member. SARCAN's process flow is described as follows:



- Brand owners (producer, distributor) are required to remit the deposit value and an Environmental Handling Charge (EHC) to the Government of Saskatchewan for their product upon entry into the province. These funds are placed into the general revenue fund.
- When purchasing product from brand owners, retailers include the deposit and the EHC in their purchase price; these are recovered by the retailer when customers make a purchase.
- The customer is eligible to receive a full refund on their \$0.05, \$0.10, \$0.20 or \$0.40 deposit when the container is returned to a SARCAN depot. However, the EHC is not refunded as these funds finance the program.
- SARCAN collects returned containers from depots and invoices the Government of Saskatchewan monthly. SARCAN is compensated within 10 days of the invoice for deposits paid to customers. Unredeemed deposits remain in the general revenue fund and are not remitted to SARCAN.
- SARCAN processes returned containers and markets recycled material to buyers. Revenue from these sales accounts for approximately 25% of the annual operating budget, with the majority of revenue coming from aluminum and PET materials.

5.3.4. Program Comparison

The Saskatchewan and Alberta programs are very similar in legislation, governance and operations. Both are administered by an exclusive entity and both use depots to collect the majority of empty containers. The two major differences are scale and fundamental objectives. Alberta's program is significantly larger due to having over three times the population in a comparably sized geographic area. Saskatchewan's program is based on two driving philosophies – stewardship of the environment (like all comparable programs), and providing employment opportunities for disabled people. Saskatchewan is the only jurisdiction with dual operating premise.

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5.4. NEW BRUNSWICK

5.4.1. Legislation

Enacted in 1992, the New Brunswick is the Beverage Containers Act governs the province's stewardship program. New Brunswick's system was the original model for the "half-back" approach in Canada. The program's Governmental Administrative Agency governance structure and legislation require distributors to register with the Department of Environment and submit a stewardship plan. The stewardship plan may assign an agent to fulfill stewardship requirements on the distributor's behalf.

- The collective distributors of soft drink beverages have engaged Encorp Atlantic to fulfil collection and recycling duties. Encorp manages approximately 50% of the containers that flow through New Brunswick's system.
- Distributors of alcoholic beverages have contracted Alcool New Brunswick Liquor Commission (Alcool) to perform collection and recycling duties on their behalf.
- Alcool subcontracts Rayan Investments to undertake collection activities and recycling processes of non-refillable liquor containers, and leverage breweries to collect and reuse refillable beer containers.
- The Beverage Containers Act states that customers are eligible to receive 50% of their bottle deposit upon return of an empty container. The other 50% is split equally between agents of the beverage industry to operate the program, and the Environmental Trust Fund which provides funding for projects that promote the sustainability and beautification of New Brunswick's environment.

5.4.2. Program Scope

All beverage containers included in the Beverage Containers Act are subject to a deposit. The collection, recycling and reuse of all deposit containers in New Brunswick are performed by three entities: Encorp Atlantic, Rayan Investments and The Brewers Association of Canada.

- All ready to consume beverage products excluding dairy, dairy substitutes, meal replacements and unpasteurized apple cider, are included in the program and are subject to a deposit. New Brunswick's legislation includes and deems aluminum, bi-metal, PET, HDPE, glass and polycoat eligible for a deposit and refund upon return.
- All refillable beverage containers are deposit eligible however; consumers receive a full (100%) refund when the containers are redeemed. Consumers who recycle one-way containers receive a half-back deposit.
- Containers are assigned a deposit based on the alcoholic or non-alcoholic content, and are further categorized based on container volume. Alcoholic beverages are classified once more into refillable and non refillable groups, with refillable and one-way containers having separate deposit levels. Deposits charged in New Brunswick are either \$0.10 or \$0.20 depending on the container type.

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5.4.3. Program Structure

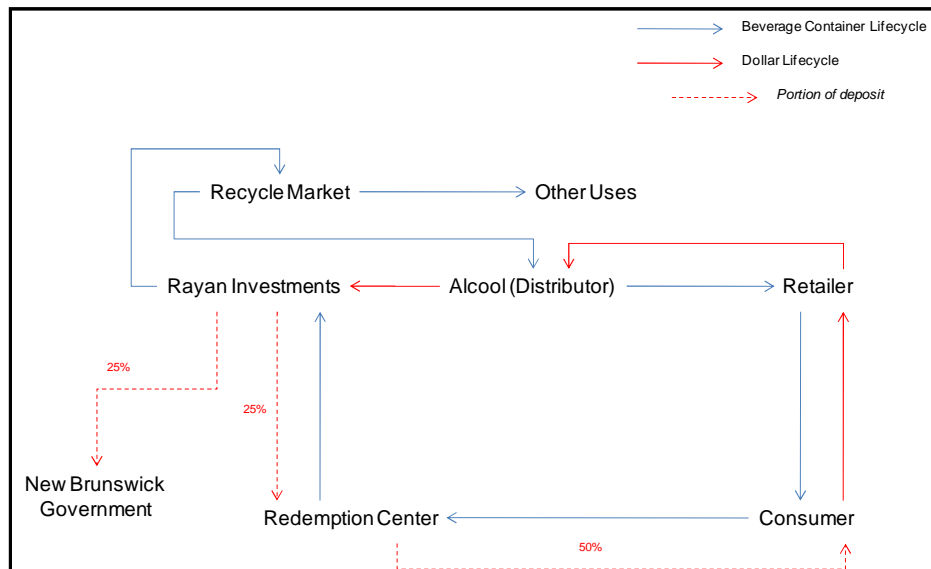
Encorp Atlantic

Encorp Atlantic acts as the agent for all non-alcoholic beverage bottlers in New Brunswick. They manage the collection, transportation and recycling duties and reimburse depots for deposits paid to consumers. The Encorp process flow is diagrammed below:

- Brandowners initiate the flow of containers and charge retailers the full deposit value upon delivery of an order.
- Distributors remit the full deposit value collected from retailers to Encorp Atlantic.
- Retailers add the full deposit value to a product's selling price and are reimbursed the deposit when customers purchase a beverage.
- Customers are eligible to receive half their deposit upon return of empty containers to redemption centres.
- Encorp collects empty containers from redemption centres and reimburses operators the deposit paid to consumers. The remaining portion of the full deposit value is remitted to the New Brunswick Government for redistribution to environmental programs.
- Encorp transports and processes used containers to sell the materials to end markets.

ALCOOL

Alcool, representing alcoholic brandowners, is the agent responsible for stewardship activities related to alcoholic beverage containers in New Brunswick. Rayan Investments is subcontracted to perform collection and recycling activities. The Alcool process flow is described as follows:



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- The distributor (Alcool) charges a full deposit for each beverage container delivered to retailers. Retailers pay the full deposit upon receiving the product. Alcool is required to remit the full deposit to an agent that has been approved by the Minister of the Environment. This agent is Rayan Investments.
- The full deposit is included in the beverage price and retailers are refunded the full deposit remitted to Alcool when consumers purchase a ready-to-serve beverage.
- Consumers return used containers to a redemption centre where they receive a refund of half the deposit they paid when making the beverage purchase.
- Like Encorp, Rayan remits half the deposit collected from Alcool to redemption depots as compensation for refunds paid to customers. Rayan is required to remit a portion of the deposit to the Environmental Trust Fund, pay for HST and operating costs. Any remaining amounts are Rayan revenue.
- Containers collected by depots are recycled. Revenues generated by the sale of processed containers, unredeemed deposits and non-refunded half-back deposit amounts are directed to fund the stewardship program.

5.4.4. Program Comparison

New Brunswick's program is built on a different stewardship model compared to Alberta's program. Similarities exist in legislation, structure and operations. The brandowners in each program outsource to third party organizations, and independently owned depots are operated in a similar fashion. The major difference is geography given New Brunswick is much smaller than Alberta. New Brunswick's use of a half back model is an alternative method of funding the program, where half the deposit is used to fund economic shortfalls of the program versus adding a consumer fee (CRF) that Alberta deploys. The result is a lower cost to the consumer, but less financial incentive to recycle their containers.

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5.5. CALIFORNIA

5.5.1. Legislation

The California Beverage Container Recycling and Litter Reduction Act govern the beverage container stewardship program in California. The stated goal of the legislation is to reduce litter by ensuring that the recycling process for every container type is easy and accessible for all consumers.

The following are significant characteristics of the program:

- A processing fee is charged to manufacturers to mitigate financial and operational costs. The processing fee, similar to the Container Recycling Fee charged to consumers in BC and Alberta, is imposed to cover the difference between revenues from the sale of processed containers and cost of recycling those materials. No other state has a system that places this responsibility on the manufacturer.
- California has designated "Convenience Zones" which are half mile radius zones around retail grocery stores where a recycling centre must be located. Zones are intended to make recycling convenient by providing customers with easily accessible locations for container returns. This essentially places depots in retail areas versus industrial or commercial areas.

5.5.2. Program Scope

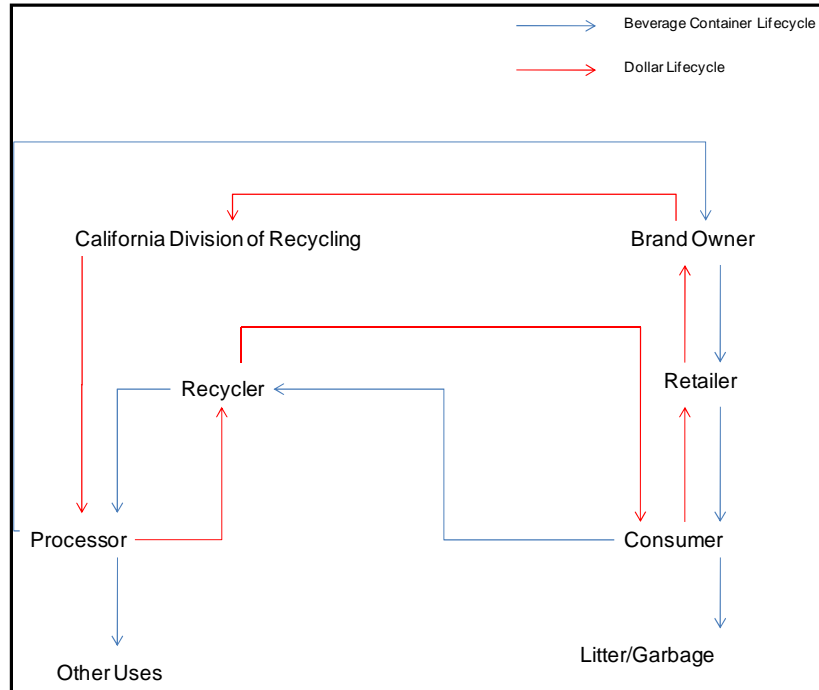
California's program is structured very much like Alberta's program. The stewardship program is financed entirely through unredeemed deposits and brandowner's fees; government funds do not subsidize the program.

- California's stewardship program accepts aluminum, all plastic, glass and bi-metal materials. Containers made of these materials hold drinks such as beer, soda, water juice, coffee and tea drinks, sport drinks, and wine coolers.
- Vegetable juice containers under a certain size and refillable glass bottles are excluded from the deposit program and have no deposit or refund value. Other vegetable juice containers are eligible for return on a voluntary basis with no deposit-refund.
- Dairy containers are not included in California's stewardship legislation and do not have any deposit or refund value. Dairy containers can be returned on a voluntary basis only.
- Deposit levels for containers in California are similar to those in BC. Containers are categorized based on container volume. Sorted containers less than 24 ounces have a deposit of \$0.05 USD, and containers equal to or greater than 24 ounces have a \$0.10 USD deposit.

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5.5.3. Program Structure

Oversight responsibilities and managing the collection and disbursement of deposits are the focus of The California Division of Recycling (Division); it has no direct role in collection or processing activities. The following diagram depicts the container and dollar lifecycle in this system:



The overall flow is described as follows:

- Brand owners (distributors) initiate the beverage container system and deposits. Upon entry into California's marketplace, brand owners pay a deposit (termed California Redemption Value or CRV) to the Division for each container they sell to retailers.
- Brand owners deliver beverage products to retailers and recover their deposit by adding that amount to the retailer's invoice.
- Deposits paid by retailers are reimbursed when customers purchase a beverage and are charged the deposit.
- Customer return eligible containers to one of approximately 2,200 recycling centres located throughout the state and receive a full deposit refund.
- Recycling centres are reimbursed refunds disbursed to customers when collected containers are sold to materials processors.
- Materials processors are responsible to recycle collected containers. The Division reimburses processors for amounts paid to the recycler for the containers.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

5.5.4. Program Comparison

California's program is also very similar to Alberta's program in terms of legislation, structure and operations. California is roughly the same geographic size as Alberta with approximately ten times the population, allowing the state implement some creative initiatives. Significant strategic and operational differences exist comparing the California and Alberta programs. The major difference from the Alberta program is that the State is allowed to escheat the fund of unredeemed deposits, and the current escheatment of \$99 million presently in conjunction with the economic downturn has created a fiscal stress on the program.

The brandowners in California pay a processing fee on a declining sliding scale based upon recoveries designed to encourage brandowners to design containers easier to re-use or recycle whereas in Alberta, all additional fees are charged to the consumer. California deposit levels are lower despite being increased twice in the last five years. The California program subsidizes local processors and through this subsidization is developing a local end market for plastic. California regulations allow incineration of recycled material if no end markets exist though this has not been done in years. California funds both broad environmental initiatives and academic research into recycling initiatives such as "bio bottles" and alternative materials for containers

California locates their collection depots mainly in retail areas close to grocery retailers, and deploys almost a hybrid of a return to retail model. Collection depots, independent business very similar to the Alberta depot model, are paid a bonus for increasing their volumes (and hopefully increasing State-wide recoveries) and for increasing their quality (defined as reducing contaminants) optimizing end market potential. In Alberta, there is one processor serving 216 collection depots. In California, there are 173 processors serving approximately 2,200 depots. Different from Alberta, RVMs are deployed at many of the collection sites, as is redemption by weight option. One of the key challenges in the redemption by weight approach in California continues to be contaminants (rocks, wood, sand, garbage, etc) in the recycling stream as well as elements of fraud.

5.6. CONNECTICUT

5.6.1. Legislation

Connecticut's Beverage Container Deposit and Redemption Law forms the bottle bill program that state. Originally intended to reduce litter and promote recycling within the state, the legislation was enacted in 1978 and came into effect on January 1, 1980.

- Between the months of November 2008 and February 2009, the Connecticut General Assembly passed three laws to expand the scope of the bottle bill legislation and modify some of the requirements on members of the beverage industry.
 - First, Public Act 08-01 requires the "deposit initiator" (the first entity to be paid a deposit for a beverage container sold in Connecticut) for every beverage included in Connecticut's program to open a bank account to set aside deposits collected.
 - Second, Public Act 09-01 states any unredeemed deposits remaining in an initiator's bank account after the reporting period must be remitted to the Government of Connecticut.
 - Third, Public Act 09-02 expands the coverage of the program to include non-carbonated beverage containers such as water, enhanced water, flavoured water, and other related products.
- Connecticut uses a range of collection methods including redemption centres, retailers, and Reverse Vending Machines (RVM) that are located at large retail chains. Customers can use any method to return containers and receive a deposit refund.
- Redemption centres in the state are privately owned and operated. The Department of Environmental Protection does not require redemption centres to adhere to standard corporate dress (e.g. colours, signage, logos, etc.) but the redemption centres are expected to pass inspection and ensure clean and honest operations. The Department will conduct a redemption centre audit when a complaint is received about its operations.
- Dealers such as grocers or other retailers may enter contractual agreements with redemption centres to collect/deliver returned containers from dealers.

5.6.2. Program Scope

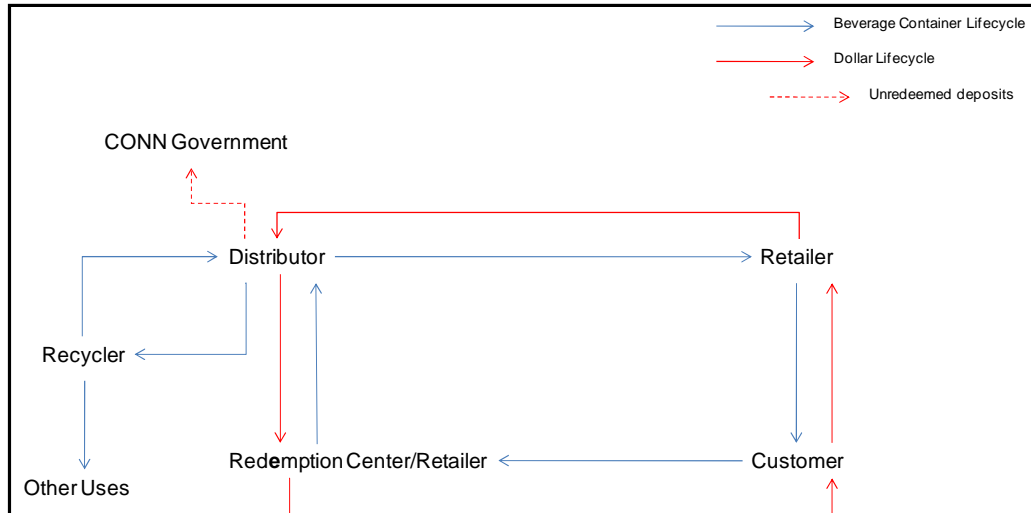
Connecticut's program is supported by state funding, but the overall collection, transport, and recycling operations are managed directly by industry and is therefore considered a Governmental Administrative Agency model. Until recently government involvement in stewardship processes was negligible. However laws passed in 2008 entitled the state government to escheat, or collect unredeemed deposits from deposit initiators.

- Connecticut's program includes any individual, separate, sealed glass, metal or plastic bottle, can, jar or carton containing a beverage. As of 2008, non-carbonated water beverages are also accepted. Thus, any soda, water, mineral water, certain juice, and beer container is accepted for a refund. The program exempts any container greater than 3L, HDPE containers, and containers for juices, coffee, and iced teas.
- Depots will only accept containers outlined in applicable bottle bill legislation. All containers are assigned a \$0.05 USD deposit value in Connecticut.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

5.6.3. Program Structure

Connecticut does not have an independent entity to administer the stewardship program. The program is operated by brandowners, referred to as deposit initiators. The process is described as follows:



- Distributors deliver beverage products to retailers and charge a \$0.05 USD deposit per container as part of the invoice.
- Retailer mark up the product selling price to include the deposit amount. Customers are charged the deposit at time of purchase thereby refunding the retailer.
- Customers return eligible used containers to a redemption centre or retail location for a deposit refund.
- Redemption centres/retailers return collected containers to product distributors. Distributors reimburse redemption centres/retailers the deposits reimbursed to customers at the time of container returns.
- The State is allowed by law to escheat. An amendment to the bottle bill recently introduced directs distributors to remit any unredeemed deposits collected from retailers to the Government of Connecticut. These deposits are placed in the General Revenue Fund.

5.6.4. Program Comparison

Connecticut's program is similar to Alberta's program in design except for the provision for the State government to escheat unredeemed deposits. Alberta is significantly larger than Connecticut but has approximately the same population, significantly changing the program operational logistics and dynamics. Certain aspects of Connecticut's program are directly comparable to Alberta's program, such as the similar structure and operations of redemption depots. The Connecticut program scope is much narrower than Alberta's and their deposit levels are lower.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

5.7. MICHIGAN

5.7.1. Legislation

Michigan's Beverage Container Act, enacted on November 2, 1976 governs the bottle deposit program in that state. The legislation was introduced to reduce roadside litter on public highways, clean up the environment, and conserve energy and natural resources. The program has enjoyed an overall redemption rate of well over 95% since inception.

- Similar to other programs, brandowners in Michigan are assigned responsibility to undertake stewardship activities.
- Beer and soft drink distributors have contracted their collection duties to the Used Beverage Container Recovery (UBCR), a joint venture company between Tomra, an RVM company and Schupan Recycling, a recycling company.

5.7.2. Program Scope

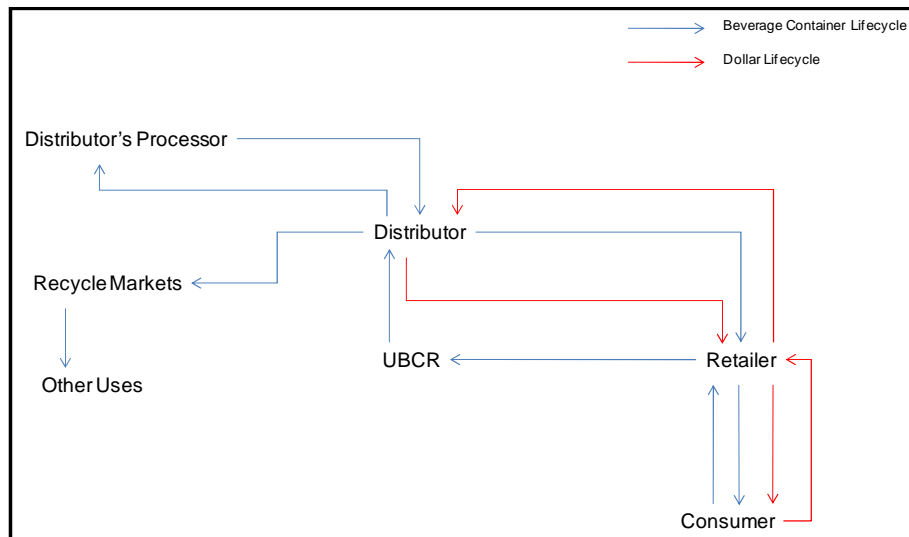
Michigan's stewardship program is organized as a Producer Responsibility Organization model that is fully funded by distributors and retailers. Distributors are required to compensate retailers for bottle deposit refunds they've paid to customers upon container returns. Distributor program costs are approximately \$0.02-0.03 per container. Retailers are responsible to acquire RVMs and finance their purchase, at \$15,000 to \$20,000 each RVMs represent a significant cost of the program. RVMs reduce manual sorting and counting labour.

- Deposit eligible containers include any bottle for carbonated beverages (soft drinks, energy drinks, certain flavoured waters, beer, wine coolers, etc.) and exclude any dairy or non-carbonated beverages (bottled water, certain fruit juices, etc.).
- All containers included in the stewardship program have a \$0.10 USD deposit.
- Dairy containers are excluded from the deposit program, while they can be returned to retail locations on a voluntary basis.

5.7.3. Program Structure

Michigan's program is delegated to brandowners by legislation with no direct input from the state government and program funding is also the responsibility of brandowners. Collection and transportation of used containers is outsourced to UBCR. UBCR serves more than 90% of distributors in Michigan and offers accounting and reporting services for distributors. The process flow below depicts the beverage container lifecycle and the dollar lifecycle in Michigan.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers



- Distributors initiate the flow of containers by delivering beverage product to retailers. Upon receiving the product, retailers remit to the distributor a \$0.10 USD deposit for each container.
- Deposits are added to the retail price of containers and retailers recover their deposit when customers purchase a beverage.
- Consumers return eligible empty container to retail locations, usually via RVMs. Retailers refund deposits to consumers in exchange for the RVM receipt.
- Not all retail locations are eligible for UBCR's services. UBCR will only collect containers from stores that meet the following requirements: 1) the retail location must be equipped with a RVM, 2) the retail location must collect at least 750,000 bottles per year, and 3) the retail location must be within certain geographical boundaries. The pick-up programs are offered at no additional charge retailers saving warehouse space as well as hours of manual labour are reduced.
- Retailers are refunded deposits paid to consumers by distributors when UBCR collects containers from eligible retail locations. Empty containers are transported to designated recycling areas for processing.
- Collected containers are returned to distributors that have the choice to sell unprocessed recyclable materials to Schupan Recycling, or undertake processing and recycling duties independently. Revenues earned from the sale of processed containers are retained by distributors.

5.7.4. Program Comparison

With the exception of legislated escheatment, Michigan's program is similar to Alberta's program in design. Michigan is approximately half the size of Alberta's with three times the population. Michigan's program scope is much narrower than Alberta's, focusing on beer and non-beer aluminum, plastic and glass. Aside from the narrower scope, the major differences are that return to retail approach to depots is deployed, and the majority of depots operate with RVMs. Michigan's recovery is reported at 96.9%. Only Germany with a return rate of over 100% for some container categories matches this result, with best of all other jurisdictions achieving recoveries in the high 80 percent range. Michigan is bordered by Indiana, Ohio and Ontario, and relatively close to Wisconsin and Illinois – all non deposit jurisdictions. There appear to be containers from other jurisdictions being redeemed in Michigan but this factor alone likely would not account for Michigan recoveries being so much higher than any other jurisdiction. Given this, Michigan may be considered an anomaly and an outlier.

5.8. NEW YORK

Officials with New York declined to participate.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

5.9. DENMARK

5.9.1. Legislation

The Danish stewardship program is governed by the Statutory Order on Packaging for Beer and Soft Drinks #124 and a subsequent amendment by Statutory Order #540 introduced in 1989 and 1991 respectively. The Ministry of the Environment has made several changes to the stewardship program with most recent program scope expansion in 2002 to include metal cans.

- Under Danish law, all beverages in one-way packaging must be marked with a deposit label that serve to identify material type, relevant deposit level, and help prevent fraud by electronic scanning in the RVM.
- The Danish Environmental Protection Agency has granted Dansk Retursystem A/S the exclusive right to operate the Danish deposit and return system. Daily tasks and functions are regulated under the terms set in relevant Statutory Orders. Tasks include, nationwide recycling, settling deposits, paying handling fees, and developing technical and logistical solutions for program efficiency.
- Dansk Retursystem A/S does not have any formal powers, and may only identify mistakes and omissions. On occasions where disputes with stores, importers or producers are unresolved, they can forward cases to the Danish Environmental Protection Agency for adjudication.
- Unredeemed deposits are used by Dansk Retursystem to pay for the processing and recycling of products excluded in the country's deposit program. Remaining unredeemed deposits fund improvements to customer service, environmental community projects and educational initiatives.

5.9.2. Program Scope

Denmark has pioneered the handling of one-way packaging by unifying container collection processes and deposit refund processes. These are exclusively managed by Dansk Retursystem under a Delegated Administrative Organization Model.

- Dansk Retursystem accepts a wide range of container materials: aluminum, bi-metal, one-way and refillable PET, HDPE, glass, and polycoat. Refillable glass and plastic containers are classified based on their size, with each size having a different deposit value. One-way containers are separated into three different categories: Type A, Type B, and Type C. The types are based on the material of the container and the size.
- Deposit rates vary according to the container's material and volume with a range from 1.00 DKK to a maximum of 3.00 DKK (\$0.19 to \$0.57 CDN).

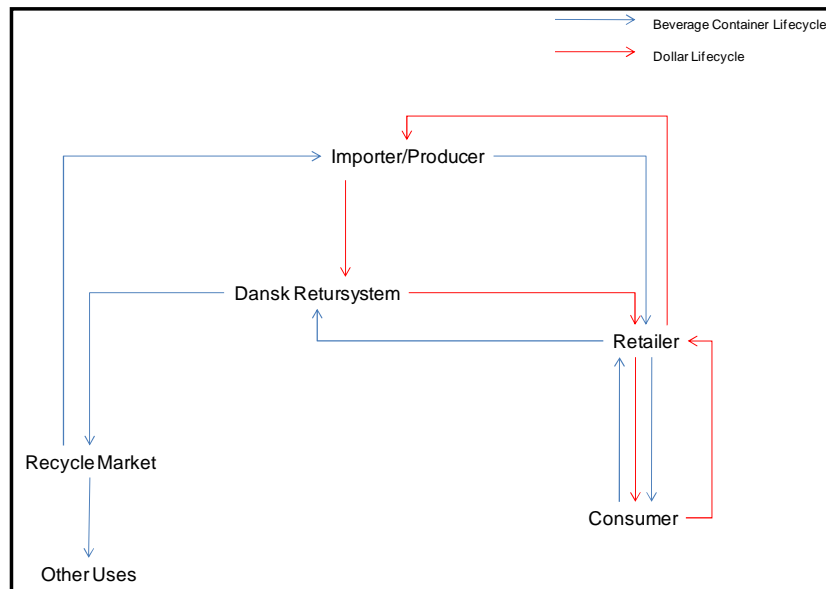
5.9.3. Program Structure

Denmark incorporates compaction and sorting technology at many stages in the recycling program's operations. Consumers are educated to return containers in their original form to ensure barcodes are legible and identifiable by collection machines.

- By the end of 2008, Dansk Retursystem had installed 1,450 compactors in the country's largest grocery stores. These compactors flatten cans at a ratio of 1:6 and plastic bottles at a 1:3, which increases the capacity of transport vehicles and reduces the environmental impact of container transportation.
- Anker Andersen collection technology, currently being investigated by Alberta, used in Denmark features infrared technology which electronically scans special bar codes on labels to facilitate material sorting and enhance count accuracy.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

The diagram below depicts the beverage container lifecycle and the dollar lifecycle in Denmark's stewardship program:



- Beverage importers/producers initiate the process by collecting deposits upon delivery of beverage products to retailers.
- Importer/Producers remit collected deposits to Dansk Retursystem.
- Retailers add the deposit amount to the selling price of the product and recover deposits paid to the importer/producer when customers purchase a deposit eligible beverage.
- Customers collect their deposit refund when containers are returned to a retail location.
- Dansk Retursystem collects empty containers from retail locations and reimburses deposits paid by retailers to customers.
- Dansk Retursystem transports containers to their processing facilities and sells processed containers to end markets.

5.9.4. Program Comparison

The Denmark program is actually quite similar to Alberta's program in design and structure. The legislation is different, but the European regulatory environment is significantly different thus comparison is difficult. The same difficulty applies to the financial model, although the program is funded much like Alberta through unredeemed deposits and consumer fees. The structure of brandowner fees is unknown. Denmark's program scope is narrower than Alberta's and focuses on beer and non-beer aluminum, plastic and glass; and tend to have more refillable containers. The major structural difference is that Denmark, like most European countries, deploys a return to retail model enhanced by the deployment of high speed sorting and compaction technology. Incineration of recycled materials for energy is viewed as an acceptable re-use, and the market for certain materials for incineration is quite strong.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

5.10. GERMANY

5.10.1. Legislation

The Ordinance on the Avoidance of Packaging Waste, the “Dosenpfand-Regelung” legislation governs the bottle deposit program in Germany. It was enacted in 1993, but deposits on beverage containers were added to the law in 2003. The legislation sets targets for recovery rates of recyclable and refillable containers, and places the responsibility on beverage manufacturers to collect and process the containers they sell.

- While one-way containers have a mandatory deposit imposed on them by the Packaging Ordinance, refillable containers have a voluntary deposit on them through the manufacturer. The purpose of the deposits on refillable containers is to encourage consumers to return these containers along with recyclable containers.

5.10.2. Program Scope

In 2003, legislation was implemented to include deposits on the beverage containers sold in Germany. Cans, glass and plastic bottles were all imposed a deposit of 0.25 EUR, with a few exceptions. First, Refillable glass bottles up to and including 500ml have a deposit of 0.08 EUR, and refillable PET and glass bottles over 500ml have a deposit of 0.15 EUR.

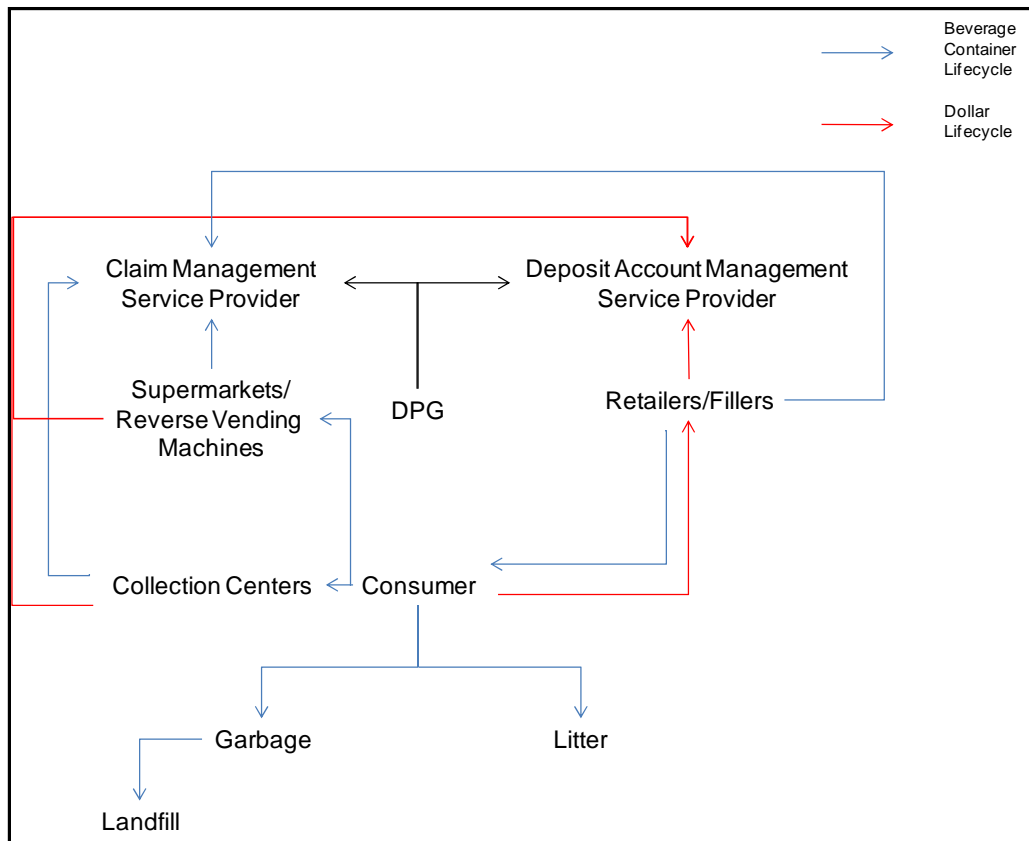
5.10.3. Program Structure

Germany's program differs from Scandinavian nations in that no single enterprise has the exclusive right to collect and recycle used beverage containers. Brandowners have the option of delegating their collection and deposit refunding responsibilities to nine third party stewardship organizations. These entities manage all deposit accounts and collection duties for beverage retailers/producers.

- Duales System Deutschland GmbH is the most popular third party stewardship organization in Germany. They are registered with the Deutsche Pfandsystem GmbH (DPG), an organization financed by member organization fees such as retail stores, collection centres and manufacturers of RVM's. DPG's purpose is to provide the legal and organizational framework for managing the flow of deposits through the German system.
- Duales System operates the Green Dot (Der Grüne Punkt) initiative. Beverage producers pay to label their products with a green dot to indicate their inclusion in the collection and recycling activities managed by Duales System.

Germany's stewardship program is based on an *extended producer responsibility* model; also known as a Product Stewardship Germany's program is an internal cost recovery system. The costs of collecting and processing the used containers are built into the price of the product. The following diagram depicts the German beverage container lifecycle and the dollar lifecycle.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers



5.10.4. Program Comparison

The German program is similar to Alberta's program in design, but differs in structure given there are multiple brandowner recyclers operating within the system. Again, legislation is different, but the European regulatory environment is significantly different thus comparison is difficult. The same difficulty applies to the financial model, although the program is funded much like Alberta through unredeemed deposits and consumer fees. The actual structure of consumer and brandowner fees is unknown. Germany's program scope is narrower than Alberta's and focuses on beer and non-beer aluminum, plastic and glass; and tends to have more refillable containers.

The major structural difference is that Germany, like most European countries, deploys a return to retail model enhanced by the deployment of widely deployed high speed sorting and compaction technology. Germany's major issue is that it borders on countries without deposit programs, thus a significant volume of containers from these bordering jurisdictions are brought into the German program, inflating recoveries over 100% and presenting a financial risk to the program. Incineration of recycled materials for energy is viewed as an acceptable re-use, and the market for certain materials for incineration is quite strong.

5.11. NORWAY

5.11.1. Legislation

Originally enacted in 1974, The Product Control Act was designed to limit pollution and waste by encouraging the use of refillable containers. The act placed an excise tax ("product charge") on all packaging, including non-refillable beverage containers. In 1993 new regulations were adopted where producers could benefit from lower product charges if they produced higher rates of return in their materials. The charges on materials would decrease as the return rates increased, and the charge would be dropped altogether if the return rate reached 95% or greater. Thus, if return rates reached 92%, there would be a 92% decrease in the product charge. In 1994 the act was again revised to include an additional charge on non-refillable beverage containers which was not dependent on return rates.

- All manufacturers and importers of non-refillable cans and bottles have the option of enrolling their products with Norsk Resirk. Norsk Resirk is a non-profit system founded in 1999 and co-owned by industry and trade organizations that collects and recycles non-refillable plastic containers in Norway. Those that enrol with Norsk Resirk benefit from a reduced product charge due to Norsk Resirks' consistently high rates of return. The official rules are stated as follows:
 - If the return and recycling rate of the used beverage containers is below 25%, the producer or importer will receive no reduction in the environmental fee.
 - If the return and recycling rate is above 95%, the environmental fee is reduced to zero.
 - If the return and recycling rate is between 25% and 95%, the environmental fee is reduced linearly.

5.11.2. Program Scope

Norway's deposit program accepts all non-alcoholic and alcoholic one-way beverage containers, as well as refillable containers. The beverages that are included are: beer, carbonated beverages, wine liquor, and non-carbonated beverages. Vegetable juice containers and water bottles are excluded from Norway's deposit program.

- Containers are assigned a refundable deposit based on their volumetric size. Containers with volume less than 500ml have a deposit value of 0.94 NOK, while containers over 500ml have a value of 2.35 NOK.
- Refillable glass containers are included in the deposit legislation but are not part of Norsk Resirk's scope of operations. Glass containers are managed by Rentpack. Rentpack owns a range of standard refillable packaging which they rent to brewers and beverage producers. Collection and recycling activities for these containers is the responsibility of Rentpack.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

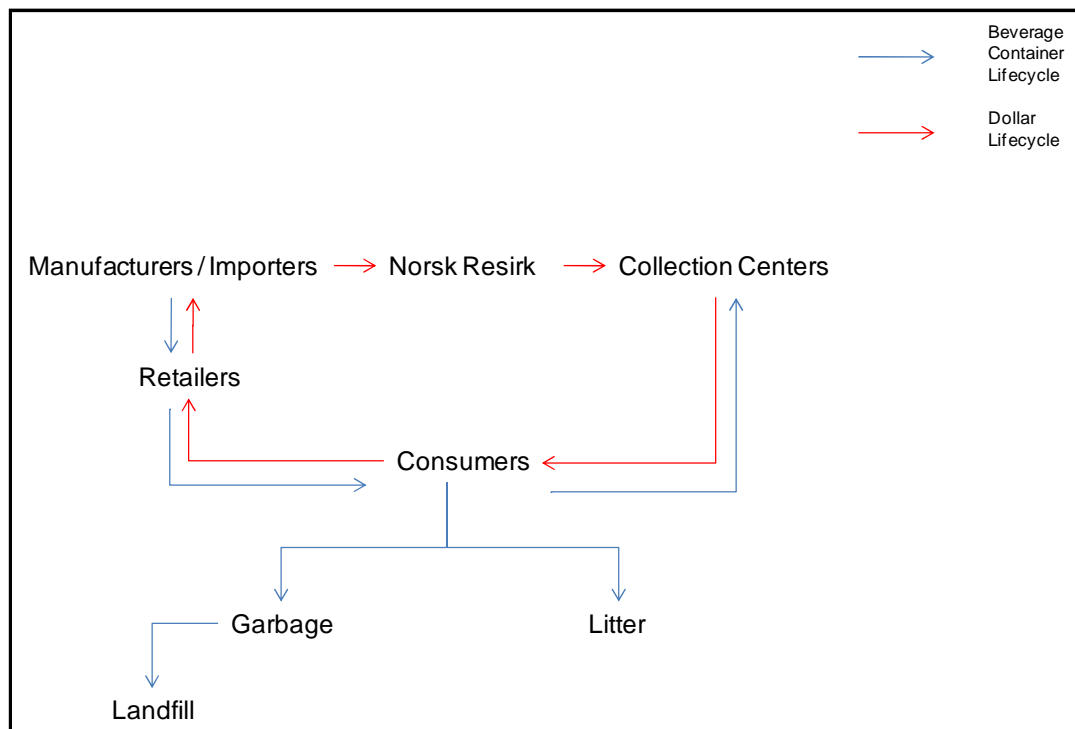
5.11.3. Program Structure

The most prominent characteristic of Norway's program is the product charge which is placed on non-refillable containers that decreases in proportion to increases in the material's return rates; a higher rate of return results in a lower product charge for that particular material.

A levy of 1 NOK on recyclable containers (as opposed to refillable containers) has been at issue. The levy was deemed discriminatory and in breach of the European Area Agreement by the European Surveillance Authority in 2008. Industry claims the levy distorts the competitive landscape for producers who utilize recyclable packaging. Norway's claim that the levy is an environment tax is currently under review by the European Free Trade Association (EFTA) court.

- Norsk Resirk's revenues derive from an administrative fee placed on each beverage container manufacturers and importers sell, deposit surpluses (unredeemed deposits) and sales of collected packaging materials.
- Products that are included in the deposit system display Norsk Resirk's distinctive deposit symbol on their labels. The symbol assures the consumer that their deposit will be refunded upon return of the empty packaging, and allows the container to be identified by Norsk Resirk staff or by RVMs.

Norsk Resirk is Norway's most utilized stewardship organization. Producers enrol products with the organization and benefit from Norsk's ability to drive high return rates therefore lowering recycling levy payments. A diagram depicting the beverage container lifecycle and dollar lifecycle for Norsk Resirk follows:



Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

Attributes of the Norwegian program include:

- All producers and beverage importers are eligible to register their products for inclusion in the Norsk Resirk deposit scheme. Norsk Resirk imposes an administrative fee on each container the producer/importer sells as part of the deposit program.
- The flow begins when those organizations distribute their containers to the retailers. Producers/Importers charge retailers the deposit-refund upon delivery.
- The retailer includes the deposit amount in the selling price of the product. Retailers are reimbursed deposit-refunds they paid to the producer when consumers purchase a beverage.
- Consumers receive a refund on used containers when returning them to a retail location via RVM.
- Norsk Resirk reimburses retailers for deposits they've refunded to customers.
- Returned containers are collected and transported by the beverage wholesalers when delivering new beverage containers to the retailers. Empty containers are returned to Norsk Resirk facilities or regional partners where they are counted, processed and prepared for recycling.
- Processed material is transported to recyclers for conversion into new products.

5.11.4. Program Comparison

The Norwegian program is similar to Alberta's program in design and structure. The legislation is different, but the European regulatory environment is significantly different thus comparison is difficult. The same difficulty applies to the financial model, although the program is funded much like Alberta though unredeemed deposits, consumer fees and brandowner fees. Brandowner fees are based on an inverse sliding scale based on recoveries, where fees start to reduce as a percentage when recoveries reach 25% and reduce to nil when recoveries reach 95%.

Like all European programs, the scope is narrower than Alberta's and focuses on beer and non-beer aluminum, plastic and glass; and tend to have more refillable containers. Again like most European countries, Norway deploys a return to retail model enhanced by the deployment of high speed sorting and compaction technology. Incineration of recycled materials for energy is viewed as an acceptable re-use, and the market for certain materials for incineration is quite strong.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

5.12. SWEDEN

5.12.1. Legislation

Sweden's stewardship program is governed by the SFS 1993 1154 legislation. It was implemented in 1994 and established an *extended producer responsibility* model for the country's program. Beverage producers and distributors were assigned responsibility to recycle glass and cardboard beverage packaging.

- The Swedish Parliament imposed the requirement to achieve mandatory recycling rates on materials on brandowners, with the rates were set as follows:
 - 70% recycling rate for glass containers;
 - 65% recycling rate for metal containers; and
 - 30% recycling rate for plastic containers.

Established targets were achieved by 1996 and recovery rates have increased since. Today the recovery rate for glass and metal containers is greater than 90%.

5.12.2. Program Scope

Sweden operates on an *extended producer responsibility* model. Legislation requires that brandowners collect and recycle any container sold in the Swedish marketplace. Brandowners establish all deposit rates and manage all collection and processing activities through an organization they have created and implemented, Returpak.

- Producers only set a refundable deposit on metal and plastic containers, which customers can return to RVM's operated by Returpak or by specific retailers. Retailers that employ RVMs are paid a handling fee by Returpak for every container they collect.
- The refundable deposit rates are as follows:
 - Metal (any size) = 1 SEK
 - PET (>500ml) = 1 SEK
 - PET (=<) 500ml) = 2 SEK
- Other packaging materials (such as glass and paper) are not eligible for deposit-refunds. However the government requires that producers collect and recycle these containers as well. Therefore, producers/importers have assigned these containers a "recycling fee", a non-refundable fee added to the purchase price of the container. Consumers are required by law to return these containers for recycling, but there is no enforcement of this policy.
- Unredeemed deposits are kept by producers/importers and fund their program operations.
- Dairy and juice containers are excluded from the program due to hygienic concerns. They are not issued a deposit and cannot be returned to collection sites.
- The Swedish program does not require returned containers to be sorted as most refillable bottles in the market have a similar shape and size. This standardization initiative was led by the Swedish brewers and bottlers, and is similar to some of the refillable beer bottles used in Alberta.

5.12.3. Program Structure

Not enough information is available at this time.

5.12.4. Program Comparison

The Swedish program has a much narrower scope than Alberta's program. The structure appears comparable, but minimal information is available to validate this. Sweden appears to deploy a return to retail model supported with high speed sorting and compaction technology, similar to most other European programs. One unique feature with the Swedish program is that the deposit system is predicated on the bar code and not the container. If the bar code is damaged, consumers are reimbursed

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

the salvage value of their returned container rather than the full deposit. This is in stark contrast to Alberta's program where consumers are paid a consistent refund regardless of the container's condition.

5.13. SOUTH AUSTRALIA

5.13.1. Legislation

The Beverage Container Act of 1975 introduced deposit legislation and was integrated with the Environment Protection Act in 1993 which prohibited retailers from selling beverage containers without approved refund markings. The law governing container recycling in South Australia is commonly referred to as the Container Deposit Legislation (CDL) and is intended to reduce beverage container litter, achieve higher recovery rates, and educate the community to recycle more actively.

- South Australia is the only Australian state with an active bottle deposit program, and the state accounts for only 8% of the beverage containers sold in the country. Northern and Western Australia are considering implementing similar systems based on the success South Australia has demonstrated.

5.13.2. Program Scope

South Australia's program is an *extended producer responsibility* model where collection and recycling responsibilities are managed by two non-profit "Super Collector" entities. The Australian government has no involvement in the operations of Super Collectors.

- South Australia's stewardship program accepts any container whose material is recyclable and saleable to other markets. Deposit program materials include aluminum, bi-metal, PET, HDPE, glass, polycoat, and Liquid PaperBoard (LPB). Materials that cannot be recycled, such as aluminum containers with plastic tops are not accepted by the program.
- All containers that are included in the stewardship program have a deposit value of \$0.10 AUD (\$0.094 CDN).
- Dairy containers are not part of the legislation and are excluded from the deposit program. Dairy products sold in HDPE containers can be returned on a voluntary basis. Flavoured milk products sold in LPB containers are part of the program and have a deposit and refund value at collection yards.

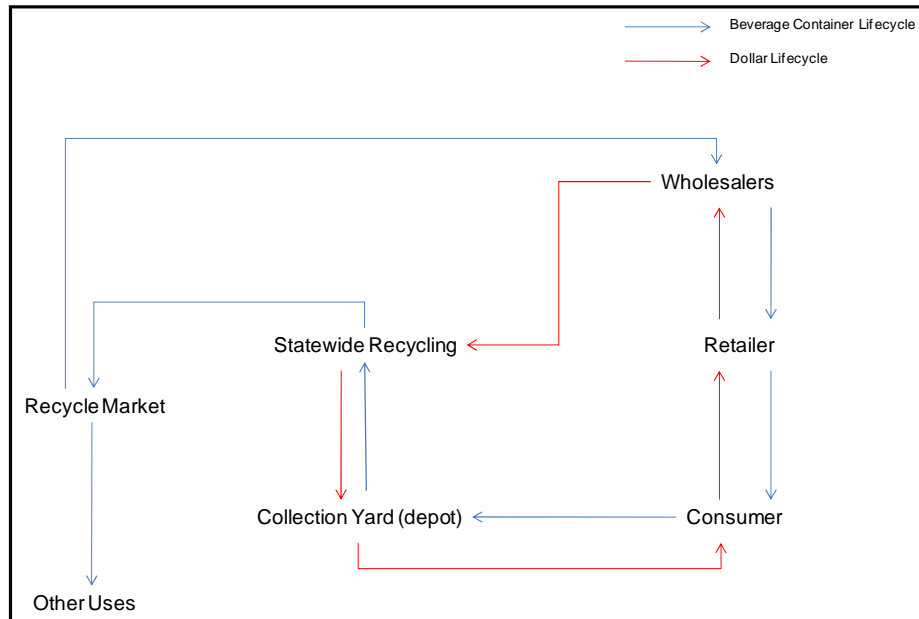
5.13.3. Program Structure

Two active Super Collectors operate in South Australia, Statewide Recycling Ltd and Lion Nathan. Statewide is responsible for the collection, recycling and marketing of all non-beer beverage containers, while Lion Nathan uses its Marine Stores to manage the collection, recycling and reuse of beer containers exclusively. Containers are collected at collection yards that vary in size, equipment and structure depending on location. For example, collection yards in small towns employ compacting machines and local trucks for transportation, while collection yards in large cities (where the volume of containers returned is much greater) do not use similar technology because of a higher risk of fraud in these operations.

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

Statewide Recycling

Statewide is the primary entity involved in the lifecycle of non-beer containers and deposits in South Australia's stewardship program. The government does not have an active role within Statewide's everyday operations. The process flow is described as follows:



- Upon entry into the state, manufacturers deliver product to wholesalers and receive a deposit of \$0.10 AUD per container. Manufacturers remit deposits to Statewide.
- Wholesalers (distributors) add the \$0.10 AUD deposit value onto delivered product to retailers. Retailers pay the deposits to wholesalers on the product shipment.
- Retailers add deposits to the purchase price of each container. Retailers recover deposit costs when customers purchase a beverage and pay the deposit.
- Customers return used containers to collection yards and receive a full deposit refund.
- Collection yards sort and process collected materials and return them to Statewide. Statewide reimburses collection yards for deposits refunded to customers and also pays a handling fee as compensation. Unredeemed deposits are returned to brandowners.
- Statewide sells processed containers to wide variety of end markets, mostly in Europe and the Middle East. Statewide has a reputation for producing a clean and high quality recycled product.

5.13.4. Program Comparison

South Australia's and Alberta's programs are very similar in legislation and operations, with South Australia's program scope being quite broad. South Australia does not have a regulatory body equivalent to the BCMB that administers the program, and none of their operating budget is devoted to conventional advertising.

6. APPENDICES

6.1. PHASE 1 – INTERIM REPORT

BENCHMARKING EVALUATION OF ALBERTA'S STEWARDSHIP PROGRAM FOR RECYCLING EMPTY BEVERAGE CONTAINERS

PHASE 1 REPORT: FINAL SELECTION AND RATIONALE



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1. PHASE 1 DELIVERABLE: PRELIMINARY JURISDICTIONAL SELECTION

MNP has undertaken research examining current beverage container deposit legislation and return systems in jurisdictions across Canada, the United States and Europe. A preliminary evaluation has revealed a number of potential comparator jurisdictions that can be effectively benchmarked against Alberta's approach and system for container recycling. The selection was based on the jurisdictions: 1) comparability to the Alberta model in the areas of governance structure, the types of containers collected and the source of program funds, and 2) the overall strength of the collection program including the demonstration of leading practices.

1.1 DIVISION OF SELECTED JURISDICTIONS INTO TWO TIERS

The beverage container recycling programs chosen for comparison have been organized into two tiers. The first encompasses eight programs or jurisdictions that are essential to effective benchmarking. Research to date has revealed that these programs, spanning Canada, the US, Europe and Australia, lead the field in terms of their organizational structure, overall effectiveness, or their unique practices.

- BC
- Saskatchewan
- Oregon
- California
- Norway
- Denmark
- Germany
- South Australia

There is a second tier of programs that can add value to the benchmarking despite duplicating some of the systems examined in Tier 1 or possessing key characteristics that may limit direct comparisons to Alberta's approach. These jurisdictions are particularly well-suited to an investigation of leading practices, and further research can enhance the benchmarking analysis. The following four programs were chosen to be studied in greater depth and compared against Alberta:

- New Brunswick
- Michigan
- New York
- Sweden

The following sections summarize the logic for the selection of the eight Tier 1 and four Tier 2 jurisdictions that will be examined and compared to Alberta's system.

1.2 TIER 1 SELECTION

The following jurisdictions were selected for comparison in Tier 1:

- BC
- Saskatchewan
- Oregon
- California
- Norway
- Denmark
- Germany
- South Australia

The container return programs in BC and Saskatchewan are administered by non-profit organizations with delegated authority from the provincial government, consistent with the BCMB's status as a delegated administrative organization. Like the BCMB, the core competency of these organizations is arranging the collection and recycling of used beverage containers. However, BC has an electronics recycling program as well. Encorp Pacific in BC is run by a board that consists of representatives of the beverage and retail grocery industries and appears to be owned by various industry participants, providing an interesting contrast to Alberta's government-delegated system. Containers are only accepted at licensed depots in BC and Alberta, and not at retail locations. Encorp charges a handling fee, similar to the container recycling fee in Alberta.

Saskatchewan's program is overseen by the Saskatchewan Association of Rehabilitation Centres and balances social, environmental and economic goals. Although the social aspect of the organization's mission is not shared by the BCMB, most aspects of the two programs are structured quite similarly. For instance, Saskatchewan operates on a licensed depot model and collects an Environmental Handling Charge. Saskatchewan and BC are two of a very select number of jurisdictions that accept returned dairy containers in a voluntary, non-deposit program, a key parallel to Alberta although its program does include a deposit. Saskatchewan and BC are considered to be some of Alberta's closest comparators stemming from similarities in governance structures, consistent product mixes, and close geographic proximity. Despite some slight differences, namely the social purpose of SARCAN and the industry orientation of the board at Encorp Pacific, most aspects of these programs are consistent with Alberta.

California is also considered to be a strong comparator, although there are some important distinctions from Alberta's program. First of all, California exempts refillable containers from the return system altogether. It includes grant funding as part of its core activities in contrast with the BCMB, which simply administers the return system and associated education and marketing activities. The existence of "Convenience Zones" offers another departure, requiring recycling centres to be located within a half mile radius of supermarkets in urban areas and within three miles in rural areas. The return centres can be as simple as stand-alone kiosks in a grocery store parking lot, contrasting the larger scale depots that comprise Alberta's depot network. Additionally, producers in California do not design and manage the collection system and only participate moderately in its funding. Consumers are charged a California Refund Value (similar to a deposit), while manufacturers are required to pay processing fees to a state fund. Unlike Alberta, the state government oversees the program directly instead of delegating responsibilities to an arm's length intermediary. However, despite the differences, California is judged to be one of Alberta's closest comparators among US states. It is unique among the other states and similar to Alberta in that containers are not returned to retailers, but are collected by a network of independent bottle depots throughout the state. It also typically refunds the full deposit paid on a particular container to consumers instead of subscribing to the half-back model present elsewhere.

In Oregon, the non-profit Oregon Liquor Commission has been delegated the authority to organize the collection and recycling of used beverage containers, mirroring Alberta's system. The state is similar in that it includes both beer and non-beer containers in the return stream, but differs from the BCMB's historic model in that this collection doesn't appear to be segregated. The program is funded independently, and the Government of Oregon does not receive any income, taxes or fees for services

associated with container recycling. Overall, despite the absence of detailed program information, Oregon's system appears to be a solid comparator to Alberta.

Norway emerged as a logical European comparator as a result of governance similarities and the disclosure of useful benchmarking information. There is significant industry involvement in Norsk Resirk, the organization charged with collecting and recycling used beverage containers. The fact that industry participants are active partners in beverage container recycling is consistent with Alberta's model. The availability of extensive financial and production data also facilitates a detailed comparison to the BCMB. Norsk Resirk is a non-profit system, but is co-owned by organizations in trade and industry as opposed to being a delegated administrative organization. Norway charges beverage manufacturers an environmental fee (excise tax) for their containers and the program allows for a corresponding decrease in this fee proportional to the increase in return rate. A similar framework does not exist in Alberta. The funding structure of Norsk Resirk, although it is independent of government contribution, appears to be slightly different as well, consisting of sign-up fees, per-container fees and collection/logistics fees. Like most European jurisdictions, collection of bottles takes place in shops and supermarkets and often involves the use of reverse vending machines. The network of licensed depots present in Alberta does not exist in Norway. Interestingly, Norway is the only jurisdiction to mention the incineration of beverage containers in the absence of a more preferable method, a practice of interest to the BCMB. Despite the differences, the Norwegian model makes for a valuable comparison owing to the non-profit model, the availability of information, and the overall strength of the program.

The value of examining Denmark in depth comes not from its similarities to Alberta, but from its remarkable distinctions. It is the only European jurisdiction observed that has elected to internalize the cost of waste container management with no established system of producer responsibility. Metal containers were effectively banned until this practice was judged to be in contravention of EU law and a supporting deposit system was established. In spite of these structural differences, certain similarities link the two systems. Denmark and Alberta both require all ready-to-serve beverage containers sold in the jurisdiction be registered with a common collection system, the Dansk Retursystem in Denmark and the ABCRC or ABCC in Alberta. The board of Dansk Retursystem is composed of owner representatives, members of the grocery trade and branch organizations. The board's duty is to ensure that the company maintains its overheads at a competitive level in order to offer all parties an efficient and cost-effective deposit and return system, closely resembling the mandate of the BCMB. Dansk Retursystem, like the BCMB, has been given the exclusive right to operate the deposit and return system by government legislation.

Germany, like Alberta, has adopted an extended producer responsibility model, but has taken this process a step further by encouraging design changes to beverage containers that proactively minimize the impact on human health and the environment. The system is an internal cost recovery system as in Alberta. While German law obligates producers to take back packaging sold within the country, producers are given the opportunity to contract this function to third-party product stewardship organizations. A key difference from Alberta is that several stewardship organizations compete to offer collection and recycling services for beverage containers. Container take back is organized by shopkeepers and via reverse vending machines, not through licensed depots. Non-licensed packaging is also permitted in Germany (usually from small-scale producers below threshold production levels) and its collection often pushes the return rates beyond 100%. Returns from beverage containers sold out-of-country also contribute to this elevated return rate. The system is funded by membership fees from stores, collection centres and manufacturers, a contrast to the funding structure in Alberta consisting of deposits and recycling fees. In spite of the differences, the similarities around producer responsibility and cost recovery, coupled with the introduction of competition into the container collection system, create a valuable baseline for comparison to Alberta.

Unlike the nationally-based programs in Europe, South Australia has a state (provincial) based program that conforms more closely to the Albertan model. A series of four "super collectors" in South Australia operate in a similar fashion to the collection system agents in Alberta, coordinating the collection of empty containers from the depots and selling material to recyclers and processors. The program is run by the South Australian Environmental Protection Authority, an independent statutory authority that is governed

by a Board with members representing business, community, local and state government. This structure bears striking similarities to the governance of the BCMB. There does, however, appear to be more direct government involvement in South Australia, as board members are appointed directly by the Governor. South Australia is unique along with Alberta in that it has extended deposits to dairy containers, albeit only flavoured milk in containers less than 1L. Although a producer responsibility scheme has been implemented, the South Australian government contributes administrative funding unlike the BCMB, which receives no government funding whatsoever.

1.3 TIER 2 SELECTIONS

The following jurisdictions were identified as potential comparators in Tier 2. Our objective is to select up to four of the following programs to be studied in greater depth and compared against Alberta:

- New Brunswick
- Michigan
- New York
- Sweden

New Brunswick segments the recovery of beer and non-beer containers among two collection agents, Encorp Atlantic and the New Brunswick Liquor Commission. This approach is consistent with Alberta's historic model and may be useful for cost comparison purposes although Alberta is presently moving towards a single collection agent. New Brunswick's system was the original model in Canada for the half-back deposit approach where refillable containers are subject to a full refund and non-refillable containers only receive half back. This feature represents a departure from Alberta's full deposit system. There is also no arm's length oversight body like the BCMB in New Brunswick, and instead the two stewardship agencies act on behalf of distributors to manage the recovery program. The responsibility for registering redemption centres, undertaken by the BCMB in Alberta, falls directly under the Minister of the Environment. The two programs are consistent in their use of licensed redemption centres to collect beverage containers. Key differences, including the use of the half-back deposit approach and the lack of an arm's length oversight body, make for an interesting comparison to Alberta. New Brunswick was selected over other Maritime jurisdictions on account of the program's larger scale and overall success.

New York and Michigan run very large scale operations that encompass the collection of both beer and non-alcoholic containers. Michigan's deposit level of \$0.10 per container is the highest in the US, a factor that has also led to the highest return rate among all of the bottle bill states. Michigan differs in that most containers are labelled with a barcode that allows for collection by reverse vending machines, departing from the depot model in Alberta. In essence, retailers and distributors assume a similar role to Alberta's licensed depots in container collection. 25% of Michigan's unredeemed deposits are returned to retailers to fund their participation in beverage recycling while the remaining deposits are allocated to state environmental programs. New York's program appears to be in its infancy compared to other, more robust collection regimes. It is, however, valuable to examine based on the sheer scale of containers processed. Its funding structure differs from Alberta, with 20% going to distributors while the remainder becomes a part of the state General Fund. It is believed that New York's program involves less state-wide coordination compared with other jurisdictions. A comparison to Alberta is valuable due to the large scale collection and differences in funding structure.

Sweden has two collection agents with exclusive mandates to serve the beverage container market. The organizations are segmented according to material (glass versus non-glass) and not according to their alcoholic content, as was historically the case in Alberta. The strength of Sweden's comparison lies in the wide scope of its producer responsibility model and strong return rate results. In Alberta, industry is required to fund a system for the collection and recycling of used beverage containers through deposits and recycling fees. In Sweden, this responsibility is extended to include additional producer requirements, such as informing households regarding the collection and removal of used packaging and designing packaging so that it can be recovered and waste is minimized. One notable way that brewers and bottlers have adapted to this model is by standardizing the size and shape of refillable containers so they do not need to be sorted by brand. While Alberta's government has established a guideline of 85% recovery for

all containers, Sweden's targets are written into law, with a 70% target mandated for glass containers. The system has resulted in significant success, with some of the highest recycling rates in the world. This is especially true with aluminum cans where the return rate approaches 91%.

1.4 JURISDICTIONS ELIMINATED FROM COMPARISON

Several additional Canadian jurisdictions were researched as potential benchmarks, but eliminated from comparison due to structural and scale differences from Alberta's system as well as duplication with other selected jurisdictions:

- Manitoba
- Ontario
- Québec
- Nova Scotia
- Prince Edward Island
- Newfoundland
- Yukon
- Northwest Territories

Manitoba's model has seen the stewardship of many waste materials, including beverage containers, combined under the Manitoba Product Stewardship Corporation. The province's unique approach offers beverage producers the choice between establishing a container recycling program and paying a uniform levy on containers. The majority of beverage producers have chosen the latter option, with the exception of beer producers. Therefore, only beer containers are included in Manitoba's product stewardship plan, representing a fraction of the containers handled by Alberta's system. Unredeemed deposits are also retained by the beer distributor and bottler instead of directly funding the recycling system. The system has resulted in an overall return rate of only 31%, well below its peer jurisdictions. The significant differences from Alberta's program and the extensive role of blue box collection in particular diminish Manitoba's comparability to Alberta.

Ontario is the only province without a strong producer responsibility model. Similar to Manitoba, the province relies on a municipally-funded blue box collection program for most beverage containers while a deposit-based recycling system is only in place for beer containers. Unredeemed deposits are returned to the beer distributors and bottlers instead of funding the recycling program.

Québec also employs a model that differs from Alberta in several important respects, limiting its potential for comparison. The province entrusts the stewardship of beverage containers to a Crown Corporation, Recyc-Québec, in lieu of a delegated administrative organization. It is one of the few Canadian jurisdictions to allow the return of beverage containers to retail locations. In fact, soft drink distributors are responsible for picking up empty containers from retail stores in their area. Similar to Alberta, Recyc-Québec retains unredeemed deposits to manage the system, although bottlers are able to keep scrap revenues. Industry is also required to fund blue box pick up for those containers not included in an existing deposit/return scheme.

The programs in Prince Edward Island, Newfoundland, the Northwest Territories and the Yukon have more direct government involvement, administered and funded by a provincial department or crown organization. These programs also have a reduced scale compared to Alberta, diminishing potential for comparison.

It appears that PEI only allowed the sale of non-refillable beverage containers for the first time in 2008 and established a deposit and return system in conjunction with this change. The PEI program in its infancy is not directly comparable to the well-established system in Alberta.

Newfoundland's Multi-Materials Stewardship Board (MMSB), consisting of 9 members appointed by the Minister of the Department of Environment and Labour, resembles the BCMB in some respects although it is a crown agency and is responsible for other waste materials such as tires and hazardous waste. Newfoundland Beverage Recovery Inc., which is contracted by MMSB to run the daily operations of the

deposit return system, also bears resemblance to the ABCRC. The independently run Green Depots throughout the province are likened to Alberta's depot network. However, the deposit system is similar to the half-back models present in other Maritime jurisdictions. Potential duplication with New Brunswick along with the scale issue removed Newfoundland from consideration.

Nova Scotia does collect beverage containers through a network of independently owned Enviro-Depots throughout the province, closely mirroring the depot network in Alberta. The Resource Recovery Fund Board Inc. (RRFB) is a non-profit corporation that oversees the container recycling system and in many ways fulfils the role of the BCMB and its collection agents. Unredeemed deposits are retained by the RRFB to offset recycling costs, as with the BCMB. However, the reduced scale of Nova Scotia's program as well as the presence of the half-back model represent important distinctions from Alberta. Nova Scotia was not chosen for comparison in order to eliminate duplication as its program is very similar to New Brunswick.

The US and International jurisdictions examined but eliminated from potential comparison are as follows:

- Connecticut
- Delaware
- Hawaii
- Iowa
- Maine
- Massachusetts
- Vermont
- Finland

Connecticut, Hawaii, Vermont and Maine collect beverage containers through retailers and reverse vending machines in addition to a depot network. The differing collection methods, coupled with the relatively smaller scale of the programs, make a direct comparison to Alberta difficult.

Iowa also uses a hybrid collection system consisting of both retailers and redemption centres, although retailers can refuse containers if an agreement exists with a licensed redemption centre. In addition to the different collection method, it was felt that Iowa's program was quite similar to some of the jurisdictions already selected for comparison.

Delaware exempts aluminum containers from its bottle bill, which comprise a significant proportion of Alberta's recovered containers. The lack of a depot network and limited disclosure of the program's operations eliminated it from comparison.

In Massachusetts, the program is administered by the state government and containers are collected by retailers and distributors, not by licensed depots. These differences, as well as the lack of detailed program information, reduce the value of examining Massachusetts in further detail.

Finland's distinction stems from its taxation of non-refillable beverage containers. It was feared that the presence of this tax might skew recovery and cost figures, damaging the integrity of a direct comparison to Alberta. The fact that aluminum cans make up less than 4% of beverage production in Finland, a stark contrast to the high volume present in Alberta's beverage industry, also played a role in its elimination. As Finland's system is reasonably similar to Sweden, the latter was selected for comparison instead.

2. LEADING PRACTICE RESEARCH

Supplementary to the in-depth benchmarking study of selected jurisdictions, MNP will also undertake a preliminary investigation of leading practices within the industry. The unique approaches to beverage container recycling adopted by certain North American and international jurisdictions provide a wealth of material for leading practice research. An examination of innovations in container recycling may reveal practices that can be applied towards improvements in Alberta's system. Specific areas that may be studied in further detail include the following:

- Container handling processes
- Container deposit fees
- The use of reverse vending machines
- Payment schemes for bottle returns
- Deposit and return systems where no single enterprise has the exclusive right to collect and recycle used beverage containers
- Opportunities to standardize the size and shape of refillable containers, allowing for increased system efficiency
- The use of material compacting and incineration
- The use of spare capacity on suppliers' trucks to transport recyclables

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6.2. DATA QUESTIONNAIRE

		Interview Responses
1)	Program Overview	
	<p>Could you please provide a brief overview of the beverage container recycling program in your jurisdiction speaking to features such as the following?</p> <ul style="list-style-type: none"> - Structure (deposit, voluntary, other) - Relevant legislation (references to acts, regulations - could you attach the appropriate references?) - Beverages included in the scope of the program (e.g. beer, soda or soft drinks, etc.) - Sources of program funding - Flow of recycled materials through the system (e.g. consumer --> return to retailer --> material collection agent --> material recycler) 	
	What are the options available to consumers that are seeking to return containers (i.e. what approaches are used to collect containers)	
	Which of the options are most effective?	
	Are dairy containers included in the scope of the program or planned for inclusion? Describe the rationale for the decision and (if relevant) it's timing?	
2)	Container materials	
	<p>What types of beverage container materials are included in the recycling program?</p> <ul style="list-style-type: none"> - Aluminum (including Bi-Metal) - PET - Other plastics (e.g. HDPE) - Glass - Polycoat Containers - Other (please list) 	
3)	Total Container Volumes Handled	
	What was the total quantity of all beverage containers sold in the jurisdiction in the most recent year for which data is available?	

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	What was the total quantity of all containers recycled in the jurisdiction in the most recent year for which data is available?	
4)	Return Rates	
	What were the recycling rates (percentages) for the following containers in the most recent year for which data is available?	
	- Aluminum containers (including Bi Metal containers)	
	- PET containers	
	- Other plastic containers (e.g. HDPE)	
	- Glass containers	
	- Polycoat containers	
	- Combined return rate for all containers	
	How are the above recycling rates calculated (i.e. same period quantity redeemed divided by same period quantity sold)?	
	Is the jurisdiction able to report statistics on return rates by the type of beverage contained? If so, can you report on return rates for the following beverage containers?	
	- Beer	
	- Wine and spirits	
	- Pop or soft drinks, water	
	- Dairy	
	- Other (please list)	
5)	Deposit Rates	
	If the jurisdiction has a deposit program, how are the rates structured (e.g. by beverage type, material type or both; is container size a factor)?	
	What level of deposit is placed on each type of container (please list or provide a schedule of container type and the associated deposit)?	
6)	Revenue or Sources of Cash	
	During the past fiscal year, what was the total amount of revenue collected or earned in regard to each of the following beverage container recycling program features?	

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	- Total beverage container deposits collected	
	- Revenue from the sale of recycled materials	
	- Other container recycling fees (please describe and list the amounts)	
	- Other revenue (please describe and list the amounts)	
7)	Total Costs and Refunds or Uses of Cash	
	During the past fiscal year, what were the total program costs or disbursements in regard to each of the following beverage container recycling program features?	
	- Administration	
	- Total deposits refunded	
	- Processing and transportation	
	- Advertising and communications	
	- System development/improvement	
	- Handling Fees for Collectors	
	- All other Costs (please describe)	
	During the past fiscal year, what was the average net system cost for recycling a beverage container (i.e. average cost of recycling one container net of all associated revenue such as material sales and unredeemed deposits)?	
8)	Handling and Disposition	
	Does the jurisdiction compact or shred containers for transport?	
	How are the collected materials processed and disposed of (please describe and provide the percentage represented by each)?	
	- Recycling	
	- Reuse	
	- Incineration	
	- Other (please list)	
9)	Environmental Performance Measures	
	Does the jurisdiction use formal performance measures other than recycling rates to assess its contribution to reducing the environmental impact from beverage container manufacture, use and	

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	recycling?	
	If so please describe the measures.	
10)	Leading Practices	
	Please describe beverage container recycling or handling practices that are uniquely innovative or "leading" in the industry?	

6.3. INTERVIEW PROTOCOL

PURPOSE OF THIS DOCUMENT

The Beverage Container Management Board (BCMB) has retained MNP to assist with a benchmarking project to evaluate the effectiveness and efficiency of Alberta's Stewardship Program for empty beverage containers. The project will analyze BCMB's current practices and compare them to similar bottle deposit programs in other jurisdictions, with particular attention on recovery rates, financial data, and leading practices and innovations.

The two main project themes are:

1. Review the strategies and operating procedures of stewardship programs in comparable North American and European jurisdictions.
2. Determine how BCMB can refine their operations by analyzing leading practices of the selected stewardship programs and develop efficiency improvement solutions.

Phase 2 *Benchmarking Research and Evaluation* involves a thorough evaluation of data that has been compiled in regards to specific stewardship programs. Consultation with key members of these programs is critical to developing accurate benchmarks and setting the foundation for a full analysis of BCMB's current state.

The purpose of this document is to provide interviewees with the questions that will be discussed in the session so that you may consider your experiences and thoughts beforehand.

INTRODUCTION

At the outset of the interview it would be helpful for us to discuss your position and role in your program.

QUESTIONS

1. Please provide a brief overview of how used containers are collected, transported and recycled after they have been returned for a deposit in your system. It would be very beneficial to have details about major steps in the process and the significant parties involved at those stages.
2. Please describe how container deposits flow to and from distributors, retailers, and customers in your program.
3. What are some unique/tailored practices or innovations you consider fundamental to your program's success? What practices would you consider to have been significant failures throughout your program's operating history?
4. The following are a series of questions that centre on leading practices utilized in your program. Further details about these practices would be very useful in our overall analysis.
 - a) Who bears the responsibility (or has the licensed right) to collect and recycle used beverage containers in your program? Please provide details about any strategies these parties employ to create operational efficiencies across different levels in your program. For example, if distributors are responsible for collecting used containers, do they provide pick-up services for retailers or collection centres? Or are aluminium cans crushed prior to transport so that trucks are able to hold more capacity?
 - b) Does your program employ a standard size/shape container for deposit eligibility? If not, how would you predict the introduction of a standardized container would affect your operation's efficiencies, in areas such as collection costs or return rates?
 - c) Please describe the top three processes your program utilizes that contribute to advancing the overall health of the environment? For example, is spare capacity on recycling trucks used to transport other reusable materials?
5. How does your program market the recyclable materials to interested parties? How significant are the economic benefits that arise from these sales, and are these benefits shared with any other environmental organizations? In the absence of an alternative purpose for recyclable materials, what is your program's policy on incineration?
6. How does your recycling program collaborate with other environmental programs for the purposes of increasing environmentally-conscious activity in your jurisdiction?

7. When new materials are introduced to be included in your beverage container recycling program, how long is required for return rates to achieve targets? For example, if dairy containers were recently added to your program, how long would you expect it to take to achieve an 80% return rate?
8. What kinds of performance measures are utilized to determine the operating efficiency of your recycling program? Are performance reports available to the public?
9. Have any studies been undertaken to measure how activities within your recycling program indirectly affect the overall health of the environment? For example, do you monitor the CO₂ emissions from trucks during the collection and transport of containers, or the increased use of electricity required for converting reusable materials?
10. Does your organization use marketing techniques to increase awareness about your program or other beverage container recycling matters? If so, please describe. What communication and marketing approaches have you found effective? Which were less effective?
11. May we contact you again for supplementary information if required?

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6.4. BIBLIOGRAPHY AND REFERENCES

All Canadian provinces:

- <http://www.ec.gc.ca/epr/default.asp?lang=En&n=CAF18AE3-1>
- Brewers Association - http://www.brewers.ca/default_e.asp?id=27

Alberta Data Sources:

- BCMB provided data
- Financials: Calculated from ABCRC and ABCC Financial Statements
- Bottle Bill Resource Guide - www.bottlebill.org/legislation/canada/alberta.htm
- *Presentation to Standing Committee on Resources & Environment*. September 18, 2007. Alberta Dairy Council Milk Container Recycling Program. http://www.milkcontainerrecycling.com/AB/_pdfs/PresentationToStandingCommittee.pdf
- Alberta Dairy Council Milk Container Recycling Program. www.milkcontainerrecycling.com
- Anker Anderson: Overview provided by BCMB
- Demographics:
 - <http://en.wikipedia.org/wiki/Alberta>
 - <http://www40.statcan.gc.ca/l01/cst01/econ15-eng.htm>
 - http://www.zurich-base-line.com/cn_gdp_pc_nation_data.html
 - <http://www40.statcan.gc.ca/l01/cst01/lfss02c-eng.htm>
 - <http://www.servicealberta.ca/pdf/vs/2000population.pdf>
- Legislation:
 - Beverage Container Management Board Three Year Business Plan 2010 - 2012. p. 3-5
- Operations:
 - <http://www.abcrc.com/cfm/index.cfm?It=907&Id=7>
 - <http://www.bcmb.ab.ca/what-happens-to-containers.html>
 - Beverage Container Management Board Three Year Business Plan 2010 - 2012. p. 20.
- Statistics/Financials:
 - Spreadsheet provided by SARCAN Comparison of Provincial Recycling Programs - July 2009.xls) – compiled for the Canadian Recycling Affiliates
 - Spreadsheet provided by BCMB (Return Data Rollup June 2009 Monthly Totals.xls)
 - ABCRC 2008 Annual Report, BCMB 2010-2012 Business Plan, Spreadsheet provided by BCMB (Comparison of Provincial Recycling Programs - July 2009.xls)
 - ABCRC Annual Report 2008, ABCC Financial Statements March 31 2009 – March 31 2011

BC Data Sources:

- Data Questionnaire provided by: Elena Zevakhina, Encorp Pacific.
- Interview with: Elena Zevakhina, Encorp Pacific.
- Interview with: Greg D'Avignon, BDL Board Member, BCMB Board Member
- Recycling Council of BC
- Demographics:
 - http://en.wikipedia.org/wiki/British_Columbia
 - <http://www.bcstats.gov.bc.ca/data/bcfacts.asp>,
 - http://www.bcstats.gov.bc.ca/DATA/bus_stat/bcea/tab1.asp
 - http://www.zurich-base-line.com/cn_gdp_pc_nation_data.html
 - <http://www40.statcan.gc.ca/l01/cst01/lfss02a-eng.htm>
- Legislation:

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- <http://www.bottlebill.org/legislation/canada/britishcolumbia.htm>
- <http://www.encorp.ca/cfm/index.cfm?It=100&Id=8&Se=2>
- Operations:
 - <http://www.encorp.ca/cfm/index.cfm?It=907&Id=3&Se=38>
 - <http://www.encorp.ca/cfm/index.cfm?It=907&Id=7&SearchID=8D79C899-FF1D-12CC-F16A16C17892E68C>
 - <http://www.encorp.ca/cfm/index.cfm?It=940&Id=3&Se=39>
 - http://www.encorp.ca/temp/2009111019084/BCDC_Release_Recycling_Announcement_Oct_20_06_Final.pdf
- Statistics/Financials:
 - http://www.encorp.ca/ar2008/pdf/Encorp_AR_2008_page3.pdf
 - <http://www.encorp.ca/ar2008/>

New Brunswick Data Sources:

- Data provided by: Derek Wilson, Best Metals (return depot company)
- Demographics:
 - http://en.wikipedia.org/wiki/New_Brunswick
 - <http://www.statcan.gc.ca/daily-quotidien/091106/t091106a3-eng.htm>,
 - http://www.zurich-base-line.com/cn_gdp_pc_nation_data.html
 - <http://www40.statcan.gc.ca/l01/cst01/lfs02a-eng.htm>
 - <http://www.gnb.ca/0160/Economics/LabourForce.htm>
 - <http://www.gnb.ca/0160/Economics/GDPatMarketPrices.html>
- Legislation:
 - <http://www.gnb.ca/oag-bvg/2004v2/chap3e.txt>
 - <http://www.bottlebill.org/legislation/canada/newbrunswick.htm>
- Operations:
 - <http://www.ec.gc.ca/epr/default.asp?lang=En&n=5BF89F76-1>
 - <http://www.gnb.ca/0009/0372/0004/0005-e.asp>
- Statistics/Financials:
 - <http://www.bottlebill.org/legislation/canada/newbrunswick.htm>

Saskatchewan Data Sources:

- Data Questionnaire completed by Ken Homenick from SARCAN
- Interview with Ken Homenick from SARCAN
- Demographics:
 - <http://en.wikipedia.org/wiki/Sask>
 - <http://www.stats.gov.sk.ca/docs/factsheet09.pdf>
 - http://www.zurich-base-line.com/cn_gdp_pc_nation_data.html
 - <http://www40.statcan.gc.ca/l01/cst01/lfs02c-eng.htm>
- Legislation:
 - <http://www.bottlebill.org/legislation/canada/saskatchewan.htm>
 - <http://www.sarcsarcan.ca/sarcan/index.php>
 - <http://www.ec.gc.ca/epr/default.asp?lang=En&n=F7911B8D-1>
- Operations:
 - <http://www.sarcsarcan.ca/sarcan/beverage/index.php>
- Statistics/Financials:
 - http://www.sarcsarcan.ca/sarcan/links/SARCAN_Did_You_Know_2007-2008.pdf
 - <http://www.sarcsarcan.ca/links/Annual%20Report%2008-09.pdf>
 - <http://www.ec.gc.ca/epr/default.asp?lang=En&n=F7911B8D-1>

California Data Sources:

- Data Questionnaire completed and interview conducted by Kent Harris, CalRecycle
- Demographics:

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- <http://en.wikipedia.org/wiki/California>
- <http://www.census.gov/compendia/statab/tables/09s0013.xls>,
- Legislation:
 - <http://www.consrv.ca.gov/DOR/Pages/index.aspx>
 - <http://www.calpsc.org/products/docs/2009/CPSC%20Beverage%20Container%20White%20Paper.pdf>
- Operations:
 - <http://www.bottlebill.org/legislation/usa/california.htm>,
- Statistics/Financials:
 - <http://www.conservation.ca.gov/dor/gpi/Documents/FactSheet.pdf>
 - <http://www.allbusiness.com/food-beverage/beverage-industry-beverage-manufacturing/5882524-1.html>

Connecticut Data Sources:

- Interview with: Jackie Parnell, Department of Environmental Protection
- Demographics:
 - <http://en.wikipedia.org/wiki/Connecticut>
 - <http://www.census.gov/compendia/statab/tables/09s0013.xls>
- Legislation/Operations:
 - <http://www.bottlebill.org/legislation/campaigns/connecticutc.htm>
 - http://www.ct.gov/dep/cwp/view.asp?a=2714&q=324834&depNav_GID=1645
 - <http://www.ct.gov/dep/cwp/view.asp?A=2714&Q=324838#General>
- Statistics/Financials:
 - http://www.ct.gov/dep/lib/dep/waste_management_and_disposal/solid_waste_management_plan/april2009/090428_swac_bottle_bill_presentation.pdf
 - <http://www.container-recycling.org/images/graphs/plastic/PETrec-bystate-07.png>
 - http://www.ct.gov/dep/lib/dep/waste_management_and_disposal/solid_waste_management_plan/april2009/090428_swac_bottle_bill_presentation.pdf
 - <http://search.cga.state.ct.us/dl2005/rpt/doc/2005-R-0836.doc>
 - www.environmentconnecticut.org/preservation/bottle-bill
 - www.ct.gov/dep/cwp

Michigan Data Sources

- Interview with: Spencer Nevins, Michigan Beer and Wine Wholesalers Association and with Jeff Schram from UBCR
- Data questionnaire completed by: Jeff Schram, UBCR
- Demographics:
 - <http://en.wikipedia.org/wiki/Michigan>
 - <http://www.census.gov/compendia/statab/tables/09s0013.xls>,
- Legislation/Operations/Statistics/Financials:
 - <http://www.deq.state.mi.us/documents/deq-wmd-swp-mibottledepositlawFAQ1.pdf>
 - <http://www.bottlebill.org/legislation/usa/michigan.htm>

New York Data Sources:

- Demographics:
 - http://en.wikipedia.org/wiki/New_York
 - <http://www.census.gov/compendia/statab/tables/09s0013.xls>
- Legislation/Operations:
 - <http://www.bottlebill.org/legislation/usa/newyork.htm>
 - <http://www.dec.ny.gov/chemical/57687.html>
- Statistics/Financials:

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- http://www.dec.ny.gov/docs/materials_minerals_pdf/0506rcarpt.pdf
- <http://search.cga.state.ct.us/dl2005/rpt/doc/2005-R-0836.doc>
- *Beverage Container Deposit and Redemption Statistics for October 1, 2005-September 30, 2006.* New York State Department of Environmental Conservation. www.dec.ny.gov/docs/materials_minerals_pdf/0506rcarpt.pdf

Denmark Data Sources:

- Demographics:
 - http://www.dst.dk/homeuk/statistics/key_indicators/population/soft_drink.aspx
 - <http://www.tradingeconomics.com/Economics/GDP.aspx?Symbol=DKK>
 - http://siteresources.worldbank.org/DATASTATISTICS/Resources/GDP_PPP.pdf
 - <http://www.tradingeconomics.com/Economics/Unemployment-rate.aspx?symbol=DKK>
- Legislation:
 - <http://www.bottlebill.org/legislation/world/denmark.htm>
 - <http://anker-andersen.com/deposit-laws/denmark.aspx>
 - <http://www.dansk-retursystem.dk/content/us>
 - <http://www.pro-e.org/Denmark>
- Operations
 - <http://anker-andersen.com/deposit-laws/denmark.aspx>
- Statistics:
 - <http://www.bottlebill.org/legislation/world/denmark.htm>,
 - <http://www.dansk-retursystem.dk/content/us>
- Financials:
 - <http://www.iowabottlebillcoalition.com/aroundtheworld.html>
 - <http://www.bottlebill.org/legislation/world/denmark.htm>

Germany Data Sources:

- Demographics
 - <http://datafinder.worldbank.org/population-total>
 - <http://www.tradingeconomics.com/Economics/GDP.aspx?Symbol=DEM>
 - http://siteresources.worldbank.org/DATASTATISTICS/Resources/GDP_PPP.pdf
 - http://www.indexmundi.com/germany/unemployment_rate.html
- Legislation:
 - <http://www.calpsc.org/products/docs/2009/CPSC%20Beverage%20Container%20White%20Paper.pdf>,
- Operations:
 - <http://anker-andersen.com/deposit-laws/germany.aspx>
 - <http://www.bottlebill.org/legislation/world/germany.htm>
- Statistics/Financials:
 - <http://www.bottlebill.org/assets/pdfs/pubs/2009-BeverageSystemsCalifornia.pdf>

Norway Data Sources:

- Demographics:
 - <http://datafinder.worldbank.org/population-total>
 - <http://www.tradingeconomics.com/Economics/GDP.aspx?Symbol=NOK>
 - http://siteresources.worldbank.org/DATASTATISTICS/Resources/GDP_PPP.pdf
 - <http://www.tradingeconomics.com/Economics/Unemployment-rate.aspx?Symbol=NOK>
- Legislation:
 - <http://www.bottlebill.org/legislation/world/norway.htm>
 - <http://www.resirk.no/Frontpage-63.aspx>
- Operations:
 - <http://anker-andersen.com/deposit-laws/norway.aspx>
- Statistics:

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- Financials:
 - <http://www.resirk.no/lpaper-125.aspx?Showlpaper=14>
 - <http://www.resirk.no/Frontpage-63.aspx>

Sweden Data Sources:

- Demographics:
 - <http://datafinder.worldbank.org/population-total>
 - <http://www.tradingeconomics.com/Economics/GDP.aspx?Symbol=SEK>
 - http://siteresources.worldbank.org/DATASTATISTICS/Resources/GDP_PPP.pdf
- Legislation/Operations:
 - <http://www.bottlebill.org/legislation/world/sweden.htm>
 - http://www.glasatervinning.se/in_english.php
 - http://www.petrecycling.cz/swedish_epa_resp.htm
- Statistics/Financials:
 - <http://www.iowabottlebillcoalition.com/aroundtheworld.html>,

South Australia

- Data Questionnaire completed and interview conducted by Edward Nixon, Statewide Recycling
- Demographics:
 - <http://www.bottlebill.org/legislation/world/australia.htm>
 - <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/1345.4Main%20Features4Oct%202009?opendocument&tabname=Summary&prodno=1345.4&issue=Oct%202009&num=&view=>
 - <http://www.adelaide.edu.au/saces/economy/production/>
 - <http://www.adelaide.edu.au/saces/economy/labour/>
- Legislation:
 - <http://www.bottlebill.org/legislation/world/australia.htm>,
 - <http://www.hotkey.net.au/~gargoyle/CDL/AroundTheWorld/Australia/SA/index.html>
 - <http://www.hotkey.net.au/~gargoyle/CDL/AroundTheWorld/Australia/SA/index.html>
- Operations:
 - <http://www.hotkey.net.au/~gargoyle/CDL/AroundTheWorld/Australia/SA/index.html>
 - http://www.aph.gov.au/senate/committee/eca_ctte/environment_protect_09/report/c01.pdf,
 - http://www.boomerangalliance.org/000_files/26_CD_L_in_South_Australia.pdf
 - http://www.aph.gov.au/senate/committee/eca_ctte/environment_protect_09/report/c01.pdf
- Statistics:
 - <http://www.recyclesa.com.au/>
 - [http://www.mav.asn.au/CA256C320013CB4B/Lookup/Container_Deposits_Extended_Producer_Responsibility_Forum_8_Nov_2007_Tom_Whitworth/\\$file/Assoc%20RWMG%20-%20Container%20Deposits-Extended%20Producer%20Responsibility%20Forum%20-%208%20Nov%202007%20-%20Tom%20Whitworth.pdf](http://www.mav.asn.au/CA256C320013CB4B/Lookup/Container_Deposits_Extended_Producer_Responsibility_Forum_8_Nov_2007_Tom_Whitworth/$file/Assoc%20RWMG%20-%20Container%20Deposits-Extended%20Producer%20Responsibility%20Forum%20-%208%20Nov%202007%20-%20Tom%20Whitworth.pdf)
- Financials:
 - <http://www.bringitback.org.au/boomerang/node/43>

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

2008 UCAs – 2009 Phase I Report UCA Process Changes HC Policy Task Force Initiatives. December 2, 2009. Prepared by: Desiderata Energy Consulting Inc.

Alberta Beer Container Corporation: 85 Years of Brewers Recycling. December 2009. Prepared by: ABCC

Alberta Regulation 101/97. Environmental Protection Act: Beverage Container Recycling Regulation. October 2008.

Antymis, Neil. BCMB Board Member. Telephone Interview. January 19, 2010.

An Analysis of the Costs and Benefits of Beverage Container Recovery in Canada. CM Consulting. January 2002.

Approval of Redemption Centers and Beverage Containers: Deposit-Redemption System. June 2007. State of Vermont.

Australian Senate Container Legislation. 2009.

Benchmarking Evaluation of DAO Stewardship Programs in Alberta: Final Report. February 28, 2006. Prepared by: Bearing Point.

Beverage Container Recycling: A Survey of Albertans. November 2009. Prepared by: The Praxis Group.

Biannual Report of Beverage Container Sales, Returns, Redemption, and Recycling Rates. May 8, 2009. Prepared by: California Department of Conservation.

Comparison of Provincial Recycling Programs. July 2009. Prepared by: Rod Simpson.

Evaluating End-of-Life Beverage Container Management Systems for California: Final Report. Division of Recycling, California. May 15, 2009. Prepared by: R3 Consulting Group, Inc. and Clarissa Morawski.

Final UOMA Program Review Findings. June 21, 2005. Prepared by: Bearing Point.

IBM, Stanford University Unveil Research on Plastics. Recycling Today, March 10, 2010. http://www.recyclingtoday.com/Article.aspx?article_id=78833 (Sourced March 24th)

Linton, Jeff. BCMB Board Member. Telephone Interview. January 19, 2010.

McQueen, Diana. Letter. Risvold, Ross. August 20, 2008.

McQueen, Diana. Letter. Risvold, Ross. November 6, 2008.
Oregon Department of Environmental Quality Solid Waste Program - Organizational Chart. April 1, 2008. State of Oregon Department of Environmental Quality.

Organocatalysis: Opportunities and Challenges for Polymer Synthesis. Macromolecules, 2010, 43 (5), pg. 2093-2107. February 16, 2010.

Performance Measurement and Reporting for Extended Producer Responsibility Programs. October 2007. Prepared by: Stratos.

Product Stewardship for Beverage Containers: A Comparison of Systems in California, BC and Germany. California Product Stewardship Council. Sourced: March 26, 2010.
<http://www.calpsc.org/products/docs/2009/CPSC%20Beverage%20Container%20White%20Paper.pdf>

Benchmarking Evaluation of Alberta's Stewardship Program for Recycling Empty Beverage Containers

Recycling of Beverage Packages.

Recommendations upon Review of Key Issues Pertaining to the Beverage Container Recycling Regulation. November 2007. Standing Committee on Resources and Environment.

Reports on trips to AA / Denmark. February 11, 2010. Prepared by: John Bachinski.

Reports on Trips to AA / Iceland. February 8, 2010. Prepared by: John Bachinski.

Reverse Vending Machine (RVM) PILOT STUDY. April-May 2007. Nicolas Coburn. Funding Provided By: ABCRC, ABDA, CBSI.

Risvold, Ross. Letter. McQueen, Diana. August 22, 2008

Risvold, Ross. Letter. McQueen, Diana. January 6, 2009.

Risvold, Ross. BCMB Chair. Telephone Interview. January 19, 2010.

The Dual System in Germany. Joachim Quoden.

The Expanded Bottle Bill. 2007. State of Oregon Department of Environmental Quality.

UOMA Program Review: Final Report. May 27, 2005. Prepared by: Bearing Point.

Vermont Bottle and Label Approval. State of Vermont.

Wanted Empty and Alive: The Best Recycling System in the World. Suomen Palautuspakkaus Oy

West, Guy. President. Alberta Beverage Container Recycling Corporation. Telephone Interview. January 20, 2010.

What is Gasification? Gasification Technologies Council. Sourced: May 3, 2010.
http://www.gasification.org/what_is_gasification/overview.aspx

Who Pays What: An Analysis of Beverage Container Recovery and Cost in Canada. Spring 2008. Prepared by: CM Consulting.