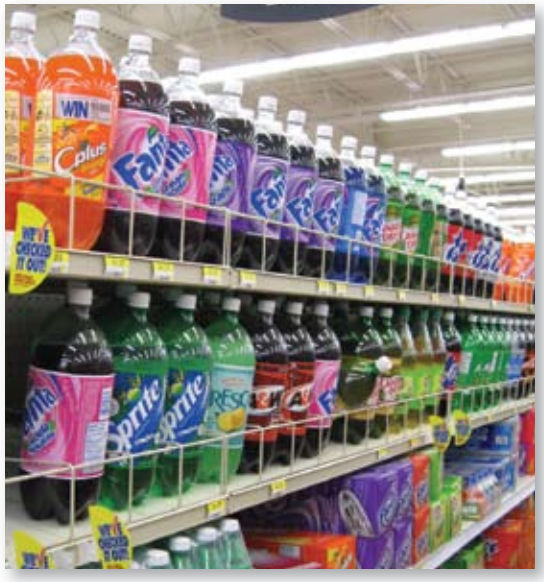
by Clarissa Morawski

"The data on climate change mitigation from recycling clearly shows that recycling beverage containers is a priority."

Beverage container collection in Canada

The UPDATE

As the price of oil approaches $150 a barrel and energy is at a premium, high quality empty beverage containers made from aluminum, plastic, and glass are in great demand. Canadian provincial governments and beverage producers (on their own) have taken steps to increase collection for recycling.



New programs

Following years of pressure from municipalities, British Columbia's Dairy Council launched the Used Milk Container Recycling Program in October 2006. In addition to on-going curbside collection, this program offers an additional recovery infrastructure for empty milk containers through 116 existing beverage depots. Encorp Pacific, the organization that manages the stewardship obligation for non-alcohol, wine, spirit and imported beer producers, has been contracted by the dairy industry to manage this program. The dairy industry picks-up the costs associated with depot collection, processing and program advertising.

In February 2007, Ontario's Deposit Return Program (ODRP) was launched by the provincial government for all wine, spirit and imported beer containers. The deposits, or "financial return incentives," are 10-cents on small bottles (representing a share of 48 per cent of all units), and 20-cents on larger containers, (52 per cent share) like wine bottles. In spite of its naysayers, the program has actually succeeded in shifting consumer behaviour from conveniently tossing their empty wine bottle into their household blue bin to taking it back to their local beer store, usually within five kms of their home, apartment or back alley. In 2007-2008, the program diverted over 78,000 tonnes of which about 67 per cent was re-manufactured into new glass bottles, and the remaining 33 per cent into fibreglass.

Late in 2007, Prince Edward Island repealed the law prohibiting non-refillable beer and soft-drinks on the island. The law was introduced in 1973 for beer and later expanded to include soft drinks in 1984. Last April, the Minister of Environment, Energy and Forestry announced details about the new deposit return program to manage all the new non-refillable containers brought to the island. This provincial system has harmonized program elements with its Atlantic counter-parts. Encorp PEI, (like Encorp Pacific in British Columbia, and Encorp Atlantic in New Brunswick) is the system administrator on behalf of beverage producers. The new half-back program will compensate 10 island-wide depots with a 3.6-cent handling fee.

In Germany, refillable bottles are available for many different beverages, in a variety of shapes, sizes, glass and PET.

Our Cover Story author visited Germany to investigate beverage container recovery in that country. Read her special report on pages 14-17.

A plan for change?

Following a robust consultation process in Alberta last November, an all-party government committee reviewing the beverage container regulation delivered 12 specific recommendations to the minister. Of particular interest were the following four:

- The Beverage Container Management Board (BCMB) should review and set deposit rates every two years;
- Deposit levels should be raised to a minimum of 10-cents for containers under or equal to one litre and a minimum of 20-cents for containers over one litre;
- Management of unredeemed deposit revenue should be transferred to the BCMB; and
- Milk containers should be included in the deposit return system, and the current levy [on milk] should be removed.

Whether the existing Alberta government chooses to act on its government's non-partisan counsel is anybody's guess.

Manitoba's WRAP program, which includes charging a two-cent levy on all non-refillable, non-beer containers to finance 80 per cent of the municipal recycling system will be terminated before 2009, to be replaced with a

Table 1

Who Pays What

in cents / per unit sold (CAN$)

Stakeholders	BC	AB	SK	MB	ON	QC	QC	NB	NS	NF
	wine /spirits / non-alcohol	all (excluding domestic beer)	all (excluding refillable beer)	all (excluding refillable beer)	all (excluding beer)	soft-drinks	all (excluding beer & soft drinks)	all (excluding refillable beer)	All (excluding refillable beer)	all (excluding refillable beer)
Beverage Industry	0	0	0	0	Range: ~(0.03)... 1.18	0.15	Range ~0.02...0.87	n/a	0	0.0
Operating Agent	0.02	(0.65)	0.00	0	n/a	—	n/a	n/a	(2.64)	(1.5)
Provincial Government	7.10	n/a	n/a	0	0	n/a	0	0.00	0	0.0
Municipal Government	—	—	—	n/a	n/a	—	n/a	—	—	—
Recycling Consumer	1.16	0.83	n/a	2	0	0	0	~5.4	5.20	>3.0
Wasting Consumer	5.72	6.70	10	0	0	5.55	0	~10.7	10.19	~9.0
Non-System consumer cost	0	0.65	n/a	0	0	—	0	n/a	2.64	1.54

*In Manitoba, part of the revenue generated from the 2-cent levy on beverage containers subsidizes recovery of other materials in the municipal waste stream. The portion of revenue dedicated to beverage container recovery is unavailable.

multi-material brandowner-funded program. The program will be similar to the programs currently operating in Ontario and Quebec, but brandowners will be required to off-set 80 per cent of the municipal net costs versus 50 per cent.

Quebec's all-party Committee on Transportation and the Environment of the National Assembly also held public hearings and consultation on residual material management in Québec, including increasing the recovery of empty beverage containers. Early this summer the committee finally released its recommended preference for one system — that of the Collect Selective program (curbside), ONLY IF this system is able to improve collection of beverage containers generated away-from-home and in multi-residential units. The beverage and grocery industries are hopeful that their new investment plan in promotion and education will propel increased municipal public space, event and commercial collection. Until successful, the *status quo* in Quebec remains.

Who pays what?

In order to provide a clearer picture of the associated program costs, a method of analysis called *Who Pays What* developed by CM Consulting provides a transparent picture of the program cost/unit sold as they relate to the various "funders" or stakeholders of the system.

Table 1 provides a summary of stakeholder costs for 2006-2007. These average costs are unique to the individual stakeholder for every container sold, and will vary year-to-year. It's important to note that each identified stakeholder cost represents but a portion of the total. For example, the "wasting consumer" represents only a small portion of all consumers — those who chose not to redeem their container; the "recycling consumer" represents only those consumers that redeem their container. As such, these costs should be examined on their own, as individual stakeholder costs, and columns or rows should not be totalled.

Environmental benefits

Traditionally, the measurement of waste and recycling has been based on the weight of material disposed or diverted. More recently, however, recycling measurements are being expanded to comprise of factors which include the amount of energy saved and the reduction in greenhouse gas emissions from recycling.

Table 2

Environmental Benefits

From Beverage Container Reuse and Recycling in Canada

Measurement Factor	Tonnes diverted from disposal	Avoided emissions (MTCO2e)	Equivalent number of cars taken off the road.	Avoided energy (gigajoules)	Equivalent avoided crude oil extraction in barrels	Value of crude oil saved ($) (based on $133/barrel)
TOTAL	1,325,491	757,789	138,789	12,399,975	1,968,250	$ 261,777,240

Table 3

Beverage Container Collection Rates

	British Columbia	Alberta	Saskatchewan	Manitoba	Quebec (soft-drink & beer)	Quebec (other beverages)	Ontario	New Brunswick	Nova Scotia	Newfound-land & Labrador
Aluminum cans	84%	79%	93%	53%	68%	—	49%	74%	82%	70%
Glass	85%	85%	90%	n/a	77%	62%	n/a	76%	81%	70%
PET	—	—	84%	51%	76%	34%	40%	75%	76%	71%
Other Plastics	72%	64%	87%	n/a	—	—	n/a	—	37%	—
Bi-Metal	49%	58%	78%	n/a	—	25%	67%	—	—	42%
Gable/Tetra	54%	53%	56%	n/a	—	52%	15%	—	64%	67%
Other	42%	—	—	n/a	—	—	n/a	55%	—	—
TOTAL Non-refillables	**78%**	**74%**	**86%**	**n/a**	**70%**	**n/a**	**n/a**	**72%**	**76%**	**68%**

Notes: The "other" category is used for reporting purposes by managing agencies to address a very small portion of the container stream that do not fall within the definition of traditional beverage containers. More specifically, in British Columbia, "other" accounts for less than 0.6% of total sales, and includes multi-laminate packages. In New Brunswick, "other" accounts for 12% of sales and comprises of other plastics, multi-laminates, gable top, and bi-metal.
Calculation methodologies for Ontario and Manitoba with sensitivity analysis are provided in Who Pays What – An Analysis of Beverage Container Recovery and Costs in Canada — 20072008 (see end of article)

... continues on page 18

Beverage Container Reuse & Recycling in Canada

STATS 2006-2007

(Produced by CM Consulting)

NON-REFILLABLES

Total tonnes of non-refillable beverage containers collected for recycling 453,656t
Total material value of non-refillable beverage containers collected . . . . . ~$151M[1]

REFILLABLE GLASS BOTTLES

Total tonnes of reused glass bottles (refillable beer bottle servings) . . . . . 871,834t[2]
Estimated avoided GHG emissions by using refillable bottles instead of one-way bottles (GHGs savings from avoided primary resource extraction activities) 116,519t (CO2e)

ALUMINUM CANS (UBCs)

Total tonnes of UBCs collected and sent for recycling 53,268t
National UBC collection rate 66%
Amount of UBCs discarded 27,809t
Value of UBCs per tonne (loose) . . . . . $2,099[3]
Total value of UBCs collected for recycling $111.8M
Total value of UBCs discarded (lost revenue) $58.4M
Total avoided GHG emissions from recycling UBCs (MTCO2e) . 346,774t
Total potential avoided GHG emissions if discarded UBCs were recycled 181,037t

PET

Total tonnes of PET bottles sent for recycling . . . . . 68,355t[4]
National PET collection rate . . . . . ~51%[5]
Amount of PET discarded . . . . . ~65,674t
Value of PET per tonne . . . . . $367[6]
Total value of PET collected for recycling $25M
Total value of PET discarded (lost revenue) $24M
Total avoided GHG emissions from recycling PET 193,665t

1 Includes aluminum, PET, HDPE, glass and steel.
2 Assumes a trippage rate of 15 times and a average bottle weight of 263 grams
3 Based on three-year rolling average 2006, 2007, 2008 (CSR Price Sheet) — Source: www.csr.org/pricesheet/pricesheet.htm
4 Includes PET for BC based on assumption that ~95% of plastic collection are PET bottles, as per AB. Also includes PET tonnage from Quebec's curbside program, based on assumption that 85% of plastics collected represent PET bottles.
5 Excludes non-deposit bearing PET bottles sold and collected in curbside program.
6 Based on three-year rolling average 2006, 2007, 2008 (CSR Price Sheet) — Source: www.csr.org/pricesheet/pricesheet.htm

New Beverage Packaging and Recycling

Tetra Pak boxes

Tetra Pak cartons or drink boxes are made up of paper, an aluminum lining, and plastic coating. Tetra Pak cartons are hydro-pulped and separated into different material types. The resulting paper pulp (~50%) is used to make tissue. The remaining aluminum and plastic mix (~50%) can be used to manufacture durable products like pallets, and paper core plugs, but most end-markets currently do not use the aluminum/ plastic mix for value-added products.

Today, Tetra Pak material is sent off-shore to China and Korea for pulping and tissue production.

Gabletop cartons

Gabletop cartons for juice and milk are made up of "polycoat", a lightweight, paperboard between two layers of polyethylene film. Polycoat can be converted into raw fibre or pulp by applying the right combination of heat, water and agitation (hydrapulping) to break down the material.

The fibre by-product can be re- manufactured into new paper products such as corrugated medium (the inner layer of corrugated cardboard), linerboard, tissue products, and fine paper. The small amount of residual polyethylene can be screened off for use in other plastic and composite materials.

Today, most collected gabletops are sent to facilities in the U.S, and some is sent off-shore to China and Korea.

Poly Pouch containers

Poly Pouch containers are made up of composite layers of plastic including low density polyethylene with aluminum foil. Specifically, it is a PET/ink/adhesive/aluminum foil adhesive with an LLDPE sealant.

Traditional recycling with aluminum or plastics recycling are not available because the other material is a contaminant in each process.

Today, recycling agents - primarily in provinces that mandate that all beverage containers get recycled (versus landfill or incineration) - are currently sourcing a permanent market for recycling this material. Using Poly Pouches for energy-from-waste (EFW) is also being considered.

LESSONS FROM EUROPE

Billions of Bottles & Baby in Berlin

Our columnist visits Germany

As the snow banks swelled past six feet around my Peterborough home last March, I was tending to the newest addition to our family; baby Catherine. "Cate" arrived seven weeks early and spent her first month growing in the Peterborough neo-natal care unit. So when I received an invitation travel to Europe to join an international group of colleagues specializing in beverage container reuse and recycling, naturally, I had to decline. Traveling to Europe with an eight pound premature baby seemed inaccessible. But on reflection, the opportunity to meet like-minded professionals and learn about the new German system — the largest deposit return and refillables program of its kind in the world — was both unique, and too good to pass up. So, within a week, the preparations were complete: baby passport, plane ticket, and arrangements with a German nanny named Sabina.

The "great war"

Insiders to beverage recycling in Germany have coined the last ten years of recycling policy development as "the great war". On one side are large brewers, large retailers, the waste disposal industry, the packaging sector, and DSD, the organization managing producers' take-back obligation. On the other side are municipalities, small and medium brewers, beverage retail sector, beverage wholesalers, and environmental organizations.

The war began in the late 1990s when the government became aware that their 72 per cent refillable quota was not being met year after year. After several failed voluntary attempts by industry at increasing the refillables share, the Ministry of Environment passed a law for a deposit-refund system on most non-refillable bottles. Despite ten thousand law suits filed against government concerning the new law, the unwavering Green Party introduced deposits ("doesenpfand") by January 2003.

Opponents to deposits had to devise a new strategy to fight them. "The Islands" solution was a sure way to make deposits totally un-tenable. Trade and industry ceased work towards a nationwide system, and each retailer took back only what it sold. Known as the "retail island solutions," the program led to a shift from beverages packaged in cans to brand-specific unique glass bottle molds, devastating the can share in Germany for years to come. Immediately, the European Commission began an infringement on the "island solutions" as a barrier to free trade. By December 2004 the MOE amended the law in order to make deposit rules simpler and to appease the European Commission. The war had ended: deposits won.

The German way: modern, high-tech, and competitive

Today, the deposit return system for beer, water, carbonated, and non-carbonated beverages collects and recycles between 95 and 98 per cent of the 15 billion non-refillable containers consumed in Germany (population 82 million). One would think that with nine neighbouring countries, and about 120,000 take-back retailers, the task was un-manageable.

The universal deposit of 25€ (worth 40-cents Canadian) on every container, irrespective of its size, has significantly reduced many of the traditional inefficiencies of deposit refund systems. Collectively,

Advertising campaign from the German Ministry of Environment. Translated it reads: "The argument for deposit return lies on the street."

Catherine and Clarissa Morawski at the Berlin Wall, April 2008.

retailers and bottlers initiated a central deposit organisation, and most retailers have invested in in-store container return automation. The Deutsche Plandsystem Gmbh (DPG) is the managing agency which reports directly to their board of trade and industry. DPG is in charge of: contract management; linking reverse vending machines (RVMs) with processing and counting centres; marking standards; IT Interface; certification management; marketing and PR. The national program uses a universal barcode system, and contracts out all the various required physical operations and data management. The system design is founded on the basic principle of maintaining a high level of competition at every stage of the process. Each service provider has a portfolio of services which can be offered together or individually to retailers and bottlers. The barcode system allows this modular marketplace to operate competitively by using the program standard for data tracking and accounting.

Polluter pays

The deposit rate and recovery rate are high, as is the large pool of unredeemed deposit revenues. Based on a 95 to 98 per cent collection rate, unredeemed revenues alone bring in $120 to $300 million directly to bottlers to finance the system. These funds have been voluntarily forfeited by consumers who don't return their containers. Retailers keep the material revenues, and are usually compensated by the bottlers with an individually agreed upon clearing fee. There is no official handling fee.

Impact on Green Dot fees

There are many variables that determine which way stewardship fees (like Green Dot fees in Europe, or Stewardship Ontario fees in Ontairo) will go year to year. One cannot make a direct link between the loss of 18 per cent of German Green Dot beverage material throughput and related fee revenue, with a subsequent increase or decrease in fees. Similar to Ontario, in 2007, after the annoucement of the Ontario Deposit Return Program (ODRP) for all liquor containers, the Blue Box Program Plan would see about 70,000 tonnes worth of material throughput and funding diverted to the deposit system. Beverage producers and retailers are quick to forecast doom, gloom, and much higher fees from reduced economies of scale in the blue box. The impact on stewardship fees in Ontario is not known yet, but in Germany at least, fees have actually declined.

Parting thoughts

Before we left Berlin, Cate and I took a boat excursion down the River Spree through the centre of the city. For a city that was almost completely demolished less than 70 years ago, today Berlin is economically thriving, artistically renowned, and an amazing showcase of contemporary architecture juxtaposed against its dark history. As for the deposit refund system, perhaps it too will emerge as a model in contemporary efficiency and elegance in German engineering. — *Clarissa Morawski*

LESSONS FROM EUROPE

A Case for Refillables?

Learning from the German Experience

I have a confession to make. I have always supported refillable bottles, but deep down, I never *really* thought the idea was economically viable in our global marketplace. *However*, after my trip to Germany — where refillables are available for nearly all beverages — (in all shapes, sizes, glass or PET), I believe the case can be made for refillables today.

What is especially impressive is that refillable glass bottles have an average of 50 lives, while refillable PET usually lasts up to 25 servings. The plastic crates last for 100 trips. This begs the question about Canadian brewers and their industry standard glass bottle that only has an average of 15 lives. Why the gap?

The difference is a cultural one. Germans are un-phased by the physical scars of reuse, like the white erosion rings that develop at the top and bottom of a glass bottle, or the many scratches that can render a PET bottle dull and opaque. Canadian brewers have no choice but to limit the potential life of an industry standard beer bottle in order to complete against their gleaming competition.

Today, in Germany, more than 85 per cent of all beer, 37 per cent of mineral water, 34 per cent of soft drinks, and 10 per cent of fruit juices are sold in refillable bottles. Refillables bear a lower deposit level of eight and 15 Eurocents (worth 13 and 24 cents Canadian) versus the 25 Eurocent deposit on non-refillables. Wholesalers play a critical role in the refillable system, by purchasing, storing and distributing full goods to retailers, and from the back end; collecting and re-distributing empty refillables back to bottlers.

In a study by the IFEU Institute in Germany, both refillable PET and glass bottles ranked more favorably compared to non-refillable aluminum cans and PET in terms of: material consumption, global warming potential, acidification and summer smog. The German Packaging Institute reports the difference in greenhouse gas emissions between all non-alcohol beverages packaged in refillable containers versus single-serve containers is over one million tonnes of CO2e.

The *Herald Tribune* ("Putting pollution costs on the table," April 26, 2008) examined the life cycle impact of two bottles of wine consumed in New York City. The first bottle came from California transported by truck, and the other from France shipped and then trucked. Interestingly, the California bottle resulted in almost double the carbon footprint (2,514 grams of C02e per bottle), primarily due to the impact of transportation, which accounts for a whopping 57 per cent of the total footprint. Containers (barrel and bottle) accounts for an additional 25 per cent of the footprint. While lower in terms of greenhouse gas emissions, the French wine still resulted in 1,371 grams of C02e per bottle, of which transportation accounted for 33 per cent and containers came to 35 per cent of the footprint.

As crude oil hovers at high levels, the economics of modern refillable solutions are beginning to look more attractive. Imagine the possibilities...

- Large retailers offering non-alcohol drinks on-tap, with a built-in volume counter. This would allow consumers to either bring their own container from home, or buy one in-store. Retailers would invest in an in-store carbonation/ mixing system (like those found in large bars, movie theatres etc.) and would pipe-in local water. Less costs, less shelve space, and an ideal option for high volume buyers on a budget.
- Ship foreign beverages in bulk and have them filled locally in standard refillable bottles.
- Promote local beverage production, like wine and beer, which can

In Germany even small plastic Coca Cola bottles get refilled 15-25 times.

In Germany, 85 per cent of all beer is sold in refillable bottles.

One refillable glass bottle can replace 50 containers, but offer the same volume of beer.

stimulate the economics for a refillables program in the region.

• Utilize reverse logistic (back-hauling) to eliminate additional freight associated with container transportation.

We are facing interesting times. Several municipalities and businesses are considering bottled water bans, the cost of raw materials continues to rise, and the high cost transportation is making local production more attractive. Those that are able to think beyond the classic one-way distribution model, to one that reduces energy at all stages of production, and ultimately delivers the refreshment of choice to the consumer, may indeed end-up on top. Perhaps a case can be made for refillables. This is something that Canada can learn from Europe.

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Environment Canada has undertaken extensive life-cycle analyses to measure the inputs and outputs from cradle-to-grave of various materials. The results can be applied to beverage container diversion in order to quantify the environmental benefits associated with those programs. Table 2 presents a summary of the environmental benefits of beverage reuse and recycling (glass, PET, HDPE and aluminum) for Canada.

Increasing costs, performance

Canada's relatively high handling fees for depots, and the high cost of fuel will surely result in overall cost increases, in spite of the large revenues from high-value secondary material. While recycling markets are strong for traditional beverage materials, newer container materials like pouches, poly cups, aseptic boxes, polystyrene and paperboard cups are difficult to market and may require long transportation distances to recyclers in the U.S. or off-shore.

Overall, capture rates are declining. This is symptomatic of the diminishing value of deposits which have not kept pace with inflation. In jurisdictions with residential recycling for beverage containers, lack of progress is due primarily to the inherent difficulties of multi-residential recycling and recycling of away-from-home or "on-the-go" beverage consumption.

With the current economic and environmental interest in the collection of beverage containers, opportunities abound. Small-scale, affordable compaction technology, like the Enviropactor (*see June/July 2008 edition*) can have a dramatic impact on shipping and labor costs. As awareness grows around the associated benefits of reducing greenhouse gases, the level of interest in recycling is greater than ever. Comprehensive data is readily available, which means those involved can better understand the full life-cycle implications on carbon dioxide emissions, as well as other pollutants.

In a country where over 10 billion beverage containers are sold each year, the data on climate change mitigation from recycling aluminum PET, steel and glass clearly shows that recycling beverage containers is a priority.

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