A case of eco-effectiveness

A cradle-to-cradle approach to brewing by Canadian brewers

Canadian Pollution Prevention Roundtable
June 2006

Canada's National Brewers

- CDN $12.3B in economic activity (GDP) and approx. CDN $4B in government tax revenue
- 72% of the economic value added generated by Canada's beverage alcohol industry
- 13,700 direct employees, 144,000 indirect employment
- Vertical integration of manufacturing, distribution and packaging recovery
- Closed-loop, deposit-refund based packaging recovery, reuse and recycling in every province and territory
  - Operated voluntarily since mid 1920s

Canadians like beer

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- In 2005 Canadians consumed 19.4 million hectoliters of beer – about 5.7 billion single servings
- Per capita (LDA) consumption: 87.7 liters
- Sales by package type:
  - Refillable draught kegs: 9.93%
  - Refillable glass bottles: 66.79%
  - Cans: 23.29%
- Well over 1 million tonnes of packaging utilized annually

Canadian beer packaging recovery performance

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- Refillable draught kegs: 100% reuse and recycling
- Refillable glass bottles: 97% recovery and reuse
  - 12-15 reuses and subsequent closed-loop bottle-to-bottle recycling
- Cans: 84% recovery and recycling
- Boxboard: >90% recovery and recycling

Pollution prevention principles of the Canadian brewing industry circa. 1991

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- **A commitment to extended producer responsibility:**
  - No financial or environmental subsidies; and
  - Accounting for all life-cycle packaging and product costs (both financial and environmental)
  - Costs internalized are costs to be avoided through efficiency
- **A commitment to environmental protection:**
  - Reduction of energy and natural resource consumption, emissions and solid waste through reuse; and
  - The substitution of knowledge and efficiency for materials, energy, waste and financial cost
- **A commitment to continuous improvement:**
  - Effecting policies and programs with meaningful performance targets to ensure high rates of waste reduction, reuse and recycling; and
  - Ongoing measurement and evaluation

A new paradigm: “Cradle to Cradle Design”

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“Minimizing toxic pollution and the waste of natural resources are not strategies for real change. Designing industrial processes so they do not generate toxic pollution and "waste" in the first place is true change. Long-term prosperity depends not on the efficiency of a fundamentally destructive system, but on the effectiveness of processes designed to be healthy and renewable in the first place…”

McDonough Braungart Design Chemistry, LLC

The basic concept

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- Nature is 100% effective in metabolizing wastes into nutrients:
  - Material requirements of one ecological process rely on the waste(s) of other(s)
  - The only input into the system is energy from sunlight
- Industrial "ecologies" must emulate nature to be effective
- So, it's not about reducing waste, but eliminating it entirely – i.e. zero waste
  - Any other approach only delays resource consumption and pollution

Eco-effectiveness vs. Eco-efficiency

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- Eco-efficiency means reducing, slowing and delaying consumption of resources and generation of waste for a given output
- Eco-effectiveness is preoccupied with ensuring ***systems*** where the waste of one process is in demand by another

"Eco-effectiveness seeks to design industrial systems that emulate the healthy abundance of nature. The central design principle of eco-effectiveness is waste equals food."

A systems approach to effectively reutilizing an “abundance” of beer

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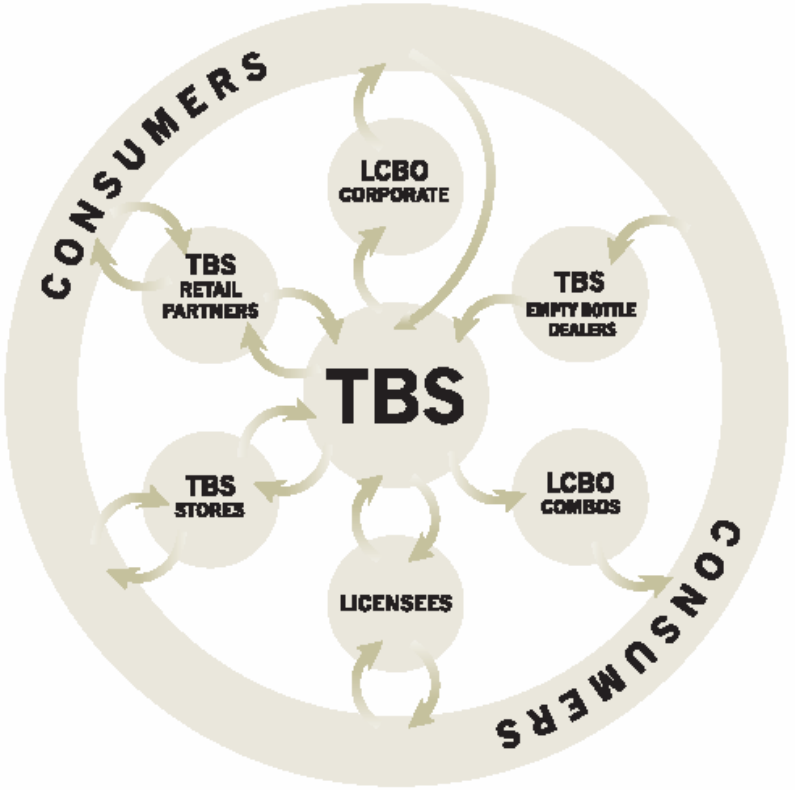

Beer brands:	325
Domestic and foreign brewers:	71
The Beer Store locations:	437
The Beer Store Retail Partners[1]:	113
Northern agency stores:	82
Liquor Control Board of Ontario locations:	598
Total points of sale[2]:	1230
Empty bottle dealers:	239
% of population within 5 km of a TBS bottle redemption point:	90%
Licensees[3]:	17,500
Hectoliters sold[4]:	7,283,157
Bottles and cans sold:	1.94 billion
Bottles and cans recovered:	1.8 billion

The Beer Store

Packaging recovery design elements

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- Deposit-refund – an incentive to recovery
- Integration of packaging recovery with full goods delivery
- In-store sorting of all packaging returned by consumers; and
  - Color sorting of non-refillable glass (clear, green and amber) to maximize marketability and bottle-to-bottle recycling
  - "Upstream" sort means there is very little cross contamination of materials
- Operation of a state-of-the-art recycling facility for all TBS's packaging in Brampton, Ontario
  - 99 per cent of all packaging that enters the facility is processed, baled and sent to recycling markets.

The Beer Store

Key design component: the refillable bottle

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- Deposit-refund system used to recover refillable bottles is basis on which all other packaging is recovered
- Savings result in both increased profits and lower cost to consumers
  - Reusing a bottle 15 times avoids the cost of purchasing 14 one-way containers
- ~250 million refillable containers to deliver 3.5 billion refillable servings in Canada (93% fewer containers)
- Substitutes the use of new containers with more jobs

Brewery reutilization design elements

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- Commitment to standard refillable containers
  - Case de-packing, sterilizing, inspection, filling labeling, packing
- Caustic soda reclamation and gray water recycling in bottle sterilization process
- Label pulp recovery and recycling into egg cartons
- Utilization of spent brewery organics as cattle feed
- Utilization of biological wastewater treatment to re-metabolize organic loadings in its wastewater effluent and thus reduce biological oxygen demand
- Capture of CO2 during fermentation for carbonation use during packaging
- 3rd party distillation of "off-spec" beer to recover ethanol

Avoided energy and GHG

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Fiscal 2004-05	Tonnes recovered and reutilized	Avoided GHG Emissions (MTCO2E)	Avoided Energy (Gigajoules)
Glass Reuse	890,121.3	338,246.1	5,340,728.1
Glass Bottle Recycling	63,580.0	7,629.6	97,913.2
Aluminium Recycling	16,445.5	107,060.3	1,434,378.1
Carton Recycling	56,206.7	198,971.9	481,129.7
Total	**1,026,353.6**	**651,907.9***	**7,354,149.0**

* The equivalent of taking 144,000 cars off of the road annually.

Based on: *Determination of the impact of waste management activities on greenhouse gas emissions - 2005 update*, ICF Consulting, submitted to Environment Canada and Natural Resources Canada

A word on energy

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- Currently brewing industry energy needs are met largely by fossil fuels (not the sun)
- Reducing fossil fuel use is critical to reducing GHGs
  - Reducing vehicle idling, optimizing fleet routing, purchasing new energy efficient vehicles
  - Reducing energy consumption in owned retail and warehousing facilities
  - Installation of gas fired co-generation
  - Reducing brewery heat loss
- Between 1990 and 2003, Canadian brewers decreased the amount of energy used to generate $1 of economic activity by 28%

“Reduction” versus eco-effectiveness

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- Ontario curb-side recovery of aluminum soft drink containers was 40% in 2005
  - Over 1 billion aluminum cans are sent to landfill in Ontario annually
  - 5.6 days continuous operation of Pickering A at 4,120 MW
- A switch from refillable bottles to curbside collected aluminum cans would “reduce” weight; but
- Switching to lightweight packaging can have the perverse effect of replacing more of a benign, highly reused and recycled package with less of a lighter, less recycled and more deleterious alternative
- It’s the effectiveness of the recovery and reutilization system that is more important to ensuring a positive environmental outcome than the weight of packaging

Conclusion

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"The world will not evolve past its current state of crisis by using the same thinking that created the situation."

-- Albert Einstein